REPORT

Ebeye Coastal Protection Engineering Design and Construction Supervision

ESIA/ ESMP

Client:	Republic of Marshall Islands Ministry of Works, Infrastructure and Utilities
Reference:	MH-PREPII-PIU-83435-QCBS Deliverable 19
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Royal HaskoningDHV

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Acronym	
ADB	Asian Development Bank
AEP	Annual Exceedance Probability
AOI	Area of Interest
ATON	Aids to navigation
AQI	Air Quality Index
ARI	Annual Return Interval
CEDAW	Convention on Elimination of Discrimination Against Women
C-ESMP	Contractor Environmental and Social Management Plan
CIU	Central Implementation Unit
CLO	Community Liaison Officer
COC	Code of Conduct
COFA	Compact of Free Association
COT	Crown of Thorns
CRC	Convention of the Rights of the Child
CROSMOR	Cross Shore Model
CRPD	Convention on the Rights of People with Disabilities
CSC	Construction Site Supervisor
CSP	Contractor Safety Plan
CSS	Construction Site Supervisor
DCP	Designated Contact Person
DCR	Design Concept Reports
DIDA	Department of International Development Assistance
DIP	Design Investigation Protocol
DTL	Diurnal Tide Level
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
ESHS	Environmental, Social, Health and Safety
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework

Acronym	
ESMP	Environmental and Social Management Plan
ESR	Environmental and Social Receptor
ESS	Environmental and Social Safeguards
FGD	Focus Group Discussion
FHH	Female Headed Households
FNU	Formazin Nephelometric Unit
GBV	Gender-based Violence
GDP	Gross Domestic Product
GoRMI	Government of the Republic of Marshall Islands
GRM	Grievance Redress Mechanism
HAT	Highest Astronomical Tide
HPO	Historic Preservation Office
HIES	Household Income and Expenditure Survey
IEC	Information, Education, Communication
IEE	Initial Environmental Examination
IFC	Issued for Construction
IIC	Included in Costs
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union on the Conservation of Nature
KADA	Kwajalein Atoll Development Authority
KAJUR	Kwajalein Atoll Joint Utilities Resources
KALGOV	Kwajalein Atoll Local Government
KII	Key Informant Interviews
LAT	Lowest Astronomical Tide
LCC	Live Coral Cover
LiDAR	Light Detecting and Ranging
LOS	Level of Service
MCA	Multi Criteria Analysis
MHH	Male Headed Households
MHHW	Mean High High Water
MHW	Mean High Water
MLLW	Mean Low Low Water

Acronym	
MLW	Mean Low Water
MOF	Ministry of Finance
MPW	Ministry of Public Works
MSL	Meal Sea Level
MTL	Mean Tide Level
MWIU	Ministry of Works, Infrastructure and Utilities
NEPA	National Environment Protection Act
NGO	Non-Governmental Organisation
NOAA	National Oceanographic and Atmospheric Administration
NOL	No Objection Letter
NSC	National Steering Committee
NTA	National Telecommunications Authority
OHS	Occupational Health and Safety
PDO	Project Development Objective
PDR	Preliminary Design Report
PIC	Pacific Island Countries
PIU	Project Implementation Unit
PM	Particulate Matter
PMU	Project Management Unit
PPE	Personal Protective Equipment
PREP	Pacific Resilience Program
PRIF	Pacific Regional Infrastructure Facility
RCP	Representative Concentration Pathway
RHDHV	Royal HaskoningDHV
RL	Reduced Level
RMI	Republic of Marshall Islands
RMIEPA	Republic of Marshall Islands Environmental Protection Authority
RMIPA	Republic of Marshall Islands Port Authority
RP	Return Period
SEA/SH	Sexual Exploitation and Abuse and Sexual Harassment
SEP	Stakeholder Engagement Plan
SLR	Sea Level Rise

Acronym	
SOP	Standard Operation Procedures
SOPAC	Pacific Islands Applied Geoscience Commission
SPREP	Secretariat for the Pacific Regional Environment Program
SSL	Storm Surge Level
SWMP	Solid Waste Management Plan
TMP	Transportation Management Plan
TOR	Terms of Reference
UNSW WRL	University of New South Wales Water Research Lab
USA	United States of America
USD	United States Dollars
UXO	Unexploded Ordinance
VE	Value Engineering
WHO	World Health Organisation
WMP	Worker Management Plan
WWII	World War II

Executive Summary

The Republic of Marshall Islands (RMI) is one of the World's smallest, most isolated and vulnerable nations and is highly vulnerable to the impacts of climate change and natural disaster events. There is widespread acceptance of the need to strengthen disaster early warning and preparedness, and to mainstream disaster risk and climate change into development planning and financing. The second phase of the Pacific Resilience Program (PREP II) for Pacific Islands, funded through the World Bank, responds to this need in the RMI. Royal HaskoningDHV (RHDHV) has been retained by the RMI Ministry of Works, Infrastructure and Utilities (MWIU) as the Coastal Designer to support delivery of PREP II Component 2 through Engineering Design and Construction Supervision of a coastal defense structure on Ebeye.

The design consultants, in consultation with the Ebeye leadership and community, have been through a lengthy consultative process which has ultimately identified a design solution of a 1,811 m long rock revetment across the unprotected oceanside coastline. The design presented has been guided throughout by an iterative environmental and social screening process which has now been completed to the Issued For Construction (IFC) Final detailed design level. However, please note that a design addendum is currently in progress to update the stairs and ramps following negotiations with the Contractor. In order to progress this Environmental and Social Impact Assessment and Management Plan (ESIA/ESMP), these changes have been incorporated in this document where possible.

This ESIA has undertaken screening of the Project, alongside scoping of the potential impacts, all of which are described in this report. This report also provides a description of the baseline conditions and it identifies and assesses the predicted impacts from the Project activities. Furthermore, it provides recommended mitigation measures and a monitoring plan which have been taken forward and incorporated into the ESMP in **Section 8, Appendix B** and **Appendix C**.

The proposed design and works at Ebeye have been screened based on field investigations, expert technical opinion, community consultation and a review of the available secondary data sources. This screening process identifies as a Category B rating under the World Bank Operating Policy 4.01, as its potential adverse environmental impacts on human populations or environmentally important areas are less adverse than those of a Category A project. These impacts are site specific; with few of the impacts, if any, being irreversible; and in most cases mitigation measures can be designed more readily than a Category A project.

Currently, the oceanside coast of the island is intermittently armored by a range of defensive type structures ranging from an existing rock revetment along the northernmost 300 m, to homemade seawalls of rocks and piled junk and scrap metal. The road passes close to the shoreline in two locations and storm water outlet wing wall structures, originally constructed on the coastal edge, are now located on the beach face indicating that shoreline erosion has occurred since 2004 and is ongoing. The southern portion of the causeway is well constructed with a substantial rock revetment extending from the Public Works Department on Ebeye to the first island to the north.

The key output of this Project is the design and construction of a coastal defense structure stretching for 1,811 m along the oceanside coastline. The alignment of this defense would provide protective cover for the Ebeye oceanside shoreline from the southernmost tip of Ebeye at the power station, to the existing rock revetment at the northern end of the island (which will not be replaced as part of this Project).

The rock revetment alignment will be lie outside of the Weto boundaries and on the existing shoreline for most of its length; thus avoiding negative impacts to private property, cemeteries and avoiding the need for land acquisition.

The final design is a rock revetment, similar to the existing revetment located along the northern end of Ebeye. The IFC Final Design drawings provide a typical cross section for the rock revetment as shown below (**Figure 0-1**)

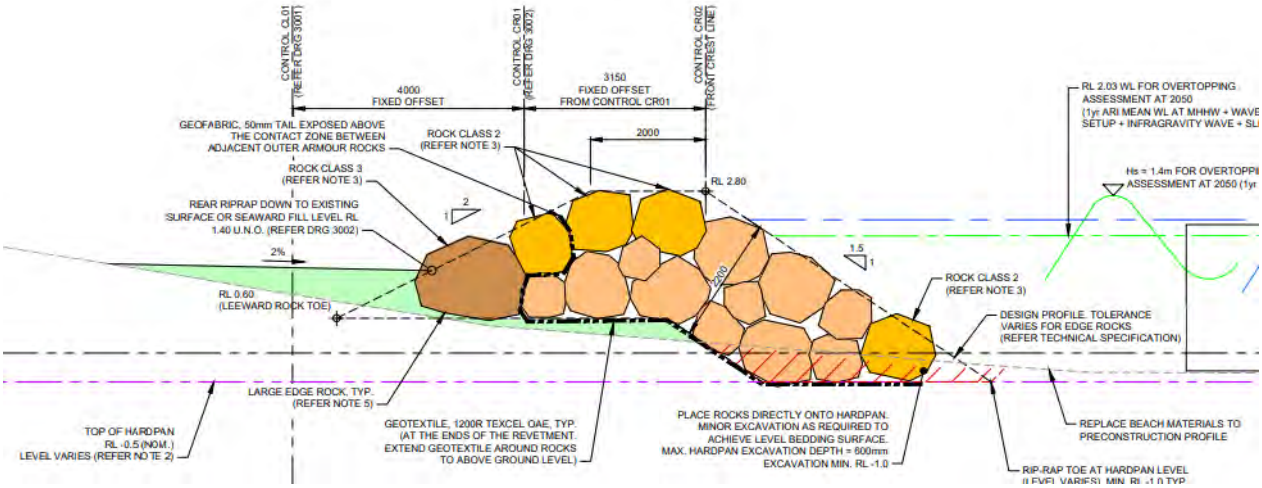


Figure 0-1: Typical cross section

Infilling is required behind the revetment to support the back of the structure and to provide all-tide access behind the structure along its full length. Fill levels are generally set in the design at +1.4 m Mean Sea Level (MSL) but is locally managed in some places along the wall in order to manage impacts on private properties. Final fill levels and extent would be determined following the Contractor's survey and in consultation with landowners. Infilling is required to avoid creating a moat for standing water behind the wall at high tide. The fill is specified and sloped to avoid encroachment beyond the seaward side of the walls of foreshore houses and to minimize the impact on drainage of rainfall runoff.

Access would be provided at five points along the rock revetment, with four sets of concrete stairs and one lapped revetment ramp. These access locations aim to align with existing access ways to the coastline to the greatest extent feasible, and are based on feedback from consultation with the community.

In addition to the footprint of the revetment itself, the project would temporarily access land for stockpiling materials, a construction yard and a small-scale workers accommodation (for up to 22 international workers). There would be no permanent land acquisition. Priority would be given to using lands under Kwajalein Atoll Development Authority (KADA) control, otherwise should private lands be required, only temporary access would be needed. If necessary, the proposed procedure in **Section 8.2.1** of this ESIA/ESMP would be used in securing use of these lands.

Stakeholder and Community engagement for this design development been ongoing since mid-2021 through participatory planning workshops, focus group discussion, key informant interviews and regular meetings with the KADA board and island leadership. A Stakeholder Engagement Plan (SEP) has been developed and is the driving instrument for ongoing stakeholder engagement and community consultation for the Project and would be implemented in parallel with and in compliment to the environmental and social management measures that the Contractor would have to implement.

Information gathered during the consultation process on the social, economic or environmental situation of Ebeye at all stages have been included in the baseline description (**Section 5** of this report). Wherever

possible, the remaining concerns have been addressed either through design solutions or mitigation measures and included in this document.

The overall objective of this report is to identify the potential environmental and social impacts (ESIA) of the project and to provide a management plan (ESMP) for the works which encompass the items described above, including any known ancillary infrastructure for the works. All assessment and planning must comply with the World Bank Operational Policies (OP) as well as the relevant RMI Legislation and Regulations. As part of that process, this ESIA/ESMP has undertaken screening of the project as it is known and scoping of the potential impacts, it provides a description of the baseline conditions, it details the predicted qualitative and quantitative impacts from the project activities and provides safeguards management and monitoring plans to avoid, mitigate or remedy.

The key environmental and social risks and impacts identified in this report along with their recommended mitigation measures are summarized below.

Table 0-1: Key Risks and Mitigation Measures

Key Environmental or Social Risk/Impact	Key Mitigation Management Measures
Increased levels of traffic, particularly heavy vehicles, on the road causes damage to and/or deterioration of roads and other infrastructure.	Contractor Pre-Construction Survey would include dilapidation survey of nominated routes. Survey would be used as guide to remediation on completion of works.
High levels of haulage required for the revetment construction creates risk of accident and injury to pedestrian and other vehicles in Ebeye.	ESMP TMP requirements. TMP would be informed through consultations with key stakeholders and subject to additional approval by KADA. Traffic through the town and via Ebeye Port would be minimized as much as possible. Plant movement will be kept to the works areas and clearly demarked and fenced off.
During construction, use of existing freshwater resources for construction and the workers accommodation will place added demand on limited supply, potentially leading to shortages.	Contractor is to ensure that they don't negatively impact the public water supply and Project cost has included for a Contractor purchased portable desalination unit (or similar).
Vibration damage to poorly constructed houses/buildings from use of heavy machinery and during haulage	Contractor Pre-Construction Survey would include condition survey within 10 m of work areas. Condition assessment would be used as guide to reinstatement on completion of works. Contractor to utilize at least 3 vibration monitors (moving across the site) during the works.
Contractor doesn't fully utilize local labour force thereby minimizing employment for community members	ESMP and Project costing require Contractor to maximize the use of local labour force and to provide justifications for all international recruitment.
Lack of, or poor-quality consultations and engagement with the community during the finalisation of revetment design and pre-construction activities could lead to grievances and lack of support for the Project.	Stakeholder Engagement Plan to be regularly updated and implemented.

Key Environmental or Social Risk/Impact	Key Mitigation Management Measures
Increased instances of violence, anti-social behaviour and transmission of sexually transmitted illnesses resulting from the arrival of international workforce.	ESMP and Contract Document requirements for codes of conduct and ongoing worker training.
Damage to reef flat and associated marine benthic fauna from placement of stockpile and use of machinery on reef flat.	ESMP controls for stockpiling on reef flat. Noted that ecological value of reef flat is limited but stockpiling should be kept to area of areas of least ecological sensitivity. Unloading site would be pre-approved by the Engineer, PIU/ CIU and RMIEPA following underwater video footage of surrounding reef flat.
Access to reef flat for fishing activities may be limited or altered during construction work or from any materials stockpiled on reef flat	Contractor's TMP requires pedestrian access around work sites. SEP is implemented. Contractor Community Liaison Officer (CLO) regularly engages with community to seek input and inform.
Access to South Ebeye Beach may be limited during construction work due to construction and use of Roll On/ Roll off (RORO) facility	Ensure RORO site is approved by the Engineer, PIU/ CIU and RMIEPA prior to construction of the facility. SEP is implemented. Contractor CLO regularly engages with community to seek input and inform. BBQ area to remain publicly accessible for the duration of the works. Use of the area adjacent to the BBQ hut will be limited to the area required to turn one articulated dump truck and for two articulated dump trucks to pass one another. Temporary fencing and spotters required. TMP and safety management plan to ensure that the public, particularly children, cannot access the area and be at risk from moving plant. Area to be reinstated after completion unless requested by the client.
Detonation of unexploded ordnance (UXO) leading to significant injury or death of community members or Project workers.	Contractor required to undertake detection and removal of UXO prior to excavation works. Chance find procedure in place.
Demand for housing on Ebeye increases to accommodate workforce leading to increased rents and/or reduced availability of accommodation for the community.	ESMP measures for influx of labour and management of workers, plus consideration of the provision of dedicated workers camp.
Demand for food and supplies increases to accommodate workforce.	ESMP measures for influx of labour and management of workers, including requirement for Contractor to supply all food to workers.

Key Environmental or Social Risk/Impact	Key Mitigation Management Measures
Demand for power, medical, waste disposal increases to accommodate workforce.	ESMP measures for influx of labour and management of workers, including provision for a backup diesel generator.
Risk to safety of children if unauthorized access is gained to the Project sites during the day or night.	Technical specifications require Contractor to install fencing around all works sites including demolition work. Contractor to liaise with Ebeye police for provision of additional security. Also work with community to assist with education of children as to the dangers of the work site.
Changes to drainage patterns and speeds through the construction of the revetment and associated drainage. This will create a situation which is at least the same, but possibly better than the current status with potential for standing water and poor drainage. This impact is of low risk.	Fill level behind majority the wall raised to +1.4m MSL and maintenance instructions provided to KADA.
Drainage function of revetment may be hampered if maintenance corridor isn't maintained properly. This could lead to a decrease in drainage speed and gradually lead to comparative increases in flooding and result in ponding at normal high tide. This impact is low risk.	Design acts as a natural drain. Maintenance instructions provided to KADA. Minimal maintenance required for drainage function.
Loss of beaches under the revetment alignment would result in the community losing the cultural and recreational value afforded by beaches.	Alignment is set close to shoreline and may allow for reinstatement of some beach areas. Stairs and ramps designed to allow for access to key beach areas. Impact to beaches is unavoidable due to need for coastal protection. Noted that current beaches are small and would be lost in future years to coastal squeeze and sea level rise / erosion.
Presence of revetment with dedicated crossing points will change the way in which the community uses and interacts with the reef flat environment, including the borrow pits. This will be felt disproportionately by the elderly and community members with mobility difficulties.	Multiple access points are provided along the alignment including one all access ramp. The removal of waste and rubbish will actually increase access to the shoreline in many places and make the area far more attractive to visit.
Breeze will be reduced immediately behind the revetment and has the potential to reduce the comfort and wellbeing experienced within impacted households.	Revetment crest has been bought to lowest safe level. Some impact on sea breeze in the most adjacent properties is unavoidable and outweighed by the protection afforded to over topping and waves (i.e. most seaside properties are currently derelict due to ocean damage, not wind issues)..

