

Hall Contracting Pty Ltd

Kiribati Outer Islands Transport Infrastructure Investment Project

Environment and Social Management Plan

Reference: 305194-EN-ESMP-RPT-001

E | 9 January 2026



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Glossary

Acronym	Definition
ADB	Asian Development Bank
AtoN	Aids to Navigation
CMP	Principal Contractor's Project Management team
ER	Environmental Representative
ESMP	Environmental Social Management Plan
GoK	The Government of Kiribati
HSP	Health and Safety Plan
IAs	The Implementing Agencies designated by the Government of Kiribati comprising the Ministry of Information, Communications and Technology and Ministry of Infrastructure and Sustainable Energy.
IFC	International Financial Corporation
IFC PS1	International Finance Corporation Performance Standards, 2012
KOITIIP	Kiribati Outer Island Transport Infrastructure Investment Project
MELAD	Ministry of Environment, Lands and Agricultural Development.
MFED	Ministry of Finance and Economic Development
MICT	Ministry of Information, Communications and Transport
MISE	Ministry of Infrastructure and Sustainable Energy
Principal Contractor	Hall Contracting Pty Ltd, or other party who assumes contractual lead responsibility for the design and construction of the project
Screening Report	Environment & Social Screening Report prepared by the Executing Agency, the Ministry of Finance and Economic Development
SEMP	Soil and Erosion Management Plan
TMP	Traffic Management Plan
WB	World Bank
WMP	Waste Management Plan

1 Introduction

1.1 Project background

The Republic of Kiribati (herein referred to as ‘Kiribati’) is a geographically dispersed and climate-vulnerable nation in the central Pacific. The nation comprises 33 low-lying atolls and the raised phosphate island of Banaba. These remote atolls are divided into 3 island groups, with the project located on 3 islands within the Gilbert Islands group. Approximately 55% of Kiribati’s population live on the island of Tarawa in the capital, South Tarawa [1]. Internal migration from the outer islands within Tungaru to South Tarawa is largely driven by limited access to goods, services, employment, and education opportunities.

To address these disparities and strengthen resilience, the Government of Kiribati (GoK), with co-funding from the World Bank (WB) and the Asian Development Bank (ADB), has launched the Kiribati Outer Island Transport Infrastructure Investment Project (KOITIIP). The development objective of KOITIIP is to improve the connectivity, safety, and climate resilience of transport infrastructure on selected outer islands of Kiribati, and, in the event of an eligible crisis or emergency, to provide an immediate response.

The Ministry of Finance and Economic Development (MFED) serves as the Executing Agency, while the Ministry of Information, Communications and Transport (MICT) and the Ministry of Infrastructure and Sustainable Energy (MISE) serve as the Implementing Agencies (IA) for KOITIIP. In September 2024, the GoK commissioned Hall Contracting Pty Ltd (Hall) as the Principal Contractor to deliver sub-components of KOITIIP (referred to as the ‘project’ hereinafter) on selected outer islands in Gilbert Islands Chain of Kiribati, namely: Abaiang, Nonouti and Tabiteuea South (respectively referred to as the ‘project site’).

The location of each project site in relation to Tarawa is presented in Figure 1-1.

1.2 Project objectives

The project aims to improve the safety of inter-island navigation and provide resilient outer island access infrastructure ship-to-shore transfer and land transport at each site. The project also aims to strengthen the capacity of the Implementing Agencies.

The key objectives of the project are to:

- Bolster inter-island navigational safety by conducting hydrographic surveys and generating nautical charts.
- Improve outer island access infrastructure resilience by supplying ship-to-shore navigation aids, jetties, boat ramps, shelters, and multipurpose maritime facilities, and rehabilitating island-crossing causeways.
- Strengthen the local community capacity for designing, implementing, and maintaining transport sector investments, including contingency planning, extreme weather maritime management, and resilient operational and maintenance practices through provision of technical assistance and training.

1.3 Purpose of the ESMP

This Environmental Social Management Plan (ESMP) provides guidance for mitigating and managing potential environmental and social impacts that may result from the construction and operation of the project at each site.

The ESMP is intended to guide the Implementing Agencies and Principal Contractor with protocols and mitigation measures to ensure that construction activities are carried out in an environmentally responsible manner in accordance with the standards and requirements listed below.

Sub-plans that form part of the ESMP are discussed further in section 1.5 of this report. Subject to approval, the Principal Contractor may refine the scope of the ESMP and subplans to align with the outcomes of the detailed design phase.



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<p>Client</p> <p>Hall Contracting Pty Ltd</p>						
<p>Project Name</p> <p>Kiribati Outer Islands Transport Infrastructure Investment Project</p>						
<p>Figure Title</p> <p>Gilbert Islands chain showing KOITIIP sites in context to the nation's capital</p>						
<p>Scale at A4</p> <p>1:4,000,000</p>						
<p>Role</p>						
<p>Suitability</p> <p>Issued for ESMP report</p>						
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Figure 1-1 Project sites in context to the capital of Kiribati (Tarawa).

1.4 Site context

1.4.1 Abaiang

The Abaiang atoll is situated approximately 30 nautical miles (NM) north of South Tarawa. It is an elongated atoll with a total land area of around 20 square kilometres (km²) surrounded by a vast lagoon and reef system that makes up the majority of its total area.

The Abaiang project site is situated in Taburao kainga on the lagoon side of the atoll (refer to Figure 1-2) and encompasses all permanent and temporary components required to construct and operate the project. The design footprint covers approximately 500 square meters (m²) and is bound by the existing Kiribati Oil (K-Oil) facility to the south, the existing Sea Cucumber Farming facility to the north, a main unsealed road to the east and the lagoon coastline to the west. The lagoon coastline can extend up to 350 metres (m) into the lagoon at low tide.

1.4.2 Nonouti

The Nonouti atoll is situated approximately 150 NM southeast of South Tarawa. The atoll extends approximately 36 km and consists of a vast lagoon with a complex network of ribbon reefs.

The Nonouti project site is situated approximately 500 m north of the Temaraira kainga on the lagoon side of the atoll (refer to Figure 1-3). The site covers an approximate footprint of 500 m² and incorporates the existing Covid-19 Quarantine shed, which is currently being used to store various goods including rice and timber. Directly abutting the project site to the south is the existing Nonouti Ice Plant facility and to the north are local residences as shown in Figure 1-3. To the east, the existing Covid-19 Quarantine shed extends up to a minor unsealed roadway and a permanent goods storage building. To the west the site extends out to the lagoon coastline which can extend up to 800m into the lagoon at low tide.

1.4.3 Tabiteuea South

The Tabiteuea South atoll is situated approximately 210 NM southeast of South Tarawa. It is an elongated atoll extending approximately 15 km with a vast lagoon and complex network of coral reefs.

The project site is situated in Teobokia kainga on the lagoon side of the atoll (Figure 1-4). The site covers an approximate footprint of 700 m² and is positioned on existing council land. Local residences are situated north and south of the project site. A historic dilapidated copra shed, and ice works facility are situated directly north of the project site. A large new copra shed is positioned east of the project site adjacent to the main island road. To the west the site extends out to the lagoon coastline which can extend up to 400 m into the lagoon at low tide.



● Project site

Key points of interest / adjacent properties

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Figure Title

Abaiang project site location

Scale at A4

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Role

Suitability

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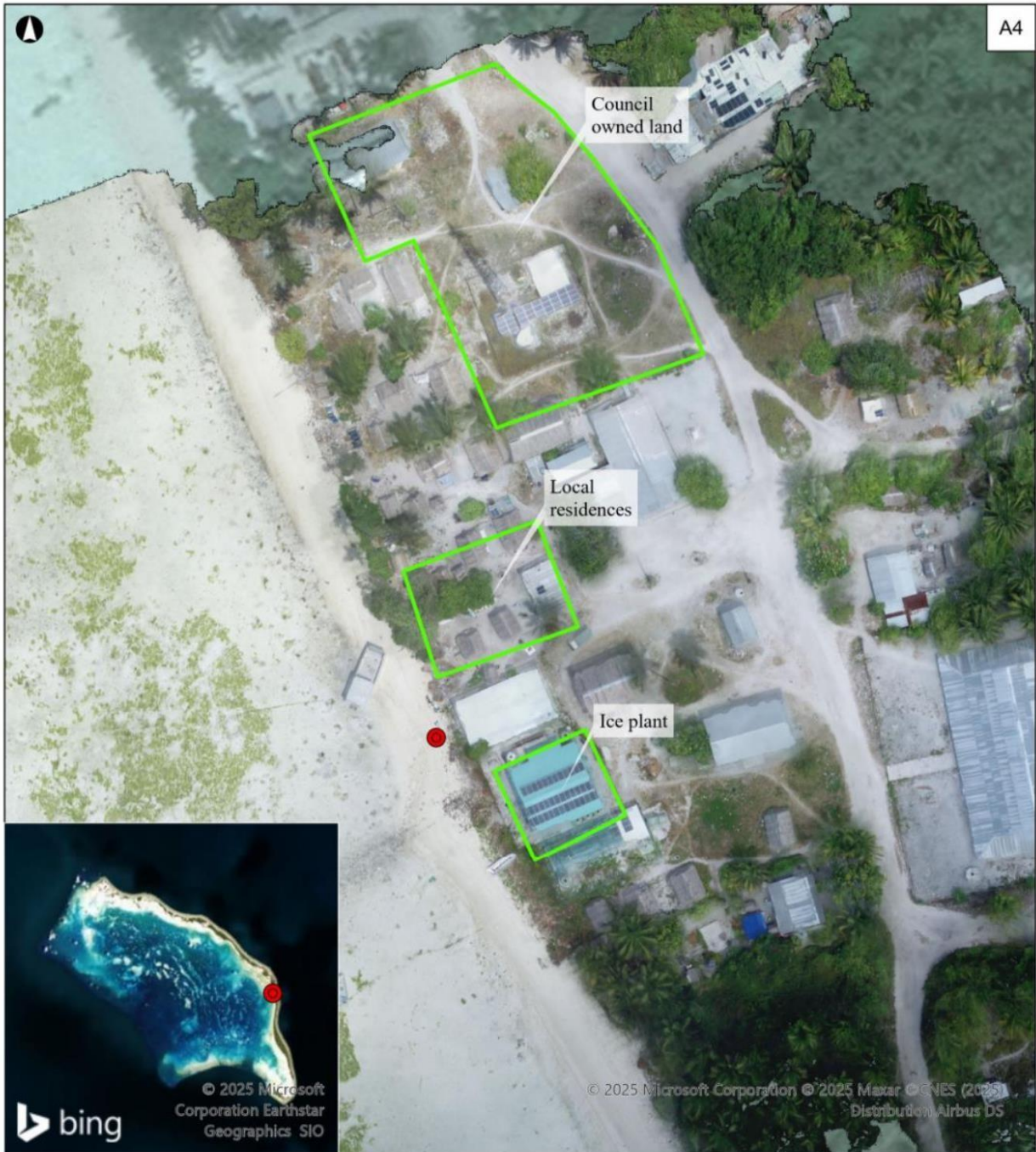
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Figure 1-2

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Figure 1-2 Abaiang project site location.



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● Project Site
 Key points of interest / adjacent properties

Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere

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Figure Title
Nonouti project site location

Scale at A4
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Figure Name
Figure 1-3

Figure 1-3 Nonouti project site location.



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● Project Site

Key points of interest / adjacent properties

Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere

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Figure Title

Tabiteuea South project site
location

Scale at A4

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Role

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Figure Name

Figure 1-4

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Figure 1-4 Tabiteuea South project site location.

1.5 Construction Management Framework

The Environment and Social Safeguard Unit, established under the Executing Agency, prepared an Environmental and Social Screening Report (the 'Screening Report') on the potential environmental and social risks associated with the project.

A Construction Environmental and Social Management Plan (CESMP) consistent with the project's Environmental and Social Management Framework (ESMF) will be prepared for the project. The CESMP will include construction environmental management measures outlined in the ESMP mitigation matrix (section 7) and can be divided into sub-plans. The CESMP, including any associated sub-plans, will be submitted to World Bank for approval prior to starting construction.

The sub-plans identified in Figure 1-5 will secure the safeguards and mitigation measures identified in section 7 of this ESMP. The safeguards will ensure these mitigation measures are implemented during all stages of project delivery.

It is noted that the requirement to prepare a Resettlement Plan only applies in circumstances where land requirements, land clearance or civil works undertaken for the project will result in involuntary resettlement to people temporarily impacted by the proposed works. Loss of private assets such as trees, crops, minor structures associated with private property because of the project would require an Abbreviated Resettlement Action Plan (ARAP). Where specific works do not require an ARAP, a Land Access Due Diligence Report (LADDR) is required.

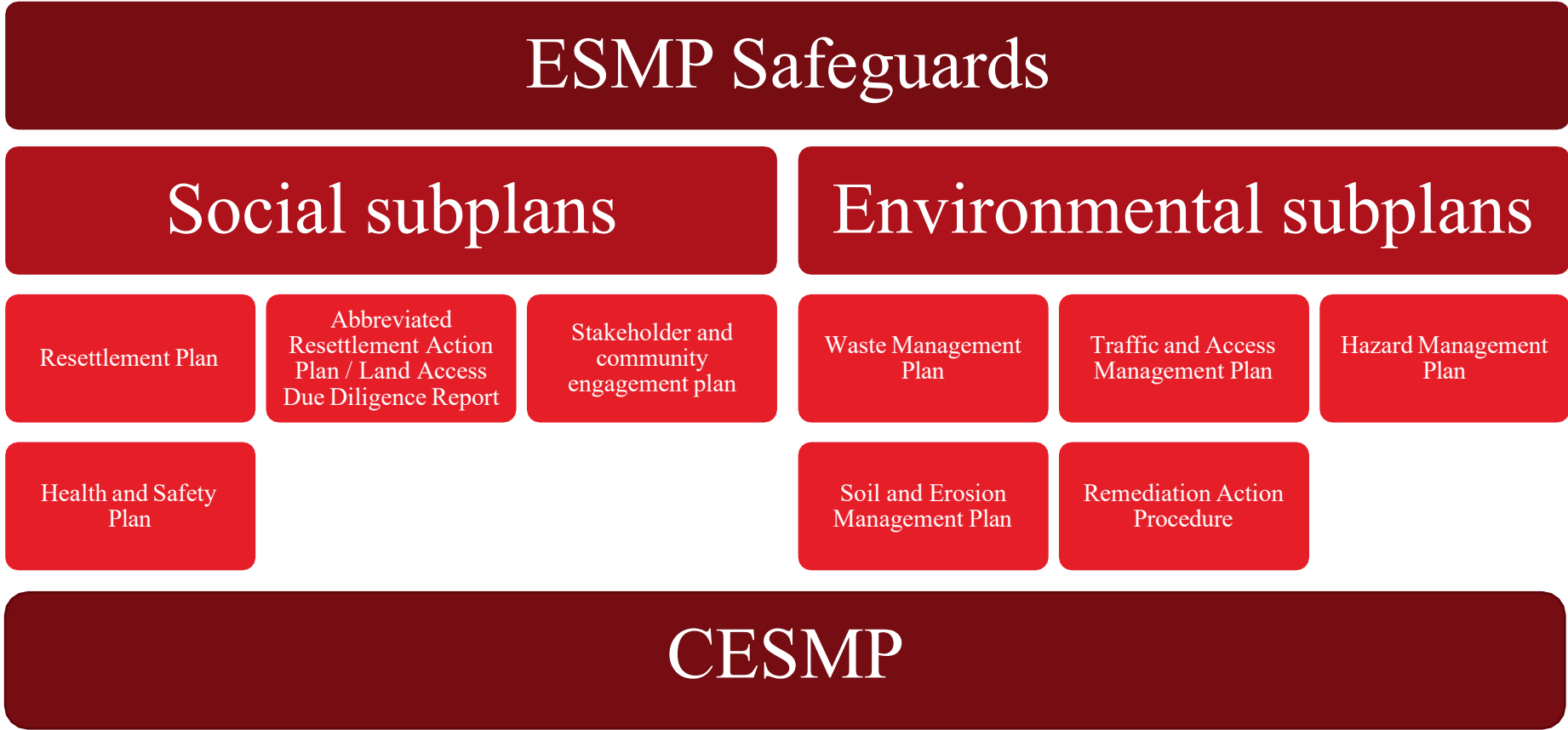


Figure 1-5 Construction management documentation framework

In addition to the environmental subplans identified in Figure 1-5, should the scope of the project change to include demolition of the copra shed in Tabiteuea South an addendum to the ESMP will be created to reflect demolition risks and necessary mitigation measures. Upon agreement of the ESMP addendum a demolition plan will be prepared and included within the CESMP. Each of the project's management plans will provide details on the specific environmental or social topic for which it is written, including specific detail on any procedures that must be followed to avoid, minimise or mitigate environmental or social impacts with the potential to arise from construction of the project.

1.5.1 Construction Environmental and Social Management Plan (CESMP)

The CESMP must include details on the responsible person(s) for delivery of the works, or a point of contact within the Principal Contractor's organisation (Hall Contracting Pty Ltd) that can be contacted for information regarding the project, including name, contact details, specific role and responsibilities. The CESMP must also set out a procedure for how the Principal Contractor will facilitate submission of, and respond to, grievances and / or complaints from site personnel, members of public, community representatives and other stakeholders.

The CESMP must be approved by the Outer Islands Implementation Unit (OIIU) before works commence. The CESMP will include the mitigation and monitoring measures in section 7, elaborating on how the measures will be implemented on site and include the thematic plans as indicated in Figure 1-5. A sample CESMP is provided in Appendix 10 and the structure will include:

Core document structure

- Project and contractor overview
 - project description and scope of works
 - schedule and work program
 - site layout, laydown, haul routes, workforce profile, equipment list
 - contractor health, safety, security and environment (HSSE) policy including alcohol / drug and community interaction commitments.
- Applicable laws, permits and standards; WB Operational Polices, ESS and WBG EHS Guidelines references.
- Environmental, social, health and safety (ESHS) management system and organisation
- ESHS governance
 - roles and responsibilities (Project Manager; ESHS Manager; occupational health and safety (OHS) officer; social / gender-based violence (GBV) focal point; environmental officer; stakeholder liaison; medical support) and authority to stop work.
- Resources and equipment for monitoring (e.g., noise, air, water meters), vehicles, communications.
- ESHS budget
- Risk assessment and method statements
 - activity-based hazard identification and risk assessment (HIRA) / job safety analysis (JSA) linked to method statements;
 - updates when methods change.
 - register of legal / permit requirements and compliance conditions
 - training, competence and communication
 - induction, toolbox talks, task-specific training (including OHS, community health and safety (CHS) / traffic, GBV / SEA / SH, waste, hazardous materials) with records;
 - subcontractor training and competence certification.

- internal and external communication protocols, including:
 - noticeboards
 - incident reporting and learning
 - stakeholder engagement and grievance
 - interface with project stakeholder engagement plan (SEP)
 - site-level stakeholder engagement activities
 - community information prior to disruptive works.
- Grievance mechanisms: workers' GM and community GM (intake, confidentiality, SEA/SH-sensitive pathways, resolution timelines). For details on SEA/SH-sensitive pathways and resolution timelines, please refer to the GBV GRM Manuals attached as an appendix to this document.
- Issue-specific sub-plans (attach as annexes and summarise in the CESMP body)
- Contractors are required to include the following sub-plans, tailored to actual risks and the project ESMP.
 - Occupational Health and Safety (OHS) Plan risk registers detailing safe work procedures (work at height, lifting, confined spaces, energy isolation, hot works), personal protection equipment (PPE) matrix, first aid and medical arrangements, incident / near-miss reporting, fitness for work, and daily toolbox talks.
 - Community Health and Safety (CHS) Plan measures to avoid / minimise community exposure to dust, noise, emissions, wastewater, vectors, and site security and exclusion, interface with schools / health facilities, signage and public warnings.
 - Traffic and Road Safety Plan identifying haul routes, speed limits, spotters, driver training, vehicle safety inspections, pedestrian controls, school zone measures and crash reporting.
 - Emergency Preparedness and Response Plan including scenario-based procedures (fires, spills, structural failure, extreme weather, medical emergencies, security incidents), muster points, drills, and contacts with emergency services.
 - Waste and Materials Management Plan with procedures for solid and liquid waste segregation, storage, transport, licensed disposal, no open burning, recycling, spill prevention and response, wastewater and sanitation for workforce.
 - Hazardous Materials and Chemicals Management Inventory and material safety data sheets (MSDS), storage and secondary containment, handling, permits, transport, disposal, paint / solvent controls, welding fume controls.
 - Erosion, Sediment and Stormwater Control Plan providing details of site drainage, silt fences, sediment traps, stabilised access, stockpile management, disturbed area minimisation, progressive rehabilitation.
 - Biodiversity and Vegetation Management Plan (as relevant) with establishing clearing limits, tree protection, fauna rescue, invasive species controls, site rehabilitation.
 - Noise, Vibration and Air Quality Management Plan Equipment detailing maintenance, suppression (misting), barriers, hours of work, monitoring, and vibration controls near sensitive receptors.
 - Water Resources Protection/Water and Wastewater Plan Water, with details on sourcing water and permits, discharge controls, sediment and chlorine management if flushing / commissioning applies, prevention of contamination of surface / groundwater.
 - Labor Management and Workers' Accommodation Plan Recruitment, non-discrimination, age verification, terms and conditions, worker GM, camp standards (WASH, safety,

security, respect for community).

- SEA/SH (GBV) Prevention and Response Plan Codes of conduct, mandatory training, supervision, safe GM pathway.

1.6 Limits and assumptions

Sufficient and reliable environmental and social data is required to appropriately assess the potential impacts associated with the project and to determine effective mitigation measures that will safeguard the community and environment. The following geospatial data gaps have been identified across the following topics:

- Hydrology, surface water and flooding including the location and extent of surface water and catchment environments, and existing drainage functions and water quality.
- Groundwater including the scale, extent, depth, flow and quality of groundwater.
- Hydrodynamic and coastal processes including swell and ocean wave conditions, and local sea and wind-wave conditions.
- Social and economic information including occupation health and safety practices, statistics on gender-based violence and protection, and business and economic impacts due to climate change.
- Existing assets and infrastructure including the location and extent of existing water, sewage, electricity, and subsea pipelines and cables.

1.7 Site familiarisation

As Site Familiarisation Mission was undertaken in November 2024, where members of the project team visited all the project sites across each island to obtain environmental baseline survey data, and undertake stakeholder consultations to inform the preparation of this ESMP. Limitations in the collection of data during the mission include:

- Due to the remoteness of the project sites and associated logistical and budget constraints, most of the in-situ data collection/baseline surveys were undertaken by an environmental generalist under the guidance of technical specialists (e.g. acoustics engineer, terrestrial and marine ecologists, landscape character and visual specialist, contaminated land scientists, etc.).
- Sediment sampling:
 - Tides and tide times, material types (coral and rock/reef material) resulted in challenges collecting sediment in some locations.
 - Samples at depth were not able to be collected.
 - Sample locations were concentrated within the intertidal zone and foreshore, where the main footprint of the infrastructure is proposed.
 - Soil / sediment samples were not able to be refrigerated during the site visit and required transporting back to Australia for laboratory analysis. This may have affected the representativeness of samples due to loss of / changes in chemical composition and / or contamination during transit.
- Marine water quality sampling: Water samples were not able to be refrigerated during the site visit and required transporting back to Australia for laboratory analysis. This may have affected the representativeness of samples due to loss of / changes in chemical composition and / or contamination during transit.
- Noise: At some locations there were no properties or structures to place noise logger near to.
- Social values: Social values (including cultural heritage) identified within proximity to the project sites are limited to the information obtained from parties that were consulted throughout the preparation of the ESMP, including values identified during the mission.
- Stakeholder consultation: limitations of open-house format consultation sessions with the wider community as this is recognised as a male-dominant participation format with limited involvement from women and youth were noted in early consultation carried out in 2022. Many of the key stakeholders consulted for the project are also male-dominated (e.g. landowners, elected council members, etc). Efforts to host women's and youth focus groups were made as part of site visit 2, but there may still be limits on the scale of attendance for these groups.

