

# Initial Environmental Examination

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October 2013

## Kiribati: Road Rehabilitation Project

Prepared by Ministry of Public Works and Utilities, Government of Kiribati for the Asian Development Bank.

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## **GOVERNMENT OF KIRIBATI**

# **KIRIBATI ROAD REHABILITATION PROJECT**

## **IMPROVEMENT OF THE MAIN BETIO-BUOTA ROAD, TEMAIKU ROAD AND FEEDER ROADS IN BETIO, BAIRIKI & BIKENIBEU**

**CONTRACT No. KIR-12/01**

World Bank Grant H645 and  
Asian Development Bank Loan No.44281-KIR

## **CONTRACT DOCUMENT** October 2013



**VOLUME 2A [Revision 4]  
Part 2: Works Requirements  
Environmental Management Plan**



# **CONTRACT DOCUMENTS**

**Issued: February 2013**

**for**

## **Procurement of**

**IMPROVEMENT OF THE MAIN BETIO-BUOTA ROAD,  
TEMAIKU ROAD AND FEEDER ROADS IN BETIO,  
BAIRIKI & BIKENIBEU**

World Bank Grant H645 and  
Asian Development Bank Loan No.2718-KIR

**Project: KIRIBATI ROAD REHABILITATION  
PROJECT (KRRP)**

**CONTRACT No. KIR-12/01**

**Employer:** *Ministry of Public Works and Utilities*

# REPUBLIC OF KIRIBATI

## ENVIRONMENTAL MANAGEMENT PLAN (REVISION 3)

**OCTOBER 2013**

Document Status			
Rev No.	Author/Editor	Reviewer	Date
0	S. Eagle	I. Archer	<i>June 2011</i>
1	S. Eagle	I. Archer	<i>August 2013</i>
2	S. Eagle	I. Archer	<i>April 2013</i>
3	S. Eagle	I. Archer	<i>October 2014</i>
4	S. Eagle	I. Archer	<i>November 2014</i>

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## **INITIAL ENVIRONMENTAL EXAMINATION (Kiribati: Road Rehabilitation Project)**

### **I. EXECUTIVE SUMMARY**

1. The country's statutory framework requiring compliance to the Environmental Impact Assessment (EIA) System for all projects that will affect environmental quality is embodied in the Environment (Amendment) Act 2007, an amendment to the Environment Act 1999 (No. 9 of 1999), "Act to Provide for the Protection Improvement and Conservation of the Environment of the Republic of Kiribati and for Connected Purposes".

2. This document is a revised Environmental Management Plan, reflecting recent discussion and review. It covers requirements included in contract specifications for the detection and clearance of unexploded ordnance, requirements for the protection of the environment during coastal protection works, and requirements for relating to siting and management of asphalt production. A separate Environmental Management Plan, covering environmental effects, mitigation and monitoring for coastal preparation works during the operational phase is under preparation and is expected to be issued early in 2014.

3. Environmental impact assessment of all development projects whether public or private is a legal requirement under Part III of the Act, Development Control, Environmental Impact Assessment, Review and Monitoring, of the Kiribati Environment Act of 1999. Prescribed development projects as listed in the Schedule in Section 14 will need to prepare an Environmental Assessment Report (Initial Environment Evaluation or Environmental Impact Statement) and submit a Development Application which will be processed and reviewed by the Environment and Conservation Division (ECD). The proposed works would be an Environmentally Significant Activity under the current Act and require an Environment Licence.

4. The proposed Kiribati Road Rehabilitation Project involves rehabilitation of an estimated 35 kilometers of main road, approximately 8 kilometers of principal feeder and access roads and 10km of water main on South Tarawa. Extensive damage, primarily because of unusually prolonged periods of wet weather over the past year and increase in traffic volume plying the roadways, has made the existing roads difficult to traverse. The project will also include the rehabilitation and/or upgrading of coastal protection features, primarily seawalls, at selected locations on the main road and feeder roads.

5. The Republic of Kiribati which became an independent republic in 1979, is composed of 33 small islands located between Longitude 170 degrees East and 150 degrees West in the Central Pacific Ocean, on either side of the Equator at the intersection of the International Dateline and the Equator. The three groups of islands, namely, the Gilberts, the Line and the Phoenix are either coral atolls or coral islands with the exception of Banaba which is a raised or elevated lime stone. Only 18 of the 33 islands are inhabited. Due to its geographical location, Kiribati has a predominantly dry equatorial climatic conditions characterized by a hot dry climate with prevailing South Easterly winds most of the year.

6. The population of Kiribati, as enumerated on 7 November 2005, was 92,533 people: 45,612 males and 46,921 females. This is an increase of 8,039 persons in 5 years compared to the 2000 census (84,494) with an annual rate of growth of 1.8 per cent. Kiribati's population has steadily increased since the 1930s when the first census was conducted. With a population of just under 30,000 people in 1931, 56,000 people in 1978, and over

90,000 in the year 2005, the Kiribati population more than tripled in size during the last 74 years. The country's economy is predominantly subsistence, with copra, seaweed and fisheries being the main source of foreign exchange earnings. Revenue from the licensing of foreign vessels in the Kiribati Exclusive Economic Zone (EEZ) contributes some \$2-3 million per annum. Tourism plays a fairly modest role in the Gilbert but in the Northern Line Islands especially Christmas Island, tourism is high.

7. The infrastructure of Kiribati is generally rudimentary. Wherever practicable, roads are built on all atolls, and connecting causeways between islets are also being built as funds and labor permit. A program to construct causeways between North and South Tarawa was completed in the mid-1990s. Kiribati has about 640 kilometers of roads that are suitable for motor vehicles. All-weather roads exist in Tarawa and Kiritimati.

8. Excavation works and the clearing of vegetation will be necessary. A schedule of areas that are likely to be acquired, and where clearing will be required, is included together with a schedule of trees that are likely to be affected. The areas to be cleared are not always vegetated, however, the nature and type of prevalent vegetation is discussed in section V of this report. There are no protected areas in the vicinity of the road, though there are mangrove stands close to the airport road. These will be protected by a small revetment wall and by procedures for workers to prevent accidental damage during construction. Effects on erosion are minimized by the proposed drainage design and this will be enhanced by good planning during design stage, minimizing the amount of sediment lost from the site. No items of cultural or historical significance will be affected by the works.

9. Road accidents have a substantial impact on pedestrian and community safety. Road safety will be enhanced by (i) provision of footways where feasible, on both sides of the main Betio – Buota road and on one side of the road at Buota and Temaiku, (ii), provision of speed control areas which feature the provision of solar lighting, raised curbs, speed humps and village gateways (prominent signs giving the name of the village, displaying the speed limit, and with road markings that give the impression of road constriction and encourage slower driving). During construction, management measures for public traffic and construction vehicles will be implemented to reduce safety risks and disruption from the works.

10. The design provides for improved drainage by (i) construction of U drains in areas where space is constricted and runoff water is prone to build up, (ii), where there is space for water to disperse naturally, small rain gardens will be constructed, consisting of areas where soil is scarified and planted to permit infiltration, and protected by bollards. This will prevent the occurrence of depressions of compacted soil, formed by vehicle movements, where water currently accumulates and very little infiltration occurs.

11. Displacement of people is not envisaged during implementation of the proposed project. The proposed rehabilitation works are expected to be carried out within the right-of-way (ROW) of the existing road and limited acquisition will be required for the project for bus stops, sidewalks and drainage. The projected disturbances during construction are expected to be minor and temporary and can be readily mitigated.

12. Consultations with roadside residents and road users confirmed strong agreement with the proposed improvements, particularly the proposed safety measures. Social concerns (in addition to road safety) relate to drainage, extent of loss of vegetation, drainage, land acquisition and effects associated with construction activities. These are addressed in the design by provisions for drainage, minimization of removal of trees and development of land acquisition arrangements, conforming to government and funding agency requirements. Appropriate measures are included in the EMP for the construction phase to ensure adequate mitigation of construction phase effects.



13. Material for construction operations may be extracted locally by means of dredging from already disturbed locations in the lagoon, some of which may be existing navigation channels that require enlarging to cater for the beam and draft of barges used for dredging and transporting materials. No materials may be extracted from beaches or reefs. Extraction shall comply with all requirements of the Government of Kiribati, using a dredging technique that minimizes the spread of suspended sediments, using equipment in sound condition free of leaks. All practicable precautions shall be taken to avoid damage to benthic formations in the lagoon. Where material has to be imported, it shall be free of organic material and fumigated prior to arrival. Water will be required for dust control, adjustment of moisture content in pavement materials and for concrete production. Use of sea water should be made where it is both practicable and technically acceptable. Freshwater will be required for concrete production although quantities will be relatively small and dependent on the choices made by the Contractor (ie some concrete items may be manufactured offshore). Provision is made for careful handling of aggregates during processing, storage and transport to avoid traffic hazards, dust and safety hazards, and also for the handling of any spoil materials. Stormwater during construction will be passed through geotextile traps to remove soil and petroleum-based organic pollutants before disposal. Oil and bituminous products will be stored at a contained location away from drainage ditches.

14. Air quality problems created by road traffic are not a critical issue along the road. However, to minimize dust nuisance during road rehabilitation, the Contractor will regularly spray sea water on exposed surfaces during dry periods and minimize on site storage. The siting, choice of product and method of manufacture of asphalt will be developed to minimize emissions and risks to nearby residents. Noise is one of the most obvious impacts of construction activities and daily road use. In Tarawa, it will mainly affect rural centers and villages near the road and where the traffic is heavy. During construction, noise impacts will be minimized by the use of well maintained equipment, restrictions on the timing of noise generating activities and a requirement to advise schools, hospitals, churches and other locations sensitive to noise on timing and duration of noise generating activities in their vicinity. All construction waste will be removed to landfill, with the exception of used lubricants, oils and items contaminated with bitumen which shall be recycled or removed from the island. Vehicles and plant shall be removed from the island or handed over according to a plan to be developed by the Contractor. Fuels and other potential contaminants shall be stored in secure, strictly controlled and supervised locations and no refueling facilities shall be sited within 20m of the lagoon.

15. Occupational health and safety risks of road works shall be limited by clearly defining procedures for handling construction materials, conducting tests, paving, operating heavy equipment, etc in a site safety plan to be prepared by the Contractor and approved prior to commencement of site works.

16. Significant volumes of ordnance were used on South Tarawa during historical fighting. Provision is made for detection and clearance of ordnance to a bunker within Betio Police Station. These operations will be directed by an appropriately qualified and experience expert.

17. Risks of damage to utilities such as power lines, water pipes and manholes will be minimized and effects mitigated by ensuring high standards of site supervision and vehicle and plant operation to reduce risks of damage and preparing procedures for rapid notification to the Public Utilities Board and assistance with re-instatement, in the event of any disruption.

18. To minimize ongoing impacts of disturbed areas after the construction is completed, the Contractor will be responsible for the proper decommissioning of the used sites. Recommended measures will include: (i) raking or loosening of compacted ground surfaces

and (ii) establishing site re-vegetation. Where possible local communities / women's groups will be contracted to implement re-vegetation.

19. With the implementation of the project, economic development of the area (South Tarawa) will be induced. Travel time between Bairiki and Tanaea will be reduced as a result of better road conditions and connectivity. Vehicle operation costs such as fuel and maintenance will also be reduced as better road conditions would result in more efficient vehicle operation and reduced damage to vehicles.

20. Without the implementation of the project, road conditions will remain very bad and continue to deteriorate. Transport operators, especially taxis, will further reduce service or refuse to operate in the area. Travel to and from Bairiki and Tanaea will be very difficult owing to the bad road conditions. Vehicle operation costs will remain high as damage to vehicles will continue. Economic development of the area will remain stagnant or decline as transport of goods and services will remain costly. Health concerns, as is being experienced at present with dust being generated during the dry season by the unpaved areas will persist. Ponding/stagnant water will continue to serve as breeding grounds for mosquitoes during the rainy season.

21. The project assessment concludes that with appropriate mitigation strategies described in the EMP, and the positive social / economic and environmental benefits which will flow from the Project, the construction related environmental impacts can be managed within acceptable levels. There are no significant environmental impacts needing in-depth assessment. All potential and associated impacts can be addressed through proper implementation of the mitigation measures as proposed in the EMP. Provisions will be made in the Project Budget to cover the environmental mitigation and monitoring costs.

## **II. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK**

22. The country's statutory framework requiring compliance to the Environmental Impact Assessment (EIA) System for all projects is embodied in the Environment Act 1999 (No. 9 of 1999), "Act to Provide for the Protection Improvement and Conservation of the Environment of the Republic of Kiribati and for Connected Purposes". The Act is amended by the Environment (Amendment) Act 2007 and is supported by the Environmental (General) Regulations of 2009 (which repeals previous regulations to the act).

23. Environmental impact assessment of all public or private development projects is a legal requirement under Part III of the Act which provides for Development Control, Environmental Impact Assessment, Review and Monitoring. Prescribed development projects as listed in the Schedule in Section 14 require an Environmental Assessment Report (Initial Environment Evaluation or Environmental Impact Statement) and submission of a Development Application which is processed and reviewed by the Environment and Conservation Department (ECD). Annex A presents excerpts of the relevant sections on Environmental Impact Assessment System and the Schedule of the Prescribed Developments covered under the Act.

24. The Kiribati Environment Act 1999 (amended 2007) assigns primary responsibility for undertaking environmental assessment of projects to the project developer. The Ministry of Environment, Lands and Agricultural Development (MELAD), under the direction of the Principal Environment Officer (PEO), is responsible for review and approval of environmental assessment reports, prescription of requirements for publication and disclosure of environmental assessment reports, issuance of environment licenses, and prescription of any conditions to the licenses. Environment licenses are required for all activities that are deemed environmentally significant, as scheduled by the Minister (of Environment, Lands and Agricultural Development).

25. The act requires the applicant for the environment license to submit an application to the PEO. On consideration of the application, the PEO determines whether to issue an environment license or require an environmental impact assessment, or to refuse the application. The required contents of the environmental assessment report are set out in the Environment (General) Regulations, 2009.

26. In preparation of the environmental impact assessment report, the applicant is required to hold consultations with adjacent landowners and other interested parties.

27. On receipt of the environmental impact assessment report, the PEO determines the appropriate form of its publication and disclosure to interested parties, and the deadline for receipt of comments. Comments received must be shown to the applicant and taken into consideration in finalizing the environmental impact assessment report.

28. On receipt of the final environmental impact assessment report, the PEO decides whether to grant a license, according to the principles of sustainable development and with any international obligations or agreements of to which Kiribati is bound and any other prescribed requirements. Licenses may be subject to reasonable conditions, which may include duration, location, prescribed methods, emission limits, monitoring and reporting requirements, lodgment of bonds and payment of fees, preparation of plans and specific mitigation.

29. An Environmental Licence for the Kiribati Road Rehabilitation Project, Number ELA 036/10, was issued on 18<sup>th</sup> July 2013. The conditions of the licence are provided in Annex C. Further licences relating to coastal protection works also apply. A further Environmental Management Plan, covering environmental effects of coastal protection works during the operational phase, monitoring of these and mitigation, is under preparation and is expected to be issued in early 2014.

### **III. DESCRIPTION OF THE PROJECT**

#### **A. The Executing Agency**

30. The Executing Agency for the Project will be the Ministry of Finance and Economic Development. The Implementing Agency will be the Ministry of Public Works and Utilities (MPWU). During project implementation, engineers and technicians of the Civil Engineering Division of the MPWU will work with the design and supervision consultants on day to day technical management.

#### **B. Project Rationale**

31. The existing road is in poor condition as evident with excessive pot holes, gaps and cracks, surface rain puddles, etc., and is in need of urgent repairs. Every time it rains, expensive repair work is needed. While parts of the South Tarawa road network were rehabilitated in 2008<sup>1</sup>, no major maintenance works have been done on the remaining paved roads for more than 20 years. These roads have already reached the end of their economic life. The damage to the roads has greatly affected travel in South Tarawa with the average travel speed reduced to 20 km/h and vehicles traversing large and deep depressions filled with water during rainy seasons. During dry seasons, dust from the unpaved sections of the

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<sup>1</sup> Town roads in Betio and Bairiki, as well as a section of the main road at Bikenibeu were upgraded under an A\$12 million project financed by the Government of Japan as part of the Fisheries Project.

road has become a nuisance and health hazard to the adjacent communities. An increase in upper respiratory diseases has been noted among the residents of the adjacent communities from excessive dust generation.

32. Most of the South Tarawa road traverses a ribbon development area composed of residential dwelling units, small commercial and business concerns, churches, schools, etc. These are all situated within the confines of the atoll which is generally no more than 100 meters wide. Virtually the entire population lives in close proximity to the road and is greatly affected by the existing conditions of the road.

33. In accordance with the basic issue “improve the standard of roads” in the Kiribati development plan, currently the road standard is not satisfied. Since life of the people of Kiribati, especially on South Tarawa, is heavily dependent on road transportation, the reconstruction or improvement of South Tarawa road is an urgent matter.

### **C. The Proposed Project**

34. The purpose of this project is to replace the existing surface with an improved structure. This will reduce future road deterioration and to solve the problem of the continuous road repairs. The rehabilitated road will also minimize breakdown of vehicles, accommodate the increase traffic density, and cater for pedestrians and other non-motorized traffic.

35. The South Tarawa road upgrading will consist of 6-7 m wide sealed road with 1.5 m sealed shoulders which will act as footpaths and improved siting for drainage and service lines (electricity, water supply, telephone line, and other services). The road rehabilitation and upgrading will cover the road from the Betio toll booth (km 0) to Bonriki Airport (km 26.2), excluding a section through Bairiki (km 3.3 to km 4.7), and will include the Temaiku road (6.1km) and the Buota road (2.0 km).

**Figure 1: Satellite Photograph Showing Proposed Main Investments**



36. The road upgrading will include: scarifying and/or removal of the existing surface and coral base course and regulating with coral materials (obtained from the existing road or from local suppliers who have the appropriate Environmental Licences), or replacement with 15cm imported crushed stone and surfaced with a 30mm asphalt layer. The road will have concrete edging to prevent the propagation of edge breakdown of the new road. The project will also include the construction of speed humps at suitable locations, and construction of 166 bus stops at locations, agreed through council/community consultation. Wherever physical drainage measures are installed, to “capture” stormwater flows, discharge will be to the lagoon or ocean as appropriate and practical. The existing sealed roads will be rehabilitated to a similar level and the roads that are currently unsurfaced will be slightly raised. Improved camber will ensure surface drainage of the road, and drains either side of the road will be improved.

37. The Project will also include sealing of unsealed urban feeder roads with high traffic volumes. Currently, these roads consist of earth road with many depressions creating stagnant water after rain causing severe difficulties to cars in navigating the road. The feeder road will be sealed and provided with improved drainage.

38. Sections of the project roads where the improved infrastructure is identified as being 'at risk' from coastal erosion processes will receive protection measures to mitigate such risk. Designs for coastal protection measures and preparation of an Environmental Management Plan for environmental effects of these during the operational phase by a specialist firm have been commissioned by MPWU.

39. Under an associated technical assistance program, the Project will support improved institutional arrangements, including drafting of the requisite legislation for managing the Kiribati Road Assets to ensure a systematic and adequately financed regular and periodic maintenance programs. Specifically, the Project will support the creation of the Road Maintenance Fund to be financed by user charges and build the capacity of the MPWU for management of the road assets as well as creation and training of microenterprise units for outsourced road maintenance.

40. Part of the road work involves the detection and clearance of unexploded ordnance, requirements for the protection of the environment during coastal protection works, and for siting and management of asphalt production.

41. Commencement of physical construction works is anticipated to take place in mid 2012, and be completed in mid 2014, with a follow-up defects liability period of 24 months.

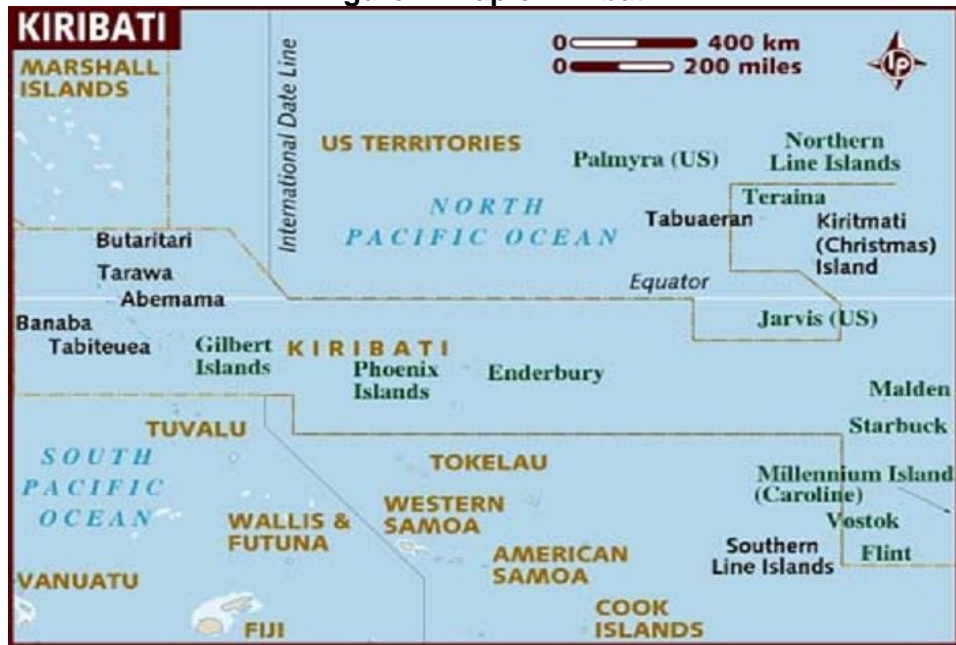
#### **IV. DESCRIPTION OF THE ENVIRONMENT**

##### **A. Physical Environment**

###### **1. Location and Geography**

42. Kiribati is composed of small islands located between Longitude 170 degrees East and 150 degrees West in the Central Pacific Ocean, on either side of the Equator at the intersection of the International Dateline and the Equator. See Figures 2 and 3 for the general location of the proposed Project and map of Kiribati. The three groups of islands namely the Gilberts, the Line and the Phoenix is either coral atolls or coral islands with the exception of Banaba which is a raised or an elevated limestone island. Of the 33 islands comprising the Republic of Kiribati, only 18 are inhabited. Kiribati became an independent republic in 1979.

Figure 2: Map of Kiribati



**Figure 3: Project Investments**



43. The Gilbert Group which is comprised of 17 islands has a total land area of 286 square kilometers. Tarawa, an atoll in this group, is home of the Kiribati government, the port of entry, and the international airport. Eight islands and atolls constitute the Phoenix Group. The Line Islands consists of a total of 8 islands and atolls covering an area of 497 square kilometers, including Kiritimati with a land area of 384.5 square kilometers, which is the largest atoll in the world. While Banaba (Ocean Island) rises some 78 meters above sea level, the rest of the islands are no more than 3 meters above sea level. The national capital Bairiki is located on the Tarawa atoll. Betio is the port of entry while Bonriki is the international airport.