Key Environmental or Social Risk/Impact	Key Mitigation Management Measures
Safety risks associated with children playing on the rock revetment structure.	The new revetment is similar in design to the existing structure and is well recognized by all parts of the community – thus offering a well understood and similar risk. All rocks should be packed together as tightly as possible and voids minimized where they can be. It is further suggested that the local community and KADA consultation encourages participation with parents and children on the dangers of playing on the rocks, particularly in high wave conditions.
The creation of the maintenance corridor may lead to encroachment by any neighboring properties leading to difficulties in proper maintenance of revetment.	KADA to manage through engagement with landowners and property owners. No development should be allowed in the maintenance corridor. This also includes landscaping and the development of trees / plants etc.
Some areas of infilling at the +1.4m MSL cross the Weto boundaries and in some areas have the potential to impact structures and property.	Instruction on design drawings call for lowering of fill level to avoid property impacts.
Landscape and oceanward will be permanently altered and may change outward views.	Designs have lowered the crest level as much as possible. Fill behind wall would elevate ground level which would minimize height of wall on the island side. Impact is unavoidable. Noted that the current landscape is dominated by rubbish and waste which will be removed and is already partially occupied by a similar revetment structure which blends well into the island sea and landscape.

The above table shows the more significant (or commonly asked about) impacts and provides the high-level mitigation measures designed to address these. **Sections 7, 8,** and **Appendix B** of this report expand on these impacts and also describe all minor, moderate and significant environmental or social impacts and related management measures to avoid, minimize or mitigate the impacts.

The environmental and social management measures in this report, as well as the stakeholder engagement requirements, would be managed during project implementation by the Contractor who would be responsible for overall implementation of the final updated ESMP through developing their own Contractor's Environmental and Social Management Plan (C-ESMP) which would be the governing document for their performance. The C-ESMP would contain the Contractor's methodology and planning for adhering to their safeguard requirements. Additionally, the C-ESMP would detail how the Contractor plans to resource their team with personnel and financial resources as per the Contract.

The C-ESMP and associated management plans would be developed, approved and disclosed prior to commencement of civil works. The Contractor is required to produce the following management plans as part of their C-ESMP: Solid Waste Management Plan, Worker Management Plan, TMP, Spill Prevention and Emergency Response Plan, Occupational Health and Safety Management Plan and an Emergency Preparedness Plan. See **Appendix D** onwards.

Day to day oversight of the Contractor would be provided by the Engineer, this includes environmental and social supervision. The Engineer would work closely with the Contractor to ensure that the Project is implemented in a compliant manner consistent with the detailed design provided and the ESMP. The

Project Implementation Unit (PIU) within the MWIU, with support from the Ministry of Finances Central Implementation Unit (CIU), would be responsible for monitoring and evaluating project activities and outputs and report the findings to the Ministry by monthly progress reports. These reports would include all aspects of safeguards compliance of the project including the results of scheduled monitoring, and instances of non-compliance, any environmental incidents and any complaints or grievance submissions/responses.

1 Introduction

1.1 Project Background

The Republic of Marshall Islands (RMI) is one of the World's smallest, most isolated and vulnerable nations. The country consists of 29 atolls and five isolated islands (24 of which are inhabited). RMI's population is estimated at about 53,000, of which over half are resident in the capital city of Majuro.

RMI is highly vulnerable to the impacts of climate change and natural disaster events. These events include typhoons/tropical cyclones, floods, tidal surges, droughts, earthquakes and tsunamis, some of which are now established as being intensified by climate change. They can and often result in disasters that affect the country's entire economic, human, and physical environment in the immediate and longer term.

Climate change projections from the Intergovernmental Panel on Climate Change (IPCC) suggest that RMI, will face an even greater intensity of weather and climate-related hazard events in the coming years, making the country among the most physically vulnerable nations in the world. The expected social and economic losses as a result of extreme events, paired with overcrowding in the urban areas of Majuro and Ebeye, are likely to contribute to more people being affected by disasters and climate change. Hence, there is widespread acceptance of the need to strengthen disaster early warning and preparedness, and to mainstream disaster risk and climate change into development planning and financing.

The Pacific Resilience Program (PREP) for Pacific Islands, funded through the World Bank responds to this need in the RMI and other Pacific Island Countries (PIC). PREP is a series of projects implemented to strengthen early warning, create a framework for climate and disaster resilience, and improve post-disaster response. PREP is being implemented in two phases (PREP and PREP II) at this stage with potential for more phases in the future.

The RMI PREP II project development objective (PDO) is to strengthen early warning systems, climate resilient investments in shoreline protection, and financial protection against natural hazards in RMI. Component 2 of PREP II will strengthen coastal planning, increase understanding of current and future risks, help the government to prioritize future investments, and deliver targeted coastal protection investments. Component 2 is divided into two sub-components: (i) coastal protection investments; and (ii) strengthen integrated coastal risk management. Royal HaskoningDHV (RHDHV) has been retained by the RMI Ministry of Works, Infrastructure and Utilities (MWIU) as the Designer to support delivery of PREP II Component 2 through Engineering Design and Construction Supervision of a coastal defense structure on Ebeye.

The design consultants, in consultation with the Ebeye leadership and community, have been through an iterative design process ultimately settling upon a 1,811 m long rock revetment along the unprotected length of the oceanside coastline. The design has been guided throughout by an environmental and social screening process, which has now been completed to Issued for Construction (IFC) Final detailed design level.

1.2 Scope and Objectives

The overall objective of this report is to provide an Environmental and Social Impact Assessment (ESIA) and Environmental and Social Management Plan (ESMP) (ESIA/ESMP) for the selected design and the expected construction methodology.

This ESIA/ESMP has undertaken screening of the Project and scoping of the potential impacts, provides a description of the baseline conditions, and identifies and assesses the predicted impacts from the Project activities. It also provides recommended mitigation measures and a monitoring plan which have been taken forward and incorporated into the ESMP in **Section 8, Appendix B** and **Appendix C**.

The PREP II Environmental and Social Management Framework (ESMF) originally designated this Project as Category B under the World Bank Operating Policy 4.01 as *its potential adverse environmental impacts on human populations or environmentally important areas are less adverse than those of a Category A project. These impacts are site specific; few, if any of them, are irreversible, and in most cases mitigation measures can be designed more readily than a Category A project*[1]. The proposed design and works at Ebeye have been iteratively screened based on field investigations, expert technical opinion, community consultation and a review of the available secondary data sources. This screening process confirms a Category B rating. It finds that potential impacts are less than significant, site specific, mostly reversible and that a range of potential measures for mitigation can be readily designed and implemented in the majority of cases.

This ESIA/ESMP examines the Project's potential negative and positive impacts, compares them with those of feasible alternatives (including the "without Project" option) and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. Where there are gaps in the available data, or where there are still unknown elements of design and/or construction methodology, these are identified, and a precautionary approach is taken.

Given the above Project categorization, **Section 7** of this report focuses on assessing the key identified positive and negative impacts which either require further expansion, cannot be readily managed through industry standard management measures or are differentiated by design.

As a component of this report, the ESMP has been developed based on the findings of the impact assessment, and provides the set of mitigations, monitoring, and institutional measures to be taken during the pre-construction, construction and maintenance phases of the revetment to avoid adverse environmental and social impacts, offset them or reduce them to acceptable levels. The ESMP also focuses on safeguard management through Project implementation by providing clear instructions, responsibilities and guidelines to the Contractor, Engineers and the PREP II Project Implementation Unit (PIU).

As well as forming part of the contract documents, the ESIA/ESMP provides the environmental and social requirements of the Contract and would be legally enforced by the conditions of any required permits which would be secured by the PIU and provided to the Contractor.

1.3 Key Documents

The following key Project documents and reports have been used in the development of this ESIA/ESMP:

- Deltares Coastal Risk Assessment for Ebeye[2]
- Ebeye Seawall Project SEP
- PREP II SEP
- Ebeye Coastal Protection Engineering Design and Construction Supervision, Final Level Of Service (LOS) report[3]

[1] *https://thedocs.worldbank.org/en/doc/29598c8bc38cbde55106dd1f6be5a7c4-0290012023/original/BP-4-01-Environmental-Assessment.pdf*
[2] *Deltares (2016) Coastal Risk Assessment for Ebeye, Technical report 1230829-001, edition B*
[3] *RHDHV (2022), Ebeye Coastal Protection Engineering Design and Construction Supervision, Final Level Of Service report*

- Ebeye Coastal Protection Engineering Design and Construction Supervision, IFC Final Design Report[4]
- Ebeye Coastal Protection Engineering Design and Construction Supervision, Technical Specification[5]
- Ebeye Coastal Protection Engineering Design and Construction Supervision, IFC Design Drawings[6]
- PREP II ESMF
- PREP II Resettlement Policy Framework
- World Bank Operating Policies
- International Finance Corporation ESHS Guidelines

1.4 Disclosure

As part of the requirements of Government of the Republic of the Marshall Islands (GoRMI) law and World Bank Operating Policies (OP), this ESIA/ESMP will be publicly disclosed once approved in order to be accessible during Project implementation. Disclosure is the responsibility of the PREP II PIU. The PIU would ensure the ESIA/ESMP Executive Summary is translated into Marshallese prior to disclosure in hard copy and on their website. Likewise, the PIU would ensure that several copies of all prepared safeguard instruments are available locally at the PIU office and the Kwajalein Government Local Government office and is accessible to affected groups and local Non-Governmental Organisations (NGO).

[4] *RHDHV (2024), Ebeye Coastal Protection Engineering Design and Construction Supervision, IFC Final Design Report, Rev 1, issued 8/4/24*
[5] *RHDHV (2024), Ebeye Coastal Protection Engineering Design and Construction Supervision, Technical Specification, Rev 1, issued 8/4/24*
[6] *RHDHV (2024), Ebeye Coastal Protection Engineering Design and Construction Supervision, IFC Design Drawings, Rev C01, issued 8/4/24*

2 Project Description

2.1 Site Location and Extent

Ebeye is built on a small island on the south-eastern side of Kwajalein Atoll, as shown in **Figure 2-1.** It is the most populous island in the atoll with only 80 acres (32 hectares (ha) or 0.14 square miles of land) and around 10,000 people (a population density of 0.3 persons/m^2). As a result, Ebeye is the eleventh most densely populated island in the world.

Figure 2-1: Ebeye Island in Kwajalein Atoll

The land above sea level stretches about 2.0 km from north to south, is approximately 250 m wide and borders a large lagoon to the west and the open ocean to the east. The lagoon is shallow with an average depth of approximately 40 m. On the eastern ocean side, the island is fronted by a reef flat. This reef flat varies slightly in width between 100 - 150 m. Beyond the reef flat, the depth quickly increases, reaching approximately 6,000 m just a few kilometers out from the coast. The island is covered entirely with buildings and infrastructure with a power plant on the southernmost point and a land fill on the northern point.

A causeway links Ebeye to Guegeegue, approximately 6 km to the north. Guegeegue is slightly larger than Ebeye although has a much lower population.

An Area of Influence (AOI) for this Project was initially determined using the World Bank definition[7] in OP4.01 Annex A[8] and will include all ancillary aspects including access roads, haulage routes, workers accommodation, stockpile sites, other ancillary sites that may be required, stockpile areas, overseas

[7] *Project area of influence defined in OP4.01 Annex A as: "The area likely to be affected by the project, including all its ancillary aspects, such as power transmission corridors, pipelines, canals, tunnels, relocation and access roads, borrow and disposal areas, and construction camps, as well as unplanned developments induced by the project (e.g. spontaneous settlement, logging, or shifting agriculture along access roads). The area of influence may include, for example, (a) the watershed within which the project is located; (b) any affected estuary and coastal zone; (c) off-site areas required for resettlement or compensatory tracts; (d) the airshed (e.g., where airborne pollution such as smoke or dust may enter or leave the area of influence; (e) migratory routes of humans, wildlife, or fish, particularly where they relate to public health, economic activities, or environmental conservation; and (f) areas used for livelihood activities (hunting, fishing, grazing, gathering, agriculture, etc.) or religious or ceremonial purposes of a customary nature."*

[8] *https://thedocs.worldbank.org/en/doc/f3077ee7a3590f4f4610ede4734496fc-0290012023/original/OP-4-01-Environmental-Assessment.pdf*

aggregate sources, adjacent coastal areas, areas of economic or livelihood activity, areas of religious or ceremonial purposes of a customary nature, and other important community use areas.

Following preliminary discussions with the Contractor[9], the following information is currently known in relation to the spatial extent:

1. The proposed rock revetment would cover the oceanside shoreline from the southern tip at the power plant stretching for 1,811 m to the start of the existing revetment (**Figure 2-2**);
2. An accommodation camp would be established on Loi (north of Ebeye) (**Figure 2-3**). This camp would be temporary and would only exist for the timeframe of the works themselves. The camp would include the following facilities:
    a. ten accommodation buildings for up to 22 workers;
    b. two shower/ toilet buildings;
    c. one dry store;
    d. one laundry;
    e. one kitchen;
    f. one refrigerated container;
    g. five 10,000L water tanks, one water filter/ treatment unit, one reverse osmosis (RO) plant; and
    h. one diesel powered backup generator.
3. An area at South Ebeye Beach and breakwater would be required for the construction of a temporary Roll On/ Roll Off (RORO) loading facility. This includes reshaping and extending the breakwater by 25 m to allow all tide access for barges (**Figure 2-4**). Access from this area to the revetment works site would also be needed. See **Section 2.4.2** for further information;
4. Rocks or other similar materials would likely be stockpiled on the reef flat on the oceanside of Ebeye;
5. Ancillary sites (construction office, laydown stockpile sites, equipment storage etc.) would be located on Ebeye within the power station land (**Figure 2-5)** at the end of the rock wall including the following facilities:
    a. Four x 20 ft containers set up two each end to end a dome between them which would form workshop and storage areas;
    b. Two x 6x3m offices with a roof between them;
    c. Desalination unit with five x 10,000 L water tanks; and
    d. Fencing.

Please note that the Contractor has advised that preliminary discussions have taken place with landowners of the proposed temporary sites. Both the Kwajalein Atoll Joint Utilities Resources (KAJUR), who own the power station and surrounding area, and Kawa, who own land on Loi, have given their support for the temporary use of their land during the project.

[9] *Hall Contracting (2023), Preliminary construction method statement*

Figure 2-2: Proposed seawall alignment (in orange)[10]

Figure 2-3: Proposed unloading site and accommodation camp at Loi[11]

[10] *RHDHV (2024), Ebeye Coastal Protection Engineering Design and Construction Supervision, IFC Design Drawings, Rev C01, issued 8/4/24*
[11] *Hall Contracting (2023), Preliminary construction method statement*

Figure 2-4: Proposed RORO facility[12]

Figure 2-5: Proposed site office/ workshop[12]

Based on the information provided by the Contractor during and after the bid stage, the AOI has been refined and mapped (**Figure 2-6**) using a conservative approach. The following delineations have been developed to help determine the AOI (**Table 2-1**).

[12] *Hall Contracting (2023), Preliminary construction method statement*

Table 2-1: Delimitations of the AOI for ESIA/ESMP

Project Element	AOI
Loi and Causeway	A 30m radius around Loi and 20 m corridor along the causeway for workers commuting to site.
South Ebeye Beach and Breakwater	A 30m radius around the South Ebeye Beach and Breakwater for unloading
Ebeye Island	The entire island of Ebeye including the oceanside reef flat
Ebeye Revetment	A 20 m corridor either side of the 1,811 m long revetment

Figure 2-6: Current (conservative) AOI with project elements and other key locations shown (note: Ebeye Port, north Ebeye and PII facility not proposed to be utilized at this stage but are shown for completeness)

The final AOI would be updated and mapped in the C-ESMP once all Project sites have been confirmed by the Contractor and with local landholders.

2.2 Current Situation

The population of Ebeye grew rapidly when inhabitants of other islets in the Kwajalein Atoll were relocated there from 1944, to allow missile testing in the lagoon from the WWII military base. The population has continued to grow reaching approximately 12,000 people[13]. While the 2021 preliminary census indicates a population of 9,945 (RMI Preliminary Census Report 2021), the continued use of Kwajalein Islet by the US military (leased to 2066) indicates that Ebeye will continue to be densely inhabited for the foreseeable future.