2 Project description

2.1 Overview of the proposed project

The project includes the following key components:

- Maritime facilities.
 - One boat ramp at each island, incorporating a trailer and winch system to bring vessels out of the water at high tide. Abaiang, Nonouti and Tabiteuea South facilities would be within the lagoons.
 - A multipurpose shelter at Nonouti and Tabiteuea South with toilet facilities and rainwater tank to provide maintenance and cargo loading capabilities.
 - An Aids to Navigation (AtoN) storage shed to house AtoN components and equipment at Nonouti and Tabiteuea South.
 - A vessel boarding structure at Abaiang to allow safe embarking and disembarking at high tide for passengers on regular ferry service from Tarawa.
 - A passenger shelter at Abaiang, serviced with toilet facilities and rainwater tank to provide a safe and comfortable environment for passengers waiting for ferries.
- Improvement of ship safety navigation.
 - Replacement and installation of AtoNs (buoys and beacons) across the lagoon channel and reef entrance at each island to provide safe navigation through the channel during daytime and night-time hours.
- Installation of utilities to service maritime facilities, such as power and water.
- Temporary ancillary facilities required during construction such as:
 - Site offices and toilets.
 - Laydown areas for storage of plant and equipment and materials.
 - Worker compounds with self-contained kitchen, offices, shower facilities, accommodation, and laundry.
 - Parking areas.
 - Stockpiling areas.
 - Desalination and fuel plant area
 - Other associated infrastructure such as hoarding/fencing.

The term ‘project site(s)’ is used throughout this ESMP and refers to the area encompassing all temporary and permanent components required to construct and operate the project at each island. The project sites are presented in Figure 1-2 to Figure 1-4.

2.2 Completed project elements

2.2.1 Design elements

Maritime facilities proposed differ slightly for each island, but generally include a new boat ramp, Aids to Navigation (AtoNs) comprising buoys and beacons, and structures to provide shelter for passengers and storage for AtoNs. An overview of the key design elements proposed at each island is provided Table 2-1 and a summary of the features of each design element is provided Table 2-2.

Indicative designs of the proposed elements at each project site are presented in Figure 2-1, and designs of the AtoNs are presented in Table 2-1.

Table 2-1 Overview of project components

Project component	Abaiang	Nonouti	Tabiteuea South
Passenger Shelter	✓		
Vessel boarding structure	✓		
Boat Ramp	✓	✓	✓
Multipurpose shelter and AtoN shed		✓	✓
Aids to Navigation (AtoN)	✓	✓	✓

Table 2-2 Summary of project design elements

Design feature	Description	Location
Maritime facilities		
Passenger shelter	<p>The passenger shelter would be comprised of the following elements:</p> <ul style="list-style-type: none"> An undercover, open sided waiting area which opens towards the new boarding structure. The waiting area includes seating and open-plan floor space to enable flexible uses such as passenger waiting, community events (such as the arrival of a visiting dignitary) or temporary storage of goods. A single covered and enclosed accessible restroom accessed from a corridor off the waiting area. The design and materials utilised would be compliant with Kiribati Building Code 2012. Rainwater tanks that provide up to 10,000 litres (L) storage capacity. Septic tank for discharge from the restroom facilities. 	Abaiang
Vessel boarding structure	<p>A boarding structure that enables the side loading and unloading of passengers to the design vessel at high tide. Wheelchair access is proposed via the bow ramp of the vessel when the vessel is located at the top of the boat ramp.</p> <p>Balustrading may be provided along the walkway and as much of the berthing platform as possible to mitigate safety risk.</p>	Abaiang
Boat ramp	<p>A precast concrete boat ramp with a trailer and winch system would be constructed at Abaiang, Nonouti and Tabiteuea South. The precast ramp would be up to 7 metres (m) wide and comprises a continuous mat of precast planks that are pinned together at each side with stainless steel plates and bolts. The stainless-steel pins prevent planks from separating and minimise differential movement and physical steps between planks when loaded or due to unforeseen localised ground settlement or scour.</p>	Abaiang, Nonouti and Tabiteuea South
Multipurpose shelter and AtoN Shed	<p>The combined multipurpose shelter and AtoN storage shed would comprise of the following elements:</p> <ul style="list-style-type: none"> An undercover, open sided multi-purpose area which allows for maintenance and loading/off-loading of cargo. AtoN storage room 3 m x 15 m with a roller door accessible from the multi-purpose area. A covered and enclosed restroom accessible from the multi-purpose area. The design and materials utilised would be compliant with Kiribati Building Code 2012. Rainwater tanks that provide up to 10,000 L storage capacity to ensure maximum water is captured and stored from the large roof area. Septic tank for discharge from the restroom facilities. 	Nonouti and Tabiteuea South
Aids to Navigation (AtoN)	<p>AtoNs are proposed in the lagoons at each island and would consist of navigation buoys and beacons at the outer reefs, and gravity-based structure along the channel, comprising:</p> <ul style="list-style-type: none"> A total of seven navigation floating buoys are proposed across all sites. These buoys would be provided with solar powered lighting, connected to a concrete block resting on the seabed via a steel chain. A total of 36 beacons (or Lagoon AtoNs) are proposed across all islands, comprising a steel cage approximately one metre in height, with a central pole 	Abaiang, Nonouti and Tabiteuea South

Design feature	Description	Location
	extending up to 7.5 m from the base, housing a solar powered light and day marks. The steel cage would rest on shallow coral platform and cover a footprint of approximately 5.5 square metres. Concrete blocks would be placed in the cage to provide a gravity load that allows the structure to stay in position.	

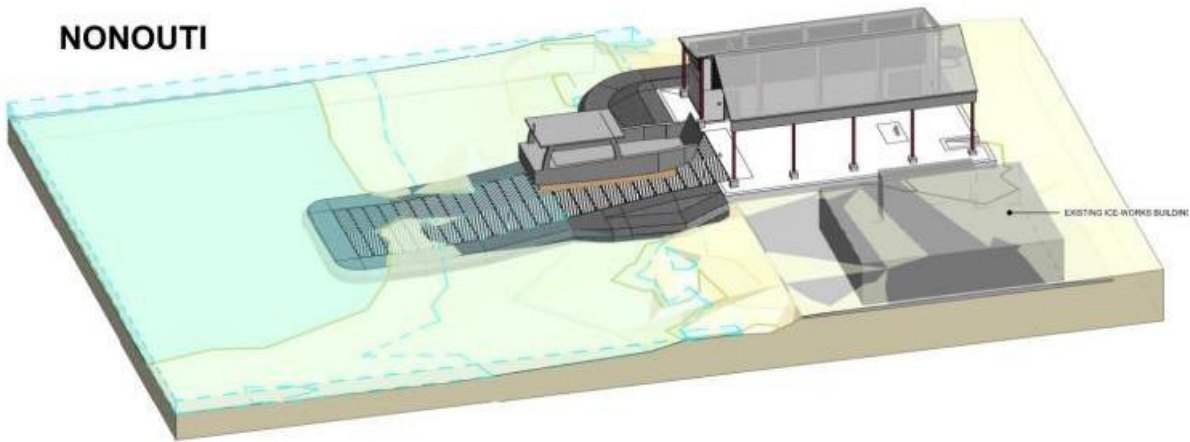
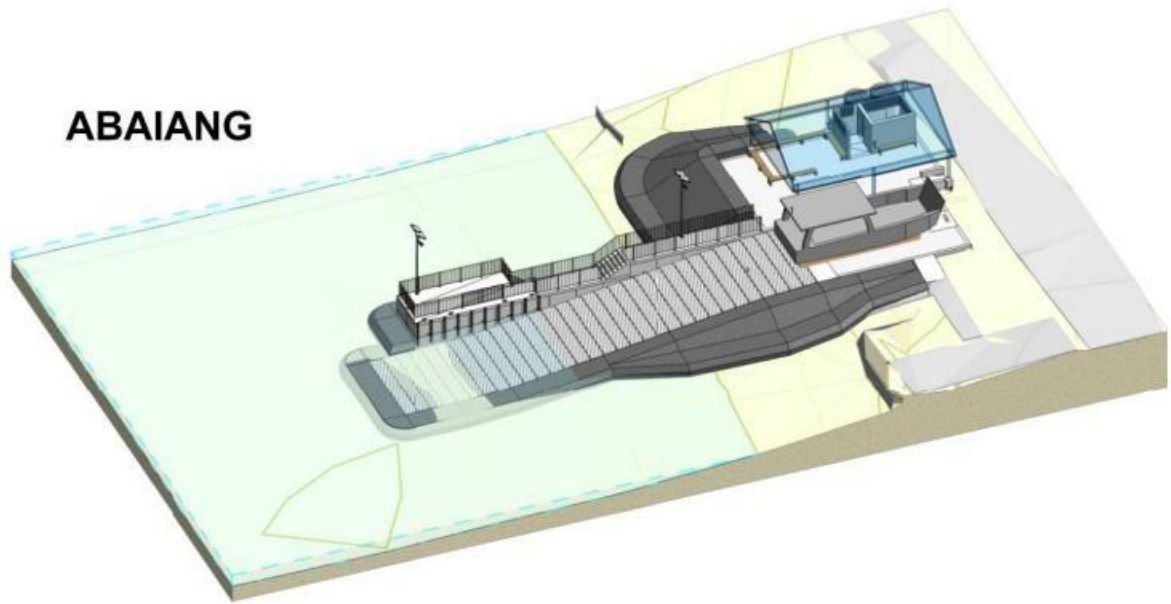


Figure 2-1 Indicative design elements at each project site

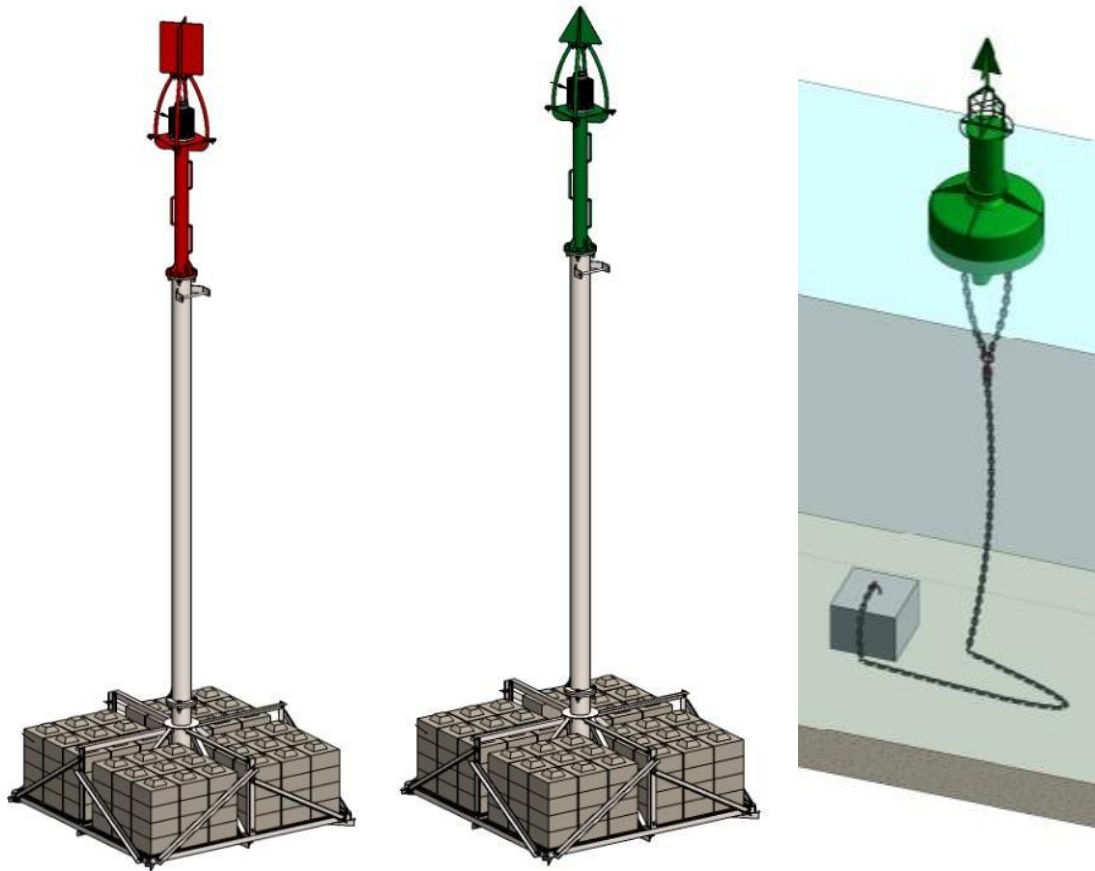


Figure 2-2 Indicative design of Lagoon AtoNs, port and starboard beacons (left and middle) and Navigation Buoy (right) at each project site



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

	Project Site
	Beacon (Green)
	Beacon (Red)
	Buoy (Green)
	Buoy (Red)
	Indicative Vessel Movement

Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere

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Metres
0 1,250 2,500

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Figure Title
Indicative locations of Lagoon AtoNs and buoys for Abaiang

Scale at A4
1:80,000

Role

Suitability
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Figure Name
Figure 2-3

Figure 2-3 Indicative locations of Lagoon AtoNs and buoys at Abaiang.



Earthstar Geographics

- B Beacon (Green)
- B Beacon (Red)
- B Buoy (Green)
- B Buoy (Red)
- < > Indicative Vessel Movement

Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere

01	01/05/2025	RT	GHG	KF	JB
Rev	Date	By	Chkd	Appd	Authd

Metres

0 2,000 4,000



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Figure Title
Indicative locations of Lagoon AtoNs and buoys for Nonouti

Scale at A4
1:120,000

Role

Suitability
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Project Number 305194-00	Rev 01
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Figure Name
Figure 2-4

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Figure 2-4 Indicative locations of Lagoon AtoNs and buoys at Nonouti.

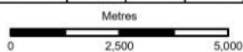


Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

- B Beacon (Green)
- B Beacon (Red)
- B Buoy (Green)
- B Buoy (Red)
- ▶▶ Indicative Vessel Movement

Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere

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Figure Title

Indicative locations of Lagoon AtoNs and buoys for Tabiteuea South

Scale at A4

1:150,000

Role

Suitability

Issued for ESMP report

Project Number

305194-00

Rev

01

Figure Name

Figure 2-5

Figure 2-5 Indicative locations of Lagoon AtoNs and buoys at Tabiteuea South.

2.2.2 Utility services

An overview of the key utilities proposed at each project site is presented in Table 2-3.

Table 2-3 Proposed utility services

Service	Purpose and design response
Potable water	Roof water collection tanks would be provided at each project site to provide a source of fresh water via rainwater collection. The project sites would be provided with two slimline polyethylene water tanks of up to 5,000 L capacity (providing a total of up to 10,000 L capacity) under the level of the eaves gutter to one side of the facility.
Electricity	Electrical wiring to power outlets and lights are proposed within waiting area, restrooms, storage and maintenance area. Multi-purpose shelters and passenger shelters would be fitted with overhead lights. Power required to generate proposed lighting would either be obtained through photovoltaic (solar) panels or generator(s). All other power required for the project would be assumed to be supplied by generators, however building structures are being designed to accommodate loading from solar panels in the future.
Wastewater	Wastewater treatment would be provided at each site to treat the black and grey water generated from the bathroom facilities, which would comprise a 4,000-litre bioseptic tank buried into the ground with re-use for irrigation or dispersal. The waste management system will adhere to the requirements of the World Banks EHS guidelines. The system would be pre-packaged to allow shipment to the project site, repeating an approach commonly used around the remote oceanic locations including Rarotonga and Fiji. The biological filtration system facilitates water recycling, enabling faster elimination of waste than a traditional septic tank. The system avoids separation of black and grey water as it can be treated in the same pod. The toilet and the sink in the bathroom facilities would be connected to the septic tank through underground polyvinyl chloride (PVC) pipes. A concrete slab of up to 150 millimetres (mm) concrete would be provided at the base of the tank to avoid floatation in water charged ground.

2.2.3 Land acquisition

The project sites at Abaiang and Nonouti are located on council-owned land. Land acquisition negotiations for permanent maritime facility sites and temporary storage areas have been completed through a voluntary MELAD process. These agreements ensure that the necessary footprints for construction are secured and legally cleared up for use.

Regarding the Tab South, a dilapidated copra building sits adjacent to the future terminal shelter location. While the structure was confirmed to be unsafe, it was previously occupied by an elderly couple acting as caretakers for their relatives, the landowners. Upon being informed of the building's structural instability, the couple voluntarily relocated to their own home approximately 2 km south of the project site, ensuring the area is vacant for development. Prior to this agreement for lease for this site, the project had actively investigated alternative sites for project works if the landowner had not agreed to the lease.

While these primary sites are secured, a small parcel on Tabiteuea South intended for a batching site remains subject to an internal family boundary determination. Despite this, the landowners have agreed to terms under an escrow arrangement. They are currently awaiting the issuance of Minister-signed lease agreements from MELAD to finalize the process.

2.2.4 Operation of maritime facilities

The following operational assumptions have been adopted for the project in preparation of this ESMP:

- Hours of operation for all maritime facilities to be 24 hours and subject to any safety requirements by the vessel operator.
- Passenger ferries will call at each project site approximately once a month each. This is informed by on site observations and discussions with local masters and shipping lines. The boat ramp is anticipated to have regular daily use by local fishermen in small powered 8ft vessel.
- Landside vehicle movements / traffic is assumed to be infrequent in line with vessel operations for transport of cargo and passenger. Vehicles anticipated to be trucks and motorbikes.
- Infrequent maintenance activities expected to be carried out at the site.

- Decommissioning / end of design life activities are expected to occur following the design life of 25 years.

- Waste expected to be generated during operation of the project would be associated with regular activities required as part of the operation of the maritime facilities. These operational waste streams are expected to include:
 - General solid waste including unused construction materials, packaging and food waste.
 - Infrequent hazardous waste materials for disposal (e.g. spill clean-up).

2.3 Construction methodology

2.3.1 Principal Contractor

The GoK has appointed Hall Contracting Pty Ltd as the Principal Contractor to deliver the design and construction of the project and prepare the ESMP. The term ‘Principal Contractor’ is used throughout this report and refers to Hall Contracting Pty Ltd or other party who assumes contractual lead responsibility for the design and construction of the project.

Arup has been engaged by the Principal Contractor to undertake detailed design and support on delivering the ESMP.

2.3.2 Works overview

The construction program for the project involves the following steps:

- Stage 1: Pre-construction
 - Preparatory and early works that would take place before the main construction activities including site mobilisation and establishment.
- Stage 2: Main construction works
 - Key construction works that would take place following Stage 1. This comprises construction of the maritime facilities and AtoNs.
- Stage 3: Post-construction
 - Works required to demobilise, dismantle and remove temporary ancillary facilities, construction plant and equipment, and prepare the facilities for operation (e.g. testing of new infrastructure). Land within the project site that is not required during operation would also be reinstated and returned to its pre-existing use.

Table 2-4 Construction methodology Stage 1-3

Stage	Activities
Stage 1: Pre-construction	<ul style="list-style-type: none"> • Relocation of residents at Nonouti currently residing on council land at project site. • Site preparation and mobilisation. • Pre-construction activities such as utility adjustments, vegetation clearing (including an existing <i>Hibiscus tiliaceus</i> tree in the Abaiang project site), adjustments to existing property access in consultation with affected residents within proximity to the project site (including the existing COVID-19 Quarantine Shed at Nonouti and the existing dilapidated ice works building at Tabiteuea South). • Where vegetation removal is likely to lead to localised destabilisation of soil, the Principal Contractor will remediate the area to protect the new infrastructure. • Installation of exclusion fencing to protect identified sensitive areas and vegetation to be retained (go/no-go areas). • Establishment of temporary ancillary facilities, such as: <ul style="list-style-type: none"> ○ Site offices and toilets. ○ Laydown areas for storage of plant and equipment and materials. ○ Worker compounds with self-contained kitchen, offices, shower facilities, accommodation, and laundry ○ Parking areas. ○ Stockpiling areas. ○ Desalination and fuel plant area.

Stage	Activities
	<ul style="list-style-type: none"> ○ Other associated infrastructure such as hoarding/fencing. ○ Installation of sediment and erosion controls considering new contours/drainage paths. ○ Implementation of stormwater drainage mitigation measures.
Stage 2a: Main construction – Maritime facilities	<ul style="list-style-type: none"> ● Earthworks required for the construction of the maritime facilities, including landside infrastructure and boat ramps requiring excavation of up to 1.5 metres below ground level. Total cut and fill volumes for each of the project sites are: <ul style="list-style-type: none"> ○ An upper limit of total cut volume for Abaiang is -196.8 m³ with a total fill volume of 205.9 m³. ○ An upper limit of total cut volume for Nonouti is -87.5 m³ with a total fill volume of 70.7 m³. ○ An upper limit of total cut volume for Tabiteuea South is -77.1 m³ with a total fill volume of 56.3 m³. ● Construction of foundations for maritime facilities. ● Concrete slab installation for maritime facilities. ● Superstructure blockwork and formwork for maritime facilities. ● Roof installation of maritime facilities. ● Construction of utilities for the maritime facilities including a septic tank. ● Site restoration activities including: <ul style="list-style-type: none"> ○ Progressive backfilling of excavated areas ○ Replanting vegetation of the same species removed to deliver of the project ○ Road restoration (if required) ○ Waste disposal, including spoil ○ Tidying construction areas.
Stage 2b: Main construction - AtoN	<ul style="list-style-type: none"> ● AtoN (buoy and beacon) equipment preparation. ● Marking of AtoN positions via GPS. ● Installation of buoys. ● Vessel anchoring would be required for installation of AtoNs. ● Installation and quality check.
Stage 3: Post-construction	<ul style="list-style-type: none"> ● Elements such as temporary plant and equipment would be removed throughout construction as works are completed and disturbed areas would progressively be reinstated to their pre-existing condition. ● Temporary access tracks, site offices, compound areas and site fencing would be removed, and the areas returned to their pre-existing condition in consultation with local community ● Areas disturbed during construction would be progressively reinstated to their pre-existing state.

2.3.3 Temporary ancillary facilities

Temporary ancillary facilities required throughout construction include:

- Site offices and toilets.
- Laydown areas for storage of plant and equipment and materials.
- Worker compounds with self-contained kitchen, offices, shower facilities, accommodation, and laundry. If land-based worker compounds are not found to be viable, a contingency plan for workforce accommodation is to use a barge for all project sites. Further details regarding contingency accommodation arrangements would be determined by the Site Supervisor.
- Parking areas.
- Stockpiling areas.
- Desalination and fuel plant area.
- Other associated infrastructure such as hoarding/fencing.