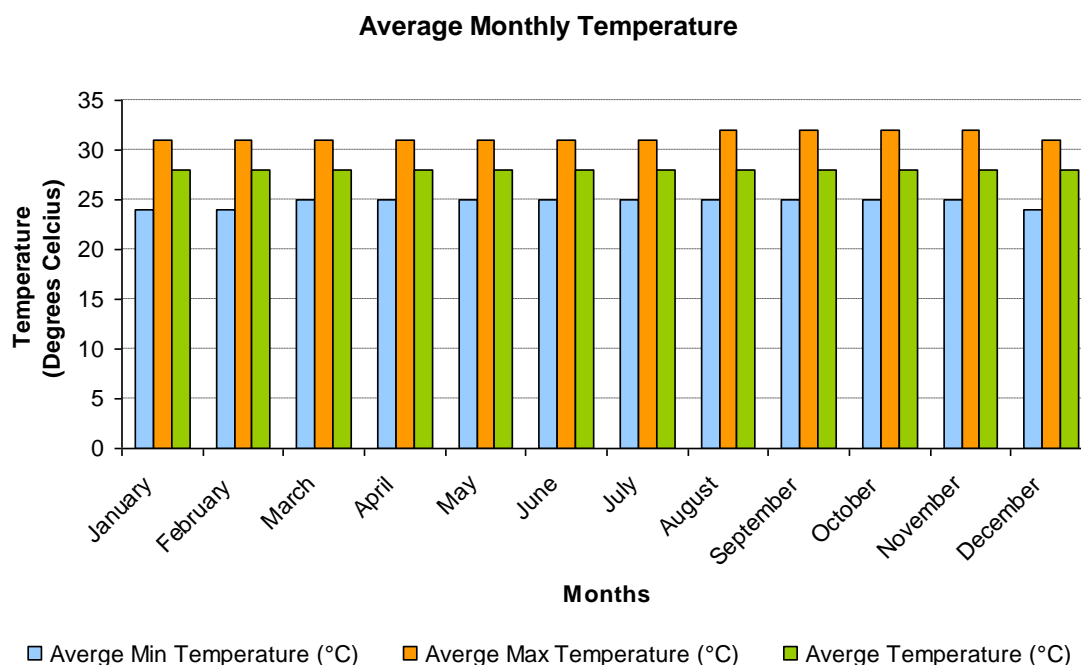
## 2. Climate

44. Due to its geographical location, Kiribati has a predominantly hot dry equatorial climatic conditions with prevailing South Easterly winds most of the year. Temperature varies



between 25°C and 33°C with maximum possible annual sunshine of 4134 hours. The wet season extends from December to May and rainfall variation is high on most of the islands. A gentle breeze from the easterly quarter is predominant. Tables 1 below displays average monthly climate indicators in Tarawa based on 8 years of historical weather readings.

**Figure 1: Average Monthly Temperature (degrees C), Tarawa Island**  
1° 35"S, 172° 93"E, 4m asl



45. Rainfall differs from year to year and from island to island. The drier Southern islands have an average yearly rainfall of 1,000 mm while that of the Northern part is 3,000 mm. Low temperatures are experienced during heavy downpours accompanied by strong winds over long periods. Prolonged drought periods were encountered in 1988 to early 1989 and in 1998 extending into mid 1999 and resulting in the loss of many valuable food crops including coconuts (*Cocos nucifera*) and breadfruit (*Artocarpus sp.*).

### 3. Soils

46. Like other coral atolls and islands, the nature of the soil is derived from limestone which has been formed as a result of coral formation over thousands of years. There is no andesitic rock formation in South Tarawa that can be used as quarry sources for road construction. The soil is alkaline and therefore it does not support the growth of certain plants and trees. The poor and infertile nature of the soil is due to its alkalinity, porosity and lack of essential elements which limit fertility. Consequently, it is incapable of supporting intensive agricultural activities.

47. The topsoil which is composed of decaying or composted organic matter mainly decaying leaves and plant materials is thinly spread over most of the area with plant cover and other areas covered with wild bushes. Due to their ability to withstand the harsh atoll conditions, the predominant plant species that survive are coconuts (*Cocos nucifera*), pandanus or screw pine (*Pandanus tectorius*), salt bush (*Scaevola sericea*), and other tolerant indigenous plants and trees.



#### 4. Water Resources

48. Freshwater resources exist underground as water lenses floating on seawater. These are derived from the infiltration of rainwater into the water table below the ground. The lens resembles the appearance of a convex lens which is thickest at the center and thinnest on the sides facing the ocean or lagoon throughout the length of the atoll or island. The lens is formed where the width of the island is sufficiently wide so as to reduce the outward flow of the accumulated underground lens. The freshwater lenses in low coral atoll and islands are extremely vulnerable to occasional environmental influences. Groundwater is the principal source of fresh water in Kiribati. Urban or South Tarawa water supply originates from water wells located in water reserve areas with restricted use and access in the villages of Bonriki and Buota. Well water is pumped from wells and conveyed through a system of pipes to consumers. Chlorination without preliminary treatment of urban water supply is carried out at the source.

### B. Biological Environment

#### 1. Coastal Resources

49. The coastal areas of Kiribati are characterized by white sandy beaches, reef flats, reef patches, lagoons, mangrove forests, extensive reef mud flats and sea grass beds. These areas contain a variety of habitats, numerous eco systems and marine organisms. The coastal areas support fishing, recreation, trade and communication. With constant mining of beach sand, gravel and other aggregates for construction purposes, the coastal areas are greatly threatened. The Government of Kiribati, with assistance from the European Union (EU) is currently implementing a project on Environmentally Safe Aggregates for Tarawa (ESAT) Project, being undertaken by the Ministry of Fisheries and Marine Resources Development, the South Pacific Commission (SPC) and the South Pacific Applied Geoscience Commission (SOPAC). The ESAT project aims to protect the vulnerable beaches of South Tarawa from damage caused by aggregate mining and provide an alternative supply of material through environmentally safe lagoon dredging. The island is vulnerable to coastal erosion and coastal protection is required at several sites deemed to be at risk. Improvements to coastal protection have been made under the Kiribati Adaptation Project (KAP) though in some cases flank erosion has taken place. Causeways connecting the islets are also subject to wave action and significant damage occurred in early 2013 on the Betio causeway. Designs for coastal protection measures are the subject of detailed review and amended designs will be made available for the project.

50. Ministry of Fisheries and Marine Resources is responsible for the management of marine resources including production of aggregates and sand from the coastal areas. Preventing the destruction of marine resources including coral reefs is necessary. Therefore, the Project will ensure that the extraction of material to be used for road rehabilitation and upgrading, or any works to existing shipping channels within the lagoon to enable access by ocean going barges bringing material will not cause significant adverse environmental impact on the coastal and marine environment. The proposed Road Rehabilitation Project will not use the reef mud from the EU funded project, but instead will import material from Banaba, Nauru, Fiji Islands or elsewhere. The project will also take necessary precautions and measures to ensure that the construction activities will not pollute lagoon environment.

#### 2. Forest Resources and Ground Vegetation

51. Except for a few uninhabited islands in the Northern Line Islands and the Phoenix Group, where “te buka” (*Pisonia grandis*) and other wild trees grow, there are no natural forest of major significance in terms of size, age and biological diversity. Forests in the Lines and Phoenix are resting and nesting places for long distance flying migratory birds all the

year round. Mangrove forests also exist on muddy shores and coastal beaches where water is calm and in areas that are protected from waves and strong currents. Mangrove rehabilitation is undertaken by the Government under the World Bank funded project, Kiribati Adaptation Project (KAP). It includes planting of mangrove in selected areas prone to coastal erosion and in areas to protect causeways. Several types of the mangroves are found in Kiribati namely the white mangroves (*Sonneratio alba*), the tongo buangu (*Bruguiera gymnorhiza*), te aitoa (*Lumnitzera littorea*), and the red mangrove (*Rhizophora stylosa*). Most of the terrestrial vegetation cover features fruit trees and decorative plants. The most common are coconut (*Cocos nucifera*), casuarinas (*Casuarina equisetifolia*), breadfruit (*Artocarpus* sp), hibiscus (*Hibiscus* sp), papaya (*Carica papaya*) pandanus (*Pandanus tectorius*), flame tree (*Delonix regia*) salt bush (*Scaevola sericea*) and terminalia (*Terminalia* sp). These plants are widespread in the Pacific and tropical regions generally, though most are spread primarily by human cultivation. Papaya and flame tree originate from outside the Pacific region.

52. The road to be rehabilitated under the Project runs through built up areas with no natural vegetation. There are no forest areas located along or close to the road and no mangrove will be adversely affected by the proposed Project. Vegetated areas affected are relatively minor in extent and bear primarily weed vegetation and some cultivated plants. However, new mangrove plantation occurs on the airport road at 1+090 – 2+080, and this shall be protected from accidental damage during the works.

## **C. Socio-Economic Environment**

### **1. Population**

53. The original inhabitants of Kiribati are Gilbertese, a Micronesian people. Approximately 90% of the population of Kiribati lives on the atolls of the Gilbert Islands. Although the Line Islands are about 2,000 miles east of the Gilbert Islands, most inhabitants of the Line Islands are also Gilbertese. Owing to overcrowding in the capital on South Tarawa, in the 1990s, a program of directed migration moved nearly 5,000 inhabitants to outlying atolls, mainly in the Line Islands.

54. The population of Kiribati, as enumerated on 7 November 2005 consisted of 45,612 males and 46,921 females or a total of 92,533 people. This is an increase of 8,039 persons in 5 years compared to the 2000 census (84,494) with an annual rate of growth of 1.8%. Kiribati's population has steadily increased since the 1930s when the first census was conducted (Figure 4). With a population of just under 30,000 people in 1931, 56,000 people in 1978, and over 90,000 in the year 2005, the Kiribati population more than tripled in size during the last 74 years.

55. Population growth varied extensively by Island and Island Groups. While the overall growth rate of Kiribati was 1.8% per annum, the Gilbert Group of Islands grew only at a rate of 1.4% while the Line and Phoenix Group of Islands grew at a very rapid rate of 6.7% per annum. Islands that experienced significant population increase include: South Tarawa (3,594); Kiritimati (1,684); Tabuaeran (782); Makin (694); Abemama (262); and North Tabiteuea (235).

56. Almost 44% of the population of Kiribati lived in South Tarawa in 2005. Its population increased from 25,380 in 1990 to 36,717 in 2000, to 40,311 in 2005. The census counted 13,999 private households with 88,644 household members, which is 6.3 persons per household on average. In South Tarawa, 7.5 persons share a household on the average. Almost a third (26,798) of all persons that live in private households live in households with 10 persons or more, and 7,191 persons live in households with 15 persons or more. The long term trend of rural to urban (South Tarawa) migration has eased. The 2005 census data

show a net flow of people from the Gilbert Group Islands towards the Line Islands during the inter-census period 2000-2005.

## **2. Economy**

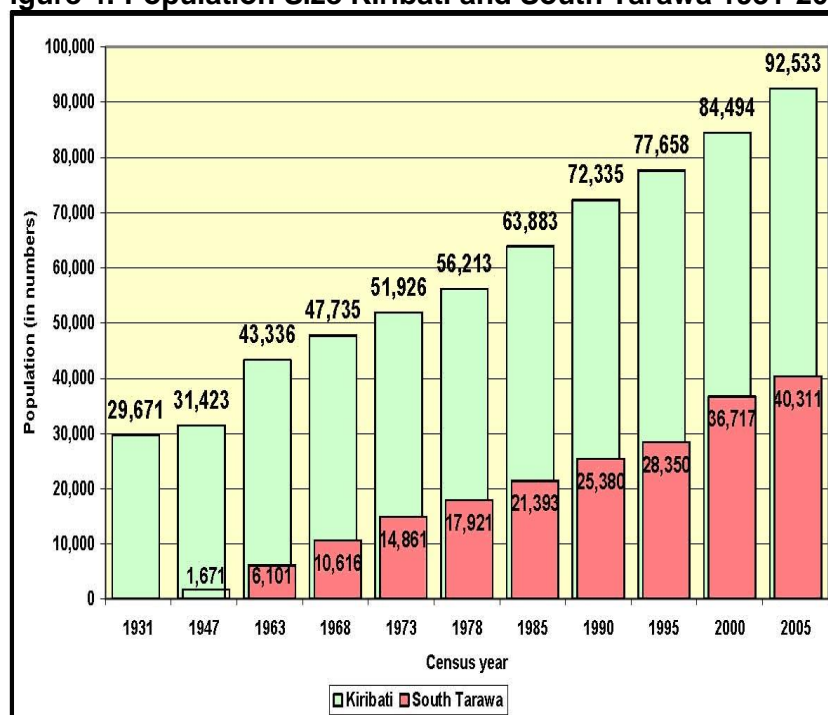
57. The country's economy is predominantly subsistence, with copra, seaweed and fisheries as the main source of foreign exchange earnings. Kiribati's per capita GDP of US\$1,322, is one of the lowest in the world. Only 16% of the workforce participates in the formal wage economy and over 60% of all formal jobs are in South Tarawa. The monetary economy of Kiribati is dominated by the services sector, representing a GDP share of over 73%, and the public sector which provides 80% of monetary remuneration. Tourism is one of the largest domestic activities. Between 3,000 and 4,000 visitors per year provide \$5-\$10 million in revenue. Attractions include World War II battle sites, game fishing, ecotourism, and the Millennium Islands, situated just inside the International Date Line and the first place on earth to celebrate every New Year.

58. Most islanders engage in subsistence activities ranging from fishing to the growing of food crops like bananas, breadfruit, and papaya. The leading export is copra, which accounts for about two-thirds of export revenue. Other exports include pet fish, shark fins, and seaweed.

## **3. Infrastructure, Public Services and Utilities**

59. The infrastructure of Kiribati is generally rudimentary. Whenever practicable, roads are built on all atolls, and connecting causeways between islets are also being built as funds and labor permit. A program to construct causeways between North and South Tarawa was completed in the mid-1990s. In 2008, the roads in Betio and Bairiki were improved with Japanese aid. Kiribati has about 640 kilometers (398 miles) of roads that are suitable for motor vehicles. All-weather roads exist in Tarawa and Kiritimati. In 1998, there were some 2,000 motor vehicles registered in the islands, of which some 75% were motorcycles. Traffic counts undertaken early in the design phase indicated that the Average Daily Traffic (ADT – both directions) at km 4.5 and km 14.7 is around 4,300 and 3,50 respectively, indicating significant growth.

**Figure 4: Population Size Kiribati and South Tarawa 1931-2005**



Note: Data for South Tarawa for year 1931 is not available.

60. In early 1998, work began on a major project to rehabilitate the port terminal and facilities at Betio. Financing for the project was provided by a grant from Japan of US\$22 million. There is a small network of canals, totaling 5 kilometers (3.1 miles), in Line Islands as well as ports and harbors such as Banaba, Betio, English Harbor, and Kanton. There are 21 airports, 4 of them with paved runways. Only Tarawa and Christmas Island are served by international flights.

## V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

61. Safeguard measures have been incorporated in the Project as follows: (i) **Design-Preconstruction Phase**, the period before the actual construction starts and designs are being prepared (Section A). This allows the designers to incorporate the environmental management plan (EMP) in the project design, technical specifications and contract documentations; (ii) **Construction Phase**, the period from the time that the “Notice to Proceed” is given to the Contractor until the issuing of the “Certificate of Completion” (Section B). The Contractor would construct the Project as per the design and technical specifications and implement the EMP; and (iii) **Operation and Maintenance Phase**, the period starting with the issuing of the “Certificate of Completion” issued by the MPWU until the end of the 20 year lifetime of the project (Section C).

### A. Design/Pre-Construction Phase

#### 1. Protection of Sensitive and Ecologically Important Areas

62. Improvements to the airport road involve revetment of the pavement close to areas where mangroves are being re-established. In order to prevent damage to the young mangrove plants, revetment will be achieved by construction of a small wall using cement filled sand bags, well clear of the mangrove stands, avoiding the formation of a slope that may affect the plants. Further measures will be:

- To ensure construction personnel are aware of locations and importance of the sensitive areas and avoid disturbing them;
- Undertake a survey to identify potential sensitive areas and plants/trees before the actual construction starts.
- Construct temporary fences to prevent accidental damage to the plants.

## **2. Environmentally Sound Design and Road Maintenance**

63. Excavation works may induce soil erosion. However excavation will be limited to drain laying works, as no bulk earthworks are required for the project.

64. The design provides for improved drainage by (i) construction of U drains in areas where space is constricted and runoff water is prone to build up, (ii), where there is space for water to disperse naturally, small rain gardens will be constructed, consisting of areas where soil is scarified and planted to permit infiltration, and protected by bollards. This will prevent the occurrence of depressions of compacted surface soil, formed by vehicle movements, where water currently accumulates and very little infiltration to underlying, permeable soils, occurs. Permeability tests on soils confirmed that when the surface crust is ameliorated by scarification, drainage through the soil profile occurs freely. The improvements to the Anderson and Temaiku causeways will involve the removal of trees. These will be replanted with suitable species, identified by local residents.

## **3. Road Safety**

65. Road accidents have a substantial impact on the community and this can be reduced through proper attention and incorporation of safety in the design. The MPWU will ensure that all safety aspects of the road are integrated into the project design and implemented during the construction phase. During project preparation, a road safety audit was done to identify the engineering issues to be addressed on the project. This information has been used by the design engineers to ensure the design is as safe as practicable. The design will incorporate:

- Proper signs along the entire highway.
- New footpaths and pull-off bays in selected areas of the roads; e.g. through villages; and near markets, schools, and other community facilities.
- Safety instructions for the construction activities in the contract documents.
- Sufficient visibility along the road section according to standard specifications.
- Speed humps near schools, hospitals, and markets.
- Safe bus stops with sufficient turn out area.
- Provision of footpaths where feasible, on both sides of the main Betio – Buota road and on one side of the roads at Buota and Temaiku
- Provision of speed control areas which feature the provision of solar lighting, raised curbs, speed humps and village gateways (prominent signs giving the name of the village, displaying the speed limit, and with road markings that give the impression of road constriction and encourage slower driving).

66. During the project additional road safety activities will be addressed through the road safety Technical Assistance activities.

## **4. Cultural Heritage**

67. Historical sites from the World War II consisting large canons and bunkers are located along the beach in Betio area. However, these sites are located outside the project

area. No specific cultural / archeological sites have been identified along the road section from St. Anne to Tanaea. However, in case a cultural/historical heritage site is identified during the construction, the Contractor will be asked to stop work immediately and notify the MPWU supervision consultant who in turn will notify the relevant Government agencies.

## **5. Social or Community Concerns (Pre-Construction)**

68. Because the project is concentrating on rehabilitation of the existing road only, there is limited concern regarding the negative effects of the road construction. Road improvements are generally aimed at bringing benefits to surrounding communities through lower transport costs and better access to market places, jobs, and services such as health and education. The rehabilitated road has safety features such as better pedestrian facilities. It will also reduce costly breakdowns and damages to private and commercial motor vehicles. Road reconstruction and rehabilitation projects can lead to changes in the community or social environment around the road, influencing various aspects of lifestyles, travel patterns, social and economic activities.

69. No displacement of people will be required for the proposed Project. The proposed rehabilitation works will be carried out along the existing road alignment and within the right of way. The only potential impacts are from (i) provision of 166 bus stops; (ii) the inclusion of footpaths as described above; and (iii) temporary easements for drainage. Measures to minimize the social impact of any necessary land acquisition and compensation of loss of crops include:

- Identification of land acquisition needed, and trees and plants or other items which may be affected by road reconstruction and rehabilitation, and compensation requirements;
- Prior discussion of project impacts and proposed measures with the affected community; local government officers and non-governmental organizations.
- Conduct surveys before activities commence to identify all members of the affected population.
- Identification of other land-based natural resources, infrastructure, and services that will be lost to the affected community.
- Preparation of resettlement plan to address the land acquisition, trees/plants losses, and other social impacts.

## **B. Construction Phase**

### **1. Social or Community Concerns (construction)**

70. The objective is to minimize social disturbance and maximize community benefits from the Project. Measures to achieve this objective are:

- Advise the local community of project plans in advance of the construction, and seek their views.
- Avoid or minimize disturbances near living areas.
- Control run-off and manage sediments near farms / garden areas.
- Arrange employment and training for local people.
- Include women and other community groups in project activities.
- Train teams of local people for routine road maintenance activities
- Maintain liaison with community representatives and arrange for the involvement of community groups where practicable, such as the provision of catering services. Include women's and other community groups in project activities.

71. The projected disturbances in the communities are minor and temporary, and the Contractor will make appropriate arrangements during the construction period. The general practice is that Contractors employ workers from the communities. The clan leaders will be consulted when recruiting workers for the Contractors. Communities may be engaged to provide catering services for road workers. The Contractor will abide by the laws of the Republic of Kiribati relating to employment and use of labor.

## **2. Soil Erosion**

72. Proper application of mitigation measures will ensure that impacts of surface erosion are temporary and minimized to acceptable levels. Measures to achieve these objectives are:

- Minimize work areas
- Reduce the time excavated drainage channels remain unsupported
- Keep vegetation clearing to a minimum.
- Place geotextile silt traps as appropriate
- At sites where vegetation is removed, encourage re-vegetation as soon as the construction activities finish, or plan to immediately rehabilitate the disturbed sites after use.

## **3. Clearance of Vegetation**

73. Site preparation work will involve some removal of trees and clearance of vegetation. A schedule of sites where tree removal will occur and of packages of land is provided as Annex D. Provision is made in the EMP for replacement of trees, of species chosen through community consultation. Where ground vegetation is removed, this is largely weed vegetation or cultivated plants on plots that are affected by the proposed improvements. Vegetation is dominated by species that are widely represented in the Pacific and in some cases introduced (as described in paragraphs 38 and 39), and has no significant conservation value. Compensation to affected persons for any necessary removal of cultivated plants is covered in the resettlement plan prepared for the works.

## **4. Controlling Sediment**

74. Risks of damage to land, property and drain lines are limited as topography is very flat and there are no bulk earthworks involved in the works. The following mitigation measures are included:

- Installing silt traps at drainage ditches and around materials stockpiles.
- Revegetating all areas where vegetation was removed which are not to be paved after final land shaping
- Phasing and limiting ground disturbance to areas of a workable size.
- Scheduling construction to limit disturbance of large areas of soil during wet seasons.
- Containing or isolating construction areas using a bund or trench, from other surface runoff, then cleaning and rehabilitating the site when construction is complete
- Discharge of sediment bearing water to the lagoon will be prohibited.

## **5. Controlling Storm Water**

75. The objective to control storm water is to minimize the impact of contaminated run-off water. Implementation of proper mitigation measures will accordingly ensure that impacts can be minimized to acceptable levels. Measures to achieve the objective are:

- Pass stormwater run-off from construction areas through geotextile traps to remove soil and petroleum-based organic pollutants before disposal.
- Store oil and bituminous products at a contained location away from drainage ditches.