The oceanside coast of the island is sporadically armored by a range of defensive type structures, ranging from an existing rock revetment along the northernmost 300 m to homemade seawalls of rocks and piled junk and scrap metal. The road passes close to the shoreline in two locations and storm water outlet wing wall structures, originally constructed on the coastal edge, are now located on the beach face indicating that shoreline erosion has occurred since 2004 (**Figure 2-7**) and is ongoing[14].

[13] *Kwajalein Impact Fund Portfolio Budget Statement, 2011*
[14] *2016, T&T Rapid Assessment of Coastal Hazards and Risks, Republic of the Marshall Islands Scoping Mission*

Figure 2-7: Erosion and failure of the storm water outlet[15]

The southern portion of the causeway comprises a substantial rock revetment extending from the Public Works Department on Ebeye (**Figure 2-8**) to the first island to the north (Lojjairok). This revetment, constructed in the late 1980s, is in good to average condition and whilst no flooding or damage was reported along this section in 2016[16], it is now starting to see some rock movement and wear in 2023/24. For example, the exposed coastal section of road on Ebeye is reportedly frequently closed during and following high wave events, when waves overtop the shoreline and rocks and debris are thrown onto the road.

Figure 2-8: Existing Revetment on Ebeye

[15] *Deltares (2016) Coastal Risk Assessment for Ebeye, Technical report 1230829-001, edition B*
[16] *2016, T&T Rapid Assessment of Coastal Hazards and Risks, Republic of the Marshall Islands Scoping Mission*

2.3 Scope of Works

The scope of works for the Project is to construct a coastal protection system along the oceanside of Ebeye.

2.3.1 Final Design – Rock Revetment

Since the engagement of the design consultant, originating from early concept studies, the development of the proposed seawall at Ebeye has undergone a number of required design and consultation stages to reach the final design. The well documented iterative design and consultation process has ensured that the development of a coastal protection system has occurred in line with client and community expectations and priorities.

The evolution of design from the Deltares (2016) report[17] has included extensive new documentation and consultation including the following:

- Final LOS Report[18]
- Concept Design Report[19]
- Multi Criteria Analysis (MCA) and two rounds of community consultation workshops
- Design Investigation Protocols (DIP)[20]
- Preliminary Design Report (PDR)[21]
- Recommended Semi-Final Designs[22]
- Physical modelling of Semi-Final Designs
- 90% Design Report[23]
- Issued for Bid (IFB) Design Report (Single and Two Phase)[24]
- IFC Final Design Report[25]

It should be noted that a design addendum is currently in progress to update the location and design of the stairs and ramps following earlier consultation rounds with the community and post-negotiations with the Contractor. In order to progress this ESIA/ ESMP, these changes have been incorporated into this document where possible, particularly **Section 2.3.3** and **Section 2.3.4**.

The final design is a rock revetment similar to the existing revetment located along the northern end of Ebeye. The IFC Final Design drawings below provide a typical cross section for the rock revetment (**Figure 2-9**).

[17] *Deltares (2016) Coastal Risk Assessment for Ebeye, Technical report 1230829-001, edition B*
[18] *RHDHV (2022), Ebeye Coastal Protection Engineering Design and Construction Supervision, Final Level Of Service report*
[19] *RHDHV (2021). Ebeye Coastal Protection Engineering Design and Construction Supervision, Concepts Phase report, issued 08/21*
[20] *RHDHV (2022), Ebeye Coastal Protection Engineering Design and Construction Supervision, Design Investigation Protocols Report, issued 18/01/22*
[21] *RHDHV (2022), Ebeye Coastal Protection Engineering Design and Construction Supervision, Preliminary Design Report (Deliverable 13), issued 26/5/22*
[22] *RHDHV (2022), D14 – Semi Final designs (3 recommended), RHDHV PA2048WMCO220413172, issued 12/5/22*
[23] *RHDHV (2022), Ebeye Coastal Protection Engineering Design and Construction Supervision, 90% Design Report (Deliverable 15), issued 4/10/22*
[24] *RHDHV (2023), Ebeye Coastal Protection Engineering Design and Construction Supervision, IFB Final Design Report (Deliverable 18), issued 26/5/23*
[25] *RHDHV (2024), Ebeye Coastal Protection Engineering Design and Construction Supervision, IFC Final Design Report (Deliverable 20), Rev 1, issued 8/4/24*

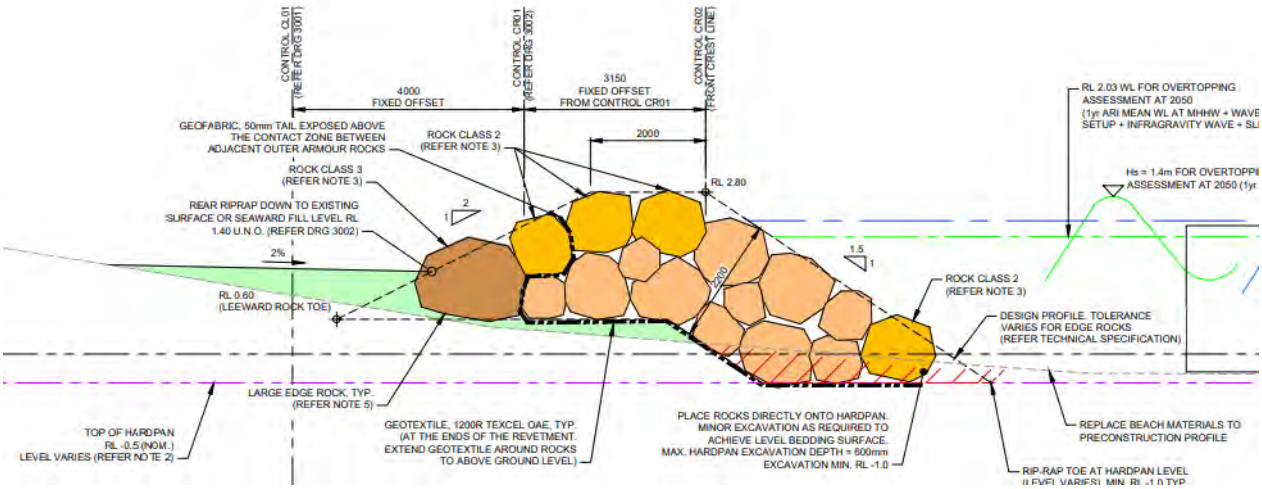


Figure 2-9: Typical cross section[26]

During construction, the rocks would be placed directly onto the reef flat, with possibly some minor excavation to achieve a level bedding surface. The crest of the rock revetment would sit at Reduced Level (RL) 2.8 m.

The alignment is 1,811 m long. This would provide protective cover for the Ebeye oceanside shoreline from the southernmost tip of Ebeye at the power station, to the southern end of the existing rock revetment at the northern end of the island (which would not be replaced as part of this Project).

The final alignment sits on the existing shoreline for most of its length. One of the driving design criteria for the alignment was to avoid any negative impacts to private property and to remain offset from the Weto boundary to the greatest extent technically feasible. The selected alignment has achieved this. The alignment pushes out on the ocean side for the rock revetment to accommodate the width of the structure.

A typical snapshot of the wall alignment relative to the property boundary is shown in **Figure 2-10.** This shows the rock revetment with engineered fill placed at the backend of the structure (green) (see **Section 2.3.2**). The alignment chainage CR02 runs along the seaward crest of the rock revetment and the property/ Weto boundary is shown (blue line). The red dash lines show the approximate extent of excavation to construct the wall. Boundaries have been provided by the client and are subject to confirmation by the Contractor as part of their pre-construction survey (**Section 2.4.8**).

[26] *RHDHV (2024), Ebeye Coastal Protection Engineering Design and Construction Supervision, IFC Design Drawings, Rev C01, issued 8/4/24*

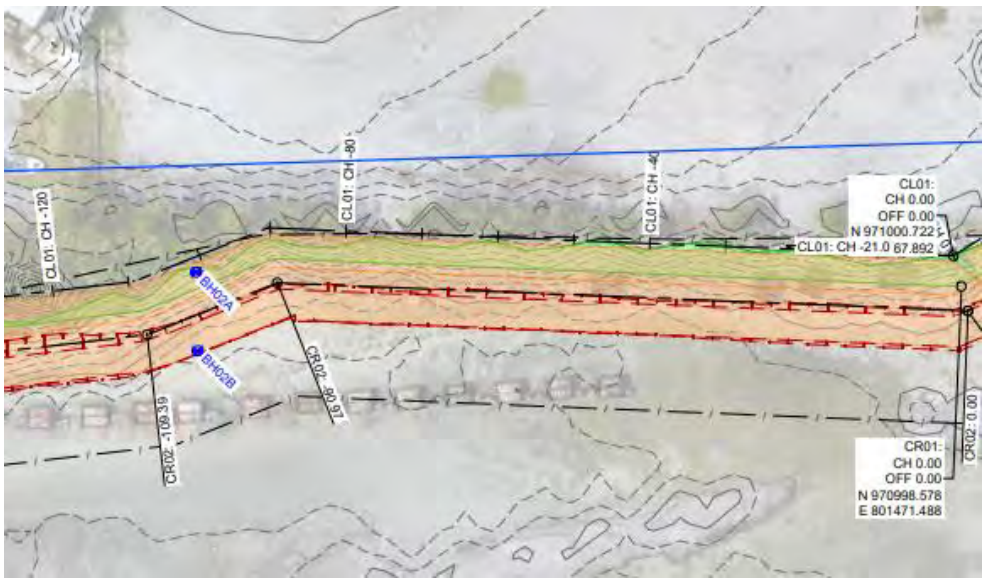


Figure 2-10: Typical Snapshot of Rock Revetment Alignment[27]

2.3.2 Infilling Behind Wall

Behind the revetment, infilling is needed to support the back of the structure and to provide all-tide access behind the structure along the full length. Fill levels are generally set in the design at +1.4m RL but is locally managed in some places along the wall in order to manage impacts on private properties. As shown in **Figure 2-11**, final fill levels and extent would be determined following the Contractor's survey.

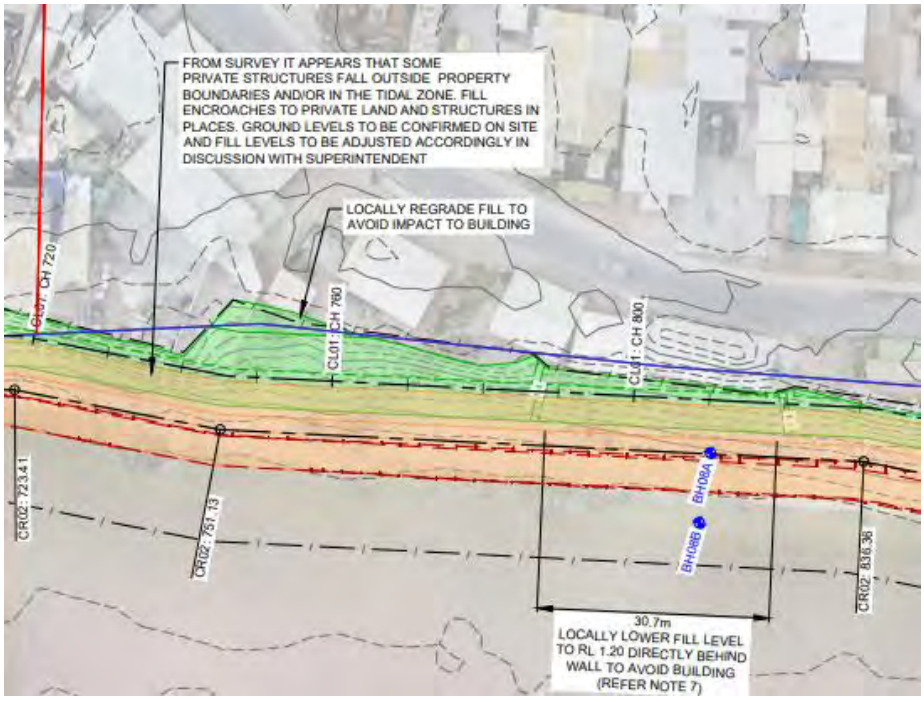


Figure 2-11: Drawing infilling and avoidance instructions (example)[27]

[27] *RHDHV (2024), Ebeye Coastal Protection Engineering Design and Construction Supervision, IFC Design Drawings, Rev C01, issued 8/4/24*

Fill to +1.4m RL is required to avoid having a moat behind the wall at high tide. The fill is specified and sloped to avoid encroachment beyond the seaward side of the walls of foreshore houses and to minimize the impact on drainage of rainfall runoff. The geometry of the walls and its' backfill would not exacerbate the flood impact of wave overtopping on private property.

2.3.3 Pedestrian Access

Access would be provided at five points along the rock revetment, with four sets of concrete stairs and one lapped revetment ramp. These access locations aim to align with existing access ways to the coastline to the greatest extent feasible and are based on feedback from consultation with the community. For example, one set of concrete stairs was moved to avoid providing access to the beach near a dangerous rip current. Stairs are specified with non-slip treatment and handrails.

2.3.4 Vehicle Access

Vehicle access has been provided at both the northern (**Figure 2-12**) and southern (**Figure 2-13)** ends of the revetment to enable the Department of Public Works to access the reef flat for maintenance of the structure. Pedestrian access to these ramps is also provided.

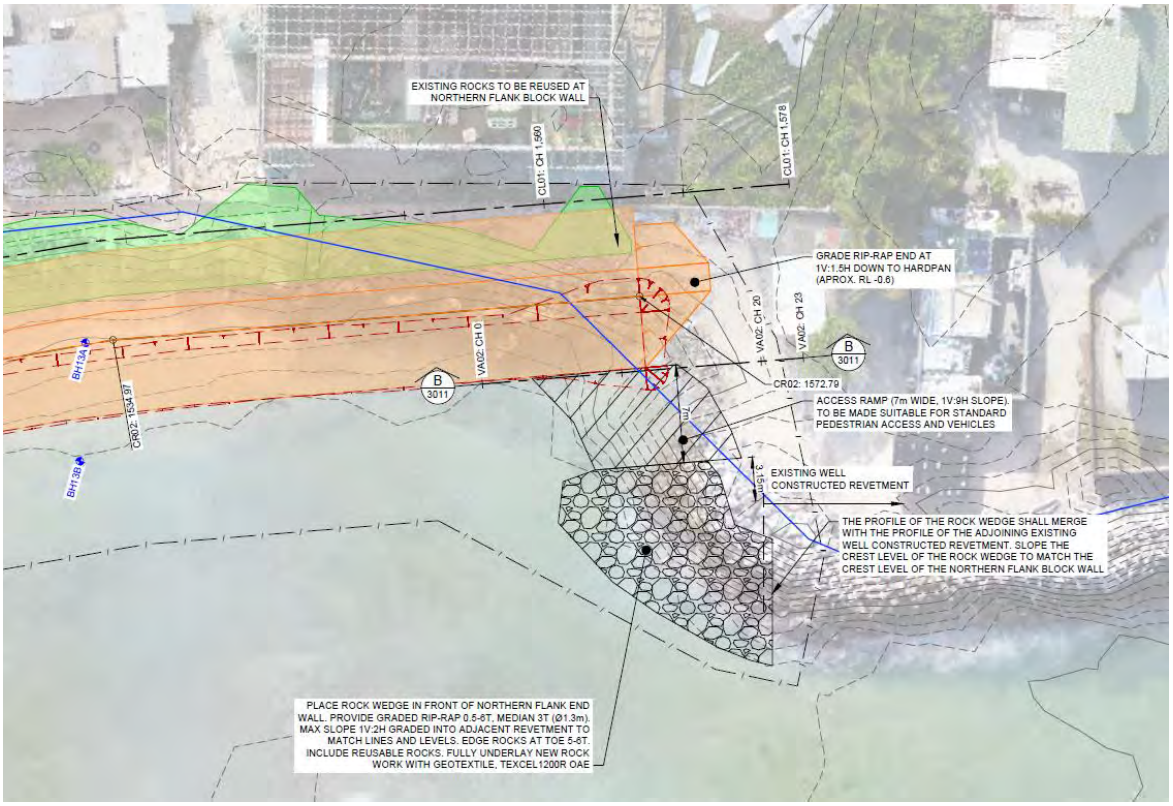


Figure 2-12: Vehicle Access Ramp at Northern End of Rock Revetment[28]