The temporary ancillary facilities would be located within the boundaries presented for each respective site as shown in



● Project site
 EarthworksVolumeFaces_Abaiang
 Key points of interest / adjacent properties
 Temporary ancillary facility
 Temporary ancillary facility - planned for partial use
→ Construction access route

Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere

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Rev	Date	By	Chkd	Appd	Authd

Metres

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Project Name
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Figure Title
Location of temporary ancillary facilities (Abaiang)

Scale at A4
1:1,000

Role

Suitability
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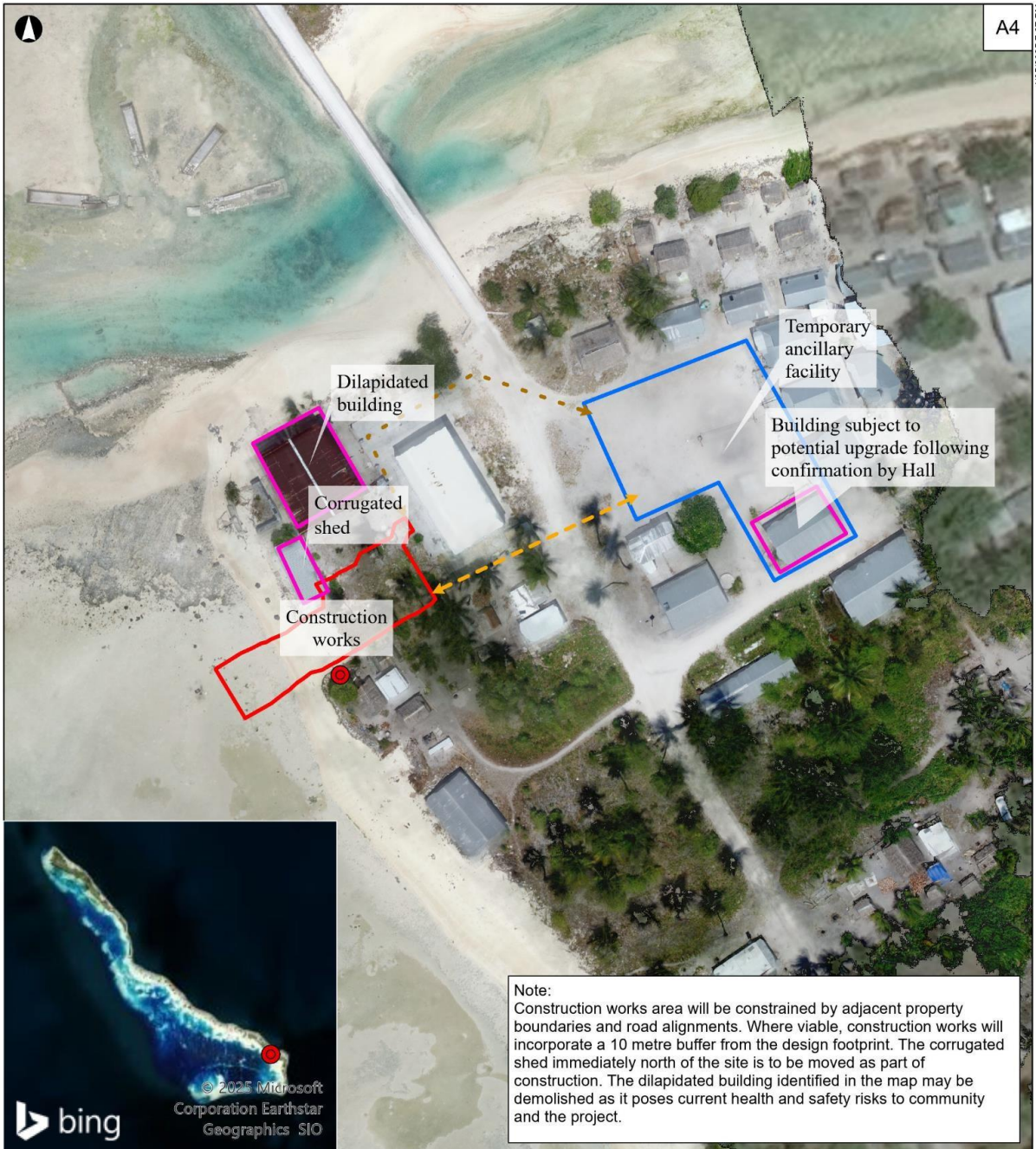
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Figure Name
Figure 2-6

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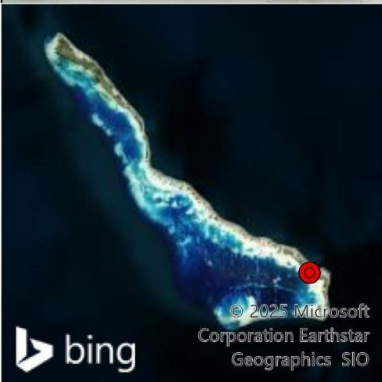
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Figure 2-6 to



A4

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● Project Site

▭ EarthworksVolumeFaces_TabSouth

▭ Key points of interest / adjacent properties

▭ Temporary ancillary facility

↔ Primary construction access route

↔ Secondary construction access route

Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere

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Metres

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Figure Title
Location of temporary ancillary facilities (Tabiteuea South)

Scale at A4
1:1,000
Role

Suitability
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Project Number
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Rev
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Figure Name
Figure 2-8

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Figure 2-8. All temporary ancillary work areas would be removed at the completion of construction, unless otherwise agreed with relevant stakeholders.

Worker compounds would be established during Stage 1 of the project at each project site. These compounds would be provided with a kitchen, offices, accommodation, laundry at each project site to minimise impacts on existing resources utilised by the local communities. If worker compounds cannot be established due to design and construction schedule considerations, workers may be accommodated on a barge as a contingency. Rental of one local house per project site may also be investigated to accommodate additional workers if required following confirmation of final design/scope and construction schedule.



● Project site
 EarthworksVolumeFaces_Abaiang
 Key points of interest / adjacent properties
 Temporary ancillary facility
 Temporary ancillary facility - planned for partial use
→ Construction access route

Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere

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Metres
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Project Name
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Figure Title
Location of temporary ancillary facilities (Abaiang)

Scale at A4
1:1,000

Role
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Project Number 305194-00	Rev 01
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Figure Name
Figure 2-6

Figure 2-6 Location of temporary ancillary facilities at Abaiang.



Notes:
 - Council residences within design footprint and construction works area to be permanently relocated.
 - Construction works area is constrained by adjacent property boundaries and road alignments. Where viable, construction works will incorporate a 10 metre buffer from the design footprint.

● Project Site
 EarthworksVolumeFaces_Nonouti
 Key points of interest / adjacent properties
 Temporary ancillary facility and worker compound area
 Construction access route

Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere

01	01/05/2025	RT	GHG	KF	JB
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Metres
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Project Name
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Figure Title
Location of temporary ancillary facilities (Nonouti)

Scale at A4
1:1,000

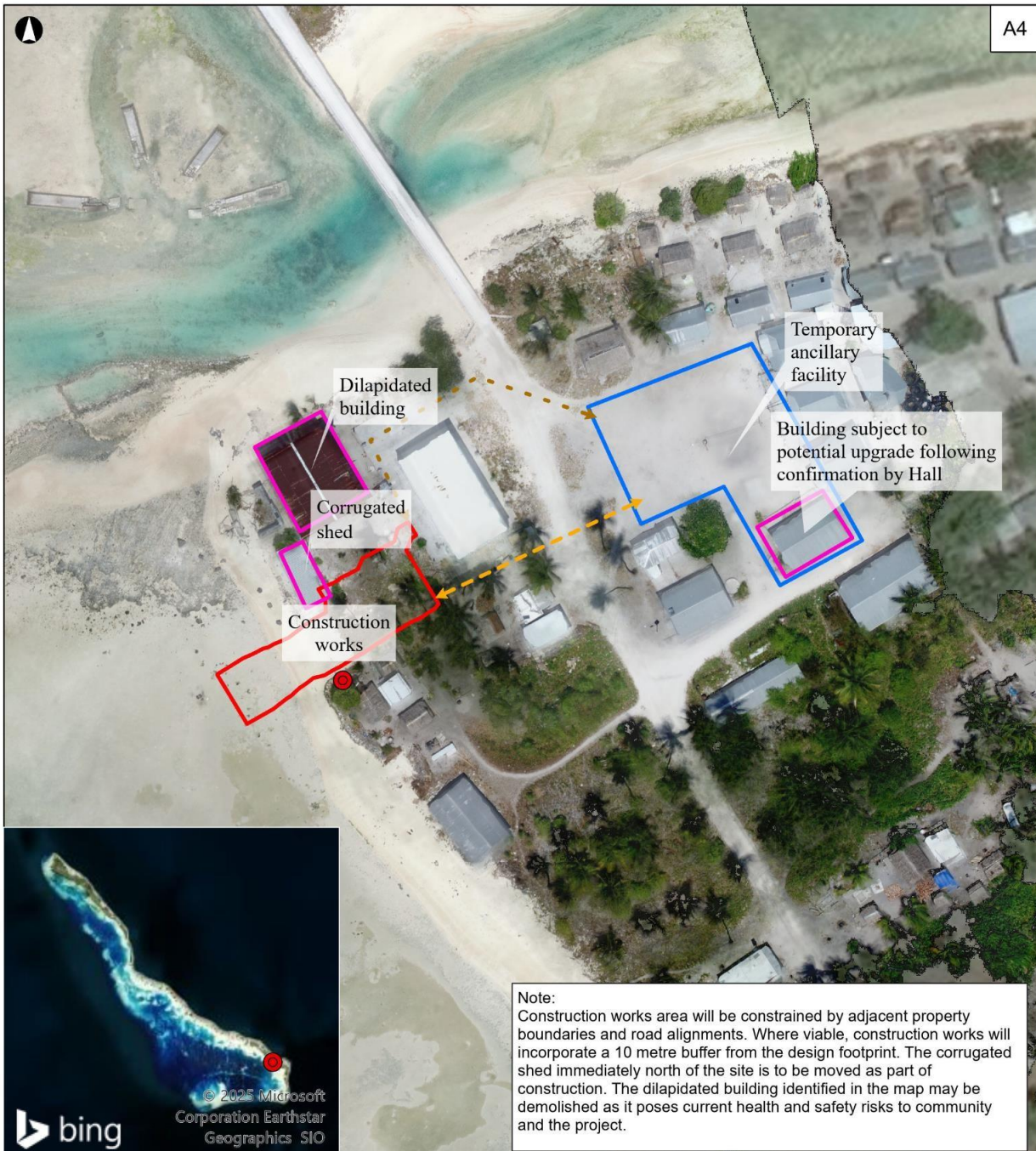
Role

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Project Number 305194-00	Rev 01
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Figure Name
Figure 2-7

Figure 2-7 Location of temporary ancillary facilities at Nonouti.



- Project Site
- EarthworksVolumeFaces_TabSouth
- Key points of interest / adjacent properties
- Temporary ancillary facility
- Primary construction access route
- Secondary construction access route

Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere

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Rev	Date	By	Chkd	Appd	Authd

Metres
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Project Name

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Figure Title

Location of temporary ancillary facilities (Tabiteuea South)

Scale at A4

1:1,000

Role

Suitability

Issued for ESMP report

Project Number	Rev
305194-00	01

Figure Name

Figure 2-8

Figure 2-8 Location of temporary ancillary facilities at Tabiteuea South.

2.3.4 Temporary land use and adjustments to existing property access

Temporary land use will be required at all sites for ancillary construction facilities, including workers accommodation, site compounds, stockpiling areas, and plant and material laydown areas. Alternative access will be provided (where impacted) and detailed in the projects Traffic Management Plan. All temporary sites will be returned to their pre-existing condition post construction. Temporary and permanent land use has been negotiated with landowners, as detailed in section 2.2.3.

Should removal of the copra shed at Tabiteuea South be confirmed, a demolition plan would be prepared and included within the CESMP (refer to section 1.5).

2.3.5 Transport and access

2.3.5.1 Marine-based access arrangements

Plant, equipment and materials would be transported to each project site via a barge vessel and tugboats owned by the Principal Contractor. The barge landing procedure would be supported by local input and brought to the foreshore area at each site to ensure easy unloading and loading of plant, equipment and materials. Workforce crew members may be required to be transported between each site via a crew vessel ship.

2.3.5.2 Air-based access arrangements

Workforce crew members may be required to be transported to each site via aircraft.

2.3.5.3 Land-based access arrangements

Existing formal/informal road networks would be used for construction transport purposes at each site. Each site is generally accessible from the existing road network and would not require new access tracks or formal road upgrades for the project. Workforce crew members would access each project site via crew vessel ship or airport. Existing roads would be utilised for the purposes of transporting workforce members, material and equipment.

2.3.6 Workforce and work hours

The workforce required to construct the project is expected to comprise up to 52 crew members in peak periods with a focus on sourcing workers who are based locally in Kiribati. Where required, workforce procurement from countries including Fiji, Philippines, Indonesia and Australia would be undertaken. Specialist trades workers may be required to travel from the Philippines, Indonesia and Fiji.

The local workforce would be engaged as labour, vessel operators and deckhands. The local workforce would be trained in the operation of loaders, concrete trucks and articulated dump trucks, as well as skilled tasks like concreting, steel fixing and formwork.

Construction would be confined to the following standard working hours:

- Monday to Saturday 6am to 6pm
- No work on Sundays or public holidays.

If works outside standard construction hours are needed, affected stakeholders would be notified and the mitigation measures detailed in section 7 would be implemented. Works outside of the standard working hours may be required depending on project needs (e.g. tidal effected works, concrete works and barge unloading,).

2.3.7 Plant and equipment

The plant and equipment needed to construct the project would be generally consistent across each project site. A summary of typical plant and equipment required during the construction stage is provided in Table 2-5.

Table 2-5 Construction plant and equipment

Type of equipment	Stage 1	Stage 2	Stage 3
Marine-based			
Loading barge (800 T)	✓	✓	✓
Loading barge (5000 T)	✓	✓	✓
Crew transfer vessel	✓	✓	✓
Forklift	✓	✓	✓
Major plant and equipment			
Light vehicles	✓	✓	✓
Trucks	✓	✓	✓
Excavators (8T, 14 T, 35 T, 48 T)	✓	✓	
Articulated Dump Truck (ADT)	✓	✓	✓
Agitator Truck	✓	✓	✓
Compactor	✓	✓	
Rock breaker	✓	✓	
Auger driver	✓	✓	
Hydraulic Drum Cutter	✓	✓	
Drilling equipment	✓	✓	
Desalination unit (20,000L)	✓	✓	
Reverse Osmosis (10,000L)	✓	✓	
Concrete Pump	✓	✓	
Small plant and equipment			
Ute	✓	✓	✓
Compactor (DPU)	✓	✓	
Water pump	✓	✓	
Compressor	✓	✓	
Generator (50 Kva)	✓	✓	✓
Mobile lighting tower	✓	✓	✓
Concrete kibble	✓	✓	

2.3.8 Construction materials and resources

Construction materials would be provided from Australia and Fiji and transported to each project site via a barge vessel and tugboats. Construction materials and approximate quantities required at each site is provided in Table 2-6. Where possible local resources will be used.

Table 2-6 Details of construction materials

Building element	Material
Foundation	Aggregate and precast concrete pad foundations with plinths for boat ramps and AtoNs.
Ground slab	Interlocking precast pavers on a mortar bed made of aggregate
Primary structure	Galvanised steel columns and rafters with cross bracing in both directions
Walls	Painted blockwork
Doors	Powder coated metal, single leaf, lockable doors

Building element	Material
Roof	Powder coated metal, roller door, lockable Steel roofing system with associated fixings and flashings as required Galvanised steel purlins
Gutter and downpipes	Marine grade aluminium or steel gutter and downpipes.
Furniture and fixtures	Timber bench seating and backrests utilising locally sourced timber where possible.
Septic Tank	Biolytix BioPod (1x per site) with PVC inground piping from WC to septic Tanks
Rainwater tank	Bushman's OzPoly's 5000L slimline water tank (2x per site) with concrete base pad to suit local conditions to avoid flotation dimensions - 2100 x 1060 3340 (mm)

2.3.8.1 Construction resources

Potable water would primarily be sourced externally and transported to the project sites for use by the workforce for the duration of construction to avoid strain on local resources. However, consultation would also be undertaken with local suppliers to assess the feasibility of local sustainable supply opportunities that do not impact on existing water supply for local communities.

Water to be used for construction purposes (e.g. dust suppression, washdown etc.) would be sourced from a temporary desalination plant which would be located in the temporary ancillary facility areas on each project site. The plant area would consist of a fully enclosed desalination plant within a 20' shipping container. To accompany the plant, approximately four 10,000 L feed water tanks and four permeate water tanks would also be installed within the project site. A submersible water pump would be installed on floats off the shoreline to provide feed water for the plant.

A designated fuel area would be established for fuel storage and refuelling of plant. Fuel would be stored in self-bunded 3,000L fuel tanks.

Diesel generators are planned to power the following temporary ancillary facilities and construction equipment:

- Worker accommodation compound would be powered by a diesel generator (50Kva, 415V 50Hz) for 24/7 hours.
- Site offices and desalination plant would be powered by a diesel generator (50Kva, 415V 50Hz) for 24/7 hours.
- Batch plant would be powered by a diesel generator (50Kva, 415V 50Hz) only during its use (approximately 3 hours during every workday).

No new overhead electricity / power lines or other means of electricity connection will be installed at any of the project sites to facilitate construction or operation of the maritime facilities.

Aggregate materials required for construction will be imported by the Principal Contractor to each of the project sites. No new aggregate mining sites or quarries are required to deliver the project.

2.3.8.2 Waste outputs

Waste would be generated at the project site primarily during the site clearance, excavation, and main construction phase of the project. Construction waste will be managed in line with relevant guidelines, the project's ESMF, Good International Industry Practice (GIIP) requirements, and in accordance with the waste hierarchy is followed (Figure 2-9). Waste would be segregated and disposed of appropriately, prevented entering the surrounding environment and, where possible, treated materials would be recovered for reuse and recycling. Details of the expected construction waste streams (including high-level estimates of generation rates and amounts during the project's pre-construction and construction phase) and its management will be included within the Principal Contractor's Waste Management Plan.

General and construction waste would be transported to a licensed waste facility on a weekly basis during

construction.

The construction works will aim to minimise disposal of waste soil by:

- Reusing clean excavated material onsite
- Minimising excavation of contaminated material and considering onsite capping and immobilisation where appropriate.

Construction waste streams along with their waste classification and proposed management pathways are expected to include:

- Site excavation waste
- Construction waste
- Demolition waste (arising from removal of extant structures within the project area)
- Packaging waste
- General waste from the construction work compound and accommodation areas
- Hazardous waste such as lubrication fluids (i.e. oil) and scrap metal

Operational waste that will be generated includes electronic waste (e-waste) and packaging waste. The site will generate small amounts of operational waste from temporary ancillary areas. These operational waste streams are expected to include:

- General solid waste.
- Mixed recycling.
- Paper / cardboard.
- E-waste from end-of-life electrical equipment.
- Infrequent hazardous waste materials for disposal (e.g. batteries, spill clean-up, paints).
- Bulky waste items, such as furniture and packaging.

Mitigation measures set out in section 7 will be implemented to ensure general and construction waste is appropriately managed without resulting in detriment to the environment and community at each site. At minimum, the Principal Contractor will be required to prepare a Waste Management Plan following approval of the ESMP.

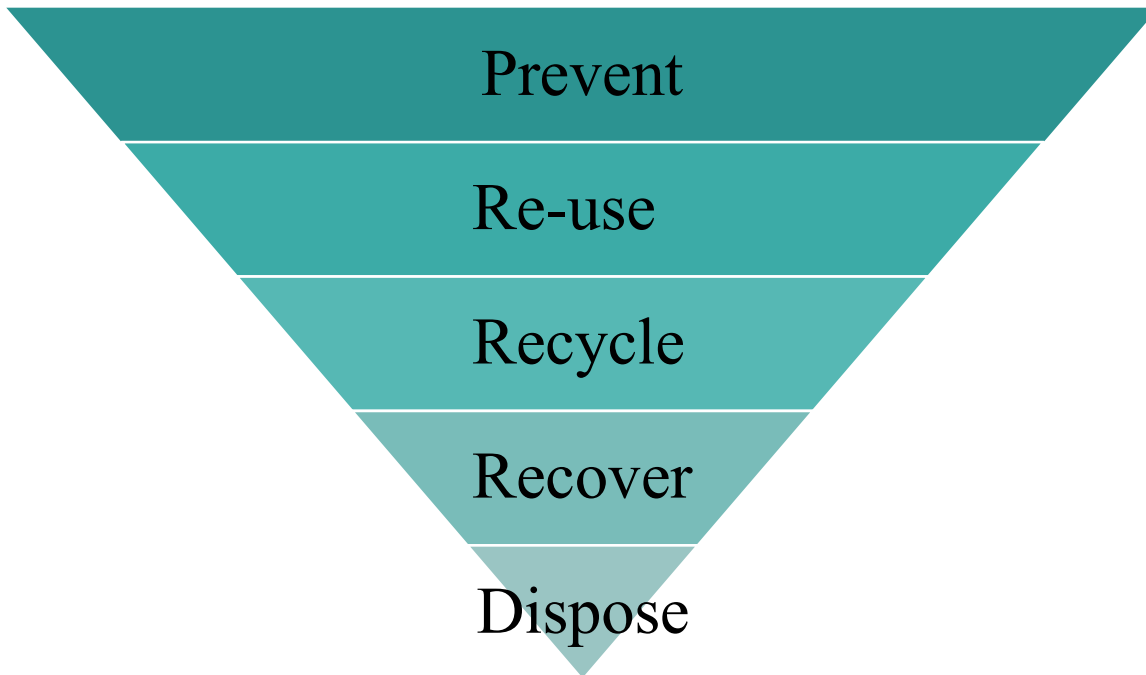


Figure 2-9 Waste hierarchy

2.3.8.3 *Energy usage and gas emissions*

The project seeks to minimise absolute and relative greenhouse gas emissions by considering alternatives, and report project-related greenhouse gas emissions, where applicable. Given the remote location of each project site and the absence of an island-wide integrated electricity distribution and transmission network, the project is required to generate its own energy during both construction and operation.

During construction, 50Kva 415V 50Hz diesel generators will generate electricity to power the following construction facilities / processes:

- Site accommodation facilitates (required to run continuously).
- Site offices and desalination plant (required to run continuously).
- The concrete batching plant (only required to operate while batching concrete, estimated to be about 3 hours during each working shift).

Temporary release of emissions associated with the use of these generators will be unavoidable during construction. Mitigation measures have been recommended within the air quality assessment (section 7) to minimise greenhouse gas emissions associated with onsite electricity generation and energy use during construction.

During operation, provision has been made in the design of the passenger shelter to support roof-mounted photovoltaic panels to generate sufficient electricity to meet the operational energy demand of the project.

2.3.9 *Construction program and staging*

The total construction period is anticipated to take approximately 6 months starting in third quarter of 2025 (subject to obtaining the necessary approvals) with the construction of each project site occurring concurrently.

This construction timeframe allows contingency for expected delays such as poor weather, unexpected finds, specific contractor requirements (such as material procurement and site mobilisation) and other unforeseen delays.

2.4 Alternatives and justification for the project

The project aligns with the plans and ambitions of the GoK, including supporting the long-term development plans of GoK (Kiribati 20-year Vision (KV20) 2016-2036, the Kiribati Development Plan (KDP)) to increase its capacity, performance and returns particularly through marine development and increasing employment opportunities.

In addition to the strategic alignment noted above, the investment case highlights the primary justifications for the project, including:

- **Enhance performance and benefits:** Investment into the project aims to implement functional and resilient infrastructure facilities, generating significant social and economic benefits for the broader Kiribati community. The role of the outer islands in and contribution to the national economy and livelihoods of the Kiribati people is highly dependent on the functionality, capacity and effective operations of the marine facilities.
- **Economic resilience:** The formalisation and improvement of marine facilities and vessel navigation is vital for the ongoing resilience of Kiribati, which is heavily reliant on imported food and other supplies due to limited arable land and fresh water.
- **Connectivity:** Each maritime facility provides essential connectivity of people, goods, and services to and from the domestic outer islands. The project will enable ongoing market access domestically as well as the potential growth opportunities for Kiribati more broadly.

2.4.1 Do nothing alternative

The ‘do nothing’ alternative would involve taking no action to develop marine facilities and upgraded safety navigation.