## **6. Management of Stockpiles and Spoil-heaps**

76. To minimize dust and sediment run-off, material stockpiles and spoil heaps (if any) require proper management. All material arising from excavation and scarification of the pavement will be re-used, and only minimal disposal will therefore be measure. Mitigation measures are:

- Discuss dumping locations with the government officials and local landowners including plans for future use of the spoil materials.
- Include all drainage provisions suggested for construction sites in the site plans.
- Choose the locations of waste spoil piles to avoid blocking surface run-off or drainage ditches.
- Cover all spoil heaps or stockpiles during rainy season to prevent erosion and sediment run-off.
- The maximum height of any stockpile will be 3m. Silt traps will be placed around all materials stockpiles
- Adequate provision shall be made to ensure that no stockpiles are able to release material into the sea or lagoon, even under heavy rain or windy conditions. Any stockpiles within 20m of the shore shall, in addition to being fitted with silt traps, also have a covering to prevent windborne deposition into the waters. Arrangements shall be made to ensure that no silt in silt traps is able to drain to the shore.

## **7. Air Quality and Dust Control**

77. Dust problems created by road traffic are a nuisance but not a very critical issue along the proposed road section, mainly because the traffic volumes are relatively small. Exhaust from asphalt production includes toxic gases and particulate pollutants. The level of emission of pollutants varies with the type of bitumen used, the process used in the asphalt plant and the use of filtering or scrubbing devices in the process. To control unnecessary dust from the road section under construction and from asphalt production, the Contractor will:

- Spray water on exposed surfaces during dry periods especially near schools, hospitals, rural communities, etc.
- Cover all dust generating loads carried in open trucks.
- Provide details of the choice of products used in asphalt manufacture, plant siting (taking account of wind direction and the location of dwellings), and measures to ensure that production ceases during unfavourable wind conditions, the process to be used, inclusion of pollution abatement measures such as centrifugal dust collectors, wet scrubbers, filters and splash guards.



## **8. Noise Control**

78. Noise mainly affects urban areas, villages, hospitals, schools, etc. along the roads. To control noise during construction the suggested measures are:

- Use modern and well-maintained equipment (with mufflers where appropriate)
- Carry out noise construction activities during daylight hours (0700hrs – 1900hrs).
- Advise schools, hospitals, churches, etc. when there will be unusual or unavoidable noise. A schedule of hospitals, clinics, schools, churches and religious establishments is provided

## **9. Aggregate Management**

79. Aggregates for the road construction may be imported or, under conditions set out in section 10 below, won from local sites that are already disturbed. The aggregate may be stored in the Betio port area, (currently an empty field, located next to the port, and about 250 m from the closest settlements), or a similar isolated area towards Temaiku or elsewhere. Measures to address potential environmental impacts are:

- Avoid overloading trucks and cover trucks to minimize dust and loss of load from trucks during transportation;
- Use water sprays or covered chutes to reduce dust emission during loading and unloading of materials from barges;
- Maintain materials processing plant in good working condition so as to reduce emission from the plant;
- Identify and use docking and storage facilities that are adequate to handle the volumes of aggregate that are to be delivered to the shore, avoiding disruption of local traffic and ensuring safety of workers and the public.
- As far as possible, plan truck trips between the processing plant in Betio to the sites during low traffic hours; and
- Implement safety procedures to reduce the potential for road accidents in village or urban areas.
- All imported material shall be free of organic matter, obtained from certified clean sources and/or fumigated prior to arrival in Kiribati.

80. The Contractor will have to obtain the requisite permits and clearances from the ECD. The Environmental permit will be one of the conditions required prior to starting the construction work.

## **10. Use of Water**

81. In addition to the use of water dust control (as described in para 66 above), water will also be required for the adjustment of moisture content in pavement materials and for concrete production. The use of sea water is practicable for dust control and, depending on the actual materials being used, for the adjustment of moisture content in pavement materials. The use of seawater will be encouraged. Freshwater will be required for the manufacture of concrete components. The total volume required for this purpose is approximately 85 cubic metres, required over the construction period (the estimated sustainable yield of water from the main groundwater reserves that feed the PUB system is approximately 2010 cu m / day). However, depending on the choices made by the contractor, concrete components may be manufactured offshore.

## **11. Extraction of Materials**

82. Materials may be sourced by dredging from the lagoon. This may be material extracted from the widening of existing navigation channels, as may be necessary to enable barge access to the shore for the delivery of the imported materials, creating adequate clearance of the beam and draft of an ocean going barge. Material may also be extracted from areas that are already disturbed. Potential effects are increased sedimentation in the lagoon waters and pollution from leakage of fuel or oil from dredging machinery. Measures to minimize the effect of sedimentation from dredging activities on water quality and benthic communities are: subject to the following conditions:

- Dredging may only take place in areas where the lagoon floor is already disturbed by activities such as prior dredging and channel construction and where sediments are coarse and loose, rather than where they are fine and cohesive in order to avoid sediment plumes and to limit siltation;
- A statement will be provided by the Contractor as to the dredging system chosen and means by which it will minimize the spread of suspended sediments. This statement shall be subject to approval by the Engineer
- The dredging barge and its equipment shall be in sound and well maintained condition, and free of any leaks of any fluid at all times. No machinery showing any signs of leaking shall be allowed to work in the lagoon until completely repaired.
- The barge shall be operated by appropriately licensed individuals only, in accordance with the laws and regulations of the Government of Kiribati, including any regulations that relate to dredging and to navigation within lagoon waters
- The barge shall operate and be kept in waters of a depth that exceed its draft or kept in areas where the lagoon floor is already disturbed, so that its hull does not come into contact with any live coral, seagrass or other benthic growth.
- All dredging shall comply with relevant laws of the Republic of Kiribati and international conventions to which it is a signatory
- Dredging operations shall be monitored visually, and photographs of plume movement taken, along with recording of conditions of wind speed and direction and phase of the tidal cycle. Dredging operations during incoming tides or strong westerly winds (which occur intermittently, mainly between April and September) will only be allowed if it can be demonstrated that plume movement does not extend to areas of intact coral or seagrass formations.
- In the case of channel enlargement, carrying out a detailed assessment of the requirements for channel rehabilitation and upgrading
- Immediate removal of all excavated materials from the dredging site to land
- Storage, temporary or otherwise, of dredged material within the lagoon zone is not allowed

## **12. Coastal/Marine Protection**

83. The provision of coastal protection, through construction of sea walls or other structure, will entail excavation below the high water level and construction of walls or revetment using concrete and/or sand-cement filled bags and/or other materials including placement of proprietary concrete or geotextile products. Potential environmental effects are:

- the collapse of the exposed beach profile after excavation and prior to construction of the wall,
- release of oil or fuel or other contaminants from construction operations, and
- dispersion of excavated material over benthic habitats.

The following measures will be taken to minimize this risk:

- Submission of a method statement to the Engineer stating how risks of collapse will be minimized and excavated material handled, including mention of measures to be adopted at sites where work will take place over open water
- Careful planning of the works to ensure that excavation work takes place during low tide
- Immediate removal of excavated material to dry land
- Minimizing the period that the excavated area will be left unprotected
- Ensuring that all equipment used below the high water mark is in sound and well maintained condition, and free of any leaks of any fluid at all times.

### **13. Offsite and Waste Management**

84. To manage waste the objective is to avoid contamination from solid wastes and sewage. Measures to achieve this objective are:

- Contain all stored wastes within construction sites and remove to landfill, excluding oils, grease and fuels.
- Properly dispose of all used fuel and lubricant oils in environmentally sound manner, either by recycling or for other use such as fuel for hot mix plant, or by removal from the island.
- Crush and remove all inorganic solid waste to landfill.
- Develop a plan for handover, sale or removal of all plant, vehicles and machinery at the end of the contract, ensuring that no unserviceable items of equipment are left on the island.
- Install onsite toilets with appropriate management arrangements for effluent and collection of sludge to prevent any release of contamination into the soil. Liaise with the Public Utilities Board for appropriate collection and disposal of sludge.
- Compost all green or organic wastes or use as animal food.
- Remove empty asphalt containers from the island

### **14. Storage and handling of fuel and lubricants**

85. Fuel and lubricants stored and distributed for use by construction vehicles and plant poses a potential hazard if leakages or spillages occur. These shall be prevented or minimized by:

- Storage of fuel, oil and bitumen in dedicated areas at least 20 m away from the lagoon areas.
- Where fuel in excess of 5,000 liters is stored on site, use of sealed tanks on a concrete base that is bunded to hold 110% of the tank capacity.
- Provision of oil and water separators at all workshops
- Vehicles and machinery will not to be refuelled within 20 m of the lagoon.
- Nomination of authorized personnel for fuel handling
- Development of procedures for cleaning up accidental spills.
- Reporting of any major spill in the vicinity of the lagoon to MELAD.
- Collection and disposal of all waste oil, oil and fuel filters off the island.

## **15. Safety and Health**

86. Occupational health and safety risks of road works can be limited by clearly defining procedures for handling construction materials, conducting tests, paving, operating heavy equipment, etc. Specific equipment and training may be needed to:

- Prepare a site safety plan specifying responsibilities and authorities within the Contractor's staff for adhering to safety and health requirements, and arrange training of Contractor's staff to ensure that the plan is understood. The plan will:
- Ensure all occupational health and safety requirements are in place on construction sites and in work camps; Provide for the use of personal protection equipment (PPE) and processes for obtaining relevant PPE;
- Provide for installation of lights and cautionary signs in hazardous areas;
- Set rules to ensure that operators of vehicles and equipment are properly licensed and trained. Provide for posting notices on emergency assistance and location of first aid kits and other emergency equipment
- Ensure safety and inspection procedures, setting schedules for regular checking
- Set procedures for safe handling of toxic materials and other hazardous substances
- Set arrangements for provision of first aid facilities, rapid availability of trained paramedical personnel, and emergency procedures.
- Include procedures for proper site management where existing services require special attention, in particular high voltage cables.
- Road safety: management and control of traffic during the works, arrangement for safe delivery of construction materials and safe parking of vehicles and plant (both during working hours and overnight)

87. The design has included provision for footpaths and 166 bus stop bays along roads through villages, near markets, schools and other community facilities;

- Penalties for violation of rules and regulations will be dealt with under the provisions of the contract.

88. General Health and Safety Awareness for construction workers will include:

- Introduction to health and safety issues in construction sites;
- Education on basic hygienic practices to minimize spread of tropical diseases;
- HIV/AIDS and STD awareness, including information on methods of transmission and protection measures;
- Prohibition of drugs and alcohol on construction sites; and
- Availability of medical assistance in emergency or non-emergency situations and availability of other health-related assistance.

## **16. Unexploded Ordnance**

89. The Contractor will undertake a detailed contamination survey of designated risk areas, detect mines and other unexploded ordnance and dispose of them. This work will conform to the standards required for mine clearance, issued by the Mine Clearance Policy Unit, Dept of Humanitarian Affairs, United Nations, New York. Detection and clearance works will cover the route alignment and a further 5m outside the limit of works on either side. The following measures are specified:

- A 100% sweep by mine/metal detectors and a deep magnetometer search following clearance work
- An Explosive Ordnance Disposal (EOD) expert will be nominated by the Contractor, of qualifications acceptable to the Engineer, who will direct disarming/defusing, transport and final placement operations and have sole responsibility to declare areas site safe. Staff engaged in detection and clearance shall have received formal and recognized training.
- Where collateral property damage is likely to occur as a result of disposal activity, the Contractor will advise the Engineer before proceeding.
- Provision for medical treatment and emergency evacuation will be provided, to be detailed in a site safety plan as required by the EMP, with the addition of special provisions for eye and face protection (confirming to US NIJ 01012.03 standards) and protective jackets (confirming to US NIJ 0101.03 standards).
- The Contractor will use nominated search instruments, either models deemed acceptable following trials by the UN or alternatives, for which suitable documentation will be submitted for consideration of effectiveness and suitability to Kiribati conditions shall be confirmed.
- Clearance work will proceed according to a detailed method statement setting out procedures for clearance, work plans, structure of the clearance team, type of equipment and quality control provisions. The method statement will cover disarming, transport and final disposal of the ordnance, will allocate responsibility for decision making for these operations, and will be cleared by the Engineer.
- Items of ordnance detected shall be removed from the site and transported to a dedicated bunker in Betio that is under police control. The Contractor will make security arrangements to ensure that the ordnance is inaccessible to the public while being transported or on delivery at the police bunker in Betio.
- Survey of mined areas in accordance with the United Nations International Standard for Level 2 Surveys, to include identified minefields, bridges and culverts and where justified, further areas where local sources of information indicate that a mine hazard exists.
- Clear and accurate marking and recording of all cleared areas to facilitate subsequent identification during construction.
- Quality control checking, which will include a minimum of 5% of the de-mined area and for existing road formation, 10% where searching will again take place using mine/metal detectors and as appropriate, magnetometers. For areas checked for other unexploded ordnance, a minimum of 10% of the searched area will be checked.

## **17. Disruption of utilities**

90. A large number of water, power and telecommunication system assets, manholes, streetlight poles exist along the road alignment. Risks of damage to these will be minimized and effects mitigated by:

- Ensuring high standards of site supervision and vehicle and plant operation to reduce risks of damage
- Preparing procedures for rapid notification to the Public Utilities Board and assistance with re-instatement, in the event of any disruption

## **18. Site De-commissioning**

91. To minimize ongoing impacts after construction is completed, the Contractor will be responsible for the proper decommissioning of the temporary construction sites. Measures to achieve this objective would involve:

- Rake or loosen all compacted ground surfaces.
- Implement revegetation / rehabilitation of the sites involving, where possible, local women's / community groups.

## **C. Operation Phase**

### **1. Road Safety**

92. Road safety features will be included as an essential element in the design for road upgrading projects, particularly along sections of roads where there is pedestrian traffic within and between settlements, or between settlements and gardens, and set down points or bus stop turn out bay.

93. Community requirements for road safety measures will be discussed with the affected communities during the initial awareness program, and their inputs will be integrated into the design phase. Issues which have been incorporated into detailed design for specific projects in more densely settled areas include:

- Measures to slow traffic; e.g., install speed bump at selected places (e.g., settlements, schools, markets, etc.).
- Off-road set down stops.
- Improvements in road signage and pavement markings.
- Attention to road accident black spots.

### **2. Rehabilitation and Maintenance Practices**

94. Routine maintenance refers to activities such as grading, grass cutting, drain clearing, pothole patching, brushing sand off the road and shoulder repairs, which are performed at regular intervals. Periodic maintenance activities are typically scheduled over periods of several years and include resurfacing and repairs. Other maintenance activities considered to be periodic include seasonal maintenance, such flood repairs, emergency maintenance to reinstate roads after major failures, and the regular upkeep of safety features and road signs. The project provides for the Contractor to train teams of local people for routine maintenance activities. The government will ensure that there is sufficient funding available to carry out routine and periodic maintenance of the road. This will be addressed by a Technical Assistance activity to be done under the project.

## **VI. ANALYSIS OF ALTERNATIVES**

95. This is the only east-west corridor through South Tarawa so there is no alternative to ensuring that it meets the basic access needs to the community and remains passable.

96. With the implementation of the project, economic development of South Tarawa will be induced. Travel time between Bairiki and Tanaea will be reduced substantially as a result of better road conditions and connectivity. Vehicle operation cost such as fuel and maintenance will also be reduced as better road conditions would reduce damage to vehicles and promote more efficient vehicle operation. Transport of goods and services within the area and within Tarawa Atoll will be enhanced and would in turn, spur economic development as cheaper goods and services will be made available as a result of better transport conditions.

97. Health risks such as the occurrence of upper respiratory diseases and mosquito vectored illnesses will be reduced since there will be fewer large depressions that will pond with stagnate water that will serve as breeding grounds for mosquitoes. The generation of dust from unpaved busy roads will be eliminated.

98. Without the implementation of the project, the road conditions will remain bad, and travel between Bairiki and Tanaea will continue to deteriorate owing to the bad road conditions. Vehicle operation costs will remain high due to damage to vehicles and fuel consumption will remain high. The economic development of the area will stagnate as transport of goods and services will remain costly. Health concerns will remain as is with the dust being generated from unpaved roads during dry seasons and ponding/stagnant water will continue to serve as breeding grounds for mosquitoes during the rainy season. Also because of the narrowness of the atoll, there are no other road alignment alternatives. Hence, the implementation of the Road Upgrading and Rehabilitation Project on the current alignment is a necessity.

99. The main alternatives considered were with regard to road design options and, importantly, material selection. Cement concrete pavements were considered but rejected due to their high capital costs and also the high volumes of water required for their construction—fresh water is a scarce commodity in South Tarawa. The normal practice for materials supply is the use of coral. While the government is considering implementing a dredge for deep-water dredging of coral from within the atoll, it was instead decided for the project to import high quality material from sustainably sourced suppliers in Banaba, Nauru and/or Fiji Islands. This will minimize the negative environmental impact of the project.

## **VII. INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION**

100. As required by the World Bank and Asian Development Bank Safeguards Policies, public consultations were undertaken during the preparation of EMP. Preliminary consultations were undertaken on 10 and 11 July, 2010 during the field visit to Tarawa. Additional public consultations and information disclosure will be carried out in August/September 2010. The EMP will be disclosed to the Public and will be available locally to the communities at the MPWU office and Community centers.

101. The 10-11 July 2010 site visit consultations with twelve individuals and small groups of people most likely to be affected by the project revealed that:

- Most respondents were not aware of the proposed project.
- All the respondents considered the project very important and would be happy if it was implemented as soon as possible.
- Most would like the road to be widened to prevent accidents especially near the end of the causeway.
- All would like to reduce the height of the speed humps because there is tendency for the trucks, buses, cars, motorbikes, bicycles to evade the hump and pass on the side jeopardizing the pedestrians.
- Dust was not perceived as an issue since most are already used to it. However, they universally welcomed the improvement to the road.

102. Further consultations took place during the design phase. These revealed:

- Consistent satisfaction with the proposed improvements, particularly the proposed safety measures
- Interest in realizing income through provision of services or employment during construction
- Concern over possible threat to mature trees from widening / footpath construction
- Some individual concerns over land acquisition issues.

- While there is acceptance that noise, dust, traffic impedance and fume emissions associated with construction are temporary, these can be intolerable (on previous projects)

103. In order to address these, the design provides for improved drainage, minimizes the removal of trees and provides for replacement with species chosen by the communities, and land acquisition arrangements, conforming to government and funding agency requirements, have been developed. The EMP provides for minimizing noise, dust and fume emissions through requiring high quality plant and equipment to be used, sound site supervision, and provision of advance information to affected communities and to schools, clinics and hospitals.

104. Beneficiary consultations will be conducted during the construction phase, and records of environmental and social issues raised and complaints received during consultations, field visits, informal discussions, formal letters, etc., will be followed up and the records will be kept in the project office at MPWU. Minor changes in work scope relating to coastal protection are anticipated. Concept design outlining options for these seawalls has just been completed and design will take place after a decision is made on the preferred option for each. The findings of these consultations will be summarized in a separate Environmental Management Plan to be issued, covering the effects of the coastal protection works during the operational phase. Consultations with the public will then take place. Further changes in the scope of works are possible, and public consultations will be arranged as and when necessary.

## **VIII. GRIEVANCE REDRESS MECHANISM**

105. The MPWU project office will receive and document issues and concerns that the local populace and stakeholders will have relative to the project and its implementation and forward copies of grievances to MELAD as appropriate. Resolution of these issues and concerns will be undertaken expeditiously so as to minimize any impacts that may affect the project implementation.

106. The following process will be followed to address the issues and concerns that stakeholders and Affected People may have on the proposed development:

- The first step towards resolution of issues and concerns relevant to project is the filing of a formal notice/complaint by the Affected Person/People (AP) with the MPWU. For minor complaints such as excessive dust, noise, safety violation, the person assigned to supervise environment and social aspects by the Supervising Engineer will respond within 24 hours of lodging the complaint and a resolution will be conveyed to the AP within 48 hours. For more substantial complaints about land occupation, damage by contractor's equipment, drainage issues, etc. the Supervision Engineer will respond within 24 hours and set up further discussion / meetings with the complainant to reach a satisfactory resolution acceptable to all parties within seven days. For land issues, the timeframe may be longer.
- The MPWU will maintain a register where all complaints are logged by: date, name and contact address and details of the complaint. A duplicate copy of the register entry will be given to the AP for their record. The AP may, if so desired, discuss the complaint directly with MPWU or its representative at a mutually convenient time and location. If the complaint of the AP is dismissed, the AP will be informed of his/her rights in taking the complaint to the next step. However, every effort will be made to resolve the issue to the mutual satisfaction of both the parties.



- Should the AP be not satisfied with the decision of the MPWU, the AP may file a written complaint with the Environment and Conservation Division (ECD) of the Ministry of Environment, Land and Agricultural Development (MELAD). The time horizon for the investigation and resolution of the complaint will vary and is dependent on the investigating officer of the ECD.
- Should the AP still be not satisfied with the decision of the ECD-MELAD, the AP may then take the grievance to the Kiribati Judicial System. This will be at the AP's cost, but if the court shows that MPWU have been negligent in making their determination, the AP may seek costs.

## **IX. ENVIRONMENTAL MANAGEMENT PLAN**

### **A. Overview**

107. The proposed road traverses a flat terrain, and no specific risks are foreseen with the upgrading of the road section aside from possible land acquisition, disruption of traffic, and disturbance to the adjoining areas. Possible impacts are detailed above and will be mitigated during the design/pre-construction, construction, and operation Phases, as summarized in the Environmental Management Plan.

108. According to the Kiribati Government's *Environmental Act, 2007, An Act to Amend the Environment Act 1999*, the Project will require to prepare Basic Environmental Impact Assessment, which is equivalent to ADB's Initial Environmental Examination and the World Bank's Environmental Management Plan (EMP). According to the Act, MPWU will need to comply with environmental requirements as detailed in the EMP and secure Environment License from the Ministry of Environment, Lands, and Agricultural Development (MELAD).

109. An environmental assessment of the proposed South Tarawa road reconstruction and rehabilitation project concluded that the construction impacts will be minor, reversible and manageable if the mitigation measures as given in the EMP are properly implemented. The EMP (Table 1 and Table 2) is based on the type, extent and duration of the identified environmental impacts. The IEE has been prepared by close reference to best practices and in line with the ADB and World Bank's *Safeguard Policies*. The effective implementation of the EMP will be audited as part of the Grant conditions. In this regard, the MPWU (the Implementing Agency) will guide the design and supervision engineers and contractors on the implementation of the EMP.

110. The EMP has been reviewed and updated to ensure that it complies with the proposed design and any additional changes made at the design stage (e.g., location, scale, source of materials, safety, etc.) and which have impacts on the environment are reflected in the EMP. The EMP needs to be reviewed by MPWU and MELAD prior to the commencement of construction.

### **B. Environmental Management Plan**

111. The EMP summarizes all the anticipated environmental impacts and its associated mitigation measures during the design, construction and operational phases. It makes reference to the relevant law and contract documents, approximate location, timeframe, mitigation costs (in US dollars), and the responsibility for its implementation and supervision.

112. The recommendations and proposed mitigation measures will be attached to the Project Bidding Documents and subsequently the Contractors' contracts. There are no environmental mitigation costs as these are incorporated in the civil work design and

included in contractor's contract. Many of the mitigation measures will be incorporated as part of the standard design and construction practices and as such their costs will be included in the construction cost. This will be refined during the detailed design stage.