[28] *RHDHV, IFC Design Drawings, Rev C02, not yet issued*

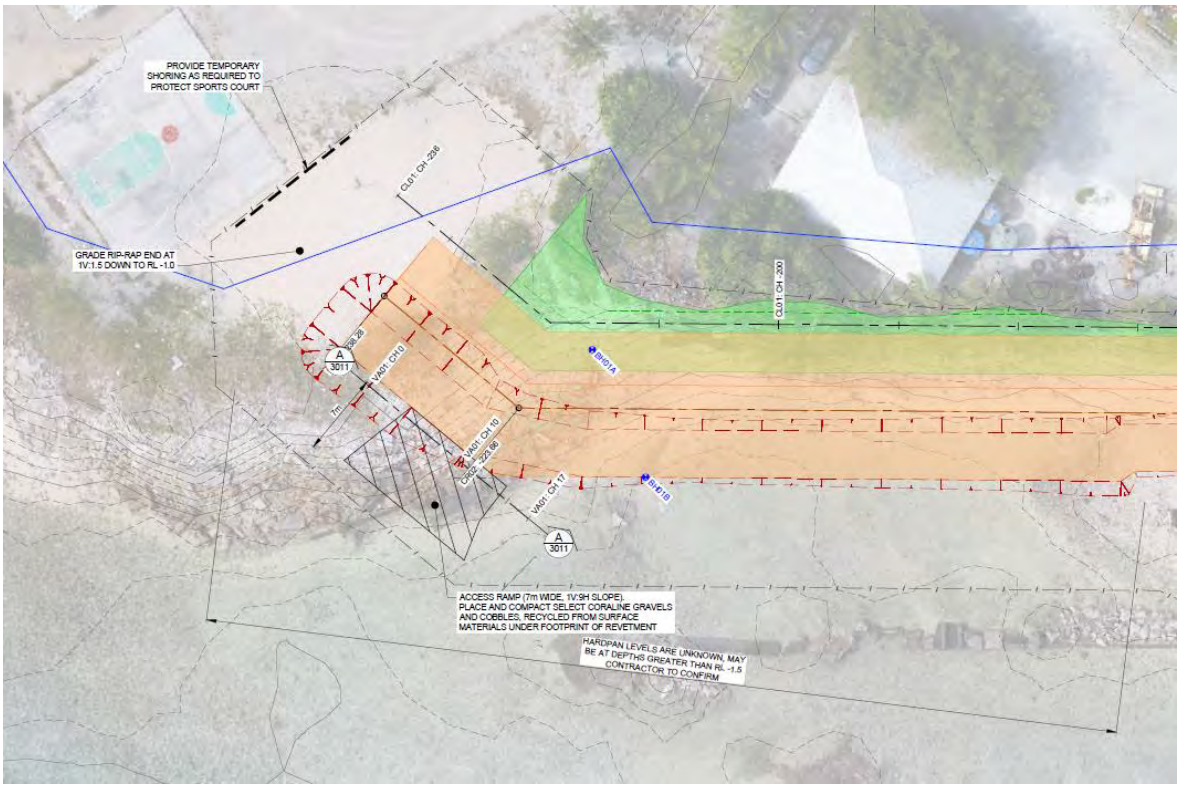


Figure 2-13: Vehicle Access Ramp at Southern End of Rock Revetment[29]

2.3.5 Drainage

Water behind the structure would be drained through the revetment as there is sufficient space between rocks to enable natural drainage with a geofabric layer in place (**Figure 2-14**).

Seven oversized polyethylene (PE) pipe sleeves have been included in the design in order to accommodate future drainage solutions from an Asian Development Bank (ADB) funded project to refurbish the existing road and associated roadside drainage. The sleeves would be capped at either end at this stage as a safety precaution. It should be noted, at the request of the client, no hydraulic or hydrologic assessment has been undertaken for the design of the PE sleeve and no assessment of the future discharge capacity of the road drainage pipe has been undertaken. The sleeves have simply been incorporated into the design to ensure that future drainage needs, based on previous road drainage designs from 1989, can be accommodated when those works are progressed.[30]

[29] *RHDHV, IFC Design Drawings, Rev C02, not yet issued*
[30] *RHDHV (2024), Incorporation of sleeves in the Ebeye coastal protection design, CA8 Technical Memorandum, Rev A, PA2048-RHD-CA8-CO-0001_RevA, issued 29/02/24*

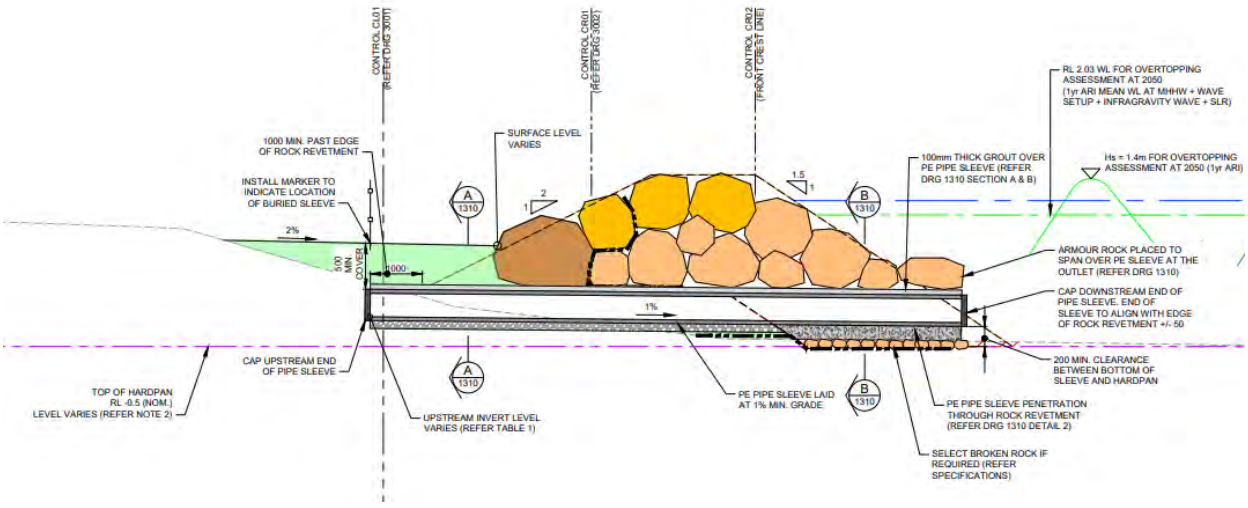


Figure 2-14: Cross section showing pipe sleeve through rock revetment[31]

2.4 Construction Methodology

2.4.1 General

The overarching construction consideration for this Project is that all materials are sourced from outside of RMI from sustainable sources. All equipment and machinery would be removed (after construction) from the island and all ancillary site assets and services would be returned in the same or better condition at the completion of the Project.

The Contactor has proposed that initial mobilization of the plant and equipment would be undertaken using a 45 tonne (t) bollard pull tug and two 1,000 t barges. The barges would be loaded in Townsville with the plant, equipment accommodation/ construction camp and initial material requirements. The two 1000 t barges would be dual towed by the tug directly to Kwajalein and initially moored in the lagoon adjacent to Ebeye. Any location of Aids to Navigations (ATONs) and anchoring of vessels will need to be agreed upon with Ebeye Port Control and the US Navy.

A workers accommodation camp on Loi, one of the Northern Islets, would be established first (see **Figure 2-3**), followed by a construction office, workshop and storage site on Ebeye within Power Station land adjacent to Ebeye's South Beach (see **Figure 2-5**). The existing breakwater seawall at the South Beach would be extended and turned into a Roll On/ Roll Off (RORO) unloading facility (see **Section 2.4.2**).

It is proposed that all the rock will be delivered utilizing specialized 44,000 dry weight tonnage (dwt) self-loading and unloading bulk carriers. The rock will be loaded at the port in Ras al Khaimah in the UAE and would be transported the 8,000 nautical miles (nm) to Kwajalein. Once in the lagoon, the two 1,000 t barges would be used to transport the rock material from the bulk carrier to the RORO facility at the Ebeye South Beach. Unloading from the barge would be carried out using a 60 t excavator, into 40 t all-wheel drive trucks.

[31] *RHDHV (2024), Ebeye Coastal Protection Engineering Design and Construction Supervision, IFC Design Drawings, Rev C01, issued 8/4/24*

The Contactor has proposed that the precast elements for access stairs and landings would be manufactured in Guam and would be delivered to site using a 2,000 t barge and tug. These blocks would be unloaded using a large capacity loader and 90 t excavator to pick and place the blocks.

All cement products would be procured from reputable suppliers in Australia and structural concrete aggregates would be procured from Guam in premixed bulker bags. These materials would be shipped to Ebeye with the precast units.

All steel reinforcement for concrete would be procured from reputable suppliers in New Zealand and Australia and would be accompanied by certification from the supplier.

The PREP II Resettlement Policy Framework confirms that the Kwajalein Atoll Development Authority (KADA), in consultation with MWIU, would allocate areas under its control, or otherwise work closely with local landowners to secure alternative sites for temporary work sites. Voluntary land access would be negotiated between KADA (in consultation with MWIU) on behalf of the Project and the landowner. Land would be fully restored before the end of the Project.

Hazardous materials encountered within the Contractor's Work Area would be removed and remediated by the Contractor or a specialist engaged by the Contractor as required, for example unexploded ordinance (UXO).

With regard UXO, the Contractor is required to undertake detection and removal of UXO prior to excavation works. It is noted that undertaking a UXO survey will be difficult prior to the clearance of waste, due to the large amount of metals currently found in the coastal zone. However, given the shallow nature of the sediment, how well traversed this site has been over the years and the corrosive nature of seawater, it is felt that the risk of UXO detonation should be limited. However, expert advice from a UXO Specialist should be sought to develop an UXO Plan as the design team are not specialists in this area.

Prior to the commencement of the works, the Contractor would undertake UXO identification training with all operators and spotters. This would allow them to identify any potential UXO's that may be buried with the existing material whilst undertaking the works.

The Contractor has undertaken early discussions with KAJUR who have indicated power supply (for construction) should be available. However, the Contractor has allowed for the installation of backup generations should this not be the case. A 45kVA generator has been allowed for the workers camp, though power draw is expected to be less than this.

2.4.2 RORO Facility

The Contractor has proposed extending the existing South Ebeye beach breakwater by 25 m for a RORO facility (see **Figure 2-4**). The extension would remain until project completion in mid-2026, or longer if requested by the client.

Establishing the proposed RORO facility would involve:

- Reprofiling of the existing rock wall using an excavator onshore to allow articulated dump trucks to drive over the top of the wall;
- Extending the rock wall by 25 m at the same profile with additional rock. At a high tide, a barge will be positioned beside the existing ramp and an excavator will push rock from the barge into the water to form this extension; and

- Erection of temporary fencing around the southern end of the family park area.

The access track from the ramp would extend around the southern end of the island until it reaches the end of the new wall location (see **Section 2.4.4**).

Prior to proceeding, the site would be approved by the Engineer, PIU/ CIU and RMIEPA following submission of underwater video footage of the surrounding reef area by the Contractor. PIU/ CIU and the Contractor would also need to obtain approval from relevant stakeholders as to the use of land adjacent to the BBQ area during the project. The Transportation Management Plan (TMP) and safety management plan would need to ensure that the public, particularly children, cannot access the area and be at risk from moving plant.

The breakwater would be reinstated to existing at the end of the project or left in place if requested by the client.

2.4.3 Haulage

Haulage would be a significant project activity as all material, plant and equipment required for construction would need to be imported. Significant levels of haulage would be needed to transport the rocks for the revetment. Estimations are provided below:

- A 40 t Articulated dump truck would be needed to move armor stone – 2,200 trips to site and similar number returning empty to the RORO at the Ebeye South Beach location.
- It would be expected that 13 t dump trucks would be needed for engineered fill resulting in 615 trips to site and similar number returning empty.
- A 13 t dump truck would be needed for excavation resulting in 135 trips from site and similar number returning empty.
- Total estimated truck movements for the design: 5,900 over the duration of the Project, which the contractor could expect to do anywhere from 50 – 200 trips per day depending on efficiency, turnaround time, number of trucks mobilized and the path of travel.

When planning the haulage schedule, the Contractor needs to be aware of the exceptional levels of pedestrian traffic at all times of day and night (as families tend to sleep in the overcrowded homes on a shift basis). For example, it is often the case that the children of households are out and about while the adults sleep.

A large proportion of the island's population is made up of children under the age of 10. These children, when not at school or in bed, are free to roam the streets and built-up areas of Ebeye and are, as such, often at risk to road traffic. They are inquisitive and not always aware of their surroundings and the risks that might be present, particularly at a young age. Children as young as 1 or 2 years of age were frequently seen walking the streets on their own and seemingly unsupervised; often wandering within existing construction sites and amongst the piles of waste and materials.

The presence of unsupervised children in such vast numbers quite clearly presents a major risk for any construction works on the island, both in terms of haulage and plant movements, and work/ storage sites. Any haulage route would need to be carefully planned to avoid built-up areas where possible. If this is unavoidable then extensive and well thought through mitigation and controls would be required.

During the fourth consultation (summarized in **Section 6.2.4**), it was discussed that the Contractor should also consider ways in which to encourage children to the atoll side during the works. This might include,

for example, temporary play parks and water parks on the western side for use in working hours. This can be explored further by the Contractor as appropriate.

The built-up areas of Ebeye, and in particular the Ebeye town commercial center, are areas of particular sensitivity. If it is intended that these areas are used as part of haulage routes, the Contractor would need to prepare a comprehensive TMP. The TMP would need approval by KADA, KAJUR, Kwajalein Atoll Local Government (KALGOV), RMI Environmental Protection Authority (RMIEPA), Local Police and National Police, with input from stakeholders including RMI Port Authority (RMIPA), Stevedores National Telecommunications Authority (NTA), local businesses and the local community.

During the operational phase, there would need to be close liaison with by KADA, KAJUR, KALGOV, RMIEPA, Local Police and National Police and Ebeye Leadership.

The proposed RORO facility at Ebeye South Beach and the location of the construction office/ workshop within the Power Station adjacent to the RORO facility removes reliance on existing roads for haulage, with a proposed temporary access/ haul road to be constructed in the intertidal zone (see section below) along the seaward edge of the wall alignment. Local roads would therefore only be used for transport of general goods and services (i.e. food and supplies), and for workers to commute along the causeway from the accommodation camp at Loi to Ebeye.

2.4.4 Temporary Access/ Haul Road

The Contractor has proposed that a temporary access/ haul road would be constructed along the seaward edge of the wall alignment. This would be constructed with 150 mm rock, which would be re-used at the end of the project as backfill to the wall once it is completed. This road would be 5m wide, and 0.5 m thick. If any settlement of the road occurs during initial use, the Contractor would top up with additional material or reshape as needed to provide a suitable platform.

The temporary access road would be protected from any coastal/ wave effects by placing armor rock in temporary wind rows on the outside of the access road for the length of the wall (**Figure 2-15**). Once a section of wall is excavated and prepared the rock would be taken from the wind row and placed on the adjacent section of wall. This would be done when there is no risk from coastal/ wave inundation.

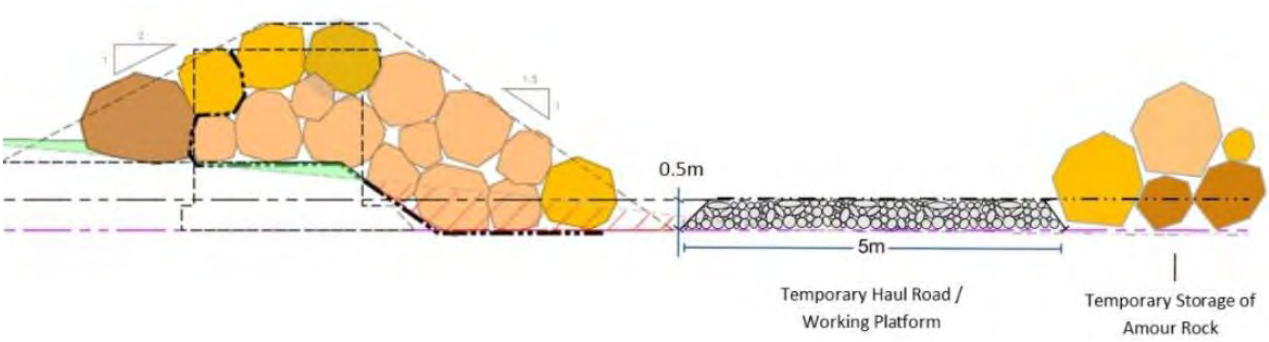


Figure 2-15: Contractor's Concept for Temporary Access Road and Armor Rock[32]

Construction plant would also access the works from within the footprint of the structure and the maintenance corridor as this is filled and partly constructed. Except for early transport of deliveries made through Ebeye Port, the Contractor has proposed that movements of trucks and plant through the streets of Ebeye would be kept to an absolute minimum and be subject to management measures as stipulated in

[32] *Hall Contracting (2023), Preliminary construction method statement*

the ESMP through a TMP. Note that use of the port for construction purposes is to also be minimized to prevent undue constraints and impacts on normal day-to-day island activities (such as food deliveries).