This alternative would not meet the project objectives presented in section 1.2, including improvements to the safety of inter-island navigation and provision of resilient outer island access infrastructure ship-to-shore transfer and land transport at each site. The general limitations of the existing infrastructure would likely lead to flow on socioeconomic impacts to the people of the outer islands who have a heavy reliance on maritime transport both for movement between the islands and connection to Tarawa, and for the import of food and other supplies due to limited arable land and fresh water.

2.4.2 Alternative options to the project

The KOITIIP prioritised four islands for marine and navigational aid improvements. Abaiang, Nonouti and Tabiteuea South are the prioritised islands, and the proposed boat ramp and dredging works are supported by approved World Bank and the Asian Development Bank funding. In addition the Environmental and Social Management Framework [Outer Islands Transport Infrastructure Investment Project: Environmental and Social Management Framework](#) (ESMF) undertook preliminary environmental and social screening of the prioritised islands to guide the implementation of overarching safeguards to be included in the ESMP for the project.

2.4.3 Alternative designs considered for the project

The preferred approach is detailed in the projects design report. The projects designs are consistent with Good international Industry Practice as required by the ABD and the World Bank.

2.5 Institutional arrangements and responsible parties

The Implementing Agencies and Principal Contractor (Hall Contracting Pty Ltd) will be responsible for carrying out the day-to-day management and implementation of the project, coordination with other government ministries and stakeholders on all aspects of project implementation and procurement. A simple overview of the institutional arrangements and structure of the various entities associated with the project is presented in Figure 2-10.

The Principal Contractor’s Project Management (CPM) team will be staffed with a core team including the Construction Manager, Project Manager, Project Engineer, Community Liaison Manager and Site Supervisor. Staff comprising the CPM team will all hold expertise in project management, procurement,

financial management, environment and social risk management, and monitoring and evaluation. The CPM team will be supported by advisory representatives including the Principal Contractor’s Health, Safety and Environment Advisor and Risk and Compliance Manager to ensure effective implementation. Individual consultants with specific skill sets will be recruited to provide support to the CPM as needed.

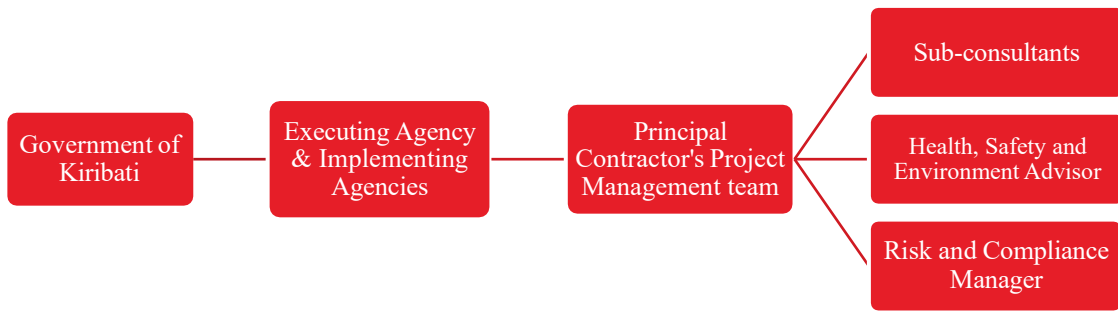


Figure 2-10 Project organisational structure

2.6 Monitoring and supervision

The Principal Contractor (Hall Contracting Pty Ltd) and their delegate(s) are responsible for ensuring full implementation of this ESMP and its procedures (including monitoring requirements) throughout the duration of the project.

Effective monitoring and supervision are essential to ensure the successful implementation of the ESMP. This section provides a framework of the processes, responsibilities, and mechanisms for monitoring and supervising ESMP implementation throughout the project lifecycle. By adhering to this framework, the Principal Contractor will ensure effective monitoring and supervision of the ESMP throughout each phase of the project, contributing to the project's environmental and social sustainability goals. Specific monitoring requirements and performance indicators must be included within the Principal Contractor’s CESMP.

2.6.1 Roles and Responsibilities

The Principal Contractor will prepare the CESMP for the project which would set out details of the qualified and responsible person(s) appointed to specific roles. In general, the Principal Contractor shall:

- Appoint a qualified Health, Safety and Environment Advisor and Risk and Compliance Manager to oversee ESMP implementation and monitoring.
- Clearly define roles and responsibilities for all team members involved in monitoring activities.
- Ensure adequate staffing and resources for effective monitoring and supervision.
- Establish lines of communication with the project proponent, regulatory authorities, and other relevant stakeholders.

2.6.2 Monitoring and Management

The Principal Contractor shall:

- Implement a robust system for collecting and recording monitoring data. Timing and frequency of monitoring to be considered in the CESMP will consider:
 - Daily continuous noise monitoring and/or monitoring during noisy activities compared to the baseline noise data identified in Appendix 8 of this report,
 - Daily observations and logging of dust generating activities e.g. truck and construction vehicle movements,
 - Daily observations and logging of sediment generating activities (e.g works undertaken within the marine environment,

- Recording grievances in accordance with the Grievance Redress Mechanism. Reporting of grievances will be in accordance with the agreed reporting schedule to be reviewed in accordance with MELADs requirements.
- Monitoring of the marine benthic environment in the vicinity of the desalination discharge point in accordance with MELADs requirements. This will include confirmation of the desalination discharge to determine if an Environmental Licence is required for this activity (refer Table 7-1).
- Ensure use of calibrated and maintained equipment for all quantitative measurements.
- Establish a centralised database for storing and managing all monitoring data.
- Implement quality control procedures to ensure data accuracy and reliability.

2.6.3 Reporting

Reporting will include:

- Submission of a detailed incident report to MELAD. following an environmental incident such as spills and leaks. The report must include investigation findings, cause, corrective actions, and communication with stakeholders.
- Submission of a Compliance Report to MELAD. Reporting will include reviewing environmental performance, monitoring trends, discrepancies between predicted and actual impacts, and planned improvements.

Public availability of compliance and incident reporting will be in accordance with MELAD’s reporting requirements.

The Principal Contractor shall:

- Develop and adhere to a regular reporting schedule (e.g., daily logs, weekly summaries, monthly reports) in accordance with MELADs reporting documentation and frequency requirements.
- Prepare comprehensive ESMP monthly compliance reports for submission to the project proponent and relevant authorities
- Ensure all reports are clear, concise, and include supporting data and photographic evidence where relevant.
- Establish a system for immediate reporting of any significant environmental or social incidents.
- Reports for all monitoring and site observations and logging shall be submitted to MELAD for review and approval in accordance with MELADs requirements.

2.6.4 Non-Compliance Management

The Principal Contractor shall:

- Develop a clear procedure for identifying, recording, and addressing non-compliance and incidents with ESMP safeguard requirements and the reporting framework described in section 2.6.
- Implement a system for developing and tracking corrective actions.
- Conduct root cause analyses for significant or recurring non-compliances.
- Report on non-compliances and corrective actions in regular monitoring reports.

2.6.5 Stakeholder Engagement in Monitoring

The Principal Contractor shall:

- Develop mechanisms for involving local stakeholders in monitoring activities where appropriate.
- Establish a system for regular communication of monitoring results to affected communities.
- Incorporate stakeholder feedback into the monitoring and management process.

2.6.6 Adaptive Management

The Principal Contractor shall:

- Regularly review the effectiveness of the monitoring program and ESMP implementation.
- Propose and implement improvements to the ESMP based on monitoring results and lessons learned.
- Adapt monitoring procedures in response to changing project conditions or unforeseen impacts.

2.6.7 Capacity Building

The Principal Contractor shall:

- Provide training to all relevant staff on ESMP requirements and monitoring procedures.
- Conduct regular refresher training and updates on environmental and social management best practices.
- Ensure all subcontractors are adequately trained and compliant with ESMP requirements.

2.6.8 Grievance Management

The Principal Contractor shall:

- Implement and maintain the ESMP Grievance Redress Mechanism (GRM) for all stakeholders.
- Ensure timely acknowledgment, investigation, and resolution of all grievances.
- Maintain a comprehensive Grievance Register, regularly updated and available for review.
- Integrate grievance data and resolutions into overall ESMP monitoring and reporting.
- Regularly review and improve the GRM based on stakeholder feedback and operational experience.

2.6.9 Documentation and Record Keeping

The Principal Contractor shall:

- Maintain comprehensive records of all monitoring activities, results, and actions taken.
- Ensure all documentation is organized, easily accessible, and retained for the duration of the project.
- Implement a system for version control and regular backups of all ESMP-related documentation.

2.7 Communications procedure

The Principal Contractor will prepare a communications procedure and assign their delegate with accountability for coordinating communication and information flow across contractors and consultants and provide the contact details of this person in the ESMP.

3 Policy and legal framework

This section summarises the relevant legislation, policy, guidelines and international financing institution requirements applicable to the project.

Within Kiribati, development is governed by a national legislative framework to control impacts of development upon its physical and social environment. The following legislative and policy instruments are applicable to the project:

- Environment Act 2021
- Environment Act General Regulations 2017
- Maritime Act 2017
- Marine Zones (Declaration) Act 2011
- Occupational Health and Safety Act 2015

The close relationship between, and the shared interests of, Pacific Island nations mean Kiribati observes other multilateral agreements. Regarding the environment, the Secretariat of the Pacific Regional Environment Programme (SPREP) is the regional organisation established by the governments and administrations of the Pacific tasked with protecting and managing the environment and natural resources of the Pacific. The organisation comprises 26 members (14 Pacific Island countries, 7 territories and 5 metropolitan states with an interest in the region), with a combined geographical coverage of 30 million km² (only 2% of which is land). SPREP's priorities are:

- Environmental governance
- Waste management and pollution control
- Island and ocean ecosystem services
- Climate change resilience
- Organisational goals

Key goals of the environmental governance priority include to support the development of environmental policy and legislation, strengthen national sustainable development planning through the use of environmental assessment and spatial planning, and strengthen environmental data collection and monitoring.

SPREP have published the following guidelines, which have been considered in the development of the project:

- Good Practice Guidelines in Environmental Impact Assessment for Coastal Engineering in the Pacific (SPREP, 2022)
- Strengthening Environmental Impact Assessment: Guidelines for Pacific Island Countries and Territories (SPREP, 2016)

As the project is being financed by both The World Bank and the Asian Development Bank (ADB), this ESMP is fundamentally based on the project's ESMF [2]. The following requirements of these international financing institutions are also relevant:

- Environmental Assessment Guidelines (ADB, 2008)
- Environmental, Health, and Safety General Guidelines (IFC, 2007)
- IFC Performance Standards on Environmental and Social Sustainability (IFC, 2012)
- The World Bank's Operational Policies, specifically 4.01, 4.04 and 4.12.

4 Stakeholder engagement and consultation

4.1 Engagement and consultations

Stakeholder engagement is an important component to the delivery of this project as it provides the opportunity for discussion with the local community that would utilise these facilities and potentially be impacted by them. Through this consultation, amendments to the design and construction methodology to better meet the needs of the local community can be made.

4.1.1 Public consultations

The following engagement activities have taken place during the concept design phase of the project:

- Site Inception Mission, undertaken in October 2024
- Site Familiarisation Mission, undertaken in November 2024
- Final Site Mission, undertaken in June 2025

The initial Site Inception Mission was undertaken in October 2024 to clarify the scope of works and delivery program for the project as well as confirm ongoing communications and meetings for the project. Early stakeholder engagement (including local residents and community members) was undertaken during this site visit to initiate dialogue with key stakeholders and understand their willingness to participate in engagement throughout the project.

Further public consultation was then undertaken in November 2024 and June 2025 to carry out engagement activities to understand key stakeholder concerns and present the progressed design and proposed construction methodology. Presentations at some sites were conducted on site and virtually based on transport and logistical limitations.

4.1.2 Key stakeholder consultations

The key stakeholders consulted as part of public consultation included:

- Ministry of Information, Communications and Transport
- Ministry of Fisheries & Ocean Resources
- Ministry of Health and Medical Services
- Ministry of Environment, Lands and Agricultural Development
- Ministry of Tourism, Commerce, Industry & Cooperatives
- Ministry of Finance and Economic Development
- Kiribati National Shipping Line
- Kiribati Institute of Technology (KIT)
- Island Council
- Village leaders, elders and representatives
- Local villagers and users of maritime infrastructure
- Landowners
- Medical services
- Police

- Churches
- Kiribati Oil Company Limited (K-Oil)
- Kiribati Women in Maritime Association
- Shipping companies
- Special interest groups
- Local businesses
- Assistant social welfare officers
- Women's groups including the Women's facility at Nonouti
- Youth groups
- Vulnerable groups

4.2 Key outcomes of engagement and consultation

4.2.1 Summary of issues raised

A summary of the key issues raised during past engagement activities include:

- **Abaiang**
 - Fresh water is a precious resource, and it was suggested that saltwater be used for dust suppression if possible. Due to poor road drainage and the potential impact of using saltwater for dust suppression on the operation of copra plants, it is advised that saltwater is not used within a 10-metre radius of copra plants. In these areas, desalinated water should be used where possible.
 - Protection of a nearby well owned by Council was also noted.
 - Concern was raised over tree removal leading to coastal erosion and the need to protect the existing seawall.
 - Concern was raised about bringing in additional workers to construct the project.
 - Desire for facilities like a shelter as there is currently no waiting area and for toilets to be publicly available and accessible for people with a disability.
 - Lighting at night for the shelter is important to improve safety.
 - People with disabilities often need to be manually lifted into the ferry.
 - Concern raised about children running into the nearby road if waiting at the shelter.
 - Desire to be able to use the surrounding space to sell food and drink.
 - Concern around construction activities distracting students at a nearby school and/or creating a safety risk for children wandering onto the site. Some students also swim in the area surrounding the project site.
- **Nonouti**
 - Desire to improve safety of the site through lighting within the shelter within the multi-purpose workshop structure at night.
 - Desire for toilet facilities that are publicly available.
 - Concern raised over the potential for coastal erosion.
- **Tabiteuea South**
 - Concern raised about Council land/public space being used, creating a safety risk to the public during construction.
 - Noted that the site is tidally dependent with access limited to high tide.
 - Desire for toilet facilities that are publicly available.

4.2.2 Means of addressing issues raised

Elements of the issues raised during consultation have been incorporated into the design development where possible and have also informed this document and the proposed mitigation measures.

4.3 Negotiation and agreements with directly affected person and land/resource owners

The KOITIIP team is leading all landholder negotiations. Acquisitions for the permanent maritime facility sites are complete, with long-term lease agreements finalized and currently awaiting the Minister of MELAD's signature.

Regarding temporary sites for laydown areas and camps, most locations have been cleared for use. For the few parcels currently subject to boundary disputes, escrow arrangements have been established to allow the project to proceed. Under these arrangements, payments will be withheld until disputes are resolved and the rightful landowners are officially identified. Subsequent outcomes for pending temporary land use will be elaborated in the works progress reporting.

4.4 Disclosure

Disclosure does not equate to consultation (and vice versa) as disclosure concerns transparency and accountability through release of information about the project. The Principal Contractor and IAs are obligated to implement and maintain effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them. A copy of this ESMP will be made available on the project web site. It will also be available from other GoK websites and hard copies available at GoK offices (most applicable and accessible) and provided to relevant Island Councils for community members to access on request. The final ESMP, and any updates, will be further disclosed at the same locations.

5 Environmental and social baseline

This section of the ESMP characterises the existing conditions with respect to the relevant environmental aspects of the project sites. Each of the environmental aspects are discussed in the following sections.

5.1 Climate change

5.1.1 Climate characteristics

A climate change and disaster vulnerability risk assessment has been undertaken for the project, which includes a climate change and disaster vulnerability risk assessment risk register outlining key risks and adaptation measures for the project under future climate change (refer to Appendix 1).

Kiribati is an equatorial country characterised by a hot, humid, tropical climate. Temperatures on Kiribati’s islands are generally stable throughout the year with average monthly temperatures between 27°C and 28°C during every month of the year [3]. Annual rainfall varies across the Kiribati islands between 1,000 millimetres (mm) per year and 3,000 mm per year and is highest between March and May, and lowest in October [3] (Figure 5-1). Abaiang is in the northern part of the Gilbert Island chain and generally experiences more rainfall than the southern parts, such as Nonouti and Tabiteuea South, which experience drier weather conditions. Kiribati is subject to the effects of El Niño which brings heavy rainfall, and La Niña which brings drought periods to Kiribati.

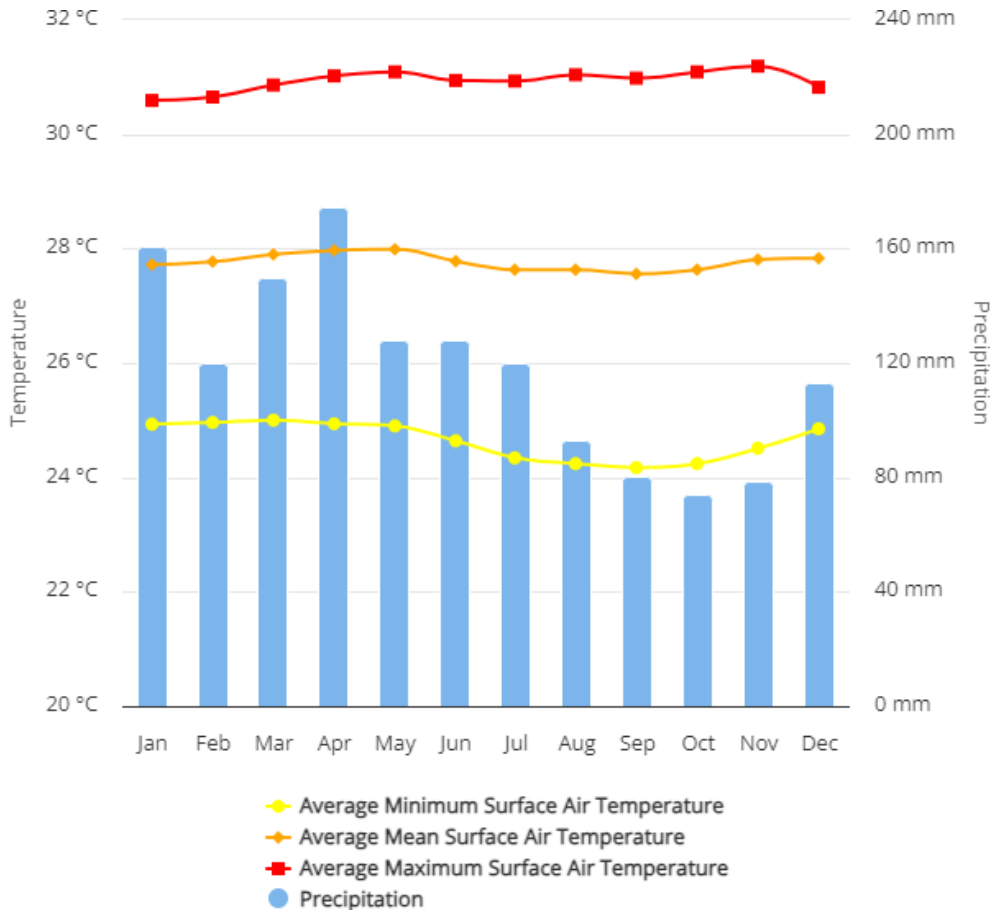


Figure 5-1 Average monthly mean, maximum, and minimum temperatures and rainfall in Kiribati (1991-2020) (World Bank, 2021)

5.1.2 Climate change

It is widely recognised that Pacific Island Nations are among the world’s most physically and economically vulnerable to climate change and extreme weather events. Owing to its archipelagic nature and generally low elevation, Kiribati is one of the most vulnerable countries in the world.

Climate change and extreme weather events include heat waves, drought and floods, cyclones and storm surge. Kiribati regularly experiences high maximum temperatures, with an average monthly maximum of 30.8°C. As the average temperature moves away from the historical baseline due to a warming climate, the probability of heat waves is likely to grow significantly [3]. Meteorological drought caused by precipitation deficit is the primary type of drought affecting Kiribati. Predictions based on Kiribati's Second National Communication to the UNFCCC [4] suggest minimal change from present-day drought distributions might be expected. Kiribati's islands tend to be sheltered from direct impact of cyclones due to current climatic patterns. However, impacts occur where cyclones pass within a few hundred kilometres. Sea-level rise, and the possibility of increased wind speed and precipitation are known risks with the potential to enhance the damage caused by cyclone-induced storm surges. Studies suggest cyclone generation will become more frequent during El Niño events, and less frequent during La Niña events.

5.2 Topography, geology and soils

The geology of each site is characterised by low-lying coral atolls. These atolls formed as volcanoes subsided and coral reefs grew around them, later evolving into limestone formations during the Pleistocene. The land within and surrounding each site is composed of sand and reef rock, with a thin, calcareous soil that is not conducive to agriculture.

Site observations recorded during the Site Familiarisation Mission are summarised below:

- **Abaiang**
 - The 'upper area' where maritime facilities are proposed to be constructed is generally flat and has been subject to previous disturbance.
 - The site slopes down between 6-9 degrees towards the lagoon before becoming level.
 - Relative abundance of coral gravels/cobbles/boulders in the near foreshore in front of the site compared with other areas along the beach.
- **Nonouti**
 - The 'upper area' where maritime facilities are proposed to be constructed is generally flat and is adjacent to a COVID-19 Quarantine Shed and existing residential areas.
 - The site slopes down between 4-6 degrees towards the lagoon before becoming level.
 - Relative abundance of coral gravels/cobbles/boulders in the near foreshore in front of the site compared with other areas along the beach.
- **Tabiteuea South**
 - The 'upper area' where maritime facilities are proposed to be constructed is generally flat except for two local depressions about < 0.5 m deep. An exposed beach rock area consisting of coralline gravel is located immediately west of the site.
 - The site slopes down between 5-7 degrees and 3-4 degrees further towards the lagoon before becoming level.
 - Relative abundance of coral gravels/cobbles/boulders in the near foreshore in front of the site compared with other areas along the beach.

Geotechnical investigations were carried out at the time of the Site Familiarisation Mission and supplemented a desk-based review of information relevant to the geotechnical conditions of the project sites. Boreholes collected at each of the project sites noted the following substrate characteristics:

- Abaiang is characterised by sand and gravelly sand substrate ranging in depths from about 0.3m to 0.55m across the work area
- Nonouti is characterised by coarse sand, gravelly sand, sandy gravel, limited topsoil, and fill mixture comprising sand and cobbles to varying depth profiles to a total depth measured of 1.25m below the surface
- Tabiteuea South is characterised by fine to medium grained sand, coarse sand and gravelly sand up to about 1.35m below surface.

The geotechnical studies identified a 40% chance in 50 years that Kiribati will experience at least once, weak levels of ground shaking, but that these levels are not expected to cause significant damage to buildings and

infrastructure. Given the low risk and expected magnitude of seismicity, as well as the relatively light load bearing of the structures proposed for the project, liquefaction risk is not deemed significant and is not considered further. Further information is provided within the Geotechnical Factual Report and Geotechnical Interpretive Report provided in Appendix 2.

5.3 Contamination

Site investigations, including sample collection, were carried out at each site as part of the Site Familiarisation Mission. These investigations comprised collecting soil/sediment samples from geotechnical test pit and/or dynamic cone penetrometer locations, which were complimented with a number of opportunistic environmental sampling locations (for instance, where visual and/or olfactory evidence of contamination was observed).

5.3.1 Sampling methodology and limitations

The method of identifying locations for and collection soil / sediment samples was consistent across each of the project sites. Generally, sample locations were distributed across each of the project work areas, to provide a representative picture of ground conditions and extant levels of contamination at the project sites. Where visible or olfactory signs of contamination were observed by personnel on the Site Familiarisation Mission, at least one sample was collected in this area.