### **1. Design/Pre-Construction Phase**

113. Experience shows that inadequate application of the EMP by the contractor may occur due to weak linkages of the EMP with the contract documents. The EMP is a part of the work program and as such it must be addressed by the contractor and carried out as required.

114. In the Bid and Contract section "Special Conditions of Contract", the Project Supervision Consultant (PSC) of the MPWU will, prior to the tender being called, will revise and update the EMP and the EMP as forming part of the Bid and Contract document. The contractor will use this document to cost his compliance with the EMP.

115. Bid evaluation and selection of contractor: The contractor will be required to provide a short statement that confirms that:

- the EMP conditions have been costed into the bid price,
- the contractor has experience of working with an EMP,
- the contractor has a qualified and experienced person on the contractor's team who will be responsible for the environmental compliance requirements of the EMP.

116. Land acquisition and compensation will be discussed with the affected communities, including identification of the land to be acquired, trees and plant or other affected by road reconstruction and rehabilitation, and compensation requirements. MPWU will discuss measures with the affected community and work with the local government officers to implement land acquisition and provide compensation as described in the Resettlement Plan.

### **3. Construction Phase**

117. During the construction, the contractor will work according to the requirements of the Contractor's Environmental Management Plan (CEMP) (based on the EMP) which has been prepared by the contractor. Supervision and monitoring of the CEMP activities will be undertaken as follows:

- (i) The contractor has the initial responsibility for preparing and implementing the CEP as per the works contract.
- (ii) The Resident Engineer (RE) will direct the contractor with regard to compliance with the CEMP.
- (iii) The MPWU will carry out independent monitoring of the work and can issue Defect Notices to the PE who will transmit these to the contractor.
- (iv) The contractor will have his own representative on site – the Site Engineer (SE) who will be responsible for implementing the contract and complying with the CEMP.

118. Contractor prepares CEMP: following the award of the contract and before commencing the work, the contractor will prepare a Contractor's Environmental Plan (CEMP) that addresses the conditions of the construction in the EMP that has been attached to the Bid and Contract Documents. The CEP will amplify how the contractor will address the activities in the construction section of the EMP. The contractor will submit the CEMP to the MPWU for approval.

119. Induction of contractor to site: Following the selection of the contractor and the approval of the CEMP, the contractor together with the person on the contractor's staff who will be responsible for supervising the CEMP will meet the PSC (Environment) on-site. If the plan is appropriate and implementable, the PSC will advise the PE that the contractor can now commence work.

120. Preparation of site and establishment of contractor's facilities: This applies to all of the contractor's facilities, storage areas, workshops, labour camps (when needed), concrete batching areas, asphalt plant, etc. The location and development of the contractors' facilities will be approved by the PE. The sites will be selected so that:

- they do not interfere with the environment and social well being of the surrounding communities re noise, dust, vibration, etc.,
- The size of contractor's facilities are limited to absolute minimum to reduce unnecessary clearing of vegetation,
- sanitary waste and grey waters are treated before release into surface water systems,
- the sites are properly drained. Paved areas, including vehicle parking areas, workshops and fuel storage areas are to drain to an oil and water separator, and
- fuel storage areas are not located within 20m of a water course. The contractor's facilities are to be contained within an adequate security fence.

121. Clearing of sites and removal and disposal of vegetation:

- Wherever possible limit area to be cleared and avoid excessive machine disturbance of the topsoil.
- Wherever practical 10 m wide buffer zones are to be established at sites abutting to the lagoon.
- Cleared material is to be piled into manageable sized heaps according to disposal or re-use requirements.

122. Prevention of soil erosion and spillage on construction site: The contractor will be responsible for ensuring that the erosion is contained by appropriate soil conservation protection methods. While excavation will be limited to the formation of U drains in certain locations, this is particularly important since the work location is close to the lagoon. The contractor will:

- Limit the extent of excavation to reduce soil erosion potential.
- Apply soil conservation protection methodology to susceptible areas to prevent / minimize storm water runoff carrying eroded materials off-site.
- Avoid excavation and operating machinery in wet ground conditions.
- Upon completion of excavation, the contractor will ensure that U drain construction is promptly completed.
- For sites that involve work over open water, ensure all materials and equipment are stored in a secure location and that works are adequately supervised to reduce injury hazards and prevent accidental spillage of materials into the water

123. Storage and handling of construction materials, fuel and lubricants: Construction materials will include aggregates, gravel and cement for concrete manufacture, reinforcing rods and steel mesh, wood and other construction materials, fuel and lubricants, etc. Fuel and oil will be stored in dedicated areas at least 20 m away from the lagoon areas. Where fuel in excess of 5,000 liters is stored on site, it will be stored in sealed tanks on a concrete base that is bunded to hold 110% of the tank capacity. All workshops would be provided with oil and water separators. Vehicles and machinery will not to be refuelled within 20 m of the

lagoon. The contractor must have trained personnel who are competent in fuel handling procedures and for cleaning up accidental spills. Any major spill in the vicinity of the lagoon will be reported to MELAD. All waste oil, oil and fuel filters will be collected and disposed of either by recycling or removal from the island. At the closure of the site, all contaminated soil will be excavated, removed and replaced with fresh topsoil.

124. Noise and Vibration: This applies to all machinery, vehicles and construction sites where noise and vibration may affect susceptible receptors. The contractor will be responsible for ensuring that noise and vibration does not affect the adjacent communities. While it is unlikely that noise and vibration will be an issue due to the large distances between the activities and the communities the contractor will confine all work to daylight hours (0700hrs - 1900hrs) should the community find that any night time operations become a nuisance.

125. Dust management: This applies to all of construction sites and haul roads. During construction, when dust may be generated, the contractor will monitor the worksite conditions and apply dust control measures, which include reducing construction traffic movements and spraying water on exposed areas.

126. Community safety from increased vehicle movements: This applies to all vehicles and particularly to haul trucks that pass through villages. The contractor will ensure that all vehicles which pass through villages are operated safely without endangering these communities. The contractor is to ensure that:

- all trucks and equipment is maintained in a safe operating condition,
- all drivers and machinery operators are properly trained and act responsibly (to be stipulated in the contractor's site safety plan),
- all loads are secured and all loads with potential dust generating materials (e.g. excavated soil and sand) will be covered with tarpaulins,
- the contractor will immediately remove any drivers that ignore any of the community safety requirements.

127. Safety and Hazard: Before commencing work, the contractor will be required to identify potential hazards. Provisions for emergency responses are to be included in the contractor's site safety plan which is to include nomination of a person who will be immediately contacted should an accident occur. The site safety plan will be submitted to the PSC for approval one week prior to starting work.

- The contractor will be required to keep the site free of drugs and alcohol.
- The contractor's site safety plan will include provision for a safe work environment and provide safety measures and protective equipment to all workers including; hand, head, eye and ear protection and safety footwear.
- The site safety plan will include provision for first aid facilities on-site and employ a trained first aid person.
- The contractor will provide supplies of potable water, toilets and wash water to the workers.

128. Disposal of waste materials: All construction waste materials including drums, lumber, sand and gravel, cement bags etc are to be suitably disposed of. If these cannot be recovered for scrap value these materials should be taken to an approved landfill sites for safe disposal. Hazardous waste will be stored and removed from the island on demobilization.

129. Clearance and rehabilitation of construction sites and removal of contractor's facilities: It is the contractor's responsibility to address site cleanup. This includes the removal of all waste materials, machinery and any contaminated soil. The contractor will develop a plan for handover, sale or removal of all plant, vehicles and machinery to ensure that no unserviceable items are left on the island. All construction sites and work areas will be rehabilitated so that these can be returned as close as possible to their previous uses. This includes the stabilization and landscaping of all of the construction sites. No waste will be left on site after the work is completed. Should the contractor fail to remove the waste, the MPWU is entitled to withhold payment and arrange the clean up and deduct the cost of the clean up and appropriate administrative charges from the final payment.

#### **4. Operational Phase**

130. People Safety: During operation, road safety features will include (i) measures to slow the traffic; e.g. installation of speed hump at selected places (e.g. settlements, schools, markets, etc), (ii) bus stop turn out bay that allow the passengers to get in and out of the bus safely, (iii) dust suppression sealing, (iv) improvements in road signage and pavement markings, and (v) attention to road accident black spots.

131. Road Maintenance: Routine maintenance (grading, grass cutting, drain clearing, and pothole patching and shoulder repairs) will be undertaken on regular basis. Seasonal maintenance such as flood repairs, emergency maintenance to reinstate roads after major failures, and the regular upkeep of safety features and road signs will be undertaken as necessary. Major maintenance that include resurfacing and repairs are typically scheduled over periods of several years.

132. Noise control: Considering the low traffic volume, noise is not considered a major concern in the area. For occasional houses, dust fence barriers (using traditional material such as coconut leaves mat) commonly used in Tarawa might be considered.

#### **C. Environmental Monitoring Plan**

133. A monitoring plan for the proposed Project (Table 3) has been prepared. The main components of the monitoring plans include:

- Environmental issue to be monitored and the means of verification,
- Specific areas, locations and parameters to be monitored;
- Applicable standards and criteria;
- Duration and frequency and estimated monitoring costs; and
- Institutional responsibilities for monitoring and supervision.

134. The cost of implementing the monitoring plan during the construction phase is \$51,000 covering the engagement of an environment specialist, providing 5.75 months of input over the 23 month construction period, and incidental costs.

135. A field monitoring checklist has been prepared based on the EMP and monitoring plan (Annex B). The field monitoring checklist will be used by the supervising field engineers. The signed checklists will be provided to the MPWU who will be responsible for the appropriate follow-up and compliance reporting.

136. The MPWU will maintain a Complaints Database, which will contain all the information on complaints received from the communities or other stakeholders. This would preferably include: the type of complaint, location, time, actions to address these complaints, and final outcome.

## **D. Institutional Implementation and Reporting Arrangements**

### **1. Project Implementation**

137. MPWU is the Implementing Agency for the Project and will be responsible for the implementation and compliance with the EMP and Monitoring Plan. Day-to-day implementation and compliance will be the task of PSC.

### **2. Reporting Arrangements**

138. The findings of the regular monitoring activities, as specified in the Monitoring Plan (Table 3) will be included in the quarterly PSC progress reports. The person assigned for environmental and social affairs of the MPWU will be responsible for the reviewing of Environmental Safeguard sections of the quarterly progress reports. This will include an overview of the status of the implementation of the EMP's and compliance to the national environmental regulations. The progress reports will be submitted for information to the EDC-MELAD, the Asian Development Bank and the World Bank.

**Table 1: Environmental Management Plan: Design/Pre-Construction Phase**

ENVIRONMENTAL ISSUE AND OBJECTIVE:	MITIGATION MEASURES	TREATMENT DURING PRE-CONSTRUCTION
<b>DESIGN/PRE-CONSTRUCTION PHASE</b>		
<b>Protection of (sensitive) Natural areas</b>  To minimize negative impacts on sensitive ecosystems, or the natural environment:	<ul style="list-style-type: none"> <li>Identify potential environmentally sensitive / natural areas</li> <li>Locate optional construction sites/activities away from them.</li> <li>Ensure construction personnel are aware of locations of sensitive areas and avoid them</li> <li>If the proposed construction passes close to these areas, include temporary fences to restrict machines and activities from encroaching in the area.</li> </ul>	The project road alignments were inspected and consultations undertaken. While most of the road alignment passes through densely populated areas where natural ecosystems have been substantially altered by human habitation, some widening is to take place adjacent to mangrove stands, including some being established under the KAP. Improved revetment of the road is required, and this will be achieved by the construction of a small wall using cement filled sand-bags, well clear of the mangrove stands. The EMP for the construction phase provides for protection of the mangroves during the course of construction activities. Trees removed from the Anderson and Temaiku causeways will be replanted with suitable species, identified by local residents.
<b>Environmentally Sound design</b>  To avoid erosion and damage to the road:	<ul style="list-style-type: none"> <li>Roads should have sufficient camber (5-8% cross fall) so that the rainwater flows away from the road.</li> <li>Road structures should have effective drainage systems (side-drains, culverts, etc.).</li> <li>Cross drainage flows are properly taken care of at causeways, bridges, culverts, etc.</li> </ul>	A camber of 3% has been included in the design, which ensures adequate flow of water from the road surface. Observations of natural drainage patterns during rainfall events shows that, on reaching bare soil surfaces, water usually seeps rapidly through the soil profile, except where the soil has been heavily compacted by vehicle movements. Testing of soils from roadside areas has demonstrated that, if uncompacted, water drains freely and rapidly through the soil profile. The main drainage problems occur in depressions where the soil has become compacted through vehicle movements. This existing situation will be remedied by the provision of "rain gardens" which comprise areas of 25 – 50 sq m, protected by bollards where the soil is to be scarified and planted with grass and shrubs. This concept has been discussed in the public consultations and is considered acceptable. U drains will be provided in sections of the road where, due to the presence of walls or buildings, water cannot disperse naturally.
<b>Road Safety</b>  To avoid accidents during and after construction of the road:	<ul style="list-style-type: none"> <li>Include occupational health and safety requirements are in place on construction sites in work camps. .</li> <li>Include install of lights and cautionary signs in hazardous areas.</li> <li>Ensure that footpaths and pull-off bays along roads; through villages; and near markets, schools, and other community facilities are included in the design.</li> <li>Include safety instructions for the construction activities in the contract documents.</li> <li>Ensure that speed bumps near schools, hospitals, and markets are included in the road design.</li> <li>Ensure sufficient visibility along the road section according to standard specifications.</li> </ul>	Villages and sections of road passing hospitals, schools and manebas have been treated as speed control zones. With these zones, the following safety measures are provided (i) "village gateways", which display the village name and speed limits (in English and I-Kiribati) and have road markings to give the impression of constriction and encourage slower driving (ii) marked pedestrian walkways, (iii) speed humps (iv) raised kerbs, (v) marked bus bays and (vi) lighting. In all other areas, safety measures include footways on either side of the road wherever space permits, appropriate signage and trimming of vegetation where required to achieve adequate visibility. The EMP for construction provides for measures to ensure safety to workers and the public from construction activities.
<b>Cultural Heritage</b>  To avoid any serious damage to cultural heritage site (i.e., ceremonial sites and burial grounds):	<ul style="list-style-type: none"> <li>In case a cultural heritage site is identified during the construction, the Contractor will cease all work immediately and notify the PSC</li> </ul>	Excavation is only required for the formation of U drains in certain locations. Consultations confirm that artifacts of cultural or historic importance do not occur during excavation activities that are undertaken regularly to build or extend homes and public buildings. However, the updated EMP for the construction phase includes provision for ceasing work and notifying the Project Steering Committee should artifacts of cultural or historical importance be unearthed.

ENVIRONMENTAL ISSUE AND OBJECTIVE:	MITIGATION MEASURES	TREATMENT DURING PRE-CONSTRUCTION
<b>Social or Community Concerns</b>  To minimize social impact of an relocation or resettlement of people:	<ul style="list-style-type: none"> <li>Plan activities to avoid/minimize displacement of residents</li> <li>Discuss the projected impacts and negotiate proposed measures in advance with the affected community; work with local government officers and NGOs</li> <li>Conduct surveys before activities commence to identify all members of affected populations</li> <li>Identify other land based natural resources, infrastructure and services which may be lost to the affected community</li> <li>Identify suitable land (if possible, land having the same clan ownership) for resettlement.</li> </ul>	Consultations have taken place with groups of villagers according to a publicized schedule. These identified little some concerns related to design and minor concern over construction activities. Concerns related to design were (i) the need to correct existing problems with drainage (ii) possible removal of trees to make way for footways and (iii) some concerns over land acquisition issues. These are addressed by (i) provision for drainage as described above, (ii) allowing for retention of trees in designing footways and (iii) development and implementation of a comprehensive land acquisition plan, including a 100% inventory of losses and enactment of specific compensation policies acceptable to affected persons, the government and the financing agencies. Where practicable, labor based techniques have been provided for. This includes the prescribed concrete surfacing of feeder roads, which makes use of labor rather than heavy machinery.
To minimize damage to personal and community property:	<ul style="list-style-type: none"> <li>Ensure works will be restricted to the 'right-of-way' of the existing road;</li> <li>Ensure projected impacts and proposed measures have been discussed in advance with the affected community; work with local government officers and non-governmental organizations.</li> <li>Conduct surveys before activities commence to identify all members of affected populations.</li> </ul>	Project impacts and proposed mitigation measures have been discussed with communities and councils during design.  Detailed surveys of affected property will be completed prior to construction
Unexploded Ordnance	<ul style="list-style-type: none"> <li>Detection at all suspected sites by means of a 100% sweep by mine/metal detectors and a deep magnetometer search following clearance work using approved, nominated search instruments and under the supervision of a qualified and designated EOD expert</li> <li>Relocation of unexploded ordnance to the police bunker in Betio,</li> <li>Clear and accurate marking of all cleared areas</li> <li>Confirmation from EOD expert that sites are safe for construction activities to proceed</li> </ul>	All measures to be carried out prior to construction  No construction to proceed without confirmation from EOD expert that sites are safe for construction activities.



**Table 2: Environmental Management Plan: Construction and Operation Phase**

ENVIRONMENTAL ISSUE AND OBJECTIVE:	• MITIGATION MEASURES	LOCATIONS	TIMEFRAME	ESTIMATED MITIGATION COSTS	IMPLEMENTATION	SUPERVISION
<b>CONSTRUCTION PHASE</b>						
<b>Social or Community Concerns</b>  To minimize social disturbance and maximize community benefits from the project:	<ul style="list-style-type: none"> <li>Advise the local community of project plans in advance of construction, and involve them in planning, as necessary (specific sites given in Table 4).</li> <li>Avoid or minimize disturbances near living areas, schools, hospitals, etc.</li> <li>Control runoff and manage sediments near cultivated areas</li> <li>Abide by the laws of the Republic of Kiribati relating to employment and use of labor</li> <li>Maintain liaison with community representatives and arrange for the involvement of community groups where practicable, such as the provision of catering services Include women's and other community groups in project activities</li> </ul>	Along road alignment	During mobilization and commencement of construction activities in the communities	Minimal (part of standard design practices).	Contractor	MPWU/CSC
<b>Soil Instability and Erosion</b>  To minimize the amount of sediment lost from the site:	<ul style="list-style-type: none"> <li>Reduce the time excavated drainage channels remain unsupported</li> <li>Keep vegetation clearing to a minimum</li> <li>Place geotextile silt traps as appropriate</li> <li>At sites where vegetation is removed, encourage re-vegetation immediately after construction activity finishes</li> </ul>	All areas where clearing is required	Continuous	Minimal (part of standard construction practices)	Contractor	MPWU/CSC
<b>Controlling Sediment</b>  To minimize impact of storm water containing sediment on streams and coasts including suspended sediment in the lagoon:	<ul style="list-style-type: none"> <li>Install silt traps at drainage ditches and materials stockpiles</li> <li>Revegetate all areas where vegetation was removed which are not to be paved after final land shaping</li> <li>Limit ground disturbance to areas of a workable size</li> <li>Schedule construction to minimize areas of soil disturbance during wet seasons</li> <li>Contain or isolate construction areas using a bund or trench, from other surface runoff. Clean and rehabilitate when construction is complete</li> <li>Discharge of sediment bearing contaminated water to the lagoon is prohibited</li> </ul>	All areas where clearing is required.	Continuous	Minimal (part of standard construction practices).	Contractor	MPWU/CSC
<b>Controlling Storm water</b>  To minimize the impact of contaminated runoff water:	<ul style="list-style-type: none"> <li>Pass storm water run-off from construction areas through geotextile silt traps before discharge into culverts or drainage systems.</li> <li>Store oil and bituminous products in a contained location away from drainage ditches.</li> </ul>	All areas where clearing is required.	Continuous	Minimal (part of standard construction practices)	Contractor	MPWU/CSC

<b>Management of Stockpiles and Spoil-heaps</b>  To minimize dust and runoff	<ul style="list-style-type: none"> <li>Discuss dumping locations with local landowners</li> <li>Ensure proper drainage to isolate the sites.</li> <li>Ensure stockpile or spoil-heap locations do not block surface runoff or drainage lines</li> <li>Cover or re-vegetate spoil-heap or stockpiles if prolonged exposure is envisaged, to minimize erosion and sediment runoff</li> <li>Maximum stockpile height shall be 3m</li> <li>Place geotextile silt traps around materials stockpiles</li> <li>Adequate provision shall be made to ensure that no stockpiles are able to release material into the sea or lagoon, even under heavy rain or windy conditions. Any stockpiles within 20m of the shore shall, in addition to being fitted with silt traps, also have a covering to prevent windborne deposition into the waters. Arrangements shall be made to ensure that no silt in silt traps is able to drain to the shore.</li> </ul>	Dumping areas and areas where materials are stored.	Continuous	Minimal (part of standard construction practices)	Contractor	MPWU/CSC
<b>Dust Control / Air Quality</b>  To minimize health risk or inconvenience due to gas and particulate emissions:	<ul style="list-style-type: none"> <li>Spray water on exposed surfaces during dry periods, especially near schools, hospitals and community areas.</li> <li>Ensure trucks are not overloaded and are covered when transporting friable materials.</li> <li>Minimize pollution from asphalt plant through the choice of products used in asphalt manufacture, plant siting (taking account of wind direction and the location of dwellings), measures to ensure that production ceases during unfavourable wind conditions, the process to be used, inclusion of pollution abatement measures such as centrifugal dust collectors, wet scrubbers, filters and splash guards.</li> </ul>	Cleared areas, material transport	During dry periods	Minimal (part of standard design practices).	Contractor	MPWU/CSC
<b>Noise control</b>  To minimize nuisance from noise:	<ul style="list-style-type: none"> <li>Use modern and well maintained equipment with mufflers</li> <li>Carry out noisy construction activities during daylight hours (0700 – 1900)</li> <li>Advise local people, schools, hospitals, etc., when there will be unavoidable noise activities. (specific sites given in Table 4)</li> </ul>	All construction areas, access routes	Continuous	Minimal (part of standard design practices).	Contractor	MPWU/CSC