The Contractor has proposed that no support is to be provided for temporary batters/ excavation during the works as the maximum slope would be 1:1.5 and would only be exposed during short windows. The extents of the excavation would be marked prior to the works commencing. A full dilapidation survey would be undertaken to confirm the existing condition and any risks associated with adjacent property/structures. If any additional support/protection is required, this would be ascertained/ implemented prior to works commencing.

It is assumed that all excavation work below MSL would be undertaken at low tide and dewatering is not used[33].

Temporary construction fencing would be constructed around active construction work areas on the oceanside foreshore running along the property boundaries. Fencing would be moved with the build, but active works areas would always be fenced. Temporary gates for contractor access and managed public access would be provided every 50 m. No fence would be provided along the oceanside of the temporary access road. The base work zones (site compounds) would be fully protected by man-proof temporary fencing and security measures for the work zones would be, as requested, determined in consultation with the Ebeye community and police force.

Clear signage would highlight danger zones and clearways, as well as road conditions when trucks may be travelling along the roads during operational hours. Road and site safety training would be provided to relevant parties, including school children so they will keep away from site operations.

2.4.5 Demolition and Earthworks

Demolition and earthworks would be undertaken using suitably large 45 t excavators. It is feasible that three or four such plant would be required to carry out the work. They would work along a 250 m section of the wall at a time to allow for quality assurance and sign-off.

It is estimated that around 500 t of materials may need to be demolished. Demolition shall only be undertaken to the extent required to allow construction of works. The extent of demolition shall include that determined from final Drawings and the Contractor's Pre-Condition Survey (**Section 2.4.8**). Items identified for demolition as part of the Works include:

- Steel debris including old vehicles, plant and armament wrecks;
- Storm water outlets;
- Potentially private structures that cross seaward of the surveyed Weto/property boundary that may need to be removed to enable construction of the Works based on final design drawings;
- Miscellaneous structures used to provide coastal protection including rock structures, fences and retaining works, concrete walls, demolished concrete slabs, beams, stonework and asphaltic debris;
- Existing steel boxes/ crates at the southern end of the island; and
- The existing revetment at the north end of the works only to the extent to enable construction of the new rock revetment.

[33] *Note that the predicted astronomical tide level will be below MSL 50% of the time while the predicted astronomical tide level will be at or below MLW (or -0.53m MSL) for between approximately 5-10% of the time. This can be compared with the average percentages of the total excavation for the shoreline structure design below MSL and below MLW equating to approximately 33% and 7% respectively.*

Demolition shall be undertaken in a careful manner, with a minimum of disturbance and prevention of damage to property and the environment or injury to personnel.

Earthworks include excavation, filling and construction of drainage works. Based on an assumed temporary batter slope of 1:1.5, a total of approximately 5,300m^3 and 2,100m^3 of excavation is required to construct the rock revetment.

All demolished and excavated materials which are not suitable for reuse are to be removed from RMI, such as steel debris. The scrap steel would be loaded into the back of the truck and taken to the southern end of the island to be stored on the hard pan at an agreed location. When all scrap steel and rubbish has been removed from the work site it would be loaded onto a barge to be taken away to an offshore recycling facility in Papua New Guinea (PNG) that is approved/ regulated.

Suitably sized concrete debris may be buried behind the coastal protection structure within the finished profile for the maintenance corridor on the condition that it does not interfere with the compaction of and drainage through the fill. The Contractor would assume full responsibility for the demolition and excavation design and the approved disposal of demolished materials.

A contractor's method statement would be required in order to identify demolished materials to be reused in the Works.

Once the area has been cleared of scrap and rubbish, the Contractor has proposed using 45 t excavators to work along a 250m section of the wall and excavate the foundation to the RL required.

2.4.6 Wall Construction

Rock work comprises the supply and placement of acceptable limestone rocks given their cost-effectiveness, resource sustainability and general availability in the Pacific, although alternative rock types were also considered. Specific material acceptance requirements would be met for the rock including minimum density, strength and durability against breakdown in the marine environment. A total of approximately 42,000 t of riprap rock is required for the revetment design comprising widely graded 0.5-6 T rocks with median size of 3 t. Suitable rocks excavated from the site would be reused in the works. The excavated surface would provide for the revetment placement of approximately 25 t rock per linear meter of structure, sloping at 1:1.5 (v:h) from the toe seated directly on the hardpan, up to the crest at RL 2.8. The crest would be typically two rocks wide depending on rock size. To guard against excessive damage in severe storms, edge rocks at the toe and landward margin behind the crest would comprise 5 to 6 t units.

It is expected that rock would be placed by excavator, commencing at the toe and proceeding upwards towards the crest. The rock would be placed to achieve an even distribution of rock sizes without concentrations of smaller rock. Attention would be paid to the manner in which the rocks are placed such that abrasion and fracturing of materials is minimized through handling. The revetment must achieve a fully interlocked placement where rocks are wedged and locked together and cannot be moved without disturbing adjacent rocks.

The Contractor would provide detailed information on their rock sourcing and require that this is approved at least one week before any rock is procured. This information would include:

- Details of the quarry source;

- For aggregates sourced from a Part 2[34] Country, the Contractor would provide relevant documentation and other evidence to show aggregates are sourced from a licensed quarry(ies) and that proper regulation of the. This not required for aggregates sourced from a Part 1[35] Country;
- Test reports; and
- Details of the Contractor's quality control procedures.

The Contractor would also provide details of coastal projects where the rock has been used previously and its known performance. If the rock does not meet the specification, it would be rejected by the Engineer.

A high-level outline of Contractor's proposed construction methodology for the rock revetment is as follows:

- **Main material arrival and placement -** It is proposed that the main rock material would arrive by ship that would be anchored in the lagoon. The material would then be transferred from ship to shore via a smaller barge that would land at the RORO facility at Ebeye's South Beach. This material would be staged here during high tide unloading and when waiting for trucks and would be directly loaded to trucks during mid tide and below. These trucks would access the reef flat at the temporary access road at the Southern end of the wall and stage the material along the alignment. They would not use roads on the main portion of Ebeye for this transport.
- **Rock wall construction -** The Contractor has proposed that the wall construction will commence from the northern end of the project and work sequentially south. The large excavator would be elevated on the temporary access road behind the armor rock. This allows the excavator to continue working during the high tide protected from significant wave action most of the time. From this elevated position the large excavator can construct the main wall through most operating conditions. The excavator would be supported at lower tide by trucks that can bring more material or take excess material away as the revetment works progress. After the main portion of the rock wall has been constructed by the large excavator, a smaller excavator would be used at the top of the wall and behind it within the maintenance corridor to do final trimming of the revetment profile and placing of the general fill materials. As the fill materials are much smaller in volume than the primary revetment materials, there would be room for these to be stockpiled in the corridor between the wall and the foreshore properties. This process continues progressively for the main rock wall but may have some staging of the works behind the wall as some of these smaller sized materials would be recycled from the main construction to fill behind some main wall sections. Once the precast elements for the concrete stairs have been put in place, the temporary access track will be excavated/ removed. The Contractor has proposed to place this material behind the rock as backfill to the levels detailed on the IFC drawings.
- **Post construction -** The site would be remediated and most equipment would be removed with the potential to sell some equipment to Ebeye subject to project sign-off. In addition, the RORO facility would be left for island use.

2.4.7 Pre-Construction Assessment

A preconstruction condition assessment would be undertaken by the Contractor as an initial task. These assessments would be:

[34] *Part 2 Countries are Developing Countries as per World Bank listing*
[35] *Part 1 Countries are Developed Countries as per World Bank listing*

- Dilapidation survey of all structural components which may be affected by the works including but not limited to all buildings, roads, footpaths and services located within 10 m of the Contractor's Work Areas; and
- Comprehensive photographic record and/or video record, including commentary, covering all areas that may be affected by the Works. This shall include all vegetated areas, gravel paths and the like. The photographic record shall be completed by the Contractor in the company of the Engineer.

The pre-condition assessments shall be replicated prior to practical completion to confirm the post construction condition and ensure the site has been appropriately reinstated.

2.4.8 Pre-Construction Survey

A pre-construction survey shall cover the works area, contractor's compound, stockpile locations, haulage access points and any other part of the site that may be impacted by the Contractor's construction activities. Pre-Construction Survey shall extend along the full length of the coastal protection works and extend a minimum of 10 m from the boundary of the Contractor's Work Areas and as a minimum capture the following details within works areas:

- Weto/property boundaries and fence lines;
- Hardpan, beach and foreshore levels;
- Fencing and access ways;
- Building outer wall and other private structures;
- Existing vegetation line including individual trees with trunks greater than 300mm or height greater than 5m;
- Roadways;
- Ports;
- Drainage elements including pits, gutters, pipes, headwalls and the like;
- Location of other services;
- Reef outcrops protruding above the beach and foreshore;
- Cemeteries and other burial sites; and
- Metal, concrete and other items and debris to be demolished.

3 Analysis of Alternatives

3.1 Introduction

The primary objective of the Ebeye seawall Project is to design and construct climate resilient shoreline infrastructure along the oceanside of Ebeye island.[36]. This section examines the technically and financially feasible alternatives that were available and / or explored to help achieve that objective. These alternatives were considered during the design development phase and have led to the validation of the Project as it is described in **Section 2**.

Decisions taken in consultation with the Ebeye stakeholders and community have significantly influenced the proposed seawall alignment and designs. This section refers to consideration of alternatives and is structured to follow a narrowing approach involving a series of logical steps, starting with the high-level alternatives followed by a description of more detailed alternatives considered as part of the Project. Using this commonly adopted narrowing approach, the analysis of alternatives considers alternatives in the following sequence:

- The 'No Project' option;
- Alternative alignments; and
- Alternative designs.

An analysis of alternative haulage routes has also been included in this section.

3.2 The 'No Project' Option

The 'No Project' alternative for the purposes of this ESIA/ESMP is the situation where the construction of any coastal defense structure on Ebeye's oceanside does not proceed.

Deltares[37] (2017) undertook a coastal hazard risk assessment to inform the initial development of the Project. The risk assessment looked at the combined effect of flooding and coastal inundation under current sea level and predicted future sea level rise (SLR). This risk assessment was updated by Deltares in 2021 based on new LiDAR survey data.

The updated findings by Deltares (**Figure 3-1**) show the inundation maps for Ebeye based on swell waves with a 10-year return period. The same map is also generated for a SLR following an RCP 8.5 (high emission) scenario in 2100.[38]

[36] *PREP II Integrated Safeguards Data Sheet, Feb 2020*
[37] *Deltares (2016) Coastal Risk Assessment for Ebeye, Technical report 1230829-001, edition B*
[38] *CSIRO 2014, Climate Variability, extremes and change in the Western Tropical Pacific: New Science and Updated Country Reports 2014.*

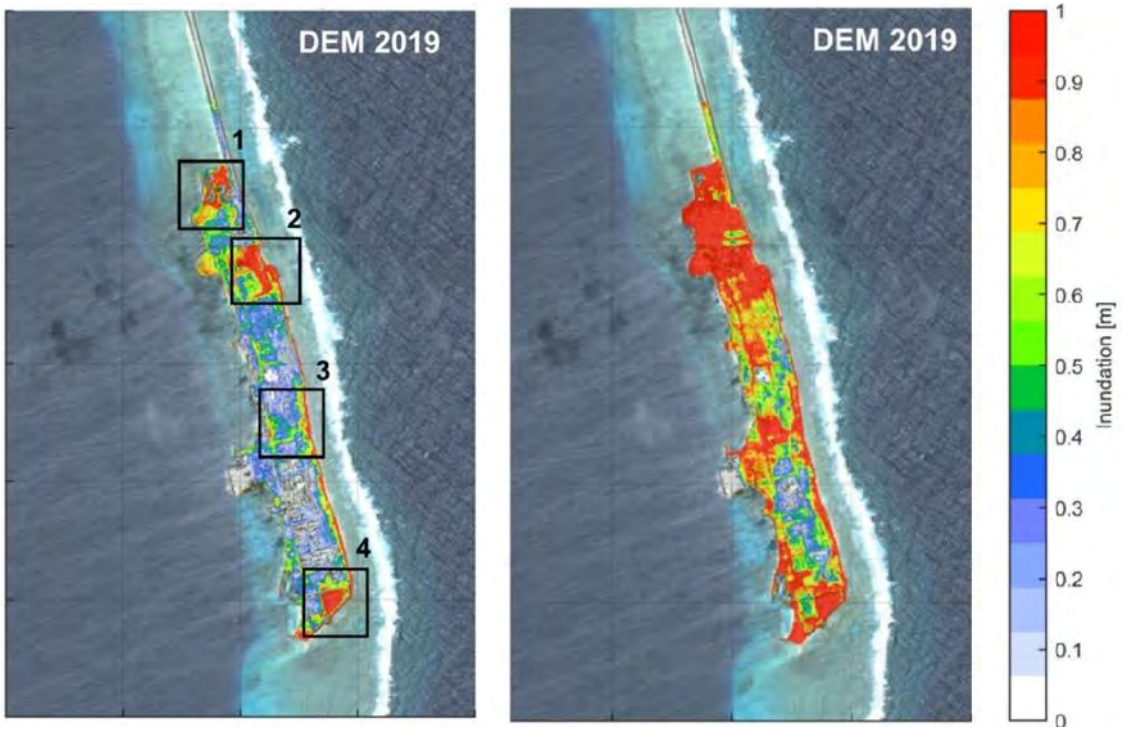


Figure 3-1: Maximum inundation modelled with a return period of 10 years for the 'No Project' option (Note – taken at existing sea levels (left) and for sea level rise RCP8.5 in 2100 (right). Adapted from Deltares (2021)[39])

Table 3-1 describes the impact of swell waves as a percent (%) of island area inundated for a flood depth threshold of 20cm and 50cm respectively in the 'No Project'.

Table 3-1: Percentage maximum of island inundation (>20cm and >50cm) (Note - for swell waves and return periods of 5, 10, 30 and 50 years at varying SLR levels. Adapted from Deltares (2021)[39])

RP [yr]	Current sea level **SLR = 0m**	RCP 4.5: 2030 **SLR=0.12m**	RCP 4.5: 2050 **SLR=0.23m**	RCP 4.5: 2100 **SLR=0.53m**	RCP 8.5: 2030 **SLR= 0.13m**	RCP 8.5: 2050 **SLR=0.26m**	RCP 8.5: 2100 **SLR=0.78m**
Percentage of island inundation greater than **20cm**							
5	63.6	71.7	77.5	87.6	72.2	78.9	91.5
10	68.5	75.7	80.6	88.9	76.0	81.9	92.0
30	75.3	80.0	84.4	90.3	81.0	85.3	92.6
50	78.1	82.7	85.6	90.8	83.0	86.5	92.8
Percentage of island inundation greater than **50cm**							
5	27.8	35.7	45.7	71.0	36.6	48.9	83.2
10	31.7	41.7	52.3	74.8	42.2	55.2	85.1
30	39.5	50.5	60.2	79.4	51.4	62.4	87.3
50	43.5	54.9	62.8	81.2	55.8	65.2	88.2

[39] *Deltares (2021), Coastal Risk Assessment for Ebeye, Update based on 2019 LiDAR elevation data, 11205176-002-ZKS-0004, 29/9/21*

Furthermore, Deltares calculated oceanside coastal storm driven retreat based on latest LiDAR data, XBeach modelling and transects perpendicular to the shoreline. These calculations showed that, with no seawall structure, storm drive coastal erosion could reach 10m of retreat inland. Added to this is their estimated structural (SLR driven) shoreline retreat of up to 3.5m along the oceanside.

The above data shows that the 'No Project' option will result in increasing levels of inundation of Ebeye during storm events projecting into the future. This option does not provide any protection or increased resilience of the island or the communities and actually increases risk and reduced resilience. Based on this data, the 'No Project' option is not considered a viable alternative.

3.3 Analysis of alternative coverage

During the risk assessment of coastal hazards undertaken by Deltares on Ebeye, several 'hot spots' were identified as potential areas for priority intervention should a full-length seawall not be the selected as the preferred option. The original hot spots defined in the report were updated based on the 2019 LiDAR data. The two hot spots defined by Deltares in 2016[40] (regions 2 and 3 in **Figure 3-1**) are still hot spots in the updated analysis (2021)[41]. Coastal risk at these spots are, however, increased for the updated model. Additionally, based on the LiDAR data, there are two additional areas defined as hot spots (regions 1 and 4 in **Figure 3-1**). All four hot spots are at high risk due to both large inundation depths and high exposure.

The original Deltares report assessment included coastal protection options for two different hot spot-based approaches (**Figure 3-2**). Following the text in the Deltares report, we will refer to these two approaches as 'hot spot only' and 'part of Ebeye'. They are shown in **Figure 3-2**. It is important to note that in the updated Deltares (2021)[41] report, the coastal defense options were not remodelled based on the correct land level (LiDAR) or the increase of the hotspots from 2 to 4.