Sample collection involved using a handheld trowel or shovel to excavate a hole until water ingress was observed, at which point a ‘grab sample’ of substrate was taken and sealed in a container supplied by the laboratory certified and contracted to undertake sample analysis in Australia. At locations below the tide level at the time of the Site Familiarisation Mission, samples were collected from the substrate surface. The depth of samples ranged between 0 – 0.3 m below ground level (bgl). Where possible, substrate samples were screened in situ using a photo-ionisation detector (PID) to provide an indication of volatile organic compound (VOC) concentrations. Sealed sample containers were stored in cool boxes and transported to a certified laboratory in Australia (ASL) for physical and chemical analysis.

Due to the remote location of the project, limitations in sediment sampling and analysis were experienced regarding the collection technique and logistics, as follows:

- Sediment samples were collected primarily using handheld tools (e.g. trowels). The lack of potable water access at the project sites meant equipment was unable to be properly cleaned or decontaminated between taking samples.
- A weight restriction imposed by light aircraft operators for travel between atolls meant a limited number of sampling containers could be taken to site. Consequently, quality assurance and quality control (QAQC) samples, including duplicates and trip blanks, as well as rinsate for sample equipment sterilisation, were not taken.
- Delays associated with transport logistics and the legal process of importing sediment to Australia for laboratory analysis (i.e. mandatory customs handling and quarantine periods) meant an extended period of elapsed time between sample collection and analysis. Logistical constraints did not allow for continuous refrigeration of samples between collection and analysis.

Refer to Appendix 3 for further details on the scope of work, sampling methodology and limitations, and adopted assessment criteria, which were consistent across each of the sites.

5.3.2 Geotechnical results

5.3.2.1 Abaiang

Field observations, soil analytical results, a high-level conceptual site model (CSM), an appraisal of impacts and proposed mitigation measures for Abaiang are detailed in 3 of this ESMP. Samples were collected from five locations in Abaiang, as shown on Figure 5-2.

A summary of the observations and results for Abaiang is provided below:

- The detected contaminant concentrations summarised in Table 5-1 are not considered to constitute significant soil contamination.
- A fuel storage and potential refuelling area, including leaking oil drums, was noted upgradient of the investigation locations during the site investigation. Minor amounts of rubbish were also observed at the depot, which is located adjacent the Kiribati Oil Company Limited (K-OIL) seawall.
- Petroleum hydrocarbons were not detected in the samples tested. However, in-field visual observation of darker-stained substrate downstream of the K-OIL facility indicated potential for localised petroleum hydrocarbon impacts, potentially relating to the adjacent fuel storage depot.
- A sea cucumber processing facility was noted north of the project site and appeared to be discharging fluid which entered the shallow water-filled depressions near to the existing boat ramp and beach (east of the locations of AB-SED-02 and AB-TP-04). The composition of this discharge water is unknown; however, a strong sulfuric odour was observed. Deposited material which was soft underfoot was also observed in this area which may be associated with the discharged fluid. Based on site observations and consultation with contamination specialists (adopting a source-pathway-receptor approach), there is very little to no evidence to indicate this smell is a result of hydrocarbon pollution.
- Refer to the Abaiang memorandum in Appendix 3 for discussion of the limitations around the soil analytical results due to holding time exceedances and absence of quality assurance/quality control sampling and standard decontamination procedures.

Table 5-1 Summary of detected contaminants within soil and sediment samples at Abaiang

Analyte	Locations	No. of detects / no. of results	Concentration range
Copper	AB-SED-03	1 / 5	<5 – 6 mg/kg
Lead	AB-SED-01, AB-SED-03, AB-TP-04, AB-DP-04	4 / 5	<5 – 18 mg/kg
Zinc	AB-SED-01, AB-SED-03, AB-TP-04, AB-DP-04	4 / 5	<5 – 25 mg/kg
Monobutyltin (MBT) ¹	AB-SED-01	1 / 5	<1 – 1 µg/kg

Note that the detected concentration of MBT was below the adopted assessment criteria for both TBT (9 µg/kg) and DBT (250,000 µg/kg).

5.3.2.2 Nonouti and Tabiteuea South

No visual or olfactory evidence of contamination, nor potential sources of pollution, were observed during site missions at the project sites in Nonouti and Tabiteuea South. A summary of the observations and results for Nonouti and Tabiteuea South is provided below:

- Samples were collected from five locations at Nonouti and six locations at Tabiteuea South, all above water (refer to Figure 5-3 and Figure 5-4 for sample locations).
- Elevated photo-ionisation detector (PID) readings were not recorded at any location, and signs of anthropogenic contamination were not observed in the samples at Nonouti and Tabiteuea South. The

sandy soils were observed to primarily be fine to medium grained coarse beach sands, with organic humic layers present at some locations.

- No contamination sources were observed at Tabiteuea South.
- The project site at Nonouti is bounded land site by a storage building and residential properties. Rubbish was observed on the beach. No evidence of contamination was observed in beach sediments during sample collection.
- The limitations of the sampling methodology adopted for Nonouti and Tabiteuea South are the same as those identified for Abaiang, outlined in section 5.3.1 and detailed Appendix 3.
- All analytical results reported analyte concentrations to be either less than the laboratory limit of reporting (LOR) or below the adopted assessment criteria. Detected analytes are summarised in Table 5-2 below.
- Given no significant potential sources of contamination were identified, no observations of visible contamination were made, and soil analytical results did not exceed the adopted assessment criteria, the standard mitigation measures presented in section 77 are considered suitable for Nonouti and Tabiteuea South.

Table 5-2 Summary of detected contaminants within soil and sediment samples at Nonouti and Tabiteuea South

Analyte	Locations	No. of detects / no. of results	Concentration range
Zinc	Nonouti: NN-TP-01, NN-TP-02	2 / 5	<5 – 19 mg/kg
Monobutyltin (MBT)	Nonouti: NN-TP-02	1 / 5	< 1 – 3 µg/kg
	Tabiteuea South: TS-DP-09	1 / 5	< 1 – 1 µg/kg



Figure 5-2 Abaiang geotechnical sampling locations.



Figure 5-3 Nonouti geotechnical sampling locations



Figure 5-4 Tabiteuea South geotechnical sampling locations

5.4 Water resources and water quality

5.4.1 Groundwater, hydrology and flooding

Groundwater is the primary source of potable water for communities at each site. These lenses provide significant volumes of accessible and unpolluted water. Shallow groundwater is extracted, reticulated and distributed to the public. The underground freshwater lenses are recharged by rainfall. The principal pollution threat to groundwater sources is faecal contamination from humans and animals. Shallow groundwater systems are also vulnerable to saline intrusion (MISE, 2019).

There are no fresh surface water resources available at any of the sites, such as lakes, rivers, ponds or streams (MISE, 2019). Flooding due to sea-level rise threatens the coastal zone of each site. Abaiang has already undergone managed relocation due to increasing vulnerability to permanent inundation due to climate change and associated sea-level rise [3].

Staining of near-surface substrate within the vicinity of the K-OIL facility at Abaiang was observed during site missions. However, given the laboratory results and source-pathway-receptor analysis undertaken by contamination specialists, there is very little to no evidence of an ongoing significant risk of groundwater pollution from the K-OIL facility.

5.4.2 Water quality

Marine water quality investigations were carried out at each site as part of the Site Familiarisation Mission and is detailed in Appendix 4.

A total of six marine water samples were taken at each site and an overview of the sampling locations is included in Appendix 4. The marine water samples collected at each site were exported to Australia for analysis at ALS Laboratories to support water quality investigations.

A summary of the observations and results for each site is provided below:

- Sample results that included a high reading for each metal tested is presented in Table 5-3. The values recorded at each site present a low risk to marine species.
 - Other than one high Nickel level, all the results are below the guideline assessment criteria or can't be compared due to an insufficient level of accuracy in the sampled results. For example, the guideline values for Zinc are 0.0033 and 0.015 mg/L, but all the samples have a reading of <0.050 mg/L, which makes it unclear whether the guidance value has been met or exceeded. This could be a result of either:
 - A limitation in the level of accuracy of the analytical method adopted; or
 - Interference between matrices when undertaking chemical analysis, meaning the limit of reporting (LOR) increased to account for unreliability.
- Comparative analysis detailed in Section 4, Table 5 of Appendix 4 concluded that the slightly elevated concentration of Nickel identified presents a low risk to marine species.

Table 5-3 Analysis of marine water samples (all values are in mg/L)

Metal	Guideline values used for assessment		Maximum reading recorded at each site		
	ANZG MW Toxicant DGVs LOSP 99% ¹ (July 2023)	ANZECC 2000 MW 95%	Abaiang	Nonouti	Tabiteuea South
Arsenic	N/A	N/A	<0.010	<0.010	<0.010
Cadmium	0.0007	0.0055	<0.0010	<0.0010	<0.010
Chromium (III+VI)	N/A	N/A	<0.010	<0.010	<0.0001

¹ Default Guideline Value (DGV) for a Level of Species Protection (LOSP) of 99% in Marine Water (MW)

Metal	Guideline values used for assessment		Maximum reading recorded at each site		
	ANZG MW Toxicant DGVs LOSP 99% ¹ (July 2023)	ANZECC 2000 MW 95%	Abaiang	Nonouti	Tabiteuea South
Copper	0.0003	0.0013	<0.010	<0.010	<0.010
Lead	0.0022	0.0044	<0.010	<0.010	<0.010
Mercury	0.0001	0.0004	<0.0001	<0.0001	<0.0001
Nickel	0.007	0.07	0.017	<0.010	<0.010
Zinc	0.0033	0.015	<0.050	<0.050	<0.050

5.5 Marine and coastal conditions

A metocean study has been carried out by Orcas Consulting Pty Ltd (Orcas) to provide specialist input on water levels, wave, current and wind data for each project site. The full report is included in Appendix 5 and has informed the project design at each site. This section provides a summary of the meteorological and oceanographic conditions of Kiribati presented within the Orcas report included at Appendix 5, reflecting the conditions experienced across each of the project sites.

5.5.1 Meteorological conditions

Across the Gilbert Islands, trade winds typically blow from the northeast and southeast across the year with occasional winds from other directions. During El Niño events, intense and persistent westerly winds dominate. While rare, winds from the northwest represent some of the strongest wind events. Winds tend to be strongest between January and March, with lighter winds over the course of the remainder of the year.

Meteorologically, Kiribati is not directly affected by tropical cyclones due to its proximity to the equator.

5.5.2 Oceanographic conditions

Wave heights and direction within the Gilbert Islands correlate with wind strength and direction. The frequency of waves (wave periods) generally ranges from 7 to 12 seconds. During El Niño events, the proportion of waves from the north and northeast increases. In La Niña events, the proportion of waves from the east increases. Sea conditions and waves, including higher sea levels, observed during El Niño are more impactful to lagoon-side shorelines than during La Niña events.

While Kiribati's meteorology is not directly affected by tropical cyclones, its sea state is influenced by large sea swells associated with low atmospheric pressures from distant cyclonic events. There are examples of severe flooding in the Gilbert Islands from large swells associated with tropical cyclones over 1000 km away.

Under a 1% return event (an event predicted to occur once in a 100-year period), extreme wave heights at the boat ramp locations for each project site is currently:

- Abaiang: 0.92m
- Nonouti: 0.75m
- Tabiteuea South: 1.00m

Considering the predicted effects of climate change, these extreme wave heights are modelled to increase by 0.04m on current levels by 2050, and 0.15m by 2100.

Under a 1% return event, extreme sea levels at the boat ramp locations for each project site is currently:

- Abaiang: 2.54m
- Nonouti: 2.68m
- Tabiteuea South: 2.75m

With the predicted effects of climate change, these extreme sea levels are modelled to increase by up to 0.21m on current levels by 2050, and up to 0.84m by 2100.

All the project sites are on the lagoon-side of the atolls and therefore more protected, and all works are within the lagoon where wave energy is low. Because the project represents a minor alteration to the existing low wave energy environment, coastal erosion and sediment transportation models/studies are not required for Abaiang, Nonouti and Tabiteuea South.

5.6 Ecology

An appraisal of the existing ecological environment and the construction risk from the project is provided in the ecological reports enclosed at Appendix 6 and Appendix 7. No critical habitat for the habitats discussed below was identified through a desk-based assessment, engagement with key stakeholders and local communities, or during any of the project teams' site missions.

5.6.1 Coastal and intertidal ecology

The locations for the landside infrastructure, such as the AtoN workshops and shelters, are primarily located on developed land where vegetation has already been cleared. Observations made on site missions identified that the shoreline environment and associated habitats have been modified by existing human uses, including roads and access tracks, concrete ramps, oil storage facilities, existing buildings / structures and municipal waste within the project sites and work areas. As such, no areas of high biodiversity value have been identified within the project sites.

Further development of design has identified the need for minor additional vegetation removal. This includes a tree within the project site at Abaiang (a *Hibiscus tiliaceus*), and a small tree in the southern corner of the existing quarantine shed at Nonouti, which would need to be demolished, and two coconut trees and several saplings on Tabiteuea South. Ecological constraints have been considered in design development, with the locations, layout and orientation of design elements having been selected with an effort to minimise vegetation removal where feasible, particularly trees, within the constraints of each site.

5.6.2 Marine ecology

A Marine Ecology Report has been prepared to support the project and is provided in Appendix 7. Data collection as part of this assessment included visual surveys, photography, video documentation, and GPS mapping of benthic features such as sediment types, macroalgae, invertebrates, and seagrass presence. The surveys, carried out during the Site Familiarisation Mission was informed by the guidance of a marine ecologist, covered both direct and indirect impact areas, with total surveyed areas ranging from 870 m² to 3,080 m².

5.6.2.1 Abaiang

The Abaiang site features a foreshore beach and intertidal reef flat with beach bedrock, supporting a natural benthic ecosystem with minimal human alteration. No coral colonies were recorded, and sparse patches of *Thalassia hemprichii* (seagrass) were found northwest of the site, outside the direct impact zone. Macroalgae coverage ranged from 5–70%, dominated by *Cladophora sp.* (blanket weed or green hair), with some *Amphiroa fragillissima* (a type of coralline red algae), *Acanthophora spicifera* (spiny seaweed), and *Schizothrix sp.* (a cyanobacterium with no widely recognized vernacular name). Invertebrate diversity was low but included healthy populations of *Sipuncula sp.* (peanut worms), a few *Holothuria atra* (black sea cucumber or lollyfish), snails, and ghost crabs. Finfish were scarce and showed low diversity. Some community-derived waste was observed, indicating minor anthropogenic impact. Overall, the ecological value of the site is considered low.

5.6.2.2 Nonouti

The Nonouti site features a foreshore beach and intertidal reef flat, similar to Abaiang, with the addition of a manmade rock breakwater. No coral or seagrass was recorded. Macroalgae coverage ranged from 5–40%, dominated by *Cladophora sp.* (commonly known as blanket weed or reticulated algae), with minor presence of *Amphiroa fragillissima* (a coralline red algae) and *Schizothrix sp.* (a cyanobacterium with no widely used common name). A few saplings of *Rhizophora stylosa* (spotted mangrove or stilt-root mangrove) were

observed on the breakwater, outside the impact zone. Invertebrate presence was sparse, with low densities of *Sipuncula sp.* (peanut worms) and *Nerita sp.* (nerite snails). Finfish were very low in both number and diversity. Despite past reclamation, the benthic habitat remains largely natural, with minimal anthropogenic waste observed. The overall ecological value of the site is considered low.

5.6.2.3 *Tabiteuea South*

The Tabiteuea South site consists of a foreshore beach and intertidal reef flat with exposed reef bedrock, supporting a largely unaltered natural ecosystem. No coral or seagrass was recorded. Macroalgae coverage was very low (less than 5%), primarily composed of *Cladophora sp.* (blanket weed or reticulated algae) and *Schizothrix sp.* (a cyanobacterium with no widely used common name). Invertebrate populations included healthy numbers of *Ocypode sp.* (ghost crabs) and *Gelasimus tetragonon* (tetragonal fiddler crabs), along with some *Nerita sp.* (nerite snails) and dead bivalve shells. Finfish were present in very low numbers and diversity. Anthropogenic impact was minimal, with very low levels of waste observed. The site maintains a low but functioning ecological value.

5.6.3 Threatened and marine species

The marine ecological assessment for the boat ramp sites at Abaiang, Nonouti, and Tabiteuea South atolls found no threatened, endangered, or endemic marine species, nor any marine mammals or reptiles at any of the locations. All three sites exhibited low ecological value, with no coral colonies and very low finfish diversity. Abaiang had sparse patches of seagrass (*Thalassia hemprichii*) and healthy populations of peanut worms (*Sipuncula sp.*), while Nonouti featured a few mangrove saplings (*Rhizophora stylosa*) and low densities of nerite snails (*Nerita sp.*). Tabiteuea South showed healthy populations of ghost crabs (*Ocypode sp.*) and fiddler crabs (*Gelasimus tetragonon*), along with scattered dead bivalve shells (*Anadara sp.*). Macroalgae coverage varied across sites, dominated by *Cladophora sp.*, with minor presence of *Amphiroa fragillissima*, *Acanthophora spicifera*, and *Schizothrix sp.* Overall, the benthic habitats remain largely natural and unaltered, with minimal anthropogenic impact.

5.7 Land tenure, zoning and use

Private ownership and state ownership are the main types of land tenure in Kiribati (about 95% private ownership and 5 per cent state ownership) (MISE, 2019). There are various forms of government leases from landowners, including for many public purpose developments, private sector subleases as well as foreshore and reclamation by Government. Limitations in land supply and tenure, particularly in urban areas are leading to increasing density as well as some illegal housing or residents entering formal or informal arrangements with landowners which have pool legal basis and contributes to land disputes.

The main land uses surrounding the project sites include:

- **Abaiang**
 - The area surrounding the project site is quite constrained. Key land uses include a Women's Centre, Abaiang Island Council office, small shops, residential properties, local sea cucumber business that operates seasonally, K-Oil site, swimming area which is also used as an access point for collecting sea cucumbers and seagrass. Engagement with the local community have also highlighted a desire to retain this area for future community uses such as the development of a police station.
- **Nonouti**
 - Key land uses surrounding the project site include the Nonouti Island Council office, the Nonouti Island Ice Plant, residential properties. The Nonouti Island Hostel, Ien Nonouti JSS (a junior college), and Kiribati Uniting Church (Matang) are also nearby (330m southeast, 390m northeast, and 365m northwest respectively). The community also use the project site to collect shellfish.
- **Tabiteuea South**
 - Key land uses surrounding the project site include the City Council office, offices for Teobokia, and residential properties.

5.8 Economy

Kiribati has a small landmass and limited natural resources which reduce its ability to support a domestic market and economic production base. There are also high costs of services delivery due to its remoteness from major trading routes. The key industries are fishing and agriculture with exports in 2022 dominated by sales of fish and coconut derived products. The areas surrounding the project sites, in particular, are often dominated by micro enterprises (i.e. local shops), fishing and copra drying.

5.9 Land-based and marine traffic

Land-based traffic on Abaiang, Nonouti and Tabiteuea South is primarily comprised of motorized vehicles, including motorcycles, and trucks for personal transportation and carrying goods. Many residents and visitors to the islands also travel by foot, however there are no designated formal footpaths. There are no railways or public transport systems in place at any of the sites.

Marine traffic is relatively low, generally small fishing boats and vessels to transport people and goods between islands.

5.10 Landscape, seascape and visual amenity

All of the project sites are located on the coastline, in fairly close proximity to residential areas and/or community facilities/structures. However, it was noted in the Screening Report that the coastline across all sites has experienced erosion which may slightly reduce the visual amenity of the sites. Despite this, the view of the project sites along the coastline which would likely have some visual amenity value to the community (both looking from the coastline out to the water, and from the water looking towards the coastline). There are also some existing structures within the project sites such as existing boat ramps and seawalls like those at Abaiang and existing structures at Nonouti.

5.11 Noise and vibration

Noise monitoring was undertaken on all three islands to provide an understanding of the ambient noise levels and context of the sites. A technical note reviewing the noise monitoring data has been provided in Appendix 8.

Background noise was observed and recorded at all sites during attended noise monitoring, originating from a range of different natural and anthropogenic sources. At Abaiang, background noise was associated with conversations between people and the noises of school children, the sounds of waves on the foreshore and against a sea wall, motor vehicles and motorcycles on local roads. At Nonouti, background noise was associated with conversations between people and motorcycles passing on local roads. At Tabiteuea South, background noise was associated with conversations between people, motor vehicles and motorcycles and the sounds of ocean waves.

A summary of the background noise levels recorded through noise monitoring at each of the project sites, in the context of the Australian *Interim Construction Noise Guideline* (ICNG) (Department of Environment and Climate Change NSW, 2009) noise management levels (NML), is presented in Table 5-4. The ICNG NMLs vary for different categories of receiver. The most conservative NML relevant to the corresponding project site is presented in Table 5-4.

Table 5-4 Rated background noise level range ICNG recommended construction noise management levels

Project location	Lowest Background Level (dBL _{A90,15 min})	ICNG Residential NMLs (dBL _{Aeq,15 min})	ICNG Non-residential NMLs (dBL _{Aeq,15 min})
Abaiang	41	External: 51 (nearby properties)	Internal: 45 (Sunshine Primary School)
Nonouti	33	External: 43 (nearby properties)	External: 70 (Council office building)

Project location	Lowest Background Level (dBL _{A90,15 min})	ICNG Residential NMLs (dBL _{Aeq,15 min})	ICNG Non-residential NMLs (dBL _{Aeq,15 min})
Tabiteuea South	44	External: 54 (nearby properties)	External: 70 (Council office building)

Further details on background noise levels and an appraisal of noise-related effects are provided in Appendix 8.

5.12 Air quality

It is highly unlikely that any air quality monitoring is undertaken on any of the three islands – Abaiang, Nonouti and Tabiteuea South. During the Site Familiarisation Mission, very little industrial activity with the potential to cause any significant air quality concerns were observed. In addition, all islands are small and surrounded by vast expanses of ocean. As such, it is considered that air quality across all three islands is at least of good standard. This is supported by observations made during the Site Familiarisation Mission, as well as anecdotal evidence from stakeholder consultation and engagement with each islands’ communities.

While no air-polluting activities were actively observed during Site Visit 2 from industrial processes, two facilities near to the site at Abaiang and Nonouti were identified as follows:

- An oil storage facility above the foreshore on Abaiang, immediately adjacent to the work area.
- An ice plant above the foreshore on Nonouti, immediately adjacent to the work area.

It is possible that the operational activities associated with these facilities may result in localised emissions of some hydrocarbons and / or aromatic compounds to the atmosphere, although it is anticipated that these would disperse over large distances given the low-lying topography of each island and the proximity to the ocean. It should be noted that Abaiang and Tabiteuea South experience breezy conditions, while Nonouti is dominated by still weather conditions owing to it being located close to the equator where it is influenced by the convergence of trade winds from the Northern and Southern Hemispheres at the intertropical convergence zone (ITCZ).

Localised releases of dust were observed across all three sites, including the movement of vehicles such as motorcycles on unsealed roads and ad-hoc burning of materials on Nonouti.

Odorous conditions were experienced at both Abaiang and Nonouti. A sulphurous smell was observed during the Site Familiarisation Mission at the project site on Abaiang, associated with the discrete blue-green patch of implied contaminated ground observed within the foreshore area of the site. The oil storage facility next to the site at Abaiang was also noted as a potential source of odour, although no petrolic aroma associated with hydrocarbon fuels from this facility was recorded during the Site Familiarisation Mission.

At Nonouti, sources of odours observed during Site Visit 2 include:

- Small-scale fishing activities, including discarding of fish waste on land.
- Management of livestock (such as pigs).
- Improper waste management, evidenced by observations of fly-tipping and rubbish heaps, on the foreshore near to the work area.

No observation of odour or additional sources of emissions to the atmosphere were recorded at Tabiteuea South.

Given the low population base of each island, such sources are considered negligible and are not expected to lead to air quality concerns.