<b>Material Management</b>  To minimize impacts of materials delivery and waste disposal	<ul style="list-style-type: none"> <li>• Develop materials delivery and waste disposal handling plan, covering the timing of truck trips to avoid delivery during peak traffic periods</li> <li>• Place silt fences around materials stockpiles</li> <li>• Ensure adequate docking and storage facilities at point of transfer from barge</li> <li>• Use water sprays or covered chutes to reduce dust emission during loading and unloading of materials from barges;</li> <li>• Develop safety measures to avoid loss of load from trucks</li> <li>• Implement methods to reduce dust emission from the loads</li> <li>• Implement site safety plan with regard to vehicle operation and use.</li> <li>• Maintain materials processing plant in good working condition so as to reduce emission from the plant;</li> <li>• Ensure no spillage from stockpile sites</li> <li>• All imported material to be free of organic matter, obtained from certified clean sources and/or fumigated prior to arrival in Kiribati</li> </ul>	All materials management areas	Continuous	Minimal (already part of standard design practices)	Contractor	MPWU/CSC
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<p><b>Extraction of Materials</b></p> <p>To ensure that all extraction of materials locally does not cause damage to benthic formations or risks of coastal erosion</p>	<ul style="list-style-type: none"> <li>• Dredging may only take place in areas where the lagoon floor is already disturbed by activities such as prior dredging and channel construction and where sediments are coarse and loose, rather than where they are fine and cohesive in order to avoid sediment plumes and to limit siltation;</li> <li>• A statement will be provided by the Contractor as to the dredging system chosen and means by which it will minimize the spread of suspended sediments. This statement shall be subject to approval by the Engineer</li> <li>• The dredging barge and its equipment shall be in sound and well maintained condition, and free of any leaks of any fluid at all times. No machinery showing any signs of leaking shall be allowed to work in the lagoon until completely repaired.</li> <li>• The barge shall be operated by appropriately licensed individuals only, in accordance with the laws and regulations of the Government of Kiribati, including any regulations that relate to dredging and to navigation within lagoon waters</li> <li>• The barge shall operate and be kept in waters of a depth that exceed its draft or kept in areas where the lagoon floor is already disturbed, so that its hull does not come into contact with any live coral, seagrass or other benthic growth.</li> <li>• All dredging shall comply with relevant laws of the Republic of Kiribati and international conventions to which it is a signatory</li> <li>• Dredging operations shall be monitored visually, and photographs of plume movement taken, along with recording of conditions of wind speed and direction and phase of the tidal cycle. Dredging operations during incoming tides or strong westerly winds (which occur intermittently, mainly between April and September) will only be allowed if it can be demonstrated that plume movement does not extend to areas of intact coral or seagrass formations.</li> <li>• In the case of channel enlargement, carrying out a detailed assessment of the requirements for channel rehabilitation and upgrading</li> <li>• Immediate removal of all excavated materials from the dredging site to land</li> <li>• Storage, temporary or otherwise, of dredged material below the high water mark is not allowed</li> </ul>	The lagoon	Continuous	Minimal (already part of standard design practices)	Contractor	MPWU/CSC
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<b>Construction of Seawalls</b>  To reduce risk of smothering benthic habitats, release of oil or fuel from machinery and collapse of excavated surface prior to completion of the wall	<ul style="list-style-type: none"> <li>• Submission of a method statement to the Engineer stating how risks of collapse will be minimized and excavated material handled including mention of measures to be adopted at sites where work will take place over open water</li> <li>• Careful planning of the works to ensure that excavation work takes place during low tide</li> <li>• Immediate removal of excavated material to dry land</li> <li>• Minimizing the period that the excavated area will be left unprotected</li> <li>• Ensuring that all equipment used below the high water mark is in sound and well maintained condition, and free of any leaks of any fluid at all times.</li> </ul>	The intertidal zone on the seaward side of the island	Continuous	Minimal (part of standard design practices).	Contractor	MPWU/CSC
<b>Offsite and Waste Management</b>  To prevent / minimize contamination from solid wastes and sewerage:	<ul style="list-style-type: none"> <li>• Contain all solid waste within construction sites and remove to landfill</li> <li>• Removal of hazardous waste, including bitumen contains, from the island</li> <li>• Prepare procedures for managing spillages to ensure rapid containment, immediate site cleaning and appropriate disposal (as for depots and workshops)</li> <li>• Crush, and remove all inorganic solid waste to landfill</li> <li>• Develop a plan for handover, sale or removal of all plant, vehicles and machinery at the end of the contract, ensuring that no unserviceable items of equipment are left on the island</li> <li>• Install onsite toilets with appropriate management arrangements for effluent and collection of sludge to prevent any release of contamination into the soil. Liaise with the Public Utilities Board for appropriate collection and disposal of sludge</li> <li>• Compost or use as animal food all green or organic wastes</li> </ul>	All off-sites storage and disposal sites	Continuous	Minimal (part of standard design practices).	Contractor	MPWU/CSC
<b>Storage and handling of fuel and lubricants</b>  To minimize hazards relating to fuel, oil, paints etc	<ul style="list-style-type: none"> <li>• Fuel oil and bitumen will be stored in dedicated areas at least 20 m away from the lagoon areas.</li> <li>• Where fuel in excess of 5,000 liters is stored on site, it will be stored in sealed tanks on a concrete base that is bunded to hold 110% of the tank capacity.</li> <li>• All workshops would be provided with oil and water separators.</li> <li>• Vehicles and machinery will not to be refuelled within 20 m of the lagoon.</li> <li>• Nominate authorized personnel for fuel handling</li> <li>• Develop procedures for cleaning up accidental spills.</li> <li>• Report any major spill in the vicinity of the lagoon to MELAD.</li> <li>• Collect and dispose of all waste oil, oil and fuel filters at the landfill.</li> </ul>	All workshops, depots, storage sites work sites and sites where construction plant and vehicles are parked	Continuous	Minimal (part of standard design practices).	Contractor	MPWU/CSC

<b>Safety and Health</b>  To ensure maximum safety of construction personnel and local residents:	<ul style="list-style-type: none"> <li>• Ensure all occupational health and safety requirements are in place on construction sites and in work camps</li> <li>• Install lights and cautionary signs in hazardous areas</li> <li>• Establish footpaths and pull-off bays along roads through villages, near markets, schools and other community facilities</li> <li>• Limit construction activities from 0700 hr to 1900 hr to limit exposure to dust, noise etc.</li> <li>• Enhance safety and inspection procedures</li> <li>• Use Personal Protection Equipment (PPE)</li> </ul>	All construction sites.	Continuous	Minimal (part of standard design practices).	Contractor	MPWU/CSC
General Health and Safety Awareness for construction workers:	<ul style="list-style-type: none"> <li>• Prepare a site safety plan specifying responsibilities and authorities within the Contractor's staff for adhering to safety and health requirements, to cover adherence to occupational health and safety requirements, provide for use of personal protective equipment, provide for lighting and warning signs at hazardous areas, set rules for operation of vehicles and equipment by authorized personnel, set procedures for safe handling of toxic and hazardous materials, set arrangements for first aid and emergency procedures, provide for posting notices about medical assistance and location of emergency equipment, set schedules for regular checking of adherence to the plan and train staff to familiarize them with the plan their obligations to implement it and main areas of risk to workers and others</li> <li>• Provide for the management and control of traffic during the works, arrangement for safe delivery of construction materials and safe parking of vehicles and plant (both during working hours and overnight)</li> <li>• Education on basic hygiene practices to minimize spread of tropical diseases</li> <li>• Increase workers' HIV/AIDS and STD awareness, including information on methods of transmission and protection measures</li> <li>• Prohibit usage of drugs and alcohol on construction sites</li> </ul>	Construction camps and all worksites	Continuous	Minimal (part of standard design practices).	Contractor	MPWU/CSC

<b>Unexploded Ordnance</b>  To eliminate risks of death or injury to workers or the public from accidental detonation of ordnance that may remain from historical fighting on South Tarawa	<ul style="list-style-type: none"> <li>• A 100% sweep by mine/metal detectors and a deep magnetometer search following clearance work</li> <li>• Nomination of a qualified EOD expert to declare sites safe, and formal recognized training for other staff involved in the work.</li> <li>• Where collateral property damage is likely to occur as a result of disposal activity, the Contractor will advise the Engineer before proceeding.</li> <li>• Provision for medical treatment and emergency evacuation.</li> <li>• Use of approved, nominated search instruments.</li> <li>• Implementation of approved clearance method.</li> <li>• Relocation of unexploded ordnance to the police bunker in Betio under secure conditions</li> <li>• Survey of mined areas in accordance with the United Nations International Standard for Level 2 Surveys.</li> <li>• Clear and accurate marking and recording of all cleared areas to facilitate subsequent identification during construction.</li> <li>• Quality control checking, to a minimum of 5% of the de-mined area and 10% of the existing road formation.</li> </ul>	All sites where military combat is known or suspected to have taken place	Prior to the commencement of construction at suspect sites (as indicated in the Contractor's Work Plan)	Included in Contract Price	Contractor	MPWU/CSC
<b>Disruption of utilities</b>	<ul style="list-style-type: none"> <li>• Ensure high standards of site supervision and vehicle and plant operation to reduce risks of damage to water, power and telecommunication lines</li> <li>• Prepare procedures for rapid notification to the Public Utilities Board and assistance with re-instatement, in the event of any disruption</li> </ul>	All construction sites	Continuous	Minimal (part of standard design practices).	Contractor	MPWU/CSC
<b>Site de-commissioning</b>  To minimize ongoing impacts after construction is completed:	<ul style="list-style-type: none"> <li>• Rake or loosen all compacted ground surfaces</li> <li>• Ensure that waste and surplus materials are removed from site, or otherwise dealt with according to the wishes of landowners or local residents</li> <li>• Excavate any contaminated soil from fuel depots / workshops, remove and reshape the area.</li> </ul>	All construction and camp sites	After completion of construction	Minimal (part of standard design practices).	Contractor	MPWU/CSC
<b>OPERATION PHASE<sup>2</sup></b>						
<b>Peoples Safety</b>  To enhance safety following increased vehicle speed :	<ul style="list-style-type: none"> <li>• Install speed bump at selected places (e.g., settlements, schools, markets, etc.) to slow down traffic at critical locations.</li> <li>• Promote off-road let down stops for PMVs.</li> <li>• Enhance improvements in road signage and pavement markings.</li> <li>• Pay increased attention to road accident black spots.</li> </ul>	Sensitive areas (settlements, schools, markets)	As required	part of standard design practices	MPWU	MPWU HQ, Provincial Government, ADB/World Bank
<b>Rehabilitation and Maintenance of Practices</b>  To avoid drainage / erosion problems,	<ul style="list-style-type: none"> <li>• Conduct regular monitoring and inventory of risks for erosion and drainage problems</li> <li>• Conduct routine maintenance like grading, grass cutting, drain clearing, pothole patching and shoulder repairs.</li> </ul>	Entire road section	As required	part of standard design practices	MPWU	MPWU HQ, Provincial Government, ADB/World Bank

<sup>2</sup> A separate EMP, covering the environmental effects and their mitigation during the operational phase, will be issued.

**Table 3: Environmental Monitoring Plan**

ENVIRONMENTAL ISSUE AND OBJECTIVE:	WAYS FOR VERIFICATION	LOCATION	STANDARDS/CRITERIA	DURATION/FREQUENCY AND ESTIMATED COSTS	IMPLEMENTATION	SUPERVISION
<b>CONSTRUCTION PHASE</b>						
<b>Social or Community Concerns</b>  Minimization of social disturbance and maximize community benefits.	Verbal or formal complaints.  Project progress reports.	Along the entire road alignment	Resettlement Guidelines and international 'Best Practices' (see WB Handbook on Roads), as necessary.	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the MPWU Engineer and the Contractor.	ES and Engineer of MPWU
<b>Soil Instability and Erosion</b>  Minimization of the amount of sediment lost from the site.	Visual check for sediment load and waste management procedures.  Verbal or formal complaints.	All areas where clearing is required.	Construction and waste materials should be controlled.  Waste can only be disposed of at approved sites.	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the MPWU Engineer and the Contractor.	ES and Engineer of MPWU
<b>Controlling Sediment</b>  Minimizing storm water containing sediment from discharging into streams.  Ensuring that dredged material from channel improvement operations is removed promptly from the dredge site and that all machinery operating in the lagoon is free of leakages of fuel, lubricant or hydraulic fluid	Visual and field inspection.  Verbal or formal complaints.	All areas where clearing is required.	Erosion should be controlled.  No storage, temporary or otherwise, of dredged material within the lagoon  Sound condition of machinery operating in the lagoon, ensuring no leakages of any kind	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the MPWU Engineer and the Contractor.	ES and Engineer of MPWU
<b>Controlling Storm water</b>  Minimizing contaminated runoff water.	Visual check for water and drainage management.  Verbal or formal complaints.	All areas where clearing is required and construction sites.	No increase of drainage problems or water logged areas.  Waste can only be disposed of at approved sites.	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the MPWU Engineer and the Contractor.	ES and Engineer of MPWU
<b>Management of Stockpiles and Spoil-heaps</b>  Manage to minimize dust and runoff.	Visual field checks.  Verbal or formal complaints.	Dumping areas.	Construction and waste materials should be controlled. Waste can only be disposed of at approved sites .Maximum stockpile height 3m Stockpiles to be 20m from shore or adequate measures to prevent loss of sediment into lagoon or sea waters provided namely silt fences and covers	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the MPWU Engineer and the Contractor.	ES and Engineer of MPWU



ENVIRONMENTAL ISSUE AND OBJECTIVE:	WAYS FOR VERIFICATION	LOCATION	STANDARDS/CRITERIA	DURATION/FREQUENCY AND ESTIMATED COSTS	IMPLEMENTATION	SUPERVISION
<b>Air Quality and Dust Control</b>  Ensure there is no health risk or inconvenience due to dust production:	Visual field checks.  Verbal or formal complaints.  Review of asphalt production method and siting of plant	Cleared areas,	International 'Best Practices' (see ADB's Environmental Assessment Guidelines, WB Handbook on Roads and the Environment and WHO Guidelines), as necessary.	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the MPWU Engineer and the Contractor.	ES and Engineer of MPWU
<b>Noise control</b>  Ensure nuisance from noise is minimized.	Visual field checks.  Verbal or formal complaints	All construction areas, access routes	International 'Best Practices' (see ADB's Environmental Assessment Guidelines, WB Handbook on Roads and the Environment and WHO Guidelines), as necessary.	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the MPWU Engineer and the Contractor.	ES and Engineer of MPWU
<b>Materials Management</b>  To minimize the impacts of materials delivery and disposal.	Visual field checks.  Verbal or formal complaints	All construction areas, access routes	<ul style="list-style-type: none"> <li>• Implementation of materials delivery and waste disposal handling plan</li> <li>• Use of silt fences around materials stockpiles</li> <li>• Safe docking and storage at point of transfer from barge, and no significant increase in local traffic congestion caused</li> <li>• No spillage or dust from delivery trucks</li> <li>• Safe operation of delivery vehicles</li> <li>• No spillage from stockpile sites</li> <li>• Inspection of imported aggregate to ensure it is free of organic matter, and evidence that it has been obtained from certified clean sources and/or certification that it has been fumigated prior to arrival in Kiribati.</li> <li>• When located next to the work site, consideration is given to traffic requirements.</li> </ul>	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the MPWU Engineer and the Contractor.	ES and Engineer of MPWU

ENVIRONMENTAL ISSUE AND OBJECTIVE:	WAYS FOR VERIFICATION	LOCATION	STANDARDS/CRITERIA	DURATION/FREQUENCY AND ESTIMATED COSTS	IMPLEMENTATION	SUPERVISION
<b>Extraction of Materials</b>  To ensure that all extraction of materials locally does not cause damage to benthic formations or risks of coastal erosion	Visual field checks.  Verbal or formal complaints	Materials extraction areas in lagoon	<ul style="list-style-type: none"> <li>Dredging may in approved, previously disturbed sites only</li> <li>Dredging system provided and used in accordance with approved Contractor's statement</li> <li>The dredging barge and its equipment in good order and free of leaks</li> <li>Barge and equipment operated by licensed individuals and in accordance with relevant Republic of Kiribati legislation</li> <li>Barge hull clear of sea floor.</li> <li>Dredging plume not impacting on coral or seagrass communities</li> <li>Channel enlargement carried out to precise plans/drawings</li> <li>Immediate removal of all excavated materials from the dredging site to land</li> <li>No storage of dredged material within the lagoon zone</li> </ul>	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the MPWU Engineer and the Contractor.	ES and Engineer of MPWU
<b>Waste Management</b>  To prevent / minimize contamination from solid wastes and sewerage:	Visual field inspections  Verbal complaints by workers	All construction sites.	<ul style="list-style-type: none"> <li>All solid waste contained within construction sites and removed to landfill</li> <li>Hazardous waste, including empty bitumen containers, to be removed from the island</li> <li>Spillages managed according to stated procedures</li> <li>Proper onsite toilets in use</li> <li>Organic waste composted</li> </ul>	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the MPWU Engineer and the Contractor.	ES and Engineer of MPWU
<b>Storage and handling of fuel and lubricants</b>  To minimize hazards relating to fuel, oil, paints etc	Visual field inspections  Verbal complaints by workers	All construction sites.	<ul style="list-style-type: none"> <li>Fuel oil and bitumen stored at least 20 m away from the lagoon areas.</li> <li>Quantities more than 5,000 liters stored in sealed tanks on a concrete base that is banded to hold 110% of the tank capacity.</li> <li>All workshops provided with oil and water separators.</li> <li>Vehicles and machinery not refuelled within 20 m of the lagoon.</li> <li>Authorized personnel only handling fuel</li> <li>Accidental spills dealt with according to set procedures.</li> <li>Immediate reporting of any spills into lagoon to MELAD.</li> <li>Collect and dispose of all waste oil, oil and fuel filters at the landfill.</li> </ul>	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the MPWU Engineer and the Contractor.	ES and Engineer of MPWU

ENVIRONMENTAL ISSUE AND OBJECTIVE:	WAYS FOR VERIFICATION	LOCATION	STANDARDS/CRITERIA	DURATION/FREQUENCY AND ESTIMATED COSTS	IMPLEMENTATION	SUPERVISION
<b>Safety and Health</b> Ensure maximum safety of construction personnel and local residents.	Visual field inspections Verbal complaints by workers	All construction sites.	International 'Best Practices' (see ADB's Environmental Assessment Guidelines, WB Handbook on Roads and the Environment and WHO Guidelines), as necessary.	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the MPWU Engineer and the Contractor.	ES and Engineer of MPWU
Avoid disturbance by the constructions workers.	Verbal and formal complaints by communities.	Construction camps	As listed in the EMP.	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the MPWU Engineer and the Contractor.	ES and Engineer of MPWU
Health and Safety Awareness for construction workers.	Verbal and formal complaints by communities and workers.	Construction camps	As listed in the EMP.	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the MPWU Engineer and the Contractor.	ES and Engineer of MPWU
Safe operation and parking of construction plant and vehicles	Visual field inspections Verbal complaints	All work sites	n/a	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the MPWU Engineer and the Contractor.	
<b>Unexploded Ordnance</b>	Field inspections; inspections of documentation	Sites known to be at risk of contamination from historical fighting	100% sweep by mine/metal detectors and a deep magnetometer Qualifications of designated EOD expert, verification of training of other staff Provision for medical treatment and emergency evacuation. Approval of search instruments nominated for use in detection. Review/approval of proposed clearance method. Relocation of unexploded ordnance to the police bunker in Betio under secure conditions Survey of mined areas in accordance with the United Nations International Standard for Level 2 Surveys. Clear and accurate marking and recording of all cleared areas to facilitate subsequent identification during construction. Quality control checking, to a minimum of 5% of the de-mined area and 10% of the existing road formation.	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the MPWU Engineer and the Contractor.	ES and Engineer of MPWU
<b>Disruption of utilities</b>	Verbal and formal complaints by communities and workers.	Construction camps	As listed in the EMP.	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the MPWU Engineer and the Contractor.	ES and Engineer of MPWU

ENVIRONMENTAL ISSUE AND OBJECTIVE:	WAYS FOR VERIFICATION	LOCATION	STANDARDS/CRITERIA	DURATION/FREQUENCY AND ESTIMATED COSTS	IMPLEMENTATION	SUPERVISION
<b>Site de-commissioning</b> Minimize ongoing impacts after construction is completed	Counting of replanting.  Agreement with Communities	All construction and camp sites	No increase of soil erosion	After completion of construction (included in standard supervision)	Joint monitoring by the MPWU Engineer and the Contractor.	ES and Engineer of MPWU
<b>OPERATION PHASE<sup>3</sup></b>						
<b>Peoples Safety</b> Mitigate increased vehicle speed.	Visual checks.  Verbal and formal complaints by communities.	Sensitive areas (settlements, schools, markets)	Routine and Periodic Maintenance of traffic signs, road hump maintenance, etc	Annually after construction (included in standard supervision)	MPWU Engineer	MPWU HQ, Provincial Government, World Bank
<b>Rehabilitation and Road Maintenance Practices</b> Avoid drainage problems, aggravation of erosion, and reduced visibility.	Verbal and formal complaints.	Entire road section	.Routine and Periodic Maintenance	Annually after construction (minimal costs, included in standard supervision)	MPWU Engineer	MPWU HQ, Provincial Government, ADB/World Bank

<sup>3</sup> A separate EMP, covering the environmental effects and monitoring of them during the operational phase, will be issued

**Table 4: Specific Mitigation Measures**

LOCATIONS:				ITEM	SPECIFIC MITIGATION ACTIVITY
Abarao Village; Ambo Village; Bairiki Village; Banraeaba Village;	Betio Town; Bikenibeu Town; Bonriki Village; Buota Village;	Eita Village; Nanikaai Village; Tabaonga Village; Taborio Village;	Teaoraereke Village; Temaiku Village; Tengaruru Village	Villages / Residential Areas	Advise communities of project plans in advance of construction. Information should be posted at maneabas, will state location duration, dates of any operations that generate noise, dust, or fumes or that affect traffic. , and provide contact information for requests, concerns or suggestions. Adapt plans to take account of feedback as practicable.
Main Road: 5+260 5+430 9+860 12+700 14+200		Airport Road 0+400 0+800 to 2+000	Temaiku Road 1+500 2+400	Coastal Protection	Development of an appropriate method of construction that minimizes risks of collapse Careful planning of the works to ensure that excavation work takes place during low tide Immediate removal of excavated material to dry land Minimizing the period that the excavated area will be left unprotected Ensuring that all equipment used below the high water mark is in sound and well maintained condition, and free of any leaks of any fluid at all times.
Main Road: 1+375				Betio Causeway Bridge	Identify safe site locally for storage of equipment and materials and adequate supervision to reduce injury hazards and accidental spillage of materials into the channel Identify safe parking as narrow work site.
Main Road: 6+950 RHS 6+970 RHS 7+820 RHS 9+300 RHS 9+780 RHS 10+180 RHS 10+910 RHS	11+150 RHS 11+720 RHS 15+170 RHS 15+440 LHS 16+270 RHS 19+300 RHS 21+280 LHS 22+560 LHS	Buota Main Road 0+165 LHS 0+630 RHS  Buota Feeder Road 0+630 RHS	Temaiku Road 2+400 LHS 4+675 LHS	Churches and other religious establishments	Advise local people, schools, hospitals, etc., when there will be unavoidable noise activities
Main Road: 7+730 RHS 10+060 RHS 22+840 LHS 23+400 RHS 23+920 RHS				Hospital and clinics	

Main Road: 5+835 LHS 5+915 RHS 6+075 LHS 7+070 RHS 7+080 LHS 8+280 RHS 9+900 RHS 10+180 LHS	12+250 RHS 13+875 LHS 15+290 LHS 15+460 LHS 15+660 RHS 17+280 LHS 17+340 LHS 18+080 LHS 18+680 RHS	21+160 LHS 21+320 RHS 21+330 LHS 21+610 LHS 22+550 LHS  Buota Main Road 0+630 LHS 0+880 LHS	Buota Feeder Road 0+880 LHS  Temaiku Road 0+280 LHS 2+430 LHS 5+190 LHS 5+570 LHS	<i>Maneabas</i>	
Main Road: 7+630 RHS 7+680 RHS 14+385 RHS 14+520 RHS 15+550 RHS	15+930 RHS 18+540 RHS 18+620 RHS 22+26 LHS 23+73 LHS	Temaiku Road: 1+525 LHS 1+860 RHS		Schools and colleges	