Figure 3-2: 2017 proposed location for hot spot only (left) and part of Ebeye (right) Source: Deltares (2016)[40]

[40] *Deltares (2016) Coastal Risk Assessment for Ebeye, Technical report 1230829-001, edition B*
[41] *Deltares (2021). Coastal Risk Assessment for Ebeye, Update based on 2019 LiDAR elevation data, 11205176-002-ZKS-0004, 29/9/21*

Deltares (2016)[42] states that constructing a revetment at the outdated hot spot locations on Ebeye is more cost effective than constructing a revetment at the hotspot location in the central part of the island (part of Ebeye approach). The report goes on to state that a possible downside of constructing a location revetment, as proposed is that the water level in front of and next to the revetment increases. It further states that while the options in **Figure 3-2** are the most cost effective (compared to full protection of Ebeye), from an engineering point of view, it may not be possible to construct the revetment exactly (and only) at these locations. Moreover, it states, this may lead to side effects (i.e. localized flanking erosion at the site of the revetment).

The updated assessment (Deltares 2021)[43] does not explore the impacts of the lower land level and, therefore, the increased number of hot stops on the two revetment options in **Figure 3-2** other than to say "some more flooding is expected to occur in the southern tip of the island and in the north, because of the lower island elevation". The report then goes on to recommend that if the "entire ocean side and southern tip are protected by the planned coastal revetment, it is expected that flooding will be largely reduced at this location".

The Designer and this ESIA/ESMP agree with the recommendation of Deltares (2021)[43] that the protection of the entire oceanside and southern tip is the preferred option and that protecting only hot spot areas has a strong risk of flanking erosion along adjacent inhabited and vulnerable sections of coastline. It is the opinion of the design consultant that the entire coastline of Ebeye is vulnerable and the concept of 'hot spots' is a misnomer leading to assumptions that other areas do not require as urgent protection.

In addition to this, the Project development objective of providing climate resilient shoreline protection is not achieved under this approach due to the localized flanking erosion and the reduced protection from inundation along the island's length.

Furthermore, the strong commentary from the Ebeye community, leaders, government, and other stakeholders set the expectation that the entire coastline should be protected, there are no sections which are more 'valuable' than others from a cultural perspective and the perception of equitable distribution of benefit from the intervention is lost if the entire coastline is not protected.

This alternative of protecting hotspots only was rejected as a suitable option early in the design process and has not been further investigated due the reasons described above.

3.4 Alternative Seawall Designs

The process to reach the design detailed in **Section 2** of this report has been thorough and has encouraged community participation, as well as ensuring that the findings from iterative environmental and social screening have been taken into account. The design selection and development process has been described extensively in the design documentation (refer to the IFC Final Design Report[44] and previous design reports) and is summarized below.

3.4.1 Ten Concepts to Five Design Options

Initially, ten concept options for the coastal protection structure were selected for multi-criteria analysis (MCA). The ten concepts were developed following deliberations from the Community Participatory

[42] *Deltares (2016) Coastal Risk Assessment for Ebeye, Technical report 1230829-001, edition B*
[43] *Deltares (2021), Coastal Risk Assessment for Ebeye, Update based on 2019 LiDAR elevation data, 11205176-002-ZKS-0004, 29/9/21*
[44] *RHDHV (2024), Ebeye Coastal Protection Engineering Design and Construction Supervision IFC Final Design Report, Rev 1, issued 8/4/2024*

Planning Workshop 1 held in May 2021, RHDHV's assessment of coastal processes operating at the site and its international coastal engineering experience with the design of coastal protection structures. The types of structure selected involve a range of materials and construction methods including rock, artificial armor units, concrete walls and tie back anchors.

The MCA of the 10 concept designs was completed in an internal workshop involving the RHDHV Engineering and Safeguards teams plus RMI PIU/CIU, KADA, KALGOV and MWIU, which produced indicative rankings for the 10 concepts. Six (6) shoreline structures and four (4) structures located on the reef flat were selected for the MCA. The indicative rankings were taken to Community Workshop 2 for further consultation and reappraisal as necessary. Community Workshop 2, which was completed over 2 days at Ebeye, validated the rankings of the 10 concepts and recommended the top 4 to 5 concepts.

In summarizing, the five options that were considered during the Preliminary Design Report (PDR)[45] and assessed for suitability as the final semi-final designs were as follows:

- **S1: Shoreline Concrete Cubes**: a modified version of the Deltares (2016) reference design, comprising a 1:1.5 sloped concrete cube (single layer) revetment backed by a concrete wave wall.
- **S3: Concrete block shoreline structure**: concrete hollow blocks keyed together and infilled with lean concrete to form a monolithic vertical seawall.
- **S5: Shoreline Seabee**: a 1:1.5 sloped Seabee revetment backed by a concrete wave wall.
- **S6: Shoreline tetrapod's**: 1:1.5 sloped revetment comprising two (2) layers of tetrapod concrete armor units backed by a concrete wave wall.
- **RF3A: Reef flat breakwater and shoreline revetment**: combination of a reef flat concrete block breakwater and shoreline riprap revetment (at 1:1.5 slope).

3.4.2 Five Options to Three Recommended

All of the PDR design options (above) would follow the same coastal defense system alignment along the shoreline, all of which lies outside of the existing property boundaries to eliminate the need for relocation of houses and structures. Each of the options would have a physical footprint range between 38,192m^2 and 39,928m^2 (i.e. a marginal difference when under consideration). Option RF3A also had a footprint which extended out onto the hardpan, with an offshore structure which aimed to break-up wave energy before reaching the main concrete block sea wall.

All options had the same number of access points which are spaced every 200m along the alignment, including an all-ability access which would be a 1:14 sloped ramped structure (and landings in accordance with AS1428.1). Following Value engineering discussions, vehicle access was also required on the northern end of the island to allow a front-end loader (or similar) to access the hard pan.

All options had appropriate and very similar drainage systems and outlets, as well as a maintenance corridor. Subsequent value engineering sessions identified that removing the majority of the maintenance corridor or changing the pavement that is proposed part of the of the concrete maintenance corridor could be one of the ways to reduce the cost to construct the Project.

For four of the options, there were no significant environmental or social factors which differentiated the preliminary designs at the shoreline in terms of their negative or positive impacts at this stage.

[45] *RHDHV (2022). Ebeye Coastal Protection Engineering Design and Construction Supervision, Preliminary Design Report (Deliverable 13), issued 26 May 2022*

All options would have similar environmental impacts on the local setting, such as the loss of the existing small beaches and bays but all would offer enhanced protection of properties and livelihoods. Seabreeze “wind shadowing” had been modelled for all structures, with all of them having a height of between 3m and 3.6m.

All five design options reviewed during preliminary design had been identified as being significantly over the current construction budget and, as such, the potential for the staging of works and the value engineering process became exceptionally important in the journey to selecting the semi-final designs to go forward with.

Following the value engineering sessions and through further cost and design assessments, the client and design team were able to identify a number of criteria which would best allow for the eventual selection of the semi-final options. These criteria included the following:

1) Does the option have an ability to allow for staging / phasing of construction, including for future additional funding which might allow for the expansion of the coastal defense system at a later date?
2) Does the option have an ability to be constructed, within (or as close to as possible) an acceptable price range to that of the current construction budget for the work (USD $35,492,500.00)?
3) Does the option have flexibility in construction methodology? Such as the ability to minimize the amount of work undertaken on the island (i.e. modular approach).
4) Being significantly different, which was part of the Terms of Reference (TOR) requirements.
5) Ability to meet the documented LOS.

Using the above criteria, there were three options which best met the Project TOR and LOS. These three options were progressed to physical modelling in the wave tank.

Modified RF3A Option (rock revetment)

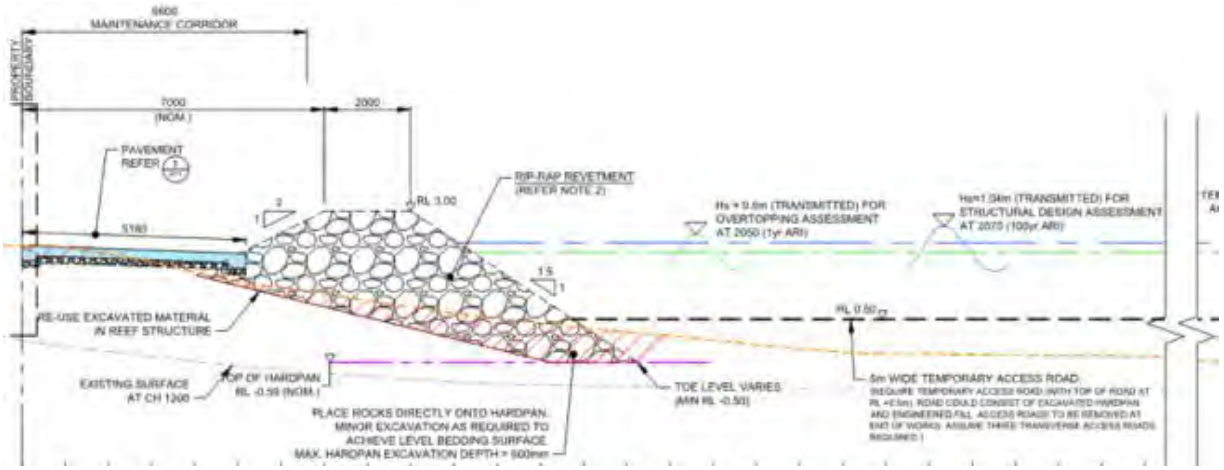


Figure 3-3: Modified RF3A (rock revetment)

The original RF3A described above was at the higher end of the cost range. During further investigations, the PREP II CIU/PIU team proposed to RHDHV that modifying the RF3A option (by removing the reef flat breakwater and making the rip rap revetment higher and better suited to absorbing all the wave energy by itself) could offer significant cost savings. A ‘modified’ RF3A means reduced precast elements, with the majority of the Project built on site, with more familiar maintenance practices for the future. The increase in onsite work does increase the risk of the Project in terms of program extension (and subsequently cost),

but the onsite work for this option is considered the easiest of all the options. In terms of adaptability, the revetment could be made higher by placing additional armor stone (of an appropriate size) on top and widening the overall revetment.

S3 Option (mass concrete block wall with either 2 or 3 blocks)

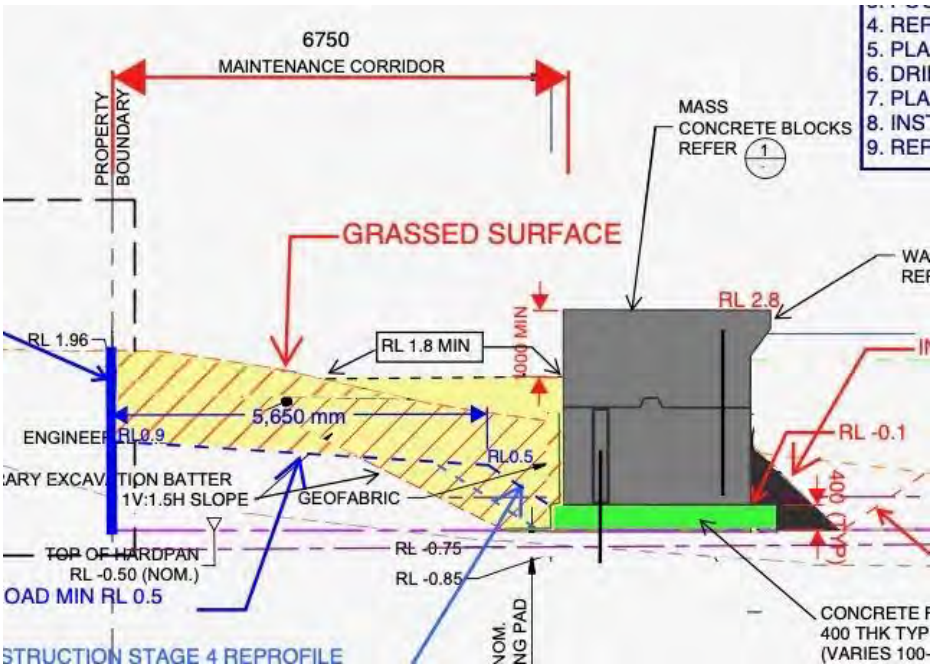


Figure 3-4: S3 (mass concrete block wall, 2 blocks high)

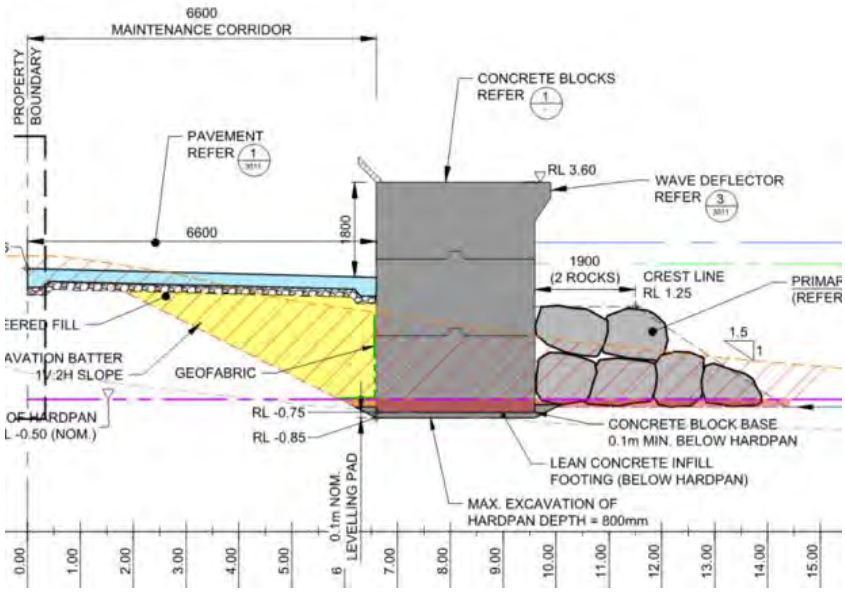


Figure 3-5: S3 (mass concrete block wall, 3 blocks high)

S3 was the second cheapest of the designs and was considered the most adaptable option. In addition, the majority of design elements could be precast including the mass concrete blocks that made up most of the seawall.

The 3-block option met the LOS, however the cheaper, shorter 2 block option would have required adjustment of the LOS.

3.4.3 Physical Modelling to Two Options

Physical wave modelling was carried out in three stages for the three structures proposed above as follows:

- Stage 1 modelled the full profile wave and water level processes without any structures in order to provide a reliable (slightly conservative) estimate of the existing dynamic reef top wave and water level conditions;
- Stage 2 looked at nearshore reef-top wave/structure model with the structures in place; and
- Stage 3 looked at effectiveness of alternative coastal engineer structures including breakwater and rock bags.

The findings of the Stage 1 testing led to Stage 2 and 3 testing being undertaking for the narrow reef flat width (110m) only since this was associated with slightly higher waves along the shoreline.

Stages 2 and 3 tests included assessment of the overtopping performance and armor stability of the following coastal protection arrangements:

- Vertical wall with deflector, with crest levels ranging from +2.55m RL to 3.6m RL and presence of rock or concrete toe apron;
- Sloping revetment with a rock armor and crest levels ranging from +2.5m RL to +3.0m RL;
- Sloping revetment with tetrapods and +2.7m RL;
- Influence of maintenance corridor levels on structure stability (+0.8m RL or 1.8m RL); and
- Overtopping reduction from installation of a breakwater 30m offshore.

In total, 10 overtopping performance tests were conducted for 4 vertical seawall configurations and 3 rock revetment configurations. The key findings of the tests showed:

- Lowering of the concrete vertical wall from + 3.6m RL to + 2.8m RL resulted in an increase in average overtopping rate from 1 L/s/m to 17 L/s/m and up to 33 L/s/m for 2.55m RL crest heigh;
- Overtopping rates on rock revetment structure were observed to increase from 29 L/s/m to 72 L/s/m when lowering the crest from +3.0m RL to +2.5m RL. This increase takes the performance beyond the target level of service; and
- The detached breakwater was observed to significantly reduce overtopping (from 33 L/s/m to 9.3 L/s/m for the vertical wall with +2.55m RL) as well as reducing nearshore wave heights (50% reduction).

Furthermore, 10 structural stability tests were conducted for 3 vertical seawall configurations and 7 rock revetment configurations. Those tests found:

- The 15 t mass concrete blocks used in the vertical seawall alignment were observed to be displaced under 200-year ARI 2070 conditions;
- Minor damage on the rock revetment (2%) were observed with the presence of a solid +1.8m RL back maintenance corridor;
- Significant increase in damage (12%, major damage) to the rock revetment was observed when tested with a scoured back maintenance corridor due to reduced crest support;

- The installation of 4 t rock bags on the landside of the rock revetment crest allowed a reduction in rock revetment damage (down to 5%, minor damage) when tested under the same conditions; and
- The 1.3 t tetrapod revetment was observed to sustain significantly higher damage levels than the rock revetment.