5.13 Waste

5.13.1 Solid waste

It is understood there is currently no provision of waste collection services and there are no landfill sites or waste management facilities on any of the project site islands. Authorities on each of the islands have different approaches and management practices in terms of waste. Generally, waste is informally disposed through local incineration or otherwise dumped.

5.13.2 Human waste

There is no formal wastewater reticulation or treatment systems on any of the project sites islands. Authorities on each of the islands have different approaches and management practices in terms of wastewater. Given poor accessibility and condition of domestic ablutions, plumbing and complete lack of wastewater system, human waste is generally released immediately to the environment.

5.13.3 Hazardous waste

Existing sources of hazardous waste are limited within the project site areas, although examples include the K-OIL fuel storage facility on the foreshore adjacent to the work area at Abaiang and the ice works at Nonouti. The fuel storage facility at Abaiang presents a potential risk of hydrocarbon fuel leaks into the surrounding environment at the project site. Any chemicals used in the ice manufacturing facility associated with disinfecting water could potentially leak into the environment at Nonouti. At Tabiteuea South, a structurally vulnerable building, potentially containing asbestos, is located adjacent to the works area. Further investigation is required to confirm the presence or absence of asbestos building materials. Should asbestos or other such hazardous materials be confirmed, a Hazardous Waste Management Plan will be prepared by the Principal Contractor prior to commencing works. No formal hazardous waste management process has been identified on any of the project islands. It is likely that hazardous waste is managed in combination with solid waste as described in section 5.13.1.

5.14 Cumulative

Other projects within the wider KOITIIP development initiative for the Outer Islands include the rehabilitation of existing, and construction of new, causeways. That proposal aims to improve connectivity within and around individual islands. Design and construction methodology is not yet developed for that proposal. It is understood that the program of works for the causeway rehabilitation and upgrades will start after completion of the project. As such, no cumulative impact with that proposal is expected.

No other separate plans or projects have been identified that could reasonably lead to cumulative impacts during the construction and operation of the project. However, given the project itself comprises both land-based and marine-based components, there is the potential for cumulative impact to arise through concurrent construction activities occurring both onshore and offshore. For instance, construction of the passenger shelter may occur simultaneously with installation of AtoNs within the lagoon at all project sites.

5.15 Social and cultural resources

The majority of Kiribati's 120,000 population reside on larger islands, in particular South Tarawa which contained 53 per cent of the total national population in 2020 (Pacific Community, 2022). However, multiple local communities reside on some of the remote outer islands. The people are known for their resilience and strong community bonds, with families often playing a central role in social and economic life. The islands and atolls are typically made up of coral limestone and the soil on many of the islands is not ideal for agriculture, making farming challenging. Freshwater is scarce, and many people rely on rainwater harvesting systems for drinking water. The local economy is largely based on subsistence agriculture, fishing, and remittances from the diaspora. Kiribati also depends on foreign aid and revenue from licensing its fishing waters to other nations.

Through discussions with the local communities and officials, it is understood that the population across the project sites' is summarised as follows:

- Abaiang's population is estimated at 5,000 – 7,000 people.

- Nonouti’s population is estimated at 2,000 – 3,000 people.
- Tabiteuea South’s population is estimated at 1,000 – 2,000 people.

The annual population growth rate for Kiribati is expected to be 1.8 per cent per annum based on 2022 projections. As noted above, the majority of this projected growth is expected to occur in South Tarawa which recorded an additional 8,804 people migrating in 2015 from other Kiribati islands and other countries.

As discussed in Section 1.4, the project sites are located within, or within proximity to existing townships at Abaiang, Nonouti and Tabiteuea South, comprising a number of residents, community facilities, and commercial uses.

5.15.1 Health and vulnerability

The life expectancy at birth in Kiribati is 67 years. Basic development indicators in Kiribati are also relatively low, with a human development index (HDI) of 0.62 in 2021 and a multidimensional poverty index (MPI) score of 0.08 (based on most recent survey data from 2018/19). This reflects the level of deprivation and vulnerability in health, education and standards of living for Kiribati. In comparison, Tonga has a HDI of 0.74 and a MPI of 0.003 (2021, UNDP & OPHI, World Bank Indicators).

Health facilities located across the project sites include:

- Abaiang | There are nine small health clinics in Abaiang, but no doctor or hospital. Residents therefore need to travel to Tarawa for treatment (GoK, 2019)
- Nonouti | There are six clinics and one health centre on Nonouti (Kiribati National Expert Group, 2021)
- Tabiteuea South | There are two village clinics in Tabiteuea South (Kiribati Annual Health Bulletin – Health Information Unit Ministry of Health and Medical Services, 2023).

5.15.2 Education

Education is compulsory in Kiribati between the ages of six and 14 and the Gross Attendance Ratio (GAR) for primary level education is quite high and reflects a high level of literacy and numeracy in the population for both genders (Pacific Community, 2022). However, there is a declining rate of students progressing through to higher levels of education (Pacific Community, 2022) and it is common for people to relocate overseas to complete tertiary education.

During community consultation for the project, it was noted that at Abaiang, there are 11 primary schools with one located approximately 155m northeast of the project site. Students from two nearby villages attend this school and use the main road to walk to / get dropped off at the facility.

5.15.3 Heritage and culture

There are no particular sites of heritage significance noted as being within proximity to the project sites. However, during consultation with the local community it was noted that the identified compound area at Tabiteuea South is used for celebrations, particularly on National Day in Kiribati.

On Abaiang there is a women’s centre used as a gathering place by the island’s female population close to the project site.

5.15.4 Gender

The ESMF [2] notes gender discrimination is culturally entrenched within the Outer Islands, with women underrepresented in most aspects outside the home. Women are mostly involved in domestic activities such as care work, subsistence agriculture and local trading. There is a high rate of gender-based violence (GBV) in Kiribati, with over half of married women experiencing some form of violence. Availability of alcohol, high unemployment, over-crowding and high living costs are considered to be key factors of high GBV rates. The GoK notes that addressing gender discrimination across the country will take time.

Economic opportunities and essential services are difficult to access for women in the Outer Islands, with GoK employment opportunities in administration, teaching, social welfare and public infrastructure filled by employees from Tarawa. High competition for jobs and discriminatory attitudes towards women further limit

social mobility for women from Outer Island communities. There are 28 woman-owned businesses registered on the islands associated with the project (14 in Abaiang, 2 in Nonouti, 12 in Tabiteuea South).

6 Future use

Once constructed and commissioned, the project would be brought into use to accommodate vessel landings and launches for passengers and cargo at each site and conduct routine maintenance of the AtoNs. The project would require intermittent maintenance throughout its operational life to ensure efficient and safe functionality. Following construction of the project, it is anticipated there would be some permanent effects to physical and human receivers as a result of operational activities. However, given the small scale and low frequency use of the maritime facilities, the adverse effects identified below are anticipated to be negligible and highly localised:

- Transient operational noise associated with:
 - vessels approaching and departing the boat ramps
 - lifting vessels out of the water using winches
 - passengers waiting in purpose-built, open structures and using the vessel boarding structure on Abaiang
 - ad-hoc maintenance of vessels and AtoNs within workshops on Nonouti and Tabiteuea South
- Potential spills or releases of chemicals from vessels and workshops, resulting in effects on water quality and / or contamination of sediments
- Waste generated through AtoN upkeep and maintenance of maritime structures
- Infrequent, small-scale emissions from vessels impacting local air quality
- Reduction in recreational amenity of beach in immediate area of the project sites, as well as landscape and visual effects from the introduction of permanent structures.

The significant social benefits realised through the construction and operation of the maritime facilities are considered to outweigh the negligible negative effects associated with the operation of the project. However, mitigation measures have been proposed within Section 7 to alleviate any adverse effects where possible.

Following the operational design life of the project, a decision on whether to extend the lifespan or decommission the project will be required. At the time of writing, it is assumed that a decision to decommission the project will seek to return the sites to the pre-development condition. Under this scenario, the process of decommissioning is anticipated to result in no greater environmental effect than those experienced during construction of the project.

7 Environmental and social impacts and mitigation matrix

This section identifies potential impacts, opportunities and mitigation measures associated with environmental aspects relevant to each site. Section 7.1 captures the potential impacts, opportunities and mitigation measures applicable to all project sites. The following subsections (7.2 - 7.4) present the additional site-specific potential impacts, opportunities and mitigation measures identified for individual project sites. All mitigation measures identified in section 7 of this ESMP will be secured in the CESMP and sub-plans identified within construction management framework detailed in section 1.5. As agreed by Hall, this ESMP sets out the areas that will be impacted from delivering the project. The specific locations for different construction uses within those areas will be identified in the CESMP prepared by Hall.

Table 7-1 to Table 7-4 below have been developed to align with the projects Environment and Social Management Framework (ESMF) [2], Ministry of Finance and Economic Development (MFED) Environmental and Social Screening Report, Environmental Assessment Guidelines (ADB, 2008), relevant specialist assessments and international best practice for managing environmental and social risks and impacts. The Principal Contractor will be responsible for regularly updating associated mitigation measures in the ESMP as the design progresses towards construction. A template summary table of mitigation measures is provided in Appendix 9 for the Contractor to complete and refer to as a quick-reference tool during construction.

Given current global economic volatility and uncertainties regarding procurement requirements, an accurate reflection of costs associated with implementing the suggested mitigation measures within this section is not considered possible and therefore has not been included within this ESMP. A more accurate estimation of costs associated with procuring the materials and labour required to implement the agreed mitigation measures will be provided by the Principal Contractor responsible for delivering the works.

7.1 All project sites

Table 7-1 tabulates the potential environmental and social impacts and opportunities, and corresponding mitigation measures, for each phase of the project (i.e. pre-construction, construction, post-construction / operation) in turn.

Table 7-1 Potential environmental and social impacts, opportunities and associated mitigation measures applicable for all project sites

Environmental and / or social aspect	Project site	Potential impacts and opportunities	Mitigation measures	Implementation mechanism and monitoring	Implementation responsibility
Pre-construction					
General	All	General management of potential environmental and social impacts.	The Principal Contractor and appropriately qualified identified representatives will prepare and implement a CESMP consistent with section 1.5 of this ESMP. The CESMP will include all construction environmental management measures outlined in this table and may be divided into sub-plans, not limited to those identified in section 1.5. The CESMP will be submitted to the World Bank and MELAD prior to construction.	The CESMP will include details on monitoring generally consistent with section 2.6 of this ESMP and include appropriate monitoring requirements identified in this table.	Principal Contractor (Hall)
Occupational health and safety	All	Increased risk of vessel collision arising from additional vessel movements within the area associated with site-establishment and mobilisation activities, leading to increased risk of injury.	The following measures will be implemented to mitigate identified health and safety impacts: <ul style="list-style-type: none"> - Prepare and implement a Health and Safety Plan outlining actions and responsibilities. - All site personnel must be inducted into the Health and Safety Plan prior to commencement of pre-construction activities. - Prepare a Hazard Management plan to manage the risk to workers and the local community where ACM (particularly in buildings) has potential to exist. Include measures that include methods for identification and safe removal. - Undertake monitoring (refer to Noise and Vibration measures below) - Prepare and maintain effective and accessible worker Grievance Mechanism. - Prepare and deliver a toolbox talk to all site workers, outlining the project site and site environs, environmental and social risks. 	Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through, the CESMP and relevant sub-plans identified in section 1.5.	Principal Contractor (Hall)
	All	Potential increased risk of injury from road traffic accidents associated with increased vehicle movements associated with site-establishment and mobilisation activities.			
	All	Potential exposure of project site personnel to unsafe conditions from site-establishment and mobilisation activities.			
	All	Potential impacts to project site personnel as result of natural hazards or extreme weather events that may occur during site-establishment and mobilisation activities Potential impacts associated with exposure to asbestos containing material (ACM) in buildings should damage occur during construction (particularly the COPA building on Tabiteuea South)			

Environmental and / or social aspect	Project site	Potential impacts and opportunities	Mitigation measures	Implementation mechanism and monitoring	Implementation responsibility
Climate change and greenhouse gases	All	Impacts to site establishment activities such as coastal inundation and flooding from extreme precipitation events, due to extreme weather events (extreme heat causing heat waves, extreme rainfall, flooding, cyclones and storm surges). However, climate-related risks to the project under future climate change scenarios are unlikely given construction is expected to start soon after securing all necessary approvals and funding, before extreme climate change events are likely to arise.	<p>The following measures will be implemented to mitigate identified climate change impacts:</p> <ul style="list-style-type: none"> - Design for future climate change scenarios that considers the lifetime proposed maritime structures. - Schedule pre-construction activities to avoid periods of wet weather where practical. - Where practical use sustainable resources as part of the procurement process (e.g. use of locally sourced timber and materials with lower embodied emissions). - Ensure energy efficient technology and machinery is prioritised. - Ensure vehicles, plant and equipment are well maintained and are not left idling where practicable. 	Mitigation to be implemented through design and construction program. Mitigation measures (such as those relating to wet weather working restrictions, energy efficient plant and equipment maintenance) and associated monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through, the CESMP and relevant sub-plans identified in section 1.5.	Principal Contractor (Hall)
	All	Potential release of greenhouse gas (GHG) emissions from the operation of vehicles, plant and equipment involved in site establishment and other pre-construction activities, and in embodied emissions from the production and sourcing of construction materials.			
	All	Opportunities to enhance the resilience of each site against natural hazards exacerbated by climate change including flooding, cyclones and storm surges, via consideration of projected climate change trends through design of marine facilities and operational outcomes that also supports community access, resilience from inundation and associated economic impacts.	<ul style="list-style-type: none"> - Design for future climate change scenarios that considers the lifetime proposed maritime structures. - Engage suitably qualified persons to undertake design 		
Topography, geology and soils	All	Potential for release of contaminants and impacts on sensitive receiving environments due to inadequate storage of hazardous materials, and management and disposal of waste including hazardous waste.	<ul style="list-style-type: none"> - Development and implementation of a Soil and Erosion Management Plan (SEMP) included within the CESMP, which would contain (at a minimum) details of: <ul style="list-style-type: none"> o Sediment controls or suitable mechanisms for the construction footprint area and temporary ancillary facilities as shown in Figure 2-6 to Figure 2-8 of this ESMP. o Construction compound layout, including areas for safe storage of chemicals, welfare / amenity blocks, ancillary facilities material laydown areas etc. Details of specific structures and items, such as storage sheds and generators, will be included. o Excavation as part of site-establishment, how these areas will be minimised and how any spoil or stockpile areas will be stabilised (such as through using sediment fencing or similar). o Responsibilities, training, staff induction, typical unexpected finds and responses, notification(s), reporting requirements and protocols for maintaining waste records. o Procedures and controls for temporary stockpiling and reuse of spoil on-site or off-site, noting that excavated material should be stored in a manner which prevents any leaching from interacting with environmental or human receptors, as discussed further below. o A Remediation Action Procedure (RAP), which must be prepared if significantly contaminated soils are encountered. o The safe storage of contaminated soil and/or sediments, including but not limited to: <ul style="list-style-type: none"> ▪ contaminated material should be stored in drums in a bunded onshore area which is located clear of the shoreline so that it is not impacted by tides or storm surges. ▪ the storage area should have lined bunding. ▪ contaminated waste should be covered with a tarpaulin. 	Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through, the CESMP and relevant sub-plans identified in section 1.5. Monitoring should, at a minimum, involve site supervision and visual inspection.	Principal Contractor (Hall)
	All	Potential short-term soil/sediment erosion, contamination and associated off-site transport of sediment and pollutants leading to potential water quality impacts in the lagoon and risks to public health.			
	All	Potential physical, chemical, and biological impacts (including loss of benthos) from sediment or soil disturbance, erosion, mobilisation, and deposition (smothering) from pre-construction activities.			
	All	Potential for disturbance and release of existing sediment bound contaminants that are associated with risk of bioaccumulation from pre-construction activities (i.e. site establishment) in areas subjected to previous human activity.			

Environmental and / or social aspect	Project site	Potential impacts and opportunities	Mitigation measures	Implementation mechanism and monitoring	Implementation responsibility
			<ul style="list-style-type: none"> soils should be contained and not reused for other works or at other sites until testing is completed to verify suitable and safe uses. 		
	All	Opportunities to reduce the transfer of contaminated surface water runoff and accidental leaks and spills into seabed sediments.	<ul style="list-style-type: none"> Implement all the relevant design measures in this table. 	Mitigation to be implemented through design, and mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through, the CESMP and relevant sub-plans identified in section 1.5.	Principal Contractor (Hall)
Water resources and quality	All	Potential short-term effects to marine water quality due to increased stormwater runoff associated with ground disturbance related to site establishment activities- (e.g. physical disturbance of the seafloor). Wastewater will be contained on site and not allowed to runoff into the marine environment.	<ul style="list-style-type: none"> Install appropriate sediment runoff measures to control sediment laden runoff moving offsite or entering the lagoon such including vehicle wash down facilities. Identify and establish an appropriate exclusion (no go zone) around the construction site. Maintain a clean and tidy site. Rehabilitate disturbed surfaces as soon as practical. Monitor weather and avoid soil disturbance works in advance of and during extreme weather events. 	Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through, the CESMP and relevant sub-plans identified in section 1.5.	Principal Contractor (Hall)
	All	Potential short-term temporary impacts to marine water quality due to increased sediment disturbance leading to increased turbidity, associated nutrient loads and release of sediment bound contaminants (if present).			
	All	Potential for increased risk of spills and leaks of fuels or other pollutants due to general construction activity.	<ul style="list-style-type: none"> Spill kits, personal protection equipment and appropriate training shall be kept on site. Waste and foul water to be contained onsite for transport to a specific biological waste management facility. 		
	All	Opportunities to reduce the transfer of contaminated surface water runoff and operational leaks and spills into the marine environment through design of an enhanced project layout, improved facilities.	<ul style="list-style-type: none"> Provide suitable personal facilities such as toilets and showers for site workers. Develop and implement a procedure for appropriate disposal of wastewater. This could include responding to manufacturers' specifications, storing wastewater in appropriate containers for offsite disposal, ensuring the brine produced through onsite desalination processes is disposed a suitable distance offshore outside any environmentally sensitive areas, etc. Where a desalination plant will be implemented the type of plant, location and discharge point will be detailed in the CESMP Monitoring of the desalination discharge point will include a marine benthic assessment and be in accordance with MELADs reporting requirements (Section 2.6 of this report) Implementation of appropriate controls to manage scouring Where discharge of brine to the marine environment exceeds 2 cubic metres the contractor will be responsible for obtaining an Environmental Licence from MELAD. Vehicle parking areas away from water sources. 	Mitigation to be implemented through design, and mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through, the CESMP and relevant sub-plans identified in section 1.5.	
Marine ecology	All	Injury or death of marine fauna due to barge movement when mobilising to site and during site establishment activities.	<ul style="list-style-type: none"> Vessels used for the purposes of the project will implement speed limit of <8 knots when in and in proximity to the site. Where practical use barge with a low draft. 	Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through, the CESMP and relevant sub-plans identified in section 1.5.	Principal Contractor (Hall)
	All	Potential for impacts to marine ecology (marine mammals, sharks, pelagic and demersal fish) including behavioural change and mortality from noise and vibration generated during pre-construction.	<ul style="list-style-type: none"> Include and implement a procedure to manage construction noise through a CESMP. 		
	All	Potential impacts to marine ecosystems associated with the introduction and / or spread of invasive non-native species.	<ul style="list-style-type: none"> Before arrival to any of the project site islands, certificates of fumigation will be obtained for goods through MELAD-ALD's Biosecurity Unit. 		

Environmental and / or social aspect	Project site	Potential impacts and opportunities	Mitigation measures	Implementation mechanism and monitoring	Implementation responsibility
	All	Potential bio-security impacts associated with the use of imported aggregate material in the marine environment.	<ul style="list-style-type: none"> - Bio-security measures adhering to national regulation will be identified within and implemented via the CESMP. 		Principal Contractor (Hall)
Terrestrial ecology	All	Potential for loss and temporary disturbance of vegetation due to site establishment activities.	<ul style="list-style-type: none"> - Initial site inspections to determine presence of any fauna that may need to be appropriately managed and moved. - Where practical, avoid vegetation removal - Establish exclusion areas and include these areas in a toolbox talk as part of site induction activities. - Rehabilitate disturbed areas to the pre-existing condition 	Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through, the CESMP and relevant sub-plans identified in section 1.5.	Principal Contractor (Hall)
	All	Potential for indirect habitat loss or degradation resulting from other effects or ground disturbance such as surface hydrological changes, groundwater interference, dust, and noise, and associated impacts to threatened fauna.			
	All	Potential for weeds and pest species to establish due to removing and disturbing native habitat.			
Transport and traffic	All	Potential short-term impacts including increased traffic levels and utilisation of existing road network by construction vehicles and machinery during mobilisation and pre-construction activities leading to degradation of existing road conditions.	<p>Develop a Traffic and Access Management Plan, as required by the World Bank which includes but not limited to, the following:</p> <ul style="list-style-type: none"> - clear communication channels with community and key stakeholders. - clear signage, and establish pedestrian-safe access - limit traffic to normal daytime working hours. - Turn off vehicles when not in use - Provide community notifications prior to commencement of construction. 	Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through, the Traffic and Access Management Plan, CESMP and relevant sub-plans identified in section 1.5.	Principal Contractor (Hall)
	All	Potential disruptions to existing access and compounding existing congestion and safety issues (including for both vehicles and pedestrians) due to short-term construction activities and site access requirements.			
	All	Potential short-term impacts including loss of amenity through increased local road traffic and traffic noise impacting residential and other sensitive receivers.			
	All	Potential long-term impacts associated with permanent access changes associated with new infrastructure and a new or altered road network within the site to optimise vehicle, machinery and equipment operations and movement.			
	All	Potential for increased collision risk arising from increased watercraft and marine vessel traffic associated with deliveries of equipment and materials for site establishment and construction during the pre-construction phase.			
	All	Potential for conflict between commercial fishing, shipping and construction vessels during pre-construction.			
Noise and vibration	All	Potential short-term impacts to surrounding receivers due to noise and vibration associated with high noise generating pre-construction activities.	<p>Include and implement a procedure to manage noise generated by pre-construction activities through a CESMP.</p> <p>The procedure will include measures to be implemented during construction to minimise noise and vibration impacts, such as restrictions on working hours, staging, placement and operation of work compounds, parking and storage areas, temporary noise barriers, haul road maintenance, and controlling the location and use of vibration generating equipment. This will include but not be limited to:</p> <ul style="list-style-type: none"> - consultation with nearby residents if works are to be completed outside of the approved working hours. - restriction of working hours for noise emitting activities shall be imposed to between 6.00am until 6.00pm from Monday to Saturday. No works shall be undertaken on Sunday or public holidays. - Operational Schedule and Labor Conditions <ul style="list-style-type: none"> • Working Hours: Operations run daily from 6:00 am to 6:00 pm. • Daily Briefings: A mandatory toolbox meeting is 	Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through the CESMP and relevant sub-plans identified in section 1.5.	Principal Contractor (Hall)
	All	Potential short-term impacts to receivers associated with increased road traffic noise associated with pre-construction traffic including trucks.			
	All	Potential for longer term increases in noise and vibration associated with road traffic noise and marine vessels operating to accommodate a greater number of vessels.			