<u>Main Road</u>	<u>12+500 RHS</u>	20+905 LHS	Bikenibeu Feeder Roads	Water System Assets	Ensure supervision of all works close to these items to avoid accidental damage
<u>5+850 LHS</u>	<u>12+700 LHS</u>	21+095 RHS	Road 1 0+627 RHS		
<u>5+900 RHS</u>	<u>13+010 RHS</u>	21+140 RHS	Road 1 1+059 LHS		
<u>6+040 LHS</u>	<u>13+050 RHS</u>	21+160 RHS	Road 1 1+153 RHS		
<u>6+830 LHS</u>	<u>13+275 LHS</u>	21+395 RHS	Road 3 0+018 LHS		
<u>7+080 LHS</u>	<u>13+665 RHS</u>	21+825 RHS	Road 3 0+020 LHS		
<u>7+265 RHS</u>	<u>13+830 LHS</u>	22+040 RHS	Road 3 0+040 LHS		
<u>7+670 RHS</u>	13+840 RHS	22+225 RHS	Road 4 0+059 RHS		
<u>7+750 RHS</u>	14+225 RHS	22+355 RHS	Road 4 0+262 RHS		
<u>7+950 RHS</u>	14+565 RHS	22+500 LHS	Road 4 0+780 RHS		
<u>8+080 LHS</u>	14+650 RHS	22+880 RHS	Road 4 0+823 LHS		
<u>8+125 RHS</u>	14+865 RHS	23+035 RHS	Road 4 0+978 LHS		
<u>8+270 RHS</u>	15+350 RHS	23+175 LHS	Road 4 0+986 RHS		
<u>8+460 RHS</u>	15+455 RHS	23+195 LHS			
<u>8+515 LHS</u>	15+660 LHS		Temaiku Road		
<u>8+650 RHS</u>	15+780 RHS	Betio Feeder Roads	0+035 LHS		
<u>8+670 RHS</u>	15+865 RHS	Road 2 0+242 RHS	0+295 RHS		
<u>9+145 RHS</u>	15+870 RHS	Road 4 0+130 RHS	0+360 RHS		
<u>9+150 RHS</u>	15+875 RHS	Road 4 0+217 RHS	0+376 RHS		
<u>9+415 RHS</u>	16+025 RHS	Road 5 0+286 LHS	0+423 RHS		
<u>9+425 RHS</u>	16+030 RHS	Road 7 0+050 RHS	0+815 RHS		
<u>9+550 RHS</u>	16+340 LHS	Road 7 0+052 LHS	1+773 RHS		
<u>9+700 RHS</u>	16+380 RHS	Road 7 0+070 LHS	1+783 RHS		
<u>9+760 RHS</u>	16+400 RHS	Road 7 0+071 LHS	3+162 RHS		
<u>9+910 RHS</u>	16+545 LHS	Road 7 0+161 LHS	6+110 LHS		
<u>10+145 RHS</u>	16+775 LHS	Road 8 0+356 LHS			
<u>10+260 RHS</u>	17+015 RHS	Road 8 0+418 RHS	Buota Main Road		
<u>10+330 RHS</u>	17+020 RHS	Road 8 0+447 LHS	0+170 LHS		
<u>10+365 LHS</u>	17+205 RHS	Road 8 0+451 RHS	0+173 LHS		
<u>10+410 LHS</u>	17+220 RHS	Road 8 0+547 LHS	0+322 RHS		
<u>10+475 RHS</u>	17+345 RHS	Road 8 0+560 LHS	0+395 RHS		
<u>10+550 RHS</u>	17+470 RHS	Road 8 0+577 LHS	0+920 RHS		
<u>10+850 LHS</u>	17+650 RHS	Road 10 0+095 LHS	1+010 RHS		
<u>10+860 RHS</u>	17+740 RHS	Road 10 0+096 LHS	1+087 LHS		
<u>10+930 RHS</u>	17+830 RHS	Road 10 0+098 LHS	1+154 LHS		
<u>10+950 RHS</u>	17+905 RHS	Road 10 0+180 RHS	1+210 LHS		
<u>11+290 RHS</u>	18+360 LHS	Road 11 0+068 RHS	1+243 LHS		
<u>11+325 RHS</u>	18+400 RHS	Road 11 0+146 RHS	1+872 RHS		
<u>11+345 RHS</u>	18+585 RHS				
<u>11+350 RHS</u>	18+630 RHS				
<u>11+495 LHS</u>	19+475 RHS				
<u>12+100 RHS</u>	20+875 RHS				

<u>Main Road</u>	<u>18+865 LHS</u>	<u>20+225 RHS</u>	Betio Feeder Roads	Streetlight Poles	Ensure supervision of all works close to these items to avoid accidental damage
<u>0+375 LHS</u>	<u>18+915 RHS</u>	<u>20+290 LHS</u>	Road 2 0+002 LHS		
<u>0+550 LHS</u>	<u>18+950 LHS</u>	<u>20+300 RHS</u>	Road 2 0+002 RHS		
<u>0+715 LHS</u>	<u>19+045 LHS</u>	<u>20+390 LHS</u>	Road 2 0+013 RHS		
<u>0+875 LHS</u>	<u>19+085 LHS</u>	<u>20+615 RHS</u>	Road 2 0+022 RHS		
<u>1+200 LHS</u>	<u>19+135 LHS</u>	<u>20+660 LHS</u>	Road 2 0+027 LHS		
<u>1+350 LHS</u>	<u>19+155 RHS</u>	<u>20+790 RHS</u>	Road 2 0+030 RHS		
<u>1+375 LHS</u>	<u>19+210 RHS</u>	<u>20+850 LHS</u>	Road 3 0+150 RHS		
<u>1+550 LHS</u>	<u>19+310 LHS</u>	<u>20+910 LHS</u>	Road 6 0+000 LHS		
<u>1+875 LHS</u>	<u>19+335 LHS</u>	<u>20+930 LHS</u>	Road 7 0+087 RHS		
<u>2+050 LHS</u>	<u>19+405 LHS</u>	<u>20+955 LHS</u>	Road 8 0+000 LHS		
<u>2+200 LHS</u>	<u>19+750 LHS</u>	<u>21+010 LHS</u>	Road 10 0+375 RHS		
<u>2+540 LHS</u>	<u>19+760 RHS</u>	<u>21+115 LHS</u>	Road 11 0+055 LHS		
<u>2+700 LHS</u>	<u>19+785 LHS</u>	<u>21+175 LHS</u>	Road 11 0+460 RHS		
<u>2+875 LHS</u>	<u>19+855 RHS</u>	<u>21+270 LHS</u>			
<u>3+030 LHS</u>	<u>19+860 LHS</u>	<u>21+300 LHS</u>			
<u>3+200 LHS</u>	<u>19+935 RHS</u>	<u>21+365 LHS</u>			
<u>3+250 RHS</u>	<u>20+075 RHS</u>	<u>21+520 RHS</u>			
<u>3+330 LHS</u>	<u>20+125 LHS</u>	<u>21+790 RHS</u>			
<u>18+590 LHS</u>	<u>20+200 LHS</u>	<u>21+835 RHS</u>			
<u>18+770 LHS</u>					



<u>Main Road</u>	10+630 LHS	15+220 LHS	19+050 RHS	Groundwater Wells	Ensure supervision of all works close to these items to avoid accidental damage
<u>4+640 LHS</u>	10+655 LHS	15+245 LHS	19+235 LHS		
<u>5+730 RHS</u>	10+810 LHS	15+250 LHS	19+235 RHS		
<u>5+860 LHS</u>	11+140 LHS	15+270 LHS	19+440 LHS		
<u>7+090 LHS</u>	11+220 RHS	15+300 LHS	19+530 RHS		
<u>7+125 LHS</u>	11+450 LHS	15+310 LHS	19+540 RHS		
<u>7+375 RHS</u>	11+450 RHS	15+310 RHS	20+540 LHS		
<u>7+400 LHS</u>	11+725 LHS	15+325 LHS	20+740 RHS		
<u>7+560 LHS</u>	11+840 RHS	15+335 LHS	20+900 LHS		
<u>7+620 LHS</u>	11+850 RHS	15+460 RHS	21+120 LHS		
<u>7+820 LHS</u>	11+900 LHS	15+525 LHS	21+525 LHS		
<u>7+890 RHS</u>	11+915 LHS	15+680 RHS	21+525 RHS		
<u>7+980 LHS</u>	11+925 RHS	15+685 LHS	21+555 LHS		
<u>8+030 LHS</u>	11+930 LHS	16+035 LHS	21+600 LHS		
<u>8+180 LHS</u>	12+130 LHS	16+050 LHS	21+610 RHS		
<u>8+205 LHS</u>	12+210 RHS	16+120 RHS	21+645 RHS		
<u>8+265 LHS</u>	12+295 LHS	16+140 LHS	21+680 LHS		
<u>8+280 LHS</u>	12+995 LHS	16+155 LHS	21+860 LHS		
<u>8+460 LHS</u>	13+115 LHS	16+160 LHS	22+185 LHS		
<u>8+490 RHS</u>	13+200 LHS	16+205 LHS	22+205 LHS		
<u>8+650 RHS</u>	13+250 LHS	16+210 LHS	22+240 LHS		
<u>8+770 RHS</u>	13+270 LHS	16+275 LHS	22+250 RHS		
<u>8+850 LHS</u>	13+375 RHS	16+310 LHS	22+905 RHS		
<u>8+850 RHS</u>	13+410 RHS	16+330 LHS	22+940 LHS		
<u>8+870 LHS</u>	13+540 RHS	16+495 LHS	22+940 RHS		
<u>8+925 LHS</u>	13+600 RHS	16+505 LHS	23+385 LHS		
<u>9+095 LHS</u>	13+800 RHS	16+555 LHS	23+615 RHS		
<u>9+225 RHS</u>	13+805 LHS	16+570 LHS	23+725 RHS		
<u>9+610 RHS</u>	13+850 LHS	16+605 LHS	23+730 RHS		
<u>9+940 RHS</u>	13+870 LHS	16+630 RHS	23+740 LHS		
<u>9+990 LHS</u>	13+905 LHS	17+070 LHS			
<u>10+025 LHS</u>	13+945 LHS	17+160 RHS			
<u>10+030 RHS</u>	13+945 RHS	17+315 LHS			
<u>10+075 LHS</u>	13+975 RHS	17+340 RHS			
<u>10+085 LHS</u>	14+065 LHS	17+380 RHS			
<u>10+110 RHS</u>	14+125 LHS	17+910 RHS			
<u>10+115 LHS</u>	14+220 RHS	17+970 LHS			
<u>10+140 RHS</u>	14+310 RHS	17+980 RHS			
<u>10+150 LHS</u>	14+365 LHS	18+095 LHS			
<u>10+180 LHS</u>	14+405 LHS	18+170 RHS			
<u>10+230 LHS</u>	14+490 LHS	18+180 LHS			
<u>10+290 LHS</u>	14+680 RHS	18+260 RHS			
<u>10+440 LHS</u>	14+725 RHS	18+360 RHS			
<u>10+455 LHS</u>	14+750 RHS	18+380 RHS			
<u>10+480 LHS</u>	15+030 LHS	18+385 LHS			
	15+135 RHS	18+980 LHS			

<u>Betio Feeder Roads</u>	Bikenibeu Feeder Roads	Temaiku Road	1+460 LHS	Groundwater Wells (cont.)	Ensure supervision of all works close to these items to avoid accidental damage
<u>Road 2 0+232 RHS</u>	Road 1 0+231 RHS	0+060 LHS	1+750 RHS		
<u>Road 2 0+343 LHS</u>	Road 1 0+325 RHS	0+160 LHS	1+807 RHS		
<u>Road 3 0+005 LHS</u>	Road 1 0+400 LHS	0+260 LHS	1+935 LHS		
<u>Road 3 0+098 LHS</u>	Road 1 1+058 LHS	0+315 LHS	1+950 RHS		
<u>Road 4 0+090 LHS</u>	Road 1 1+076 RHS	0+335 LHS	1+965 LHS		
<u>Road 4 0+106 LHS</u>	Road 1 1+105 LHS	0+355 RHS	2+002 LHS		
<u>Road 4 0+125 LHS</u>	Road 1 1+140 RHS	0+382 LHS	2+030 RHS		
<u>Road 4 0+136 LHS</u>	Road 1 1+165 RHS	0+385 LHS	2+030 LHS		
<u>Road 4 0+138 RHS</u>	Road 2 0+051 Road centre	0+390 RHS	2+100 LHS		
<u>Road 4 0+144 LHS</u>	Road 2 0+155 LHS	0+422 RHS	2+137 LHS		
<u>Road 4 0+169 LHS</u>	Road 3 0+038 RHS	0+425 LHS	2+308 LHS		
<u>Road 4 0+171 LHS</u>	Road 3 0+095 RHS	0+458 LHS	2+336 LHS		
<u>Road 4 0+176 LHS</u>	Road 4 0+025 LHS	0+458 RHS	2+500 LHS		
<u>Road 4 0+198 LHS</u>	Road 4 0+162 LHS	0+478 LHS	2+690 LHS		
<u>Road 4 0+217 LHS</u>	Road 4 0+334 RHS	0+495 LHS	2+800 LHS		
<u>Road 4 0+228 LHS</u>	Road 4 0+463 RHS	0+580 RHS	2+820 RHS		
<u>Road 4 0+232 LHS</u>	Road 4 0+484 RHS	0+600 LHS	2+887 RHS		
<u>Road 5 0+050 LHS</u>	Road 4 0+550 LHS	0+605 RHS	3+008 RHS		
<u>Road 5 0+060 LHS</u>	Road 4 0+564 LHS	0+651 LHS	3+100 RHS		
<u>Road 5 0+140 LHS</u>	Road 4 0+573 RHS	0+728 LHS	4+507 LHS		
<u>Road 6 0+011 LHS</u>	Road 4 0+579 LHS	0+735 RHS	4+511 LHS		
<u>Road 6 0+117 RHS</u>	Road 4 0+635 LHS	0+744 RHS	4+955 RHS		
<u>Road 6 0+034 RHS</u>	Road 4 0+637 RHS	0+770 LHS	5+002 LHS		
<u>Road 6 0+164 LHS</u>	Road 4 0+639 LHS	0+788 LHS	5+196 LHS		
<u>Road 6 0+316 LHS</u>	Road 4 0+687 RHS	0+822 LHS	5+287 LHS		
<u>Road 7 0+058 RHS</u>	Road 4 0+758 RHS	0+867 RHS	5+315 LHS		
<u>Road 8 0+021 LHS</u>	Road 4 0+771 RHS	0+872 LHS	5+441 LHS		
<u>Road 8 0+025 LHS</u>	Road 4 0+818 RHS	1+070 LHS	5+628 RHS		
<u>Road 8 0+038 RHS</u>	Road 4 0+976 RHS	1+348 RHS	5+783 LHS		
<u>Road 8 0+077 LHS</u>	Road 4 0+991 LHS	1+353 RHS	5+798 LHS		
<u>Road 8 0+407 RHS</u>	Road 5 0+044 RHS				
<u>Road 8 0+422 RHS</u>			Buota Feeder Road		
<u>Road 8 0+718 RHS</u>			0+655 LHS		
<u>Road 8 0+602 LHS</u>			0+813 RHS		
<u>Road 10 0+327 LHS</u>					

<u>Main Road</u>	11+245 RHS	16+580 RHS	20+970 RHS	Power Supply System Assets	Ensure supervision of all works close to these items to avoid accidental damage
<u>7+035 RHS</u>	11+340 RHS	16+690 LHS	21+010 RHS		
<u>7+070 LHS</u>	11+420 RHS	16+735 RHS	21+060 RHS		
<u>7+090 RHS</u>	11+550 LHS	16+785 RHS	21+245 RHS		
<u>7+270 LHS</u>	11+575 RHS	16+865 RHS	21+355 LHS		
<u>7+325 RHS</u>	11+665 LHS	16+925 RHS	21+355 RHS		
<u>7+400 RHS</u>	11+840 LHS	17+000 RHS	21+440 RHS		
<u>7+470 RHS</u>	11+880 RHS	17+050 RHS	21+545 RHS		
<u>7+560 RHS</u>	11+960 RHS	17+280 RHS	21+640 RHS		
<u>7+650 RHS</u>	12+090 RHS	17+350 RHS	21+695 RHS		
<u>7+700 RHS</u>	12+340 RHS	17+460 RHS	21+740 RHS		
<u>7+790 RHS</u>	12+950 LHS	17+595 RHS	21+790 LHS		
<u>7+960 RHS</u>	13+025 RHS	17+670 RHS	21+840 RHS		
<u>8+050 RHS</u>	13+225 RHS	17+725 RHS	21+915 RHS		
<u>8+150 RHS</u>	13+415 RHS	17+805 RHS	22+010 RHS		
<u>8+225 RHS</u>	13+580 RHS	17+850 LHS	22+105 RHS		
<u>8+310 RHS</u>	13+695 RHS	17+955 RHS	22+205 RHS		
<u>8+450 RHS</u>	13+765 RHS	18+010 RHS	22+310 RHS		
<u>8+520 RHS</u>	13+810 RHS	18+065 RHS	22+335 LHS		
<u>8+620 RHS</u>	13+860 RHS	18+160 LHS	22+390 LHS		
<u>8+720 RHS</u>	13+935 RHS	18+310 LHS	22+445 LHS		
<u>8+830 RHS</u>	14+050 RHS	18+440 RHS	22+510 LHS		
<u>9+200 RHS</u>	14+105 RHS	18+510 RHS	22+610 LHS		
<u>9+270 RHS</u>	14+315 RHS	18+585 RHS	22+865 LHS		
<u>9+350 LHS</u>	14+570 RHS	18+835 RHS	22+960 LHS		
<u>9+410 RHS</u>	14+610 RHS	18+925 RHS	23+095 LHS		
<u>9+500 RHS</u>	14+635 RHS	19+010 RHS	23+280 LHS		
<u>9+625 RHS</u>	14+705 RHS	19+205 LHS	23+325 LHS		
<u>9+710 RHS</u>	14+860 RHS	19+440 RHS	23+370 LHS		
<u>9+940 LHS</u>	14+940 RHS	19+905 RHS	23+480 LHS		
<u>9+960 RHS</u>	15+025 RHS	19+950 RHS	23+540 RHS		
<u>10+010 RHS</u>	15+105 RHS	20+025 RHS	23+565 LHS		
<u>10+075 RHS</u>	15+210 RHS	20+080 RHS	23+650 RHS		
<u>10+130 RHS</u>	15+320 LHS	20+165 RHS	23+730 RHS		
<u>10+185 RHS</u>	15+380 LHS	20+235 RHS	23+790 RHS		
<u>10+310 RHS</u>	15+500 LHS	20+270 RHS	23+805 LHS		
<u>10+360 RHS</u>	15+580 LHS	20+340 RHS	23+855 RHS		
<u>10+450 RHS</u>	15+580 RHS	20+380 RHS			
<u>10+520 RHS</u>	15+680 LHS	20+390 LHS			
<u>10+605 RHS</u>	15+860 RHS	20+460 RHS			
<u>10+715 RHS</u>	16+060 RHS	20+525 RHS			
<u>10+780 LHS</u>	16+105 LHS	20+580 RHS			
<u>10+860 LHS</u>	16+280 LHS	20+650 RHS			
<u>11+020 RHS</u>	16+320 RHS	20+730 RHS			
<u>11+125 RHS</u>	16+410 RHS	20+840 RHS			
	16+460 RHS	20+915 RHS			

<u>Betio Feeder Roads</u> <u>Road 7 0+043 LHS</u> <u>Road 7 0+088 RHS</u> <u>Road 8 0+000 LHS</u> <u>Road 8 0+060 LHS</u> <u>Road 8 0+270 LHS</u> <u>Road 8 0+316 RHS</u> <u>Road 8 0+445 RHS</u> <u>Road 8 0+687 LHS</u> <u>Road 9 0+038 LHS</u> <u>Road 9 0+038 RHS</u> <u>Road 10 0+042 RHS</u> <u>Road 11 0+018 LHS</u> <u>Road 11 0+068 LHS</u> <u>Road 11 0+110 LHS</u> <u>Road 11 0+357 RHS</u>  <u>Bikenibeu Feeder Roads</u> <u>Road 1 0+070 RHS</u> <u>Road 1 0+137 LHS</u> <u>Road 1 0+146 RHS</u> <u>Road 1 0+236 LHS</u> <u>Road 1 0+252 RHS</u> <u>Road 1 0+310 LHS</u> <u>Road 1 0+373 RHS</u> <u>Road 1 0+420 LHS</u> <u>Road 1 0+498 RHS</u> <u>Road 1 0+805 LHS</u> <u>Road 1 0+950 RHS</u> <u>Road 1 1+047 RHS</u> <u>Road 1 1+090 RHS</u> <u>Road 1 1+190 LHS</u> <u>Road 2 0+022 RHS</u> <u>Road 2 0+053 RHS</u> <u>Road 2 0+097 RHS</u> <u>Road 2 0+147 RHS</u>	<u>Road 2 0+184 RHS</u> <u>Road 3 0+027 RHS</u> <u>Road 3 0+103 RHS</u> <u>Road 4 0+045 RHS</u> <u>Road 4 0+197 LHS</u> <u>Road 4 0+254 LHS</u> <u>Road 4 0+284 LHS</u> <u>Road 4 0+322 LHS</u> <u>Road 4 0+425 RHS</u> <u>Road 4 0+578 LHS</u> <u>Road 4 0+602 RHS</u> <u>Road 4 0+632 LHS</u> <u>Road 4 0+691 LHS</u> <u>Road 4 0+783 RHS</u> <u>Road 4 0+926 RHS</u> <u>Road 4 0+982 RHS</u> <u>Road 6 0+047 LHS</u> <u>Road 6 0+088 RHS</u> <u>Road 6 0+126 LHS</u>  Temaiku Road 0+015 RHS 0+120 RHS 0+205 RHS 0+330 RHS 0+416 RHS 0+497 RHS 0+646 RHS 0+749 RHS 0+835 LHS 0+847 RHS 0+945 LHS 1+040 LHS 1+145 LHS 1+195 LHS	1+225 LHS 1+318 LHS 1+386 LHS 1+800 LHS 1+875 LHS 1+985 LHS 2+050 LHS 2+138 LHS 2+198 LHS 2+257 LHS 2+365 LHS 2+498 LHS 2+665 RHS 2+903 LHS 2+992 LHS 2+998 LHS 3+190 LHS 3+810 LHS 4+137 LHS 4+258 LHS 4+365 LHS 4+560 LHS 4+720 LHS 4+813 LHS 4+977 LHS 5+065 LHS 5+178 LHS 5+320 LHS 5+375 LHS 5+423 LHS 5+500 LHS 5+572 LHS 5+623 LHS 5+671 LHS 5+740 LHS	Buota Main Road 0+140 RHS 0+240 RHS 0+477 RHS 0+569 RHS 0+665 RHS 0+768 RHS 0+860 RHS 0+928 LHS 0+940 LHS 1+084 LHS 1+172 LHS 1+270 LHS 1+365 LHS 1+430 LHS 1+545 LHS 1+638 RHS 1+720 RHS 1+900 LHS 1+965 LHS  Buota Feeder Road 0+505 RHS 0+690 RHS 0+870 RHS 0+927 RHS	Power Supply System Assets (cont)	Ensure supervision of all works close to these items to avoid accidental damage
Main Road 0+100 RHS 13+085 RHS 14+030 RHS 14+070 RHS 14+335 LHS 15+105 RHS 16+475 RHS 18+135 LHS 23+900 LHS	Temaiku Road 6+100 RHS  Buota Main Road 1+908 LHS			Septic Tanks	Ensure supervision of all works close to these items to avoid accidental damage