The physical modelling results enabled RHDHV to propose the two final designs, one for a concrete vertical wall, and one for a rock revetment. Elements such as the detached breakwater, while offering improvement in performance, also greatly increased the cost and were therefore excluded from the final design selection.

3.4.4 Final Two Designs to One Issued for Construction (IFC) Design

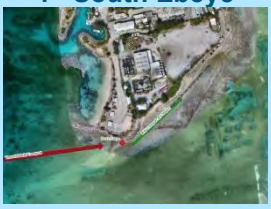
The IFB Design Report (D18) was prepared to take the two final designs to tender. This document was drafted to cover both the rock revetment and concrete block seawall options. During pre-bid discussions between with the client, it was decided to go to tender with the rock revetment option only, as there were cost and material constraints associated with the concrete vertical wall. The Final Design Report (D20) details the IFC rock revetment design, which is summarized within **Section 2.3.**

3.5 Alternative Haulage Routes

The haulage route proposed by the Contractor is from the south, using a proposed temporary access road on the seaward side of the wall alignment within the Intertidal zone, and a slight adjustment to the material landing site to be off a modified version of the existing breakwater at the Ebeye South Beach. The route is discussed in **Section 2.4.3** and **2.4.4.** The Contractor has undertaken preliminary discussions with landowners but will need to undertake further consultation with KADA, KAJUR, KALGOV, RMIEPA, Local Police and National Police, with input from stakeholders including RMIPA, Stevedores, NTA, local businesses and the local community, as required.

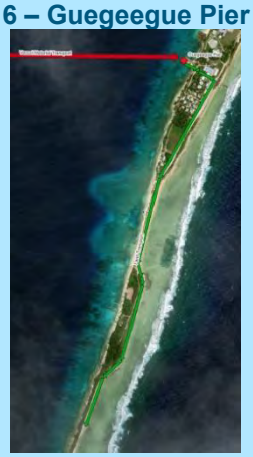
Table 3-2 below sets out a high- level E&S comparison of six nominated haulage routes investigated for the Project based on originally proposed material landing sites based on level of negative impact. This Table comes from the Preliminary ESIA and follows on from local consultation meetings.

Table 3-2: Environmental and social comparison for nominated haulage routes

1 –South Ebeye 	**Approximate Length (km)**	0.2km
	Environmental Considerations	This option is attractive given the direct access to the southern end of the sea wall. It is likely that the offshore area (i.e., rock platform) could be a material storage area for large rock revetment) when building from the south. Fine materials would not be stockpiled in this location, it would mainly be large revetment rock. There would not be any room for anything more substantial in this area. There may be environmental impacts on the coral in the vicinity of this landing zone.
	Social Considerations	Proximity to children's swimming area, picnic area (recently funded project that should be avoided where possible) and the shallow offshore area make this site sensitive to use. There would be no use of town roads in this area.
	Comment	The approaches are shallow so ship access would be limited to shallow draught barges only, during accessible tides and low draft conditions. This site to only be used for material handling / landing with impacts on local swimming

		spot and picnic area to be avoided. If they cannot be avoided then this area may not be an option.
2 – Ebeye Port 	**Approximate Length (km)**	0.4km
	Environmental Considerations	The main Ebeye Port would be used in this option, so no new ramp is needed. However, it is noted that the port facilities (pavements and sheet pile walls) are in a poor condition and any heavy equipment brought in through this direction would need to be considered further in terms of load-bearing issues. Usual environmental impacts related to spills and marine pollution to be expected but minor and manageable.
	Social Considerations	It was identified that the port could be used for delivery of specialist and valuable equipment. It will not be used for large volumes of material or frequently given that the road access leads straight into the populous part of town. Project traffic also has the potential to impact on or disrupt usual port operations and movement of cargo vessels. Careful coordination and management would be required. To be avoided where possible and only utilized for high value and small volume items (i.e., specialist plant). This option means offloading is occurring in a controlled and existing maritime infrastructure facility. This option passes through the densely populated Ebeye community (particularly children at night) and brings significant safety risks to pedestrians and other road users. Haulage could damage road surface during operations. No causeway used so no risks to causeway integrity.
	Comment	Minimal and manageable environmental impacts but potential significant safety risks to road users on Ebeye which would require careful coordination, consultation and management with all parties listed in the previous Preliminary ESIA/ESMP. Any port deliveries must not impact on port operations to the main community of Ebeye – the port is an important and essential component of life for the community.
3 – North Ebeye 	**Approximate Length (km)**	0.8km
	Environmental Considerations	Very shallow offshore and shallow at the limited ramp area. The onshore area is also very congested and there would be little area for maneuvring or storage. Contractor would need to construct a temporary offloading ramp at the northern end of Ebeye which would create environmental impacts to the lagoonside coastal and marine environment in that area. Scale of impact is unknown as no marine surveys have been undertaken, however as this is on Ebeye and adjacent to the landfill, impacts are expected to be minor. A marine assessment would be required should this option be selected.
	Social Considerations	Option travels though densely population section of Ebeye island. Creates safety risk for pedestrians and other road users. Haulage could damage road surface during operations. No causeway used so no risks to causeway integrity. This alternative is not likely to be considered further.

	Comment	Expected minor and temporary environmental impacts. However, no land space currently available and unless waste is removed this option likely not viable.
4 – PII Facility 	**Approximate Length (km)**	1.7km
	Environmental Considerations	This is a newly reclaimed ramp to the north of Ebeye. It has been constructed by PII, a local contractor, using locally resourced material from the offshore reef areas. The ramp and area are close to Ebeye with good offshore access. The ramp is new and in fair condition and provides access to a wide storage area. Note that there appears to be a healthy reef system offshore of the PII Ramp though it also appears that the reclamation has damaged a lot of local marine areas. This site would provide access to the Causeway Road which would then provide direct route to the northern area of the town. Due consideration should be given to the coral in this area so that it is not impacted during construction and operation. However, noted that there has already been disruption of coral through construction.
	Social Considerations	The PII Facility uses the causeway road to the dump site to cross over to the reef flat. The structural suitability of the causeway for this construction traffic is unknown at this stage. Damage to causeway would cause significant negative impact to community.
	Comment	This option offers a reasonable haulage route based on technical feasibility, environmental and social impacts..
5 – JoeMar Site 	**Approximate Length (km)**	3.1km
	Environmental Considerations	Similar to the PII ramp, this site provides good offshore access and a wide area for landing and storage of materials. It is located to the north of PII and has been built recently by the JoeMar Company. This is a potential site for landing and storage as it also provided access to the Causeway Road and the north of the town. It is, however, slightly further away than the PII ramp from the sea wall site. There are limited environmental impacts given that the coral has been removed from this site through previous operations.
	Social Considerations	The offshore areas here have also been badly affected by the reclamation and the ongoing quarrying activities and appear to have been badly affected in the near-by vicinity. Haulage would require travel through 2 village areas on Lojjairok on small roads. Creates extended safety risks to road users and potential damage to road during operations. The structural suitability of the causeway for this construction traffic is unknown at this stage. Damage to causeway would cause significant negative impact to the populations of Ebeye and Lojjairok.
	Comment	Minor negative environmental impacts from this option, but probable significant social impacts, particularly related to impacts on islet communities safety and roads and impacts to causeway. This site is technically less advantageous given the longer haulage route, the need to drive on the causeway and through the nearby community, and the current poor berthing facilities.

6 – Guegeegue Pier 	**Approximate Length (km)**	7.3km
	Environmental Considerations	The 50+ year old dock to the north on Guegeegue is at least 60 years old and in very poor condition. Contractor would need to construct a temporary offloading ramp at Guegeegue which would create environmental impacts to the lagoonside coastal and marine environment in that area. Scale of impact is unknown as no marine surveys have been undertaken. This would be required should this option be selected. This site is considered to be too far away from Ebeye to be considered further.
	Social Considerations	The local area is too congested with minimal space for stockpiling. Haulage would require travel through 3 village areas on Guegeeue and Lojjairok and on the islets on small roads. Creates extended safety risks to road users and potential damage to road during operations. The structural suitability of the causeway for this construction traffic is unknown at this stage. Damage to causeway would cause significant negative impact to the populations of Ebeye, Guegeegue and Lojjairok.
	Comment	Unknown scale negative environmental impacts from this option, but probable significant social impacts, particularly related to impacts on islet communities safety, damage to roads and impacts to causeway. This alternative is not likely to be considered further.

4 Policy, Legislative and Regulatory Framework

The following section provides an overview of the institutional and legal framework under which the Ebeye coastal defenses works of PREP II will be implemented.

4.1 RMI Legislation and Regulations

4.1.1 RMI Constitution

The Preamble to the Constitution of the RMI states: “All we have and are today as a people, we have received as a sacred heritage which we pledge ourselves to safeguard and maintain, valuing nothing more dearly than our rightful home on the islands within the traditional boundaries of this archipelago.” This acknowledges that the government of the RMI has a responsibility to safeguard and maintain heritage and ensure that the islands can continue to provide a home to the people of the Marshall Islands for generations to come.

4.1.2 National Environmental Protection Act 1984 (NEPA)

RMI’s environmental planning legislation is found largely in Part IV of the National Environmental Protection Act (NEPA) 1984. The NEPA Act 1984 is supported and further elaborated in a set of 8 regulations for protection of surface and marine waters, and air quality, and managing of potential impacts from earth works, sanitation systems, waste and new infrastructure development. The Act, and these regulations along with the Coast Conservation Act 2008 (CCA), provides the framework for the protection of resources and environmentally sustainable development in RMI.

The two NEPA Act regulations of specific relevance to the Ebeye coastal defense are: (i) the EIA Regulation 1994 and, (ii) the Earthmoving Regulation 1984. These are discussed below.

4.1.2.1 Environmental Impact Assessment Regulations 1994

The Environmental Impact Assessment (EIA) Regulation (Section 21, NEPA) is the central environmental planning legislation. Its aim is to ensure that environmental concerns are given appropriate consideration in decision making for all new infrastructure Projects. The EIA regulation requires a preliminary proposal for every development activity and applies a two-step assessment process to determine the level of assessment required. Step 1 is an initial evaluation to determine if the activity has the potential for significant effect on the environment; the preliminary proposal is an initial evaluation to determine whether an activity or action has significant environmental effect. Step 2 is an EIA for proposals assessed to have potential significant impact which will be reviewed and form the basis of an approved or not approved decision. The EIA process requires extensive and inclusive consultations with all stakeholders. In preparing the EIA, the proponent shall follow the format and content, as detailed in Part IV of the regulation, unless otherwise directed by the Authority. The proponent shall remain subject to regulatory and permitting requirements pursuant to NEPA, *Coast Conservation Act,* and the *Historic Preservation Act* and *Tourism Act 1991*. This ESIA/ESMP has been developed to satisfy the requirements of the EIA content.

4.1.2.2 Earthmoving Regulations 1989

This regulation stipulates that all earthmoving activities in the RMI require an earthmoving permit. Permitted persons engage in earthmoving activities shall design, implement, and maintain erosion and sedimentation controls which prevent accelerated erosion and sedimentation. Earthmoving activities may also remain subject to permit requirements pursuant to RMIEPA, *Coast Conservation Act*, and the *Historic Preservation Act* and *Tourism Act 1991*.

The filing of an Earthmoving Application requires the preparation and submission of the required documentation including an initial environmental assessment report. On receipt of an Earthmoving Application, the RMIEPA review and approval process explained under Section D.1.1 above is triggered. The construction of a coastal defense structure on Ebeye will require an earthmoving permit, requiring the preparation and submission of applications with accompanying documentation as set out under the Regulation. An application for this permit has been lodged by the CIU.

4.1.3 Coastal Conservation Act 1998 (CCA)

The Coastal Conservation Act 1998 (CCA) makes provision for a survey of the coastal zone and the preparation of a coastal zone management plan; to regulate and control development activities within the coastal zone; to make provisions for the formulation and execution of schemes for coast conservation. Notwithstanding the provisions of any other law, no person shall engage in any development activity other than a prescribed development activity within the Coastal Zone except under the authority of a permit issued for that purpose by the Director. Upon receipt of an application for a permit to engage in a development activity within the Coastal Zone, the Director may require the applicant to furnish an environmental impact assessment relating to such development activity and it shall be the duty of the applicant to comply with such requirement.

4.1.4 Animal and Plant Inspection Act

In order to protect the agricultural and general well-being of the people of the RMI, quarantine regulations are promulgated as a means of preventing the introduction and further dissemination of injurious insects, pests, and diseases into and within the Republic. All aircraft and vessels or their cargoes, including baggage, ship's stores and ballast, entering or moving within the Republic, are subject to inspection by agricultural quarantine inspectors for the purpose of enforcing the controls, quarantines and regulations established pursuant to this Part.

4.1.5 Land Acquisition Act 1968

The RMI Land Acquisition Act 1986 makes provision for the acquisition of lands and servitudes for public use for payment of just compensation in terms of Article II, Section 5 of the Constitution of the Marshall Islands and to provide for matters connected therewith and incidental thereto.

The Act defines “land” to include “things attached to the earth”. It also defines “persons interested”, with reference to land, to not include a monthly tenant. The act covers the general provisions, preliminary investigation and declaration of intended acquisition, proceedings in court, payment of compensation, possession and disposal, divesting of land and general items pertaining to such land acquisition. There is no permanent land acquisition expected for this activity.

4.1.6 Historic Preservation Act 1991

The RMI Historic Preservation Act 1991 provides the framework for balancing the preservation of cultural and historic properties against the needs of development and continuing use of land and other resources.

4.1.7 Master Lease

The Master Lease by and between the Landowners and KADA is a negotiated agreement between the three Iroijs of Ebeye on one hand, and KADA on the other, as the lessee and occupant, representing the Government. The Master Lease vests in KADA access and use rights for designated Ebeye lands, with conditions and parameters for its use “… in furtherance of its efforts to promote the redevelopment of Kwajalein Atoll …and allow essential public infrastructure projects to go forward to the better welfare and

health of its people…". The Master Lease was signed in 1966, and its 50-year term expired in October 2016. An extension for a further fifty years has been negotiated and has been signed by all landowners and/or their representatives. The Master Lease covers existing land and "…any other new reclaimed land to KADA".

Under the Master Lease, KADA pays an annual 'ground lease rent' of US$300,000 exclusive of taxes and administration fees. Of particular interest, in the Master Lease (Part V (A): Roads and Utility Corridors), the Lessor dedicates in perpetuity, all existing and presently designated future easements for public use, "…at no additional consideration."

The Master Lease thus provides for the voluntary taking of Ebeye land for development purposes. Part of this land are easements previously dedicated in perpetuity for public utilities such as water, sewer, electrical and drainage lines. KADA can authorize developments within the existing easements and can also define and set aside new easements as necessary, following a process set out in the Master Lease, which requires the prior consent of the landowners.

In compliance with the *Land Acquisition Act*, the Master Lease satisfies the requirement of the Constitution that "No land right or other private property may be taken unless a law authorizes such taking; and any such taking must be by the Government of the Republic of the Marshall Islands, for public use, and in accord with all safeguards provided by law".

No permanent land will be taken for the coastal defense structure.

4.1.8 Other relevant legislation and regulations

Disaster Assistance Act
An Act to reduce vulnerability of people and communities of the Republic to damage, injury, and loss of life and property resulting from natural or manmade catastrophes; to clarify the role of the Cabinet and local governments in the prevention of, preparation for, response to, and recovery from disaster; to authorize and provide for coordination of activities relating to disaster prevention, preparedness, response, and recovery between agencies.

Endangered Species Act 1975
An Act to provide for the protection of endangered species of fish, shellfish and game in the Republic. The indigenous plants and animals of the Republic are of esthetic, ecological, historical, recreational, scientific, and economic value and it is the policy of the Government of the Marshall Islands to foster the well-being of these plants and animals by whatever means necessary to prevent the extinction of any species or subspecies from the islands of the Republic or the water surrounding them.

Planning and Zoning Act 1987
An Act to provide for: (a) planning in land water use; (b) the promotion of the health, safety and general welfare of the people; (c) the creation of zones in municipal areas in order to lessen the congestion and to secure safety from fire and other hazards; (d) the regulation and control of the construction of buildings and the prevention of overcrowding of land.

Solid Waste Regulations 1989
Regulations that establishes minimum standards governing the design, construction, installation, operation and maintenance of solid waste storage, collection and disposal systems to:

- Prevent pollution of the drinking and recreational waters of the RMI;
- Prevent air and land pollution;

- Prevent the spread of disease and the creation of nuisances;
- Protect the public health and safety;
- Conserve natural resources; and
- Preserve and enhance the beauty and quality of the environment.

Marine Water Quality Regulation 1992
A regulation that identifies the uses for which the marine waters of the RMI shall be maintained and protected, specify the water quality standards required to maintain the designated uses and to prescribe regulations necessary for implementing, achieving and maintaining the specified marine water quality.

Public Water Supply Regulation 1994
The purpose of the regulation is to establish certain minimum standards and requirements to be necessary for the public health and safety and to ensure that public water supply systems are protected against contamination a pollution and do not constitute a health hazard.