			<p>held from 6:00 am to 6:30 am to confirm targets and ensure all staff are equipped with the required Personal Protective Equipment (PPE).</p> <ul style="list-style-type: none"> Meal Breaks: Breakfast is provided from 10:00 am to 10:30 am, followed by a lunch break from 2:00 pm to 3:00 pm. Wages: Local workers receive a base rate of AUD 6.00 per hour. This is double the minimum rate required by local labor regulations. <p>- operations on public holidays shall not be permitted unless otherwise approved by the Implementing Agencies and relevant local authorities.</p>		
Environmental and / or social aspect	Project site	Potential impacts and opportunities	Mitigation measures	Implementation mechanism and monitoring	Implementation responsibility
			<ul style="list-style-type: none"> undertake preconstruction survey of any nearby buildings and where survey indicates it is required, install vibration monitoring (Tabiteuea South) a grievance management procedure that establishes a clear method for community members affected by construction noise from the project to lodge complaints and the Principal Contractor to respond in a proportionate manner (including any opportunity for corrective actions to be implemented). 		
Air quality	All	Potential for dust emissions from site-establishment activities associated with ground disturbance and mobilisation of particulates, to reduce local air quality and impact on residential and other sensitive land uses/receptors.	<ul style="list-style-type: none"> Dust suppression using a non-potable water supply 	Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through the CESMP and relevant sub-plans identified in section 1.5.	Principal Contractor (Hall)
	All	Potential for short-term increased machinery, equipment, vehicles and vessels exhaust emissions to impact local air quality.	<ul style="list-style-type: none"> Use well-maintained plant and equipment with cognisance of emissions levels and avoid unnecessary idling of machinery and vehicles where practicable. Conduct appropriate maintenance checks on all plant and equipment to ensure proper functioning and no generation of additional / surplus emissions 		
Waste and resources	All	Potential impacts associated with the generation and inadequate management and disposal of waste during pre-construction activities (i.e. site establishment and mobilisation), including hazardous waste.	<p>Prepare and implement a Waste Management Plan (WMP in accordance with relevant legislative requirements and regulations. Including, but not limited to, the following measures:</p> <ul style="list-style-type: none"> Identify potential waste types and quantities generated during construction and potential waste management strategies and included in the Waste Management Plan. All waste and resources must be transported to a licensed designated facility for disposal, recycling and processing. At minimum, waste cannot be illegally disposed or dumped at any of the sites. Hazardous wastes such as oil, fuel and chemicals shall be 	Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through the WMP, CESMP and relevant sub-plans identified in section 1.5.	Principal Contractor (Hall)
	All	Potential impacts to resource availability including food, water, and accommodation (and goods and services) for construction personnel.			
	All	Potential impacts to waste management systems including solid and human waste due to temporary increased population during pre-construction.			

	All	Potential impacts to availability of local materials (such as sand and gravel) and personnel and services (such as construction staff, local diving professional services) where they are required to support redevelopment projects and construction.	<ul style="list-style-type: none"> collected, stored in self-bunded containers. - All construction materials and waste must be stockpiled within temporary ancillary facility areas. - Treated excavated materials are able to be re-used for onsite filling where deemed appropriate. - No local waste processing resources are to be utilised for the purposes of the project. - Waste shall not be burned, buried or otherwise disposed of on site. - All litter and waste materials in storage or in transit shall be covered and secured to prevent spillage. - Identifies measures for to manage liquid waste including washdown water, spills and leaks - Refuelling shall be undertaken by trained personal using spill and leak minimising equipment. - Plant or machinery wash down areas must be located away from existing water sources. - Designated areas including bunded areas for storage of fuels, oils and chemicals with impermeable bases and bunding to prevent any spillage will be setup at each work area. - Amounts of hazardous materials on site will be limited (mostly fuels and solvents) and the standard controls will apply i.e., provision of safety data sheets (SDS), and appropriate work method statements 		
Environmental and / or social aspect	Project site	Potential impacts and opportunities	Mitigation measures	Implementation mechanism and monitoring	Implementation responsibility
Socio-economic	All	Prior to construction, confirm residents of nearby council-owned facilities (particularly at Nonouti) would not require relocation.	<ul style="list-style-type: none"> - Develop and implement a resettlement plan with the Government of Kiribati that include identification of temporary accommodation if required (however at time of writing no relocation of residents is required at Tabiteuea South, Nonouti or Abaiang) - Early and ongoing engagement with impacted residents. - Negotiate land use agreements and/or compensation with legally recognised landowner. If there is inheritance dispute, if possible, work with the legally entitled family members to the land. 	Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through the Resettlement Plan, CESMP and relevant sub-plans identified in section 1.5.	Principal Contractor (Hall) Implementing Agencies
	All	Land acquisition for ancillary facilities would be required (particularly at Tabiteuea South).			
Other environmental risks	All	<p>Potential cumulative interactive and additive impacts due to pre-construction include:</p> <ul style="list-style-type: none"> o Potential impacts resulting from the combination of the onshore, nearshore and offshore activities of the project may result in impacts on the same sensitive receiver, such as high levels of noise and vibration during construction. o Potential impacts resulting from the interaction of projects in the surrounding area of each site. o Potential impacts of construction fatigue on surrounding receivers in the event that the redevelopment projects are constructed in a staged manner over time. 	<p>As part of pre-construction activities, the following will be implemented:</p> <ul style="list-style-type: none"> - consultation and coordination with other projects and authorities (i.e. the implementing agencies) regarding the programming and scheduling of works, to minimise overlap and interactions of construction works with other projects. 	Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through, a stakeholder and community engagement procedure / plan included within the CESMP and relevant sub-plans identified in section 1.5.	Principal Contractor (Hall) Implementing Agencies
Construction					

Community health and safety	All	Unauthorised access to construction areas may lead to accidents or injuries involving members of the public.	<p>The following measures will be secured within and implemented through the Health and Safety Plan (based on the Principal Contractor's example Health and Safety procedures for a similar project provided in Appendix 10) to mitigate potential health and safety impacts associated with construction activity:</p> <ul style="list-style-type: none"> - Mark out construction zones / work areas with fencing and signage (including public safety awareness signage in the local language, and / or using clear symbology to warn members of the public that construction activities are occurring in the area). - in the event that a member of public enters the working area and comes into close contact with machinery, work activities will stop, and plant and equipment switched off to minimise the risk of injury. - site personnel will respectfully request the member of public to leave the work area and respect a safe stand-back distance to ensure equipment can operate safely. 	Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through, a Health and Safety Plan, the CESMP and relevant sub-plans identified in section 1.5.	Principal Contractor (Hall)
	All	Potential health and safety risks for the local community (in particular, children travelling to school) such as collision with construction vehicles and/or machinery and bringing in additional people which may disrupt community cohesion.	<p>The following measures will be secured within and implemented through the Health and Safety Plan to mitigate potential health and safety impacts associated with construction activity:</p> <ul style="list-style-type: none"> - Mark out construction zones / work areas with fencing and signage (including public safety awareness signage in the local language, and / or using clear symbology to warn members of the public that construction activities are occurring in the area). - Schedule construction activities to avoid key travel times for school arrival and departure. - Coordinate with school staff to communicate construction activities and potential risks as well as safety awareness for students. 	Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through, a Health and Safety Plan, the CESMP and relevant sub-plans identified in section 1.5.	Principal Contractor (Hall)

Environmental and / or social aspect	Project site	Potential impacts and opportunities	Mitigation measures	Implementation mechanism and monitoring	Implementation responsibility
Occupational health and safety	All	Construction activities pose safety risks to workers and public due to heavy machinery and marine operations.	<p>The following measures will be implemented to mitigate identified health and safety impacts:</p> <ul style="list-style-type: none"> - all site personnel and visitors must receive a site inducted with toolbox talk on first entry to site. Details of the information provided within the site induction and toolbox talk will be included in the Health and Safety Plan prepared prior to commencement of pre-construction activities. - prepare and maintain effective and accessible worker Grievance Mechanism. 	Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through, a Health and Safety Plan, the CESMP and relevant sub-plans identified in section 1.5.	Principal Contractor (Hall)
Climate change	All	Potential for short-term increased construction machinery, equipment, vehicles and vessels exhaust emissions to impact local air quality.	<p>The following measures will be implemented to mitigate identified climate change impacts:</p> <ul style="list-style-type: none"> - select energy efficient plant and equipment that adhere to industry emissions standards, where possible - switch vehicles off when not in use - use alternatives to fossil fuels where practical and cost-effective - using timber instead of steel for building shelters. - consider use of Zinc Aluminium Magnesium coating systems for steel elements away from the water. 	Mitigation to be implemented through design. Mitigation measures (such as those relating to equipment selection and vehicle operating procedures) and associated monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through, the CESMP and relevant sub-plans identified in section 1.5.	Principal Contractor (Hall)
	All	Potential generation of GHG emissions due to increased shipping and road-based traffic emissions during construction.			

Topography, geology and soils	All	Spills or leaks from machinery/plant (e.g. excavators), fuel and chemical storage during construction that may present a risk of harm to human health and/or the environment.	<p>Inclusion and implementation of procedures set out in a Soil and Erosion Management Plan (SEMP) within the CESMP, which should include fuel and chemical management approaches for construction such as:</p> <ul style="list-style-type: none"> - isolated / contained chemical and fuel storage areas. - provision of spill kits near fuel and chemical storage areas. - excavated material is stored away from drainage or tidal areas and not reused for other works or at other sites until testing is completed to verify suitable and safe uses. - during construction, implement an unexpected finds protocol. If contaminated material is observed stop work and engage a suitably qualified person to be present during excavation and dredging works, to observe excavated material for visual signs of contamination, and assess for volatile contaminants using a photoionisation detector (PID). - if contaminated material is encountered during construction, these materials are to be stored in covered drums in a bunded onshore area located clear of the shoreline so that it is not impacted by tides or storm surges. Drums should be covered with a tarpaulin. - a requirement for a Remediation Action Procedure (RAP) to be prepared if significantly contaminated soils are encountered and disturbed. - prevent sediment moving offsite into sensitive receiving environments by maintaining sediment and erosion controls. - inspect controls weekly and immediately after rainfall events. - rectify damaged sediment and erosion controls immediately upon identification. - stop work during heavy rainfall or in waterlogged conditions when there is a risk of sediment loss off site. 	Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through a Soil and Erosion Management Plan (SEMP) within the CESMP and relevant sub-plans identified in section 1.5.	Principal Contractor (Hall)
	Spills and/or leaks of fuel from bunkering/refuelling of marine vessels including dredgers, barges, work boats, personnel transfer vessels, tugs and cargo delivery vessels in nearshore areas that could potentially contaminate intertidal substrate and pose risks to human health and/or the environment.				
Environmental and / or social aspect	Project site	Potential impacts and opportunities	Mitigation measures	Implementation mechanism and monitoring	Implementation responsibility
Water resources and quality	All	Potential short and long-term soil/sediment erosion, contamination and associated off-site transport of sediment and pollutants leading to increased turbidity and other water quality impacts in the lagoon resulting from direct construction-related disturbance (e.g. spills, physical disturbance to the seafloor) as well as potential risks to public health.	<p>The following measures will be implemented to mitigate identified water quality impacts:</p> <ul style="list-style-type: none"> - install silt curtains - use environmentally friendly construction materials - install containment barriers during concrete repairs - time works with tidal conditions. 	Mitigation to be implemented through design. Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within and implemented through the CESMP and relevant sub-plans identified in section 1.5.	Principal Contractor (Hall)
	All	Potential physical, chemical, and biological impacts (including loss of benthos) from sediment or soil disturbance, erosion, mobilisation, and deposition (smothering) from construction activities.			
	All	Potential for disturbance and release of existing sediment bound contaminants that are associated with risk of bioaccumulation from pre-construction activities (i.e. site establishment) in areas subjected to previous human activity.			
	All	Construction activities including concreting, steel work, and revetment repairs may release contaminants and increase turbidity in the marine environment surrounding the site.			
Marine ecology	All	Loss of benthic habitat	- Reduce extent of works area where practicable	Mitigation to be implemented through design. Mitigation	Principal Contractor (Hall)

	All	Smothering or benthic communities by disturbance and resettlement of sediments	<ul style="list-style-type: none"> - Implement measures identified in this table to reduce spills of chemicals and reduce noise generated through construction activities (such as the mitigation measures identified for the control of potential noise and vibration impacts below in this table). 	measures and monitoring procedures (including reporting and record keeping processes) to be included within and implemented through the CESMP and relevant sub-plans identified in section 1.5.	
	All	Disturbance to finfish and pelagic species (where AtoNs are located) arising from underwater noise associated with construction activities.			
Terrestrial ecology	All	Permanent loss of vegetation and fauna habitat.	<ul style="list-style-type: none"> - Minimise vegetation clearance and disturbance, including impacts to standing dead trees and riparian zones. Where possible, limit clearing to trimming rather than the removal of whole plants. - Avoid removal and / or damage to vegetation and fauna habitat to the minimum extent. - Implement management protocols for identified introduced weed species within and surrounding the site. 	Mitigation to be implemented through design. Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within and implemented through the CESMP and relevant sub-plans identified in section 1.5.	Principal Contractor (Hall)
	All	Degradation of surrounding vegetation and fauna habitat by edge-effects of construction.			
Transport and traffic	All	Potential impacts including increased traffic levels and utilisation of existing construction vehicles and machinery leading to degradation of the existing road conditions.	<p>Maintain and ensure compliance with the Traffic and Access Management Plan include measures such as:</p> <ul style="list-style-type: none"> - Clear communication channels with community and key stakeholders. - Limit traffic to daytime hours and use noise reduction measures for equipment and vehicles. - Consistent community correspondence on key project updates and disruptions to existing transport networks (if applicable). - Ensure construction vehicles do not obstruct vehicular or pedestrian traffic, or private driveways, public facilities or businesses unless necessary and only if appropriate notification has been provided. - Maintain and ensure upkeep of clear signage. - Provide alternative access routes for site establishment and for community, as required. - Maintain traffic flow controls, provide clear signage, and establish pedestrian-safe pathways 	Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through, the Traffic and Access Management Plan, CESMP and relevant sub-plans identified in section 1.5.	Principal Contractor (Hall)
	All	Potential disruptions to existing access and exacerbating existing congestion and safety issues (including for both vehicles and pedestrians) due to short-term construction activities and site access requirements.			
	All	Potential impacts including loss of amenity through increased local road traffic and traffic noise impacting residential and other sensitive receivers.			
	All	Potential long-term impacts associated with permanent access changes associated with new infrastructure and a new or altered road network within the site to optimise vehicle, machinery and equipment operations and movement.			
	All	Potential for increased collision risk with increased number of vessels and associated marine vessel traffic during construction.			
Environmental and / or social aspect	Project site	Potential impacts and opportunities	Mitigation measures	Implementation mechanism and monitoring	Implementation responsibility
	All	Potential for conflict between commercial fishing, shipping and construction vessels during construction.	<ul style="list-style-type: none"> - Manage sites to allow people to move safely past the works, including alternative pedestrian, bicycle, pram and wheelchair access. 		
	All	Opportunities to improve the overall traffic flow and minimise congestion within the project site and the wider road network through design of an enhanced project layout, improved facilities and operational outcomes and improved intersections.	<ul style="list-style-type: none"> - Implement the Traffic and Access Management Plan and other relevant measures included in this table. 	Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through, the Traffic and Access Management Plan, CESMP and relevant sub-plans identified in section 1.5.	Principal Contractor (Hall)
	All	Opportunities to improve the road conditions beyond their original state through restoration of the roads following construction, including improvement of pedestrian movement and safety through design.	<ul style="list-style-type: none"> - Undertake pre- construction survey. - Rehabilitate damage to roads progressively and to the pre-existing condition. 	Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through, the Traffic and Access Management Plan, CESMP and relevant sub-plans identified in section 1.5.	Principal Contractor (Hall)

Noise and vibration	All	<p>Nearby sensitive noise receivers will be affected by construction-related noise generated by the operation of construction plant and equipment, particularly the following activities:</p> <ul style="list-style-type: none"> o Rock-breaking o Use of power tools (i.e. drilling, grinding, sawing etc.) o Diesel generators used to generate onsite power <p>The noise generated from construction activities will affect sensitive receivers including nearby residents and community groups.</p>	<p>The following measures will be undertaken to mitigate identified noise and vibration impacts:</p> <ul style="list-style-type: none"> - Works must comply with the ESMP including scheduling work and deliveries during standard daytime working hours of 6am to 6pm Monday to Saturday. No work to be scheduled on Sunday nights or public holidays without approval. Any proposed work outside of these hours must be justified. - Switch vehicles and machinery off when not in use - Work may sometimes need to be scheduled outside of standard hours in certain situations, including: <ul style="list-style-type: none"> o delivery of certain equipment / structures o continuous concrete pouring o emergency work to protect human health or avoid loss of life or damage to property. <p>The contractor is to consider additional measures that minimise temporary noise impacts associated with construction. These include but are not limited to:</p> <ul style="list-style-type: none"> - Identify and consult with identified affected residents and communities prior to commencement of works. - Consider introduction of ‘shoulder periods’ for an hour at the start and end of each day where high volume / noisy work activities will not be carried out. - Consider introduction of ‘respite periods’ during which no works will take place to afford affected residents and communities a break from construction noise impacts. - Do not warm-up plant or machinery near residential dwellings before the nominated working hours. - Select appropriate plant for each task to minimise the noise impact (e.g. all stationary and mobile plant will be fitted with residential type silencers). - Regularly inspect and maintain equipment in good working order. - Arrange work sites where possible to minimise noise (e.g. generators away from sensitive receivers, site set up to minimise use of vehicle reversing alarms, site amenities and/ or entrances away from noise sensitive receivers). - Use natural landforms/ mounds or site sheds as noise barriers where practical - Where possible schedule noisy activities around times of surrounding higher background noise (local road traffic or when other noise sources are active). - Notifications to the community / sensitive receivers ahead of works starting 	<p>Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through the CESMP and relevant sub-plans identified in section 1.5, which must include a GRM..</p>	Principal Contractor (Hall)
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Environmental and / or social aspect	Project site	Potential impacts and opportunities	Mitigation measures	Implementation mechanism and monitoring	Implementation responsibility
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			<ul style="list-style-type: none"> - Apply minimum working distances identified in the projects noise memo (refer to Appendix 8 of this ESMP) - Where minimum working distances cannot be applied, investigate measures that protect buildings from vibration impacts. <p>All appropriate measures will be included within a procedure to manage construction noise contained within the CESMP.</p> <p>Written or verbal complaints shall be recorded in the Grievance Redress Mechanism (GRM) and further investigated by the Principal Contractor, and the appropriate mitigation measures will be considered. Complaints will be reported as per the GRM.</p> <ul style="list-style-type: none"> - In the event of dispute, an independent party or relevant authority shall implement noise monitoring. The process in the GRM will also be followed. - Daily inspections by the Principal Contractor when vibrating plant and equipment are in use. If directed by the superintendent vibration monitoring will occur and results will be submitted to the Contractor's delegate for review. 		
Air quality	All	Potential for dust emissions from construction activities associated with rock-breaking, ground disturbance and mobilisation of particulates, to reduce local air quality and impact on residential and other sensitive land uses/receptors.	<ul style="list-style-type: none"> - The control of dust shall be by watering dry surfaces (the use of dust suppression may be required). Water applications shall be light but frequent to prevent runoff. - The frequency of watering shall be determined by the weather conditions but shall be sufficient to prevent any significant dust nuisance. - Where possible, water used for dust suppressant measures shall be non-potable and/or treated recycled water. - Keep work areas clean and tidy. - Implement relevant measures identified in this table. - A complaints procedure shall be established and maintained during construction to provide opportunities for community members and / or groups to raise concerns relating to air quality impacts during construction. Complaints will be recorded, verified and regularly reviewed to identify common themes and where corrective or remedial actions should be taken. Where a corrective action is identified, it should be implemented in a timely manner. 	Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through the CESMP and relevant sub-plans identified in section 1.5.	Principal Contractor (Hall) Implementing Agencies
	All	Potential for temporary increased machinery, equipment, vehicles and vessels exhaust emissions to impact local air quality.	<ul style="list-style-type: none"> - All equipment shall be maintained in a good condition to minimise exhaust emissions. - Engines shall be shut down when not in use. All operations shall be in accordance with established good operating procedures. 		
	All	The potential for odours may arise through disturbance of known or unknown areas of contaminated ground.	<ul style="list-style-type: none"> - Processes likely to generate odours shall be undertaken with efficient equipment operated by experienced personnel following established procedures. This includes refuelling procedures. Where possible, such procedures shall be undertaken in locations away from odour sensitive areas. There shall be no burning of waste or other materials on site. 		
Waste and resources	All	During works, there is potential for accidental spills of fuel, oils, chemicals, and other hazardous materials into the marine environment.	<ul style="list-style-type: none"> - Implement the requirements of the projects Waste Management Plan (WMP). 	Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through the WMP, SEMP, CESMP and relevant sub-plans identified in section 1.5.	Principal Contractor (Hall)
	All	Erosion of stockpiled materials and transport of spoil / construction debris offsite (i.e. into lagoon or along foreshore).	<ul style="list-style-type: none"> - Implement the requirements of the projects WMP and Soil and Erosion Management Plan (SEMP). 		
Environmental and / or social aspect	Project site	Potential impacts and opportunities	Mitigation measures	Implementation mechanism and monitoring	Implementation responsibility

	All	Impacts on the marine ecology and water quality due to waste entering the environment, such as the introduction of foreign materials such as packaging associated with construction materials and individual waste produced by the construction work force.	<ul style="list-style-type: none"> - Implement the relevant measures identified in this table including requirements for contaminated material. - Implement the requirements of the projects WMP. 		
	All	Impacts associated with animals attracted to waste within the work site because of improper implementation of waste management measures.	<ul style="list-style-type: none"> - Implement the requirements of the projects WMP. 		
	All	Generation of construction waste may lead to improper disposal and pollution of marine and terrestrial environments if not properly managed.	<ul style="list-style-type: none"> - Identify potential waste types and quantities generated during construction and operation and potential waste management strategies and included in the WMP. 		
Socio-economic	All	Temporary loss of access to areas of community space and facilities (e.g. Women's Centre at Abaiang).	<ul style="list-style-type: none"> - Implement a stakeholder and community engagement plan which includes procedures for community notification prior to and during construction and a complaints management process. - Implement clear signage. - Support the temporary relocation of the Women's Centre activities during construction. - All construction equipment and waste material to be removed from the site once construction is complete. - Investigate opportunities to improve facilities used during construction. 	<p>Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through the Traffic and Access Management Plan, CESMP and relevant sub-plans identified in section 1.5.</p> <p>Site supervisor will be responsible for ensuring mitigation is implemented properly and effectively.</p> <p>A grievance procedure should be included within and implemented through the CESMP to allow members of the affected communities to provide feedback.</p>	Principal Contractor (Hall) Implementing Agencies
	All	Temporary impact to privately owned land where ancillary construction facilities are located.	<ul style="list-style-type: none"> - Early and ongoing engagement with impacted residents. - Relocate impacted residents to an alternative location, ideally within close proximity to current residence. - Negotiate land use agreements and/or compensation with legally recognised landowner. If there is inheritance dispute, if possible, work with the legally entitled family members to the land. 		Principal Contractor (Hall) Implementing Agencies
	All	Noise impacts during construction which impacts the amenity for surrounding residents, community organisations, facilities and businesses. This may also cause a disruption to students at the nearby school in Abaiang.	<ul style="list-style-type: none"> - Implement Noise and Vibration measures identified in this table. 		Principal Contractor (Hall) Implementing Agencies
	All	Temporary increase in traffic volumes in areas surrounding the project sites which could increase wait times and/or create potential conflict areas for people trying to travel through the area and access surrounding land uses.	<p>Develop and implement the requirements of the Traffic and Access Management Plan, including but not be limited to:</p> <ul style="list-style-type: none"> - Provide alternative arrangements for students to access the school and for any nearby businesses / community facilities and residents. - Regular ongoing engagement with stakeholders to address concerns. 		Principal Contractor (Hall) Implementing Agencies
	All	Potential for increased gender-based violence, sexual exploitation, child labour, and human trafficking due to increase in construction personnel.	<ul style="list-style-type: none"> - Enforce worker codes of conduct that outline zero-tolerance policies for harassment and exploitation as well as compliance with local frameworks protecting child labour. - Provide awareness and sensitivity training for workers, emphasising gender-based violence (GBV), sexual exploitation, abuse and harassment (SEAH) and human trafficking and child labour risks. - Conduct a risk assessment for Child Protection and Preventing SEAH. 		Principal Contractor (Hall) Implementing Agencies
	All	Influx of construction workers may lead to social tensions and conflicts with local communities.	<ul style="list-style-type: none"> - Implement a worker code of conduct to establish respectful behaviour standards. 		Principal Contractor (Hall) Implementing Agencies
	All				