<u>Main Road</u> <u>0+175 LHS</u> <u>3+250 LHS</u> <u>5+700 RHS</u> <u>5+770 RHS</u> <u>5+930 RHS</u> <u>6+610 LHS</u> <u>6+850 LHS</u> <u>6+870 LHS</u> <u>7+060 LHS</u> <u>7+060 RHS</u> <u>7+265 LHS</u> <u>7+300 LHS</u> <u>7+560 RHS</u> <u>7+670 LHS</u> <u>8+185 LHS</u> <u>8+220 LHS</u> <u>8+256 RHS</u> <u>8+280 LHS</u> <u>8+730 RHS</u> <u>9+390 RHS</u> <u>9+800 RHS</u> <u>9+810 LHS</u> <u>9+980 RHS</u> <u>10+270 RHS</u> <u>10+290 LHS</u> <u>10+350 LHS</u> <u>10+375 LHS</u> <u>10+425 LHS</u> <u>10+470 RHS</u> <u>10+530 RHS</u> <u>10+675 RHS</u> <u>10+680 LHS</u> <u>10+720 LHS</u> <u>11+025 RHS</u> <u>11+165 RHS</u> <u>11+285 RHS</u> <u>11+510 LHS</u> <u>11+650 RHS</u> <u>11+865 RHS</u> <u>11+990 RHS</u> <u>12+025 RHS</u> <u>12+260 RHS</u>	13+130 RHS 14+250 RHS 14+800 RHS 16+765 LHS 16+765 RHS 17+850 LHS 17+850 RHS 19+385 RHS 19+825 RHS 20+435 RHS 21+165 RHS 21+635 LHS 21+965 LHS 22+100 LHS 22+115 RHS 22+225 LHS 22+235 RHS 22+355 LHS 22+440 LHS 22+500 LHS 22+645 LHS 22+730 LHS 23+035 LHS 23+130 LHS 23+130 RHS 23+230 LHS 23+315 RHS 23+340 LHS 23+430 LHS 23+440 RHS 23+510 RHS 23+725 RHS 23+815 LHS 23+815 RHS 23+900 LHS  Bikenibeu Feeder Roads Road 1 0+370 RHS Road 1 0+446 RHS Road 1 0+448 RHS Road 1 0+577 LHS Road 1 1+045 RHS Road 2 0+023 RHS	Road 4 0+069 RHS Road 4 0+110 LHS Road 4 0+188 LHS Road 4 0+310 LHS Road 4 0+480 RHS Road 4 0+500 RHS Road 4 0+569 LHS Road 4 0+665 LHS Road 4 0+672 RHS Road 4 0+699 RHS Road 4 0+755 LHS Road 4 0+842 LHS Road 6 0+030 RHS Road 6 0+087 RHS Road 7 0+000 RHS Temaiku Road 0+010 RHS 0+010 RHS 0+015 LHS 0+015 LHS 0+020 LHS 0+020 LHS 0+090 LHS 0+090 LHS 0+160 LHS 0+160 LHS 0+382 LHS 0+382 LHS 0+420 RHS 0+420 RHS 0+743 RHS 0+743 RHS 0+872 LHS 0+872 LHS 1+015 LHS 1+015 LHS 1+258 LHS 1+258 LHS 1+371 LHS 1+371 LHS 1+380 LHS 1+380 LHS 1+854 RHS	1+854 RHS 1+857 LHS 1+857 LHS 1+908 RHS 1+908 RHS 1+965 LHS 1+965 LHS 2+030 LHS 2+030 LHS 2+107 LHS 2+107 LHS 2+110 LHS 2+110 LHS 2+335 LHS 2+335 LHS 3+873 LHS 3+873 LHS 4+649 LHS 4+649 LHS 4+955 RHS 4+955 RHS 5+315 LHS 5+315 LHS 5+581 LHS 5+581 LHS  Buota Main Road 0+030 LHS 0+086 RHS 0+150 LHS 0+212 RHS 0+225 RHS 1+460 RHS 1+917 RHS  Buota Feeder Road 0+652 LHS 0+840 LHS	Telecommunication Assets	Ensure supervision of all works close to these items to avoid accidental damage
<u>Main Road</u> <u>Air Valve. 14+860 LHS</u> <u>Fuel Tank. 22+810 RHS</u>				Miscellaneous Services	Ensure supervision of all works close to these items to avoid accidental damage

## **X. CONCLUSION AND RECOMMENDATION**

139. The project will introduce short-term negative environmental disturbances associated with the construction activities. This will be mitigated by operational procedures during construction, within the framework of a contractor's approved Environmental Management Plan to be supervised by the PSC and monitoring by the MPWU.

140. Positive impacts to the local economy will accrue through better travel conditions on the roadways, new income earning opportunities generated by demand for labor during construction, enhanced transport and access of goods and services and through the creation of new business opportunities in the surrounding areas.

141. The EMP concludes that in the context of appropriate mitigating strategies described above, and the positive environmental benefits to flow from the Project, environmental impacts can be managed within acceptable levels. There are no significant environmental impacts needing further detailed study or EIA. All potential and associated impacts can be addressed through implementation of the mitigation measures as proposed in the EMP. Provisions will be made in the Project Budget to cover the environmental mitigation and monitoring costs.

# **ANNEX A: EXCERPTS FROM THE ENVIRONMENT ACT (AS AMENDED) 1999**

## **ENVIRONMENT ACT 1999 (No. 9 of 1999)**

### **AN ACT TO PROVIDE FOR THE PROTECTION IMPROVEMENT AND CONSERVATION OF THE ENVIRONMENT OF THE REPUBLIC OF KIRIBATI AND FOR CONNECTED PURPOSES**

#### **PART III DEVELOPMENT CONTROL, ENVIRONMENTAL IMPACT ASSESSMENT, REVIEW AND MONITORING**

##### **General duty to consider environmental impact**

In considering the grant of approval for any existing or proposed development or further expansion in any existing development, the Minister, acting in accordance with the advice of Cabinet after consultation with the Division and the relevant public authority and all other relevant and concerned shareholders shall have regard as far as practicable to the effect such development or expansion would have on the environment.

##### **Declaration of prescribed development Schedule**

- (1) The development specified in the Schedule shall for purposes of this Act be classified as prescribed development.
- (2) The Minister acting in accordance with the advice of Cabinet may by order from time to time as the Minister sees fit, include in or delete from the said Schedule any development or proposed development except for individual proposals.

##### **Applications for approval**

- (1) Any developer who proposes to carry out any prescribed development in Kiribati shall make application to the Minister in the prescribed form.
- (2) On receipt of a development application referred to in subsection (1), the Minister shall instruct the Secretary within fifteen working days of such receipt to advise the developer to submit either –
  - (a) A development application accompanied by an Initial environment evaluation report, together with any additional requirements as notified by the Secretary; or
  - (b) A development application accompanied by an environmental impact statement, together with any additional requirements as notified by the Secretary.
- (3) Where the developer is a foreign investor, a certified copy of the Foreign Investment Commission's certificate of approval shall be attached with the application.

(4) Where the Minister acting in accordance with the advice of the Cabinet decides to dispense with the requirements of subsection (2), the Secretary shall advise the developer accordingly within the time stipulated in that subsection

(5) In determining as to whether the developer is required to submit a report referred to in paragraph (a) or (b) of subsection (2), the Minister acting in accordance with the advice of the Cabinet shall take into consideration the significant impact the development is likely to have on the environment and other factors that may be prescribed by regulations made under section 52.

### **Requirement for information concerning existing prescribed development**

Any developer carrying on an existing prescribed development, who has not submitted a development application to the Minister as required under section 14 shall, if required to do so in writing by the Minister provide -

- (a) Information of the nature of the activity carried on; and
- (b) Unless exempted by the Minister, acting in accordance with the advice of the Cabinet –
  - (i) A development application; or
  - (ii) Initial environment evaluation report or environmental impact statement, as the case may require, in accordance with this Part.

### **Consent required for prescribed development**

(1) No developer shall commence or continue to carry out any prescribed development unless-

- (a) A development application has been submitted to the Minister, together with either a initial environmental evaluation report or an environmental impact statement, as specified by the Minister in section 14; and
- (b) The developer has been issued with a development consent by the Minister, acting in accordance with the advice of the Cabinet under this Part; or
- (c) The Minister acting in accordance with the advice of the Cabinet has exempted the development from the requirements of this Part.

(2) Any person who carries on any prescribed development in breach of subsection (1) commits an offence and shall be liable on conviction of a fine not exceeding ten thousand dollars or imprisonment for a term not exceeding twelve months or to both such fine and imprisonment.

### **Contents of initial environmental report**

Any initial environmental evaluation report in respect of proposed and existing prescribed development shall -



- (a) Describe the prescribed development in summary form, including its objectives and any reasonable alternatives to it;
- (b) Describe any aspects of the prescribed development having or likely to have a substantial or important impact on the environment;
- (c) Describe the environment likely to be affected by the prescribed development and any reasonable alternatives to it;
- (d) Indicate the potential or actual impact of the prescribed development on the environment and of any reasonable alternatives to the prescribed development, including any enhancement of the environment;
- (e) Outline the reasons for choice of the prescribed development;
- (f) Describe and assess the effectiveness of any safeguards of standards intended to be adopted or applied for the protection of the environment;
- (g) State any intended investigations or studies of the possible impact on the environment before the prescribed developments implemented;
- (h) State any intended monitoring and reporting of the impact of the prescribed development; and
- (i) Address any further matters that the Minister, acting in accordance with the advice of the Cabinet may specify.

### **Requirements for further information**

The Minister acting in accordance with the advice of the Cabinet may, where the Minister, deems it necessary require the developer to submit further information within a specified period.

### **Publication of initial environmental evaluation report and procedure in respect of objections and appeal**

(1) The Minister acting in accordance with the advice of Cabinet on being satisfied that a public environmental report meets the requirements of this Act shall cause the public environmental report to be published in such manner as he considers adequate or most effective for the purpose of bringing it to the attention of all public authorities and other persons, whose interests are likely to be affected by the proposed development.

(2) Any public authority or person whose interests are likely to be affected by the proposed development may within thirty days from the date of publication of the notice referred to in subsection (1) make written objections to the Minister in respect of the proposed development.

(3) On receipt of the written objections referred to in subsection (2), the Minister shall examine the grounds of objections and where the Minister deems it necessary after examining the objections of the affected parties either -

(a) Acting in accordance with the advice of the Cabinet consent to the development, or the continuation of that development, with or without conditions;

(b) Acting in accordance with the advice of the Cabinet require the developer to produce an environmental impact statement and to conform with the provisions concerning environmental impact statements under this Part; or

(c) Acting in accordance with the advice of the Cabinet refuse consent to the prescribed development.

(4) In making the decision the Minister, acting in accordance with the advice of the Cabinet shall take into account -

(a) The information contained in the development application in the initial environmental evaluation report;

(b) Any objections received under subsection (2) and any information provided in support of the objections; and

(c) The objects of this Act.

### **Contents of environmental impact statement**

An environmental impact statement in respect of proposed and existing prescribed development shall -

(a) Contain a full description of the objectives of the prescribed development;

(b) Analyze the need for the prescribed development;

(c) Indicate the consequences of not implementing or carrying out the prescribed development;

(d) Include adequate information and technical data adequate to allow assessment of the impact of the prescribed development on the environment;

(e) Examine any reasonable alternatives to the prescribed development, including alternative sites for it;

(f) Describe the environment that is or is likely to be affected by the prescribed development and by any reasonable alternatives to it;

(g) Assess the actual or potential impact on the environment of the prescribed development and of any reasonable alternatives to it, including the primary,

secondary, short term, long term, adverse and beneficial impacts on the environment;

(h) Outline the reasons for the choice of the prescribed development;

(i) Estimate the time period of any expected impacts;

(j) Describe the geographic boundaries of the impacts;

(k) State the methods of predicting and assessing each impact from the construction, operational and where relevant, the de-commissioning phase of an implemented development and for each alternative presented;

(l) Justify the prescribed development in terms of environmental, economic, culture and social considerations;

(m) Identify and analyse all likely impacts or consequences of implementing the prescribed development, including implications for the use and conservation of energy;

(n) Describe measures to prevent or reduce significant adverse impacts and enhance beneficial effects and an account of their likely success with estimated costs as appropriate;

(o) Describe residual impacts which cannot be mitigated or can only be mitigated partially;

(p) Describe proposed monitoring and reporting schemes with estimated costs as appropriate;

(q) Describe and assess the estimated cost-effectiveness of any safeguards or standards for the protection of the environment to be adopted or applied including its implementation, monitoring and reporting;

(r) Give an account of the impact on the environment of any of a series or programme of similar development (whether implemented or not) over a period of time;

(s) Give sources and references to information relied on and outline any consultations with any person's made during the preparation of the report;

(t) Include a site survey report concerning National Heritage items or traditional artefacts as specified by the Minister acting in accordance with the advice of the Cabinet;

(u) Address any further matters as the Minister acting in accordance with the advice of the Cabinet specifies; and

(v) Give a clear and concise summary printed on a separate page.

### **Publication of environment impact statement and procedures in respect of objections and appeal**

(1) The Minister, acting in accordance with the advice of the Cabinet on being satisfied that an environmental impact statement meets the requirements of this Act, shall cause such statement to be published in such manner as he considers adequate or most effective for the purpose of bringing it to the attention of all public authorities, and other persons whose interests are likely to be affected by the proposed development.

(2) Any public authority or person whose interests are likely to be affected by the proposed development may within thirty days from the date of publication of the notice referred to subsection (1) make written objections to the Minister in respect of the proposed development.

(3) On receipt of the written objections referred to in subsection (2), the Minister acting in accordance with the advice of the Cabinet shall examine the grounds of objections, and where he deems it necessary, after examining the objections of the affected parties either-

(a) Acting in accordance with the advice of the Cabinet issue consent to the development with or without conditions; or

(b) Acting in accordance with the advice of the Cabinet refuse consent.

### **Development to be carried out in accordance with development consent**

(1) A developer shall not carry on any development except in accordance with the development consent.

(2) An Inspector may at any time if he has reason to believe that any person is responsible for, or substantially involved in any development, request such person to produce within a reasonable time evidence of the development consent.

(3) If any Inspector is not satisfied that a development consent authorising the particular development exists, or where the person requested under this section fails within a reasonable period to produce such evidence, the Inspector may issue a notice in writing requiring all persons involved in the development to immediately discontinue such development.

(4) Any person who contravenes subsections (2) or (3) commits an offence against this Act.

(5) Any person who is satisfied or disagree with the decision of an inspector may appeal to the Minister within 21 days of the inspector's notice issued under subsection (3).

(6) Any person who is dissatisfied or disagree with the Minister's decision under subsection (5) may within 21 days of the Minister's decision appeal to the High Court.

### **Offence of providing false or misleading information**

A developer who knowingly or recklessly provides false or misleading information to the Minister or Secretary or to any public authority concerning any matter required to be addressed in the initial environmental evaluation report or in an environmental impact statement commits an offence against this Act.

### **Prescribed forms**

Initial environmental evaluation report and environmental impact statement shall be in such form as prescribed by regulations.

### **Secretary to keep records**

(1) The Secretary shall keep proper records of all development applications, environmental impact assessments, public environmental reports and development consents.

(2) The Secretary shall make the records referred to in subsection (1) available for perusal to the public during normal working hours.

### **Minister to issue guidelines for assessment of reports and statements**

The Minister, acting in accordance with the advice of the Cabinet, may issue guideline for assisting the Division and the relevant public authority in assessing and evaluating any report, statements or other information.

### **Responsibility for initial environmental evaluation reports, etc.**

(1) The developer shall be responsible for all expenses incurred in the preparation of-

(a) An initial environmental evaluation report:

(b) The environmental impact statements; and

(2) The developer shall provide the necessary information for the preparation of the initial environmental evaluation report.

### **Monitoring environmental aspects of development and costs**

(1) The Secretary acting in accordance with the advice of the Cabinet or the relevant public authority authorised by the Cabinet may at any time, whether before or after a development activity has been completed, monitor, or cause to be monitored, all or any of the environmental aspects of the implemented development activity.

(2) In the performance of any functions under subsection (1), the Secretary acting in accordance with the advice of the Cabinet or any relevant public authority authorised by the Cabinet shall have regard to the effectiveness of any safeguards or standards adopted for the protection of the environment and the accuracy of any forecasts of the environmental impacts of the development activity.

(3) The Minister, may acting in accordance with the advice of the Cabinet gives such directions to the developer to ensure that appropriate safeguards and steps are taken by the developer to mitigate any adverse environmental aspects.

(4) The developer shall comply with the directions of the Minister issued pursuant to this section.

(5) The developer of any prescribed development shall be responsible for the monitoring of such development and all the costs and expenses incurred for such monitoring.

**Development consents non-transferable**

(1) No developer shall transfer a development consent granted under this Part.

(2) Any transfer of shareholding in a company or other change of ownership which has the effect of substantially changing the identity of the development which has been granted development consent shall be deemed to be a transfer contrary to this section, and shall render the development consent invalid.

**ENVIRONMENT ACT 1999**  
**(No. 9 of 1999)**

**AN ACT TO PROVIDE FOR THE PROTECTION IMPROVEMENT AND CONSERVATION  
OF THE ENVIRONMENT OF THE REPUBLIC OF KIRIBATI AND FOR CONNECTED  
PURPOSES**

**SCHEDULE**  
**(Section 14)**

**PRESCRIBED DEVELOPMENTS**

1. FOOD INDUSTRIES including;

- (a) Fruit processing, bottling and canning
- (b) Brewing, making and distillery works
- (c) Abattoirs
- (d) Other food processing requiring packaging

2. IRON AND STEEL INDUSTRIES

3. NON-METALLIC INDUSTRIES including:

- (a) Lime production
- (b) Brick and tile manufacture
- (c) Extraction of minerals and mining
- (d) Extraction of aggregates stones or shingles, sand and reef mud, beach rock
- (e) Radioactive related industries
- (f) Manufacture of cement
- (g) Plastic manufacturing and moulding

4. LEATHER, PAPER, TEXTILE AND WOOD INDUSTRIES including:

- (a) Leather tanning and processing
- (b) Textile industry with dyeing facilities
- (c) Carpet industry with chemical dyeing
- (d) Manufacture of paper, pulp and other wood products

5. FISHING AND MARINE INDUSTRY PRODUCT

- (a) Fish processing
- (b) Seaweed farming
- (c) Land or marine foods processing or farming
- (d) Pet fishing licensing
- (e) Fishing ponds industries
- (f) Fishing activities in Kiribati waters
- (g) Introduction to Kiribati non-native (alien) species.

6. CHEMICAL INDUSTRY including:

- (a) Pesticide production and use
- (b) Pharmaceutical production
- (c) Fertiliser manufacture and use
- (d) Oil refineries

7. TOURISM INDUSTRY including:

- (a) Hotels
- (b) Golf courses
- (c) Recreational parks
- (d) Tourism resorts or estates

8. AGRICULTURE INDUSTRY including:

- (a) Livestock development
- (b) Agricultural development schemes
- (c) Irrigation and water supply schemes
- (d) Logging operations
- (e) Saw milling, all forms of timber milling and treatment, copra processing

9. PUBLIC WORKS SECTOR including:

- (a) Landfills
- (b) Infrastructure developments
- (c) Major waste disposal plants including recycling and collection systems
- (d) Soil erosion, beach erosion and siltation control
- (e) Hydropower schemes, desalination plants
- (f) Reservoir development
- (g) Airport developments
- (h) Causeways, drainage and disposal systems
- (i) Dredging
- (j) Watershed management
- (k) Ports and harbours
- (l) Seawalls/land reclamation
- (m) Boat channels
- (n) Port and harbours

10. GENETICALLY ENGINEERED ORGANISMS (GEOs)

11. OTHER

- (a) Industrial estates
- (b) Housing multiple units
- (c) Settlement and resettlement schemes
- (d) Petroleum product storage and processing works.



## ANNEX B: FIELD MONITORING CHECKLIST

ENVIRONMENTAL ISSUE AND OBJECTIVE:	MITIGATION MEASURES	LOCATIONS	TIMEFRAME	ACHIEVED YES/NO	REMARKS
<b>Social or Community Concerns</b>  To minimize social disturbance and maximize community benefits from the subproject:	<ul style="list-style-type: none"> <li>Advise the local community of project plans in advance of construction, and where possible involve them in planning</li> <li>Avoid disturbances near living areas when possible</li> <li>Control runoff and manage sediments near garden areas</li> <li>Arrange for local people to be employed and trained</li> <li>Include women's and other community groups in project activities</li> <li>Negotiate with community about disposal areas, stockpiles</li> </ul>	Potential road alignment.	During mobilization and start of construction activities in the communities		
<b>Soil Instability and Erosion</b>  To minimize the amount of sediment lost from the site:	<ul style="list-style-type: none"> <li>Reduce the time surfaces remain bare</li> <li>Keep vegetation clearing to a minimum</li> <li>Avoid disturbance on steep slopes</li> <li>Keep vehicles on defined tracks</li> <li>Construct necessary temporary/permanent control structures</li> <li>Encourage re-vegetation after construction activity finishes</li> </ul>	All areas where clearing is required.	Continuous		
<b>Controlling Sediment</b>  To minimize impact of storm water containing sediment on streams and coasts:	<ul style="list-style-type: none"> <li>Install control structures at the outset of construction phase. These may need to include silt traps along flow lines</li> <li>All disturbed areas which are not to be paved should be re-vegetated or prepared for natural re-vegetation after final land shaping</li> <li>Ground disturbance should be phased so that it is limited to areas of a workable size</li> <li>Construction should be scheduled so that large areas of soil are not laid bare during wet seasons</li> <li>Construction sites should be placed on flat ground</li> <li>Construction areas should be contained using a bund or trench, or isolated from other surface runoff, and cleaned and rehabilitated when construction is complete</li> </ul>	All areas where clearing is required.	Continuous		
<b>Controlling Storm water</b>  To minimize the impact of contaminated runoff water:	<ul style="list-style-type: none"> <li>Divert run-off from non-construction areas (temporarily) around the construction areas to keep the natural flow separate from construction run-off.</li> <li>Pass stormwater run-off from construction areas through a gross pollutant trap (to filter plastics, cans, etc.) and over a vegetated surface to remove petroleum-based organic pollutants before discharge into culverts or drainage systems.</li> <li>Design drains and culverts to remove all run-off water without scour.</li> <li>Store oil and bituminous products at a contained location away from drainage lines in an appropriate manner.</li> </ul>	All areas where clearing is required.	Continuous		

ENVIRONMENTAL ISSUE AND OBJECTIVE:	MITIGATION MEASURES	LOCATIONS	TIMEFRAME	ACHIEVED YES/NO	REMARKS
<b>Management of Stockpiles and Spoil-heaps</b>  To manage features so dust and runoff are minimized.	<ul style="list-style-type: none"> <li>Discussions about dumping be held with local landowners</li> <li>Site plans should include all drainage provisions suggested for construction sites</li> <li>The stockpile or spoil-heap location should be chosen to avoid blocking surface runoff or drainage lines. If this is not a ridge-crest or flat plain site, the base should be leveled and contained</li> <li>If the spoil-heap or stockpile containing fine sediments is to remain bare for long in a high rainfall area, it should be covered to prevent erosion and sediment runoff</li> <li>Spoil-heaps and stockpiles must be subject to stability calculations to safeguard against major slips occurring</li> <li>After discussions with local landowners or community groups there may be plans to use spoil locally. If so a clear level site must be prepared on which the spoil can be dumped</li> <li>Where possible spoil should be used to backfill quarry areas or waste disposal pits before they are re-vegetated</li> </ul>	Dumping areas.	Continuous		
<b>Air Quality and Dust Control</b>  To ensure there is no health risk or inconvenience due to dust production:	<ul style="list-style-type: none"> <li>Spray water on exposed surfaces during dry periods</li> <li>Wet quarry loads or road fill loads being carried in open trucks</li> <li>Approval for establishment of asphalt plant</li> </ul>	Cleared areas	During dry periods		
<b>Noise control</b>  To ensure nuisance from noise is minimized:	<ul style="list-style-type: none"> <li>Use modern and well maintained equipment (with mufflers where appropriate)</li> <li>Use noise screens or mounds near residential areas</li> <li>Carry out noisy construction activities during normal working hours</li> <li>Advise local people when there will be blasting or unusual unavoidable noise</li> </ul>	All construction areas, access routes	Continuous		
<b>Materials Management</b>	<ul style="list-style-type: none"> <li>Implementation of materials delivery and waste disposal handling plan</li> <li>Use of silt fences around materials stockpiles</li> <li>Safe docking and storage at point of transfer from barge: no significant increase in local traffic congestion caused</li> <li>No spillage or dust from delivery trucks</li> <li>Safe operation of delivery vehicles</li> <li>No spillage from stockpile sites</li> <li>Inspection of imported aggregate to ensure it is free of organic matter, certification of fumigation from country of origin.</li> </ul>	All construction areas	Continuous		

ENVIRONMENTAL ISSUE AND OBJECTIVE:	MITIGATION MEASURES	LOCATIONS	TIMEFRAME	ACHIEVED YES/NO	REMARKS
<b>Extraction of Materials</b>  To ensure that all extraction of materials locally does not cause damage to benthic formations or risks of coastal erosion	<ul style="list-style-type: none"> <li>Dredging may in approved, previously disturbed sites only</li> <li>Dredging system provided and used in accordance with approved Contractor's statement</li> <li>The dredging barge and its equipment in good order and free of leaks</li> <li>Barge and equipment operated by licensed individuals and in accordance with relevant Republic of Kiribati legislation</li> <li>Barge hull clear of sea floor.</li> <li>Dredging plume not impacting on coral or seagrass communities</li> <li>Channel enlargement carried out to precise plans/drawings</li> <li>Immediate removal of all excavated materials from the dredging site to land</li> <li>No storage of dredged material within the lagoon zone</li> </ul>	All extraction areas	Continuous		
<b>Construction of Seawalls</b>  To reduce risk of smothering benthic habitats, release of oil or fuel from machinery and collapse of excavated surface prior to completion of the wall	<ul style="list-style-type: none"> <li>Submission of a method statement to the Engineer stating how risks of collapse will be minimized and excavated material handled</li> <li>Careful planning of the works to ensure that excavation work takes place during low tide</li> <li>Immediate removal of excavated material to dry land</li> <li>Minimizing the period that the excavated area will be left unprotected</li> <li>Ensuring that all equipment used below the high water mark is in sound and well maintained condition, and free of any leaks of any fluid at all times.</li> </ul>	All seawall construction sites	Continuous		
<b>Offsite and Waste Management</b>  To avoid contamination from solid wastes and sewerage:	<ul style="list-style-type: none"> <li>All solid waste contained within construction sites and removed to landfill</li> <li>Hazardous waste, including empty bitumen containers, to be removed from the island</li> <li>Spillages managed according to stated procedures</li> <li>Proper onsite toilets in use</li> </ul>	All construction and storage sites	Continuous		
<b>Storage and handling of fuel and lubricants</b>	<ul style="list-style-type: none"> <li>Fuel oil and bitumen stored at least 20 m away from the lagoon areas.</li> <li>Quantities more than 5,000 liters stored in sealed tanks on a concrete base that is bunded to hold 110% of the tank capacity.</li> <li>All workshops provided with oil and water separators.</li> <li>Vehicles and machinery not refuelled within 20 m of the lagoon.</li> <li>Authorized personnel only handling fuel</li> <li>Accidental spills dealt with according to set procedures.</li> <li>Immediate reporting of any spills into lagoon to MELAD.</li> <li>All waste oil, oil and fuel filters collected and disposed of at the landfill.</li> </ul>	All construction sites	Continuous		

ENVIRONMENTAL ISSUE AND OBJECTIVE:	MITIGATION MEASURES	LOCATIONS	TIMEFRAME	ACHIEVED YES/NO	REMARKS
<b>Safety and Health</b>  To ensure maximum safety of construction personnel and local residents:	<ul style="list-style-type: none"> <li>• Ensure all occupational health and safety requirements are in place on construction sites and in work camps</li> <li>• Install lights and cautionary signs in hazardous areas</li> <li>• Establish footpaths and pull-off bays along roads through villages, near markets, schools and other community facilities</li> <li>• limit time of exposure to dust particles, chemical, and noise;</li> <li>• enhance safety and inspection procedures; and</li> <li>• Safe handling of toxic materials, explosives, and other hazardous substances.</li> <li>• Use of Personal Protection Equipment (PPE)</li> <li>• Safe operation and parking of construction plant and vehicles</li> </ul>	All construction sites.	Continuous		
To avoid disturbance by the constructions workers:	<ul style="list-style-type: none"> <li>• Prohibitions on hunting and poaching of wildlife, purchasing wildlife meat, fishing, gathering and harvesting medicinal or valued plants and trees, and possessing firearms, snares, traps and other hunting equipment;</li> <li>• Access to construction camps will be controlled and access restrictions for non-construction personnel will be applied.</li> <li>• Housecleaning and waste management requirements</li> <li>• Penalties for violation of rules and regulations</li> </ul>	Construction camps	Continuous		
General Health and Safety Awareness for construction workers should include:	<ul style="list-style-type: none"> <li>• Introduction to health and safety issues in construction sites and on Construction sites including main areas of risk to workers and others</li> <li>• Education on basic hygiene practices to minimize spread of typical tropical diseases</li> <li>• HIV/AIDS and STD awareness, including information on methods of transmission and protection measures</li> <li>• Prohibition of drugs</li> <li>• Prohibition of alcohol on construction sites</li> <li>• Procedures for seeking medical assistance in emergency or non-emergency situations and procedures for seeking other health-related assistance.</li> </ul>	Construction camps	Continuous		

ENVIRONMENTAL ISSUE AND OBJECTIVE:	MITIGATION MEASURES	LOCATIONS	TIMEFRAME	ACHIEVED YES/NO	REMARKS
<b>Unexploded Ordnance</b>	<ul style="list-style-type: none"> <li>100% sweep by mine/metal detectors and a deep magnetometer undertaken</li> <li>Suitably qualified, designated EOD expert recruited and on site</li> <li>Provision for medical treatment and emergency evacuation.</li> <li>Approval given for search instruments nominated for use in detection.</li> <li>Prior approval of clearance method.</li> <li>Relocation of unexploded ordnance to the police bunker in Betio under secure conditions</li> <li>Survey of mined areas in accordance with the United Nations International Standard for Level 2 Surveys.</li> <li>Marking and records made of all cleared areas to facilitate subsequent identification during construction.</li> <li>Quality control checking undertaken to a minimum of 5% of the de-mined area and 10% of the existing road formation.</li> </ul>	All sites where the presence of unexploded ordnance is suspected	Prior to construction in risk sites, as per Contractor's work plan		
<b>Disruption of Utilities</b>	<ul style="list-style-type: none"> <li>Appropriate measures taken to avoid damage to utilities as scheduled in EMP</li> </ul>	All work sites	Continuous		
<b>Site de-commissioning</b>  To minimize ongoing impacts after construction is completed:	<ul style="list-style-type: none"> <li>Rake or loosen all compacted ground surfaces</li> <li>Establish a site re-vegetation plan. Where possible involve local women's groups to provide materials and implement re-vegetation</li> </ul>	All construction and camp sites	After completion of construction		

## ANNEX C: CONDITIONS OF ENVIRONMENTAL LICENCE

Condition of Environmental Licence ELA 036/10 issued 18 Jul 2013		Corresponding coverage in EMP
1	This licence is for the Rehabilitation of South Tarawa Road including Buota as applied for in the Environment Licence application No. 036/10.	N/A: condition relates to implementation of the EL
2	Ministry of Public Works and utilities is the nominated licence holder.	N/A: condition relates to implementation of the EL
3	This licence does NOT give permission to the licence holder or its contractor to excavate or mine aggregates including sand, gravel, and reef mud to supply the rehabilitation of the road, and to construct seawalls.	Para 82 (materials extraction)
4	The licence holder is responsible for compliance with the conditions and ensuring compliance by any contractors or any other person engaged to undertake any activity for the purpose of this licence.	N/A: condition relates to implementation of the EL
5	The licence holder must ensure that a copy of this licence is made available to the Environment Inspector or other responsible authorities for inspection upon request.	N/A: condition relates to implementation of the EL
6	This licence may be transferred in accordance with the Environment Act 1999 (as amended 2007).	N/A: condition relates to implementation of the EL
7	The licence holder will be informed of any public complaints that are communicated to the Ministry of Environment Lands and Agricultural Development (MELAD) during the rehabilitation of the road. The licence holder must take reasonable measures to investigate and if required, temporarily cease the rehabilitation of the road to address significant issues raised in complaints to ensure compliance with these licence conditions.	105/106: Grievance Redress Mechanism
8	The Principal Environment Officer (PEO) may amend the conditions of this licence in writing, if required by MELAD and/or the licence holder through consultation in accordance with the Environment Act 1999 (as amended 2007).	N/A: condition relates to implementation of the EL
9	If there is a suspected contravention to any of the licence conditions, the Principal Environment Officer (PEO) may issue a request for information or records in accordance with Section 53 of the Environment Act 1999 (as amended 2007).	N/A: condition relates to implementation of the EL
10	The licence holder shall notify MELAD in writing two weeks prior to the commencement of the construction.	N/A: condition relates to implementation of the EL
11	The licence holder or its contractor shall adhere to all mitigation measures set out in the Environmental Management Plan and the Contractor's Environmental Management Plan to be approved by MELAD before construction start throughout the physical implementation of the rehabilitation of the road. A copy of the Environmental Management Plan and the approved Contractor's Environmental Management Plan forms part of this licence.	N/A: condition relates to implementation of the EL
12	Legal actions under the Environment Act 1999 (as amended 2007) may be taken against the licence holder if there is evidence of non-compliance with any of the licence conditions and/or directions issued by the Environment Inspector(s) in relation to this activity.	N/A: condition relates to implementation of the EL
<b>Pre-Construction Phase</b>		
13	The licence holder shall obtain approval from the Quarantine Office for the importation of aggregate if any prior to a shipment from the country of origin.	Para 79 (aggregate management)
14	The licence holder or its contractor shall obtain a certified document from the country of origin to prove that the aggregates to be imported have been treated and are free from pests and diseases and invasive alien species to the satisfaction of the Quarantine Officer in Kiribati.	Para 79 (aggregate management)
15	Aggregates including sand and gravel imported and sourced locally required for the rehabilitation of the road shall be stockpiled at the Civil Engineering Unit Compound at Betio in a fenced and secured area or at other areas to be approved by the Principal Environment Officer in compliance with Condition No 17.	Para 76 (Management of stockpiles)
16	The main stockpile area for reef mud required for the rehabilitation of the road must be fenced and secured and must use an appropriate cover lining to minimize the risk of sediment being blown out of the area.	Para 76 (Management of stockpiles)
17	Should the licence holder or its contractor intend to stockpile aggregates,	Para 76 (Management of

<b>Condition of Environmental Licence ELA 036/10 issued 18 Jul 2013</b>		<b>Corresponding coverage in EMP</b>
	including reef mud, along the road alignment, proper and well secured depots for the stockpiles must be set up. Depot sites must be at least 20m away from the shoreline, flows of storm water, drainage courses, and low grounds.	stockpiles)
18	Hazardous materials including coal tar, fuel, oil, and lubricants required for the rehabilitation of the road shall be stored at the Civil Engineering Unit Compound at Betio in a secured area with a roof and concrete base that is bunded to hold any spillages or other secured placed to be approved by the Principal Environment officer. Any hazardous materials including coal tar transported during the construction shall be delivered with care to avoid any spillage during the transfer. Any spillage occurs during the transfer must be remediated by the contractor within a given timeline issued by Environment Inspectors.	85 (storage and handling of fuels and lubricants) and 86 (safety)
19	The asphalt mixing plant shall be kept for operation in a well secured area at least 20m away from the nearest resident to be approved by MELAD before operation and at least 20m away from the shoreline, underground water wells, and have a concrete base that is bunded to hold any spills.	Para 77 (air quality) and Para 120 (Preparation of site and establishment of Contractor's facilities)
20	The licence holder must get approval first from the Lands Management Division for any State Land to be used for aggregate stockpiling and hazardous materials storage including fuel oil, and bitumen. For any use of private owned land, the licence holder shall deal directly with landowners to get their consents for the use of their land.	-
21	The licence holder must set up a point of contact including a telephone hotline for receiving public complaints. The general public must be informed or made aware of the hotline for sending complaints. Public complaints received through the hotline must be recorded and documented.	105/106: Grievance Redress Mechanism
<b>Construction</b>		
22	The licence holder or its contractor shall undertake the rehabilitation of the road according to the approved design specifications.	N/A: condition relates to implementation of the EL
23	The licence holder shall not use PUB water in any aspects of the construction works including dust control, washing of equipment and machineries, EXCEPT for the concrete production and treatment only. The use of PUB water for concrete production and treatment shall be approved first by PUB CEO.	Para 81 (use of water)
24	The licence holder must ensure that the noise level and vibration emitted from the rehabilitation of the road is acceptable and does not unreasonably interfere with the health or comfort of any person. The rehabilitation of the road along residential areas shall be limited to daylight hours only from 7am to 7pm. Subject to PEO approval, the Contractor shall however be permitted to work outside of the time given above if the work is needed for emergency reasons or for works that are being scheduled to mitigate the potential disruption to the travelling.	Para 78 (Noise Control)
25	The depot for aggregate including sand, gravel and reef mud stockpiles along the road alignment must use geotextile silt fences or traps and sediment barriers, and must be covered during windy and rainy days or when not used.	72 (soil erosion); 74 (controlling sediment), 76 (Management of stockpiles)
26	The depot for aggregates including sand, gravel, and reef mud stockpiled along the road alignment must NOT occupy an area of more than what has been designated by the Land Management Division office or land owners and the stockpile must NOT block any access road.	Para 120 (Preparation of site and establishment of Contractor's facilities)
27	Hazardous materials including coal tar, fuel, oil, and lubricants required for the rehabilitation of the road shall NOT be left along the entire road alignment at the end of each working day without proper and secure fencing.	-
28	The licence holder must ensure that no hazardous materials including coal tar, oil, fuel and lubricants from any machineries spill along the entire road alignment or into the sea or marine habitat. Any incident resulting in 4 unexpected impact or damage to the environment from the construction activity should be reported to MELAD immediately. Hazardous wastes, spills including contaminated soil should be removed within a given timeline issued by Environment Inspectors to the Civil Engineering Unit Compound at Betio in a secured area with a roof and concrete base that is bunded to hold any spillages, and any damage is to be rehabilitated within	Para 83 (Coastal, Marine protection)

<b>Condition of Environmental Licence ELA 036/10 issued 18 Jul 2013</b>		<b>Corresponding coverage in EMP</b>
	a given timeline issued by Environment Inspectors at the cost of the licence holder. Evidence of rehabilitation must be provided to MELAD within a given timeline issued by Environment Inspectors in a form of written reports including photos of damage and rehabilitation within one week of completing the rehabilitation work.	
29	The licence holder must report any pre-existing soil contamination to MELAD for inspection before the work is undertaken. Any contaminated soil as a result of the rehabilitation of the road shall be de-contaminated within a given timeline issued by Environment Inspectors.	The following paragraphs cover avoidance of contamination: 84 (offsite and waste management); 85 (storage and handling of fuel and lubricants)
30	Contaminated soil from the rehabilitation of the road shall be removed off the island once they can no longer be de-contaminated and used at the end of the project.	Para 84 (offsite and waste management); 85 (storage and handling of fuel and lubricants)
31	Wastes and debris from the rehabilitation of the road shall be well contained at all times along the entire road alignment to a standard that ensures no waste or debris is washed away during rainfall events, tidal movements or dispersed by wind. No waste is to be dumped in the sea or lagoon.	Para 84 (offsite and waste management);
32	All construction wastes and debris including surplus materials and demolishing wastes, shall be reused where possible and if no reuse is available for the material, the licence holder must remove unused wastes and debris including surplus materials and demolishing wastes from the site within a given timeline issued by Environment Inspectors and disposed of at an appropriate disposal site approved by MELAD.	Para 84 (offsite and waste management);
33	The licence holder must ensure that waste water from cement mixing activity to be undertaken at the temporary construction yard should not be discharged into the sea or marine habitat but should be disposed of on site.	Para 120 (Preparation and establishment of contractors facilities); 117 (prevention of soil erosion and spillage)
34	The licence holder must ensure that no substance or material, including dust and fumes from the construction activity, unreasonably interferes with the health or comfort of any person and important ecosystems that support the livelihoods and health of the local people.	Paras 77, 84, 85, 117 and 120
35	The licence holder or its contractor must spray water on site and on the road to reduce dust stirred during the rehabilitation of the road.	Para 77 (air quality and dust control)
36	Should there be any excessive dust, the licence holder shall suspend the rehabilitation of the road as soon as practical and find a suitable or effective method to address the issue with dust before the work could start again.	-
37	The licence holder or its contractor must ensure that any impact or damage to land and coastal vegetation including mangrove ecosystem is AVOIDED unless the impact is necessary to enable the construction activity to proceed and there is no alternative available to avoid the impact.	Para 62 (protection of ecologically important areas); 83 (coastal/marine protection);
38	Any impact or damage to the environment including to land and coastal vegetation including mangrove ecosystem from the rehabilitation of the road should be rehabilitated or replanted within a given timeline issued by Environment Inspectors. Evidence of rehabilitation or replanting is to be provided to the MELAD within one week of completing the rehabilitation or replanting work. The licence holder must make sure that the replanting is successful and thrive.	Para 64 (replanting of trees); 91 (site decommissioning)
39	The licence holder must put up visible signs during the day and night at the construction site areas to warn road users of the construction activity to ensure public safety.	Para 86 (Safety and Health)
<b>Post Construction</b>		
40	The licence holder or its contractor shall notify MELAD one month prior to the completion of the expansion of the rehabilitation of the road.	N/A: condition relates to implementation of the EL
41	The licence holder or its contractor shall not leave wastes and debris, hazardous materials including coal tar, lubricants, oil, and fuel, along the road side after the completion of the rehabilitation of the road. All remnants of discarded used hazardous materials must be stored properly at the Civil Engineering Unit Compound at Betio for removal off the island once they can no longer be used after the official completion of the road project.	Para 84 (offsite and waste management); 85 (storage and handling of fuels and lubricants); 91 (site decommissioning)



<b>Condition of Environmental Licence ELA 036/10 issued 18 Jul 2013</b>		<b>Corresponding coverage in EMP</b>
42	Wastes and Debris be taken away from road sides at the completion of the rehabilitation work for proper disposal at authorized disposal site such as landfills.	As above
43	The licence holder or its contractor shall remove from Kiribati any machineries imported for the purpose of the project once these machineries are malfunctioned and can no longer be maintained or used at the end of the project.	Para 84 (offsite and waste management)
44	Any handover of unused hazardous materials including bitumen if necessary must be approved first by MELAD before the decommissioning of the project.	Para 84 (offsite and waste management)
45	The licence holder or its contractor shall be responsible for a proper decommissioning/landscaping, and rehabilitation of temporary construction yards and other sites used for aggregate stockpiling, storage of hazardous materials including oil fuel, and bitumen, and asphalt plant yards at the end of the project.	Para 91 (site decommissioning)
46	MELAD will conduct a final inspection upon completion of the project and to produce a report on the level of compliance with the Environment Licence conditions by the Contractor before the project can be officially decommissioned. The project won't be considered completed until all issues identified in the report are addressed.	N/A: condition relates to implementation of the EL
47	Any impact or damage to the environment caused after the rehabilitation of the road should be rehabilitated within a given timeline issued by Environment Inspectors. Evidence of rehabilitation is to be provided to the MELAD within two weeks of completing the rehabilitation work.	Para 126 (Road Maintenance)
48	The licence holder will be informed of any public complaints that are communicated to the Ministry of Environment Lands and Agricultural Development (MELAD). The licence holder must take reasonable measures to investigate and, if required, address issues raised in complaints to ensure compliance with these licence conditions.	103/104: Grievance Redress Mechanism
49	The licence holder is responsible for the integrity and maintenance of the road to avoid any environmental problems caused by the road design failing. Should any environmental problems caused by the road design failing such as flooding occurs, the licence holder shall be responsible for fixing it.	Para 126 (Road Maintenance)
<b>Monitoring</b>		
50	The licence holder or it contractor shall undertake monitoring according to the Environmental Monitoring Plan provided in the Environmental Impact Assessment Report. A copy of the Environmental Monitoring Plan is attached, which forms part of this licence.	Annex B
51	The licence holder or its contractor shall carry out a daily monitoring by means of visual the dust level and noise to ensure that it is not causing nuisance to the general public.	Annex B
<b>Reporting</b>		
52	The licence holder or its contractor must submit a monitoring report to MELAD on: a) Monitoring required under Condition No.51 one month after the start of the rehabilitation of the road, and then every 3 months thereafter using a field monitoring check list provided in the EIA report as Annex B. b) A compiled monitoring results required by Condition No.52, one week after the start of the rehabilitation of the road, and then every week thereafter. c) Consolidated record on any rehabilitation work undertaken in accordance with condition 28, 38, and 47. d) Report on action undertaken to address significant issues raised in public complaints as required under condition number 7 to be submitted to MELAD one day after the issue is addressed.	N/A: condition relates to implementation of the EL