Environmental and / or social aspect	Project site	Potential impacts and opportunities	Mitigation measures	Implementation mechanism and monitoring	Implementation responsibility
			<ul style="list-style-type: none"> - Provide cultural awareness training for construction workers to foster understanding of local customs and traditions. 		
	All	Temporary impact to visual amenity associated with the views of construction works like fencing, machinery, stockpiles and night lighting where required.	<ul style="list-style-type: none"> - Consider appropriate fencing (e.g. solid verses chain link fencing). 	Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through, the CESMP and relevant sub-plans identified in section 1.5.	Principal Contractor (Hall)
	All	Temporary impact to fishing activities (both commercial and recreational) through reduced access to fishing access areas and implementation of navigational aids during construction which could reduce access to areas of the marine environment. This includes a reduced access to areas for collecting shellfish, sea cucumbers and seagrass, etc. The disturbance in the marine environment may also scare fish away from the area temporarily. This may have flow-on economic impacts and/or potential health impacts from reducing the ability to collect sellable produce and/or food items required for subsistence. However, it is understood that alternative access points are available for fishing which reduces the severity of this impact.	<ul style="list-style-type: none"> - Undertake consultation with commercial fishing businesses, local fishing business representatives and recreational fishing groups to better understand sensitive locations and seasons for fishing operations and to manage potential impacts to fishery operations and yield during construction. - Clear marking of exclusion zones. - If possible, schedule construction during non-peak fishing periods, and support fishers with alternative income opportunities. 	<p>Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through, the CESMP and relevant sub-plans identified in section 1.5.</p> <p>Site supervisor will be responsible for ensuring mitigation is implemented properly and effectively.</p> <p>A grievance procedure should be included within and implemented through the CESMP to allow members of the affected communities to provide feedback.</p>	Principal Contractor (Hall) Implementing Agencies
	All	Potential increase in demand for services and use of social infrastructure, accommodation and resources with the influx of workers required for construction. It is understood that a worker's camp would be established at all three islands so is less likely to impact housing availability for existing residents. However, the temporary influx in population would likely place an added strain on resources such as fuel, food, utilities (e.g. water and electricity), as well as health services.	<ul style="list-style-type: none"> - Construction staff to bring their own supplies to cover staff needs (e.g. food, water and medical supplies). - Avoid the use of potable (drinking) water in construction activities such as for dust suppression. 		Principal Contractor (Hall) Implementing Agencies
	All	Would require the loss of some coconut tress (particularly at Tabiteuea South) which are significant to the local community and used as a food source and/or economic source. It is understood that some of these trees being removed are also currently used as a way to delineate property boundaries which may consequently be lost as a result of the project.	<ul style="list-style-type: none"> - Provide compensation to impacted landowners for the loss of any trees, crops and structures associated with the project's construction. Asset owners will be compensated at replacement cost by the Contractor. 		Principal Contractor (Hall) Implementing Agencies
	All	Potential employment and training opportunities for the local workforce during construction, particularly for unskilled labour. However, this may not necessarily be from the specific islands themselves which could cause some unrealistic expectations from the local community.	<ul style="list-style-type: none"> - Develop a local content plan to maximise local hiring and supplier participation. - Establish skills training programs to prepare local workers for project roles. - Provide clear communication about available opportunities, job requirements, and the project's hiring process. - Prioritise the use of local suppliers where possible to create indirect economic benefits for the community. - Provide opportunities for engineering and/or construction students to visit the site and learn processes. 		Principal Contractor (Hall) Implementing Agencies
	All	Potential disruption to areas used for cultural celebrations by construction compound areas.	<ul style="list-style-type: none"> - Explore opportunities to relocate compound site at Tabiteuea South and Abaiang. If this cannot occur, ensure that works do not take place during key dates of celebration (in particular Kiribati Day) and that an alternative location for celebrations is provided. - Provide cultural heritage awareness training to all project staff. 		Principal Contractor (Hall) Implementing Agencies
	All	Work carried out on religious days.	<ul style="list-style-type: none"> - Avoid work on Sundays. 		Principal Contractor (Hall)

Environmental and / or social aspect	Project site	Potential impacts and opportunities	Mitigation measures	Implementation mechanism and monitoring	Implementation responsibility
Other environmental risks	All	Potential impacts resulting from the combination of the onshore, nearshore and offshore activities of the project may result in impacts on the same sensitive receiver, such as high levels of noise and vibration during construction.	<ul style="list-style-type: none"> Ongoing consultation and coordination with other projects and authorities (i.e. the implementing agencies) regarding the programming and scheduling of works, to minimise overlap and interactions of construction works with other projects. Maintain a complaints procedure for community members to raise / escalate any feedback about cumulative impacts with other projects. 	Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through, a stakeholder and community engagement procedure / plan included within the CESMP and relevant sub-plans identified in section 1.5.	Principal Contractor (Hall) Implementing Agencies
	All	Potential impacts resulting from the interaction of projects in the surrounding area of each site.			
	All	Potential impacts of construction fatigue on surrounding receivers in the event that the redevelopment projects are constructed in a staged manner over time.			
Post-construction, operation and decommissioning					
Community health and safety	All	Potential for life and fire safety risks to users of the new maritime facilities, from new structures next to water and operation of the project (particularly operational activities within the workshop during maintenance of AtoNs).	<ul style="list-style-type: none"> The materials and design of the project will consider health and safety risks associated with life and fire aspects. Procedures shall be developed and safety signage installed to educate / inform the public on the safe use of the new maritime facilities and the best course of action to take in an emergency. 	Mitigation to be implemented through design (life and fire safety risks have already been taken account in the basis of design and concept design report).	Implementing Agencies
Occupational health and safety	All	Potential impacts associated with navigation and shipping including vessel collision due to increased vessel movements during operation.	<ul style="list-style-type: none"> A Health and Safety Plan will be prepared specifying the requirements of personnel involved in the operation of the project, including activities regarding the maintenance of AtoNs and structures. Such personnel should be competent in using specific plant and equipment, having had appropriate training. The Health and Safety Plan would include procedures to refer to and follow in case on an emergency. 	The health and safety procedures for the operation of the facilities should be regularly reviewed and updated to capture changes in occupational health best practice, guidelines, policies or legislation.	Implementing Agencies
	All	Potential impacts associated with vehicles and machinery including road accidents due to increased vehicle movements to and from new maritime facilities during operation.			
	All	Potential exposure of personnel to dangerous equipment and materials associated with the workshop for maintenance of AtoNs and structures.			
Climate change	All	Potential impacts due to the vulnerability of the project to natural hazards, extreme weather, and climate change.	<ul style="list-style-type: none"> Routine inspections for damage to the structures. 	Mitigation to be implemented through design.	Implementing Agencies
Topography, geology and soils	All	Potential changes to sediment arrangements and sedimentary processes during operation due to changes in currents and hydrodynamic conditions caused by the introduction of new structures on land and within the intertidal / marine environment.	<ul style="list-style-type: none"> Visual monitoring and reporting to identify requirement for corrective action, if needed. 	Mitigation to be implemented through design, to minimise adverse changes in sediment transport / processes. Corrective action to be implemented if visual monitoring and / or inspection identifies impacts to sediment processes as a result of the project.	Implementing Agencies
	All	Potential spills or releases of chemicals from vessels and workshops, resulting in or contamination of sediments and / or soils.	<ul style="list-style-type: none"> Spill kit and spill response equipment will be kept within the shelters at each site, for use in the event of a spill to the environment. Oil and grease separator will be installed to mitigate the risk of surface runoff transferring contaminants to the marine environment. 	Mitigation to be implemented through design.	Implementing Agencies
	All	Opportunities to reduce the transfer of contaminated surface water runoff and accidental leaks and spills into seabed sediments during operation through design of an enhanced project layout, improved facilities and operational outcomes, specifically bunkering equipment and appropriate ongoing management and maintenance to minimise the risk of future oil spills.	Implement relevant measures from this table, including routine visual monitoring and inspection.	Mitigation to be implemented through design.	Implementing Agencies
Water resources and quality	All	Potential spills or releases of chemicals from vessels and workshops, resulting in effects on water quality and / or contamination of sediments.	<ul style="list-style-type: none"> Spill kit and spill response equipment will be kept within the shelters at each site, for use in the event of a spill to the environment. 	Inspection, reporting and record keeping, with any corrective action identified and implemented in consultation with the Implementing Agencies.	Implementing Agencies

Environmental and / or social aspect	Project site	Potential impacts and opportunities	Mitigation measures	Implementation mechanism and monitoring	Implementation responsibility
	All	Potential impact on marine water quality associated with discharge of black and grey water from passenger shelters during rainfall events.	- Implement relevant measures from this table, including routine visual monitoring and inspection.	Mitigation to be implemented through design. Corrective action to be implemented if visual monitoring and / or inspection identifies impacts to water quality arising from black and grey water discharge from the project sites.	
Marine ecology	All	Impacts to marine environment from facilities wear and tear and degradation over time	- Undertake regular visual inspection and maintain facilities in good working order	Inspection, reporting and record keeping, with any corrective action identified and implemented in consultation with the Implementing Agencies.	Implementing Agencies
Terrestrial ecology	All	Potential for ongoing indirect impacts during operation due to increased noise and vehicle and pedestrian movements associated with the project.	- Consider opportunities to enhance the surrounding terrestrial environment through habitat compensation or a nature-based solution	Inspection, reporting and record keeping, with any corrective action identified and implemented in consultation with the Implementing Agencies.	Implementing Agencies
Transport and traffic	All	The project could increase marine traffic between the islands of Kiribati. However, the replacement and introduction of new AtoNs is considered to improve navigational safety. Should marine traffic increase during operation of the project, it could generate more land-based traffic transporting to and from the maritime facilities.	- Ensure new AtoNs are installed to improve marine navigation safety and manage increases in marine traffic - Maintain AtoNs in good working order	Inspection, reporting and record keeping, with any corrective action identified and implemented in consultation with the Implementing Agencies.	Implementing Agencies
Noise and vibration	All	Transient operational noise associated with vessels approaching and departing the boat ramps.	- Maintain standard daytime working hours where practical	Inspection, reporting and record keeping, with any corrective action identified and implemented in consultation with the Implementing Agencies.	Implementing Agencies
	All	Potential, transient noise associated with lifting vessels out of the water using winches	- Maintain standard daytime working hours where practical	Inspection, reporting and record keeping, with any corrective action identified and implemented in consultation with the Implementing Agencies.	Implementing Agencies
	All	Potential noise associated with groups of passengers waiting in purpose-built, open structures and using the vessel boarding structure (particularly on Abaiang)	- Detailed design will further investigate/consider noise abatement that will be effective in reducing noise at adjacent residents to the new facilities (especially the multipurpose shelters at Nonouti and Tabiteuea South) in consultation with affected residents - During operation, a feedback / complaint system for community members to report any intrusive and nuisance noise associated with the operation of the project will be established and maintained	Monitoring of complaints from members of the community regarding operational noise of the project, to identify whether any corrective or remedial action is required.	Implementing Agencies
	All	Potential noise and vibration arising from operational and maintenance activities, such as during use of machinery and equipment associated with the AtoNs workshops.	- Where marine workshop activities occur, implement appropriate operational working hours - Switch noisy equipment off when not in use	Monitoring of complaints from members of the community regarding operational noise of the project, to identify whether any corrective or remedial action is required.	Principal Contractor (Hall)
Air quality	All	Infrequent, small-scale emissions from vessels impacting local air quality.	- Switch off machinery and vessels when not in use	Inspection, reporting and record keeping, with any corrective action identified and implemented in consultation with the Implementing Agencies.	Implementation Agencies
Waste, materials and stockpile management	All	Waste generated through AtoN upkeep and maintenance of maritime structures.	- Prepare and implement operational Waste Management Plan procedures that include appropriate disposal approaches for decommissioned marine facilities	Inspection, reporting and record keeping, with any corrective action identified and implemented in consultation with the Implementing Agencies.	Implementing Agencies
Socio-economic	All	Potential ongoing noise and lighting impacts affecting amenity for neighbouring residents, businesses and community facilities	- Use lighting design elements that avoids light spill into surrounding areas at night	Inspection, reporting and record keeping, with any corrective action identified and implemented in consultation with the Implementing Agencies.	Implementing Agencies
	All	Potential ongoing impact to visual amenity from shelters creating a barrier to view corridors to and from the coastline	- Consider materials and colour of shelter to reflect the character of the surrounding area and minimise blocking of views	Inspection, reporting and record keeping, with any corrective action identified and implemented in consultation with the Implementing Agencies.	Implementing Agencies

Environmental and / or social aspect	Project site	Potential impacts and opportunities	Mitigation measures	Implementation mechanism and monitoring	Implementation responsibility
	All	Potential reduced privacy of surrounding land uses (particularly adjacent residential properties at Abaiang) from passengers waiting at the ferry terminal and encroaching on neighbouring properties due to a lack of delineation between spaces.	<ul style="list-style-type: none"> - Consider delineation of spaces (e.g. fencing, planting and/or screening) so passengers are separate 	Inspection, reporting and record keeping, with any corrective action identified and implemented in consultation with the Implementing Agencies.	Implementing Agencies
	All	Long-term improvements to facilities that can be used by the public to support community use of the surrounding space (i.e. improved toilet facilities).	<ul style="list-style-type: none"> - Consider potential for improving public facilities e.g. improved recreational spaces at Tabiteuea South 	Inspection, reporting and record keeping, with any corrective action identified and implemented in consultation with the Implementing Agencies.	Contractor (Hall) Implementing Agencies
	All	Potential training opportunity for the local workforce during operation.	<p>Consider ways to train local people:</p> <ul style="list-style-type: none"> - Develop a local content plan to maximise local hiring and supplier participation - Establish skills training programs to prepare local workers for project roles - Provide clear communication about available opportunities, job requirements, and the project's hiring process - Prioritise the use of local suppliers where possible to create indirect economic benefits for the community 	Inspection, reporting and record keeping, with any corrective action identified and implemented in consultation with the Implementing Agencies.	Contractor (Hall) Implementing Agencies
	All	Improved access to the three islands that is safer and more efficient once operational. This may also help support flow-on economic benefits and self-sufficiency by improving the ability to import products and services by improving the reliability and frequency of ships. Nearby businesses may also benefit from operational staff and passengers at the sites such as servicing waiting passengers at the ferry for Abaiang.	<ul style="list-style-type: none"> - Operation of proposed maritime facilities 	Inspection, reporting and record keeping, with any corrective action identified and implemented in consultation with the Implementing Agencies.	Contractor (Hall) Implementing Agencies
	All	Potential improvements for the local fishing industry through the implementation of improved navigational aids once operational.	<ul style="list-style-type: none"> - Operation of proposed maritime facilities 	Inspection, reporting and record keeping, with any corrective action identified and implemented in consultation with the Implementing Agencies.	Contractor (Hall) Implementing Agencies

7.2 Abaiang

Table 7-2 presents the potential environmental and social impacts and opportunities and relevant mitigation measures applicable to Abaiang only. Note that no impacts, opportunities or associated mitigation measures were identified for this site during the pre-construction or post-construction / operation phase of the project.

Table 7-2 Potential environmental and social impacts, opportunities and associated mitigation measures applicable for Abaiang only

Environmental and / or social aspect	Potential impacts and opportunities	Mitigation measures	Monitoring	Implementation responsibility
Construction				
Socio-economic	Temporary loss of access to areas of community space and facilities, including the Women's Centre at Abaiang.	<ul style="list-style-type: none"> - Implement a stakeholder and community engagement plan which includes procedures for community notification prior to and during construction and a complaints management process. - Implement clear signage. - Support the temporary relocation of the Women's Centre activities during construction. - All construction equipment and waste material to be removed from the site once construction is complete. - Investigate opportunities to improve facilities used during construction. 	<p>Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through, a stakeholder and community engagement procedure / plan included within the CESMP and relevant sub-plans identified in section 1.5.</p> <p>Site supervisor will be responsible for ensuring mitigation is implemented properly and effectively.</p> <p>A grievance procedure should be set up to allow members of the affected communities to provide feedback.</p>	Principal Contractor (Hall) Implementing Agencies
	Potential disruption to use of cultural celebration area at Abaiang for use as a compound area.	<ul style="list-style-type: none"> - Explore opportunities to relocate compound site at Abaiang. If this cannot occur, ensure that works do not take place during key dates of celebration (i.e. Kiribati Day) and that an alternative location for celebrations is provided. 		Principal Contractor (Hall) Implementing Agencies

Environmental and / or social aspect	Potential impacts and opportunities	Mitigation measures	Monitoring	Implementation responsibility
		- Provide cultural heritage awareness training to all project staff.		
Post-construction, operation and decommissioning				
Noise and vibration	Potential noise associated with groups of passengers waiting in purpose-built, open structures and using the vessel boarding structure on Abaiang.	<ul style="list-style-type: none"> - Detailed design will further investigate/consider noise abatement that will be effective in reducing noise at adjacent residents to the new facilities (especially the multipurpose shelters at Nonouti and Tabiteuea South) in consultation with affected residents - During operation, a feedback / complaint system for community members to report any intrusive and nuisance noise associated with the operation of the project will be established and maintained. 	Monitoring of complaints from members of the community regarding operational noise of the project, to identify whether any corrective or remedial action is required.	Implementing Agencies
Socio-economic	Potential reduced privacy of surrounding land uses (particularly adjacent residential properties at Abaiang) from passengers waiting at the ferry terminal and encroaching on neighbouring properties due to a lack of delineation between spaces.	<ul style="list-style-type: none"> - Consider delineation of spaces (e.g. fencing, planting and/or screening) so passengers are separate. 	Inspection, reporting and record keeping, with any corrective action identified and implemented in consultation with the Implementing Agencies.	Implementing Agencies

7.3 Nonouti

Table 7-3 presents the potential environmental and social impacts and opportunities and relevant mitigation measures applicable to Nonouti only. Note that no impacts, opportunities or associated mitigation measures were identified for this site during the construction phase of the project.

Table 7-3 Potential environmental and social impacts, opportunities and associated mitigation measures applicable for Nonouti only

Environmental and / or social aspect	Potential impacts and opportunities	Mitigation measures	Monitoring	Implementation responsibility
Pre-construction				
Socio-economic	Prior to construction, confirm residents of nearby council owned facilities would not require relocation.	<ul style="list-style-type: none"> - Develop and implement a relocation plan that identifies temporary accommodation if required (however, at the time of writing no relocation of residents is required). - Early and ongoing engagement with impacted residents. - Negotiate land use agreements and/or compensation with legally recognised landowner. If there is inheritance dispute, if possible, work with the legally entitled family members to the land. 	Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through, a resettlement plan (if required), a stakeholder and community engagement procedure / plan included within the CESMP and relevant sub-plans identified in section 1.5.	Principal Contractor (Hall) Implementing Agencies
Post-construction, operation and decommissioning				
Noise and vibration	Potential noise emissions associated with ad-hoc maintenance of AtoNs within workshops on Nonouti.	<ul style="list-style-type: none"> - Detailed design will further investigate/consider noise abatement that will be effective in reducing noise at adjacent residents to the new facilities (especially the multipurpose shelter at Nonouti) in consultation with affected residents. - During operation, a feedback / complaint system for community members to report any intrusive and nuisance noise associated with the operation of the project will be established and maintained. 	Monitoring of complaints from members of the community regarding operational noise of the project, to identify whether any corrective or remedial action is required.	Implementing Agencies

7.4 Tabiteuea South

Table 7-4 presents the potential environmental and social impacts and opportunities and relevant mitigation measures applicable to Tabiteuea South only.

Table 7-4 Potential environmental and social impacts, opportunities and associated mitigation measures applicable for Tabiteuea South only

Environmental and / or social aspect	Potential impacts and opportunities	Mitigation measures	Monitoring	Implementation responsibility
Pre-construction				
Occupational health and safety	Potential impacts associated with exposure to asbestos containing material (ACM) in buildings should damage occur during construction (particularly the COPA building on Tabiteuea South)	<p>The following measures will be implemented to mitigate identified health and safety impacts:</p> <ul style="list-style-type: none"> - Prepare and implement a Health and Safety Plan outlining actions and responsibilities. - All site personnel must be inducted into the Health and Safety Plan prior to commencement of pre-construction activities. - Prepare a Hazard Management plan to manage the risk to workers and the local community where ACM (particularly in buildings) has potential to exist. Include measures that include methods for identification and safe removal. - Undertake monitoring (refer to Noise and Vibration measures below below) - Prepare and maintain effective and accessible worker Grievance Mechanism. - Prepare and deliver a toolbox talk to all site workers, outlining the project site and site environs, environmental and social risks. 	Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through the CESMP and relevant sub-plans identified in section 1.5.	Principal Contractor (Hall)
Socio-economic	Land acquisition for ancillary facilities would be required.	<ul style="list-style-type: none"> - Develop and implement a resettlement plan that identifies temporary accommodation if required (however, at the time of writing no relocation of residents is required). - Early and ongoing engagement with impacted residents. - Negotiate land use agreements and/or compensation with legally recognised landowner. If there is inheritance dispute, if possible, work with the legally entitled family members to the land. 	Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through, a resettlement plan (if required), a stakeholder and community engagement procedure / plan included within the CESMP and relevant sub-plans identified in section 1.5.	Principal Contractor (Hall) Implementing Agencies
Construction				
Socio-economic	Loss of some coconut trees (particularly at Tabiteuea South) which are significant to the local community and used as a food source and/or economic source. It is understood that some of these trees being removed are also currently used as a way to delineate property boundaries which may consequently be lost as a result of the project.	<ul style="list-style-type: none"> - Provide compensation to impacted landowners for the loss of the coconut trees. 	<p>Mitigation measures and monitoring procedures (including reporting and record keeping processes) to be included within, and implemented through the CESMP and relevant sub-plans identified in section 1.5.</p> <p>Site supervisor will be responsible for ensuring mitigation is implemented properly and effectively.</p>	Principal Contractor (Hall) Implementing Agencies
	Potential disruption to use of cultural celebration area at Tabiteuea South for use as a compound area.	<ul style="list-style-type: none"> - Explore opportunities to relocate compound site at Tabiteuea South. If this cannot occur, ensure that works do not take place during key dates of celebration (i.e. Kiribati Day) and that an alternative location for celebrations is provided. - Provide cultural heritage awareness training to all project staff. 	A grievance procedure should be set up to allow members of the affected communities to provide feedback.	Principal Contractor (Hall) Implementing Agencies
Post-construction, operation and decommissioning				
Noise and vibration	Potential noise emissions associated with ad-hoc maintenance of AtoNs within workshops on Tabiteuea South.	<ul style="list-style-type: none"> - Detailed design will further investigate/consider noise abatement that will be effective in reducing noise at adjacent residents to the new facilities (especially the multipurpose shelter at Tabiteuea South) in consultation with affected residents. - During operation, a feedback / complaint system for community members to report any intrusive and nuisance noise associated with the operation of the project will be established and maintained. 	Monitoring of complaints from members of the community regarding operational noise of the project, to identify whether any corrective or remedial action is required.	Implementing Agencies

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Appendix 1 Climate Risk and Opportunities Register

Appendix 2 Geotechnical Investigation Reports

Appendix 3 Marine Sediment Technical Note

Appendix 4 Marine Water Quality Technical Note

Appendix 5 Metocean Study

Appendix 6 AtoN Habitat Appraisal and Risks

Appendix 7 Marine Ecology Report

Appendix 8 Noise and Vibration Technical Note

Appendix 10 Principal Contractor Example Management Plans