4.2 International Conventions and Treaties

RMI is a signatory to the following conventions which are relevant to this project:

- United Nations (UN) 64th General Assembly Resolution on the Human Right to Water and Sanitation;
- Agreement Establishing the South Pacific Regional Environment Programme (SPREP);
- Cartagena Protocol on Biosafety on the Convention on Biological Diversity;
- Convention for the Protection of the Natural Resources and Environment of the South Pacific Region;
- Convention on Biological Diversity;
- Convention on the Rights of the Child;
- Convention to Ban the Importation into Forum Island Countries of Hazardous and Radioactive Wastes and to Control the Transboundary Movement and Management of Hazardous Wastes within the South Pacific Region, Waigani, Papua New Guinea;
- Kyoto Protocol to the United Nations Framework Convention on Climate Change;
- United Nations Framework Convention on Climate Change; UN Barbados Program of Action and Mauritius Strategy;
- The Micronesian Challenge
- UN Convention to Combat Desertification
- Convention on the Elimination of All Forms of Discrimination against Women (CEDAW);
- The Pacific Plan;
- The Millennium Development Goals (MDG);
- The Revised Pacific Platform for Action for the Advancement of Women and Gender Equality; and
- The 2012 Pacific Islands Forum Leaders' Gender Equality Declaration

4.3 World Bank Operating Policies

The following safeguard policies are relevant to this Project, requiring the client to prepare this ESIA/ESMP to address all requirements of these policies. Of the four policies listed, OP4.01 Environmental Assessment[46] and OP4.04 Natural Habitats[47] are triggered by the Project. OP4.12

[46] *https://thedocs.worldbank.org/en/doc/f3077ee7a3590f4f4610ede4734496fc-0290012023/original/OP-4-01-Environmental-Assessment.pdf*
[47] *https://thedocs.worldbank.org/en/doc/920b60ec811a53704f2770a4c25005bf-0290012023/original/OP-4-04-Natural-Habitats.pdf*

Involuntary Resettlement[48] is not triggered but is appropriate to be considered in this report to ensure that any potential changes to the Project are also assessed against this policy and any triggers identified.

World Bank Operational Policy 4.01 – *Environmental Assessment*
The World Bank requires an Environmental Assessment of Projects proposed for World Bank financing to help ensure that they are environmentally sound and sustainable, and thereby, improve decision-making. OP 4.01 requires (i) detailed qualitative and quantitative analysis to determine project impacts, (ii) determination of tangible measures to prevent, minimize, mitigate or compensate for those adverse impacts, (iii) public consultation and disclosure as part of the EA process and (iv) requires and Environmental Management Plan (EMP) to address set mitigation along with monitoring and institutional measures to be taken during design, implementation, operation and maintenance phases of the project.

World Bank Operational Policy 4.04 – *Natural Habitats*
This policy requires the conservation of natural habitats and specifically prohibits the support of projects that involve significant conversion or degradation of critical habitats, as defined by the policy.
Natural Habitats, as defined in OP4.04 Annex A[49], are land and water areas where (i) the ecosystems' biological communities are formed largely by native plant and animal species, and (ii) human activity has not essentially modified the area's primary ecological functions. All natural habitats have important biological, social, economic, and existence value. Important natural habitats may occur in tropical humid, dry, and cloud forests; temperate and boreal forests; Mediterranean-type shrub lands; natural arid and semi-arid lands; mangrove swamps, coastal marshes, and other wetlands; estuaries; sea grass beds; coral reefs; freshwater lakes and rivers; alpine and sub alpine environments, including herb fields, grasslands, and paramos; and tropical and temperate grasslands.

This policy was triggered in the PREP II Environmental and Social Management Framework (ESMF) due to the unknown footprint of the Ebeye coastal defense structure. However, the coastal defense structure will not directly impact any natural habitats as the seawall will be erected on already disturbed areas i.e. the highly modified and developed shoreline of Ebeye's oceanside. Furthermore, the assessment undertaken for this report concludes that the maritime habitat of the reef flat adjacent to the Project site is highly modified and degraded due to pollution and waste. Impacts in on these immediate environments will be negligible in the medium to long term.

World Bank Operational Policy 4.12 – *Involuntary Resettlement*
This policy addresses direct economic and social impacts from the projects activities that will cause (a) involuntary taking of land resulting in loss of income sources or of livelihoods and (b) involuntary restriction of access to legally designated parks and protected areas resulting in adverse impacts on the livelihoods of the displaced persons. This policy requires siting of project infrastructure to be so placed as to avoid these impacts altogether or to minimize them to the extent possible. Where these cannot be avoided, the policy requires the preparation of either or both of these instruments (i) Resettlement Policy Framework, (ii) Resettlement Action Plan, and for meaningful consultations with potentially affected people. The policy prohibits community donations of lands for location-specific infrastructure.

Involuntary resettlement or land acquisition will not be required for this Project, therefore a specific Resettlement Plan (RP) is not currently required for the seawall. There may be the need to lease land temporarily for the siting of laydown sites or other supporting facilities, however this land will be proposed to the Contractor by KADA and leases will be managed under the C-ESMP.

[48] *https://thedocs.worldbank.org/en/doc/b192cc75476bc0d5a54a1e4ceba50776-0290012023/original/OP-4-12-Involuntary-Resettlement.pdf*
[49] *https://thedocs.worldbank.org/en/doc/2d2c6d80b4b5c06d5e519c2ac32de0c6-0290012023/original/OP-4-04-Annex-A-Definitions-Natural-Habitats.pdf*

World Bank Operating Policies OP4.11 - *Physical Cultural Resources*[50]

Physical cultural resources (PCR) are movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, religious, aesthetics or other cultural significance. The Bank assists countries to avoid or mitigate adverse impacts on physical cultural resources from development projects that it finances. When it is considered triggered, the borrower identifies appropriate measures for avoiding or mitigating these impacts as part of the environmental assessment process. These measures may range from full site protection to selective mitigation, including salvage and documentation, in cases where a portion or all of the physical cultural resources may be lost.

The cultural and historic sites of importance in RMI have been identified and listed by the Historic and Preservation Office. In Ebeye, no sites of historical or cultural significance are listed however, several public cemeteries and one private graveyard are located close to the coastline and will be at risk of disturbance during the construction of coastal protection measures. Under OP 4.11, the ESIA/ESMP addresses any impacts on these sites and provides a chance find procedure.

[50] *http://documents.worldbank.org/curated/en/842681468339637585/Physical-cultural-resources-safeguard-policy-guidebook*

5 Environmental Conditions

5.1 Physical Environment

5.1.1 Climate

Across RMI, the average temperature is relatively constant year-round. Changes in temperature from season to season are relatively small, around 1°C and are strongly tied to changes in the surrounding ocean temperature.

Kwajalein has a dry season from around December to April and a wet season from May to November. During the driest months (January to March) the atoll receives about 100 mm on average and the wettest months (September to October) receive an average of around 300 mm.[51]

Seasonal wind direction dictates the wet and dry periods, with northeast 'trade winds' bringing dryer weather, and the monsoonal southwest winds increasing rainfall. Droughts generally occur in the first 4 to 6 months of the year following an El Nino. During severe El Nino events, rainfall can be suppressed by as much as 80%. The dry season begins and ends much later than normal.

Typhoons usually form between September and November but are often weak when they pass through RMI.

5.1.2 Air Quality

Generally, the air quality in the RMI is considered to be high as it is a nation with a flat topography, almost constant breeze and very little heavy industry. Localized sources of pollution within the Project AOI are the Ebeye power station, shipping vessels, Ebeye Port and vehicles. The small size of the island and prevalence of strong marine winds ensure that any emissions are quickly mixed and travel with no pockets of low air quality in existence.

A weather station located at the nearby Bucholz Army Airfield on Kwajalein Island, south of Ebeye records air particulates to monitor air quality. While this site is not within the Project AOI, it is subject to higher pollution loading through aircraft movements and therefore does provide an indicative verification of air quality across the rest of the atoll.

The Air Quality Index (AQI) at the nearby Bucholz Army Airfield Station is rated as 42[52] which is within the 'good' range of 0-50. Good is defined as '*air quality is satisfactory, and air pollution poses little or no risk*'. The AQI is a measurement tool developed by the US Environment Protection Agency and measure for five major air pollutants: ground level ozone, particle pollution, carbon monoxide, sulphur dioxide and nitrogen dioxide. The weather station records that of those five sources of pollution, $PM_{2.5}$ is the dominant one at the airfield.

Particulate matter (PM) is the most common air pollutant that affects short- and long-term health. The major components of PM are sulphate, nitrates, ammonia, sodium chloride, black carbon, mineral dust and water. It consists of a complex mixture of solid and liquid particles of organic and inorganic substances suspended in the air. The WHO's air quality guidelines recommend that the annual mean concentrations of $PM_{2.5}$ should not exceed 10 µm/m^3 and 20 µm/m^3 for PM_{10} (10 µm). [53]

[51] *Pacific-Australia Climate Change Science Program. Technical Report – Chapter 7 Marshall Islands Report (2014).*
[52] *https://www.wunderground.com/health/PKWA?cm_ven=localwx_modaq*
[53] *https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health*

5.1.3 Ambient Noise

Due to the limited urban development or heavy industry on Ebeye, environmental noise is relatively low. However, the low topography and large expanses of water means that noise is readily transmitted across large distances. Current sources of noise on Ebeye include vehicles, ships and boats, generators at the power station and general urban noise.

5.1.4 Water Resources

Ebeye has no natural surface water. Groundwater collects in the form of a Ghyben-Herzberg lens floating atop the denser ocean water underlying the island.[54] The water is brackish as well as being polluted by the intensive human use of Ebeye for the past several decades. The lens recharges through the highly permeable coral soil.

There are a few private wells in use in Ebeye, the water being brackish to mildly brackish, the well water is typically bailed by bucket[55].

High groundwater salinity was found during the ADB's March 2014 hydrology study undertaken for their Water Supply and Sanitation Project on Ebeye. This high salinity was present despite high rainfall during the previous month. This indicates there is a low potential for fresh groundwater use[55].

5.1.5 Marine Water Quality

The RMI Maritime Investment Project[56] undertook marine water quality sampling within the Ebeye embayment (lagoon side) at six sites at a uniform depth of 6 m in 2019 and the results are reported in **Figure 5-1**. Water quality samples were analyzed for the following parameters:

- Barometer (mmHg), Barometer (mmHg);
- Temp (°C);
- Cond (µS/cm);
- Sp Cond (µS/cm);
- Sal (psu);
- nLFCond (µS/cm);
- TDS (mg/L);
- Resistivity (ohms-cm);
- Sigma-T (s t);
- Sigma (s);
- ODO (% Sat);
- ODO (mg/L);
- ODO (ppm);
- pH;
- pH (mV);
- ORP (mV); and
- Turbidity (FNU).

Water temperature varied across the six sites sampled with all sites having a similar temperature (~28^{O}C). Oxygen saturation was highest at Site 6 (98.8%) and lowest at Site 1 (94.8%), but there was littler

[54] *Proceedings of the Pacific Regional Consultation on Water in Small Island Countries Theme 4 Case Study C: Ebeye Case Study, American Samoa Power Authority. http://www.pacificwater.org/userfiles/file/Theme4_CaseStudy_C.pdf*
[55] *ADB 2020, Initial Environmental Examination RMI: Additional Financing of Ebeye Water Supply and Sanitation Project*
[56] *ESIA Consult, 2019 RMI Maritime Investment Project Environmental and Social Management Framework*

variation between the sites. This indicates good water circulation at all sites. All sites had similar turbidity results as well returning an average of 0.6 FNU, with Site 6 being the highest at 0.72 FNU. Conductivity and salinity results were also similar across all sites.[57]

Location	Site No	DATE	TIME	GPS Latitude (°)	GPS Longitude (°)	Barometer (mmHg)	Temp (°C)	Cond (µS/cm)	Sp Cond (µS/cm)	Sal (psu)	rLFCond (µS/cm)	TDS (mg/L)	Resistivity (ohms-cm)	Sigma-T (s t)	Sigma (s)	ODO (% Sat)	ODO (mg/L)	ODO (ppm)	pH	pH (mV)	ORP (mV)	Turbidity (FNU)
Ebeye	1	6/02/2019	9:47:46	8.77730 °	167.73502 °	756.9	27.9	54082.3	51253.2	33.58	50948	33315	18.48	21.4	21.4	94.8	6.17	6.17	8.17	-78.6	84.6	0.61
	2	6/02/2019	9:50:33	8.77750 °	167.73242 °	756.9	27.9	54121.4	51255.1	33.58	50945.7	33316	18.48	21.4	21.4	94.9	6.17	6.17	8.17	-78.3	83.4	0.59
	3	6/02/2019	9:52:25	8.77919 °	167.73163 °	757	28	54146.3	51256.3	33.58	50944.2	33317	18.47	21.3	21.3	95.1	6.18	6.18	8.16	-78	90.8	0.6
	4	6/02/2019	10:17:41	8.79025 °	167.73196 °	756.7	27.9	54126.6	51247.7	33.58	50936.8	33311	18.48	21.3	21.3	96.4	6.26	6.26	8.2	-79.8	120.7	0.6
	5	6/02/2019	10:28:37	8.78539 °	167.73337 °	756.7	27.9	54114.2	51244.8	33.58	50935	33309	18.48	21.4	21.4	95	6.17	6.17	8.18	-78.8	92.8	0.58
	6	6/02/2019	10:31:31	8.78120 °	167.73500 °	756.5	28	54083.9	51178.2	33.53	50864.3	33266	18.49	21.3	21.3	98.8	6.42	6.42	8.18	-79	109.3	0.72

Figure 5-1: Marine Water Quality Data for six stations along the lagoon shore of Ebeye[57]

5.1.6 Geotechnical Features

5.1.6.1 Bathymetry and Topography

The topographic survey over the island of Ebeye shows that most of the island's elevation is between 0-3 m, and the areas at the ocean side have higher elevation than the lagoon side[58]. The Island is dominated by man-made features. The boundary of residential structures is as close as 2-4 m from the back-beach erosion escarpment. Near the southern end of Ebeye the escarpment encroaches to within approximately 5-8 m of the sealed roadway.

The lagoon near Ebeye is shallow with an average depth of approximately 40 m. The oceanside shoreline crossfall/ beach slope varies from gentle slopes (1:10 or flatter, v:h) to relatively steep slopes indicative of rock revetment structures (1:2 or steeper). The average slope is 1:6 or 18 degrees, equivalent to the slope of a very steep boat ramp. The island is fronted by a reef flat which varies in width between approximately 60 -170 m based on the reef flat being defined as between MSL and LAT (-0.935 m MSL). Average levels over the reef flat fluctuate between - 0.63 m and -2.95 m MSL, with the lowest levels occurring within the excavation pits. The average reef flat level is -0.70 m MSL without considering the sections affected by excavation pits[59]. The depth of water increases steeply and reaches depths of approximately 6 km a few kilometers away from the Ebeye coast[58].

A limited boat survey identified that the southwestern side of the island has a much wider and shallower shelf than expected; whilst the areas to the north are deeper and provide better access for deep draft vessels. If deeper areas are not available, then incoming ships will need to tranship materials to barges further offshore.

5.1.6.2 Geology

The shorelines on the ocean sides of the islands on Kwajalein Atoll are generally formed of Holocene deposits: coral rubble, gravel, and sand. Generally coarser sediment such as rubble and gravel are found on shorelines exposed to higher wave energy, while sand is usually comprising the shorelines exposed to lower wave energy. Some of the shorelines are characterized by carbonate beach rock, reef breccias, and conglomerate rock strata, while the others are covered by loose sedimentary materials which sit on top of the consolidated rock[60].

[57] *ESIA Consult, 2019 RMI Maritime Investment Project Environmental and Social Management Framework*
[58] *Deltares (2016) Coastal Risk Assessment for Ebeye, Technical report 1230829-001, edition B*
[59] *RHDHV (2022). Ebeye Coastal Protection Engineering Design and Construction Supervision Preliminary Design Report (Deliverable 13)*
[60] *U.S. Army Strategic Defense Command. (1989). Final Environmental Impact Statement - Proposed Actions at U.S. ARMY KWAJALEIN ATOLL.*

The Ebeye oceanside foreshore comprises a mixture of natural coastal deposits and coastal protection structures of sorts, of mixed quality (**Figure 5-2**). Sediment characteristics of the shoreline on the oceanside are highly non-uniform. They are composed of a non-erodible reef, sandy stretches and mainly rubble beaches with some rudimentary seawalls. The rubble beaches vary in width from 3 to 7 m, and they are composed of weathered limestone, coral cobbles, gravel and mollusk shells[61]. The total approximate length of the mixed (gravel-rocks-sand) or rubble beaches is around 1160 m, where median sediment size is 50 mm; and the total length of sandy beaches is around 73 m, where median sediment size is 0.35 mm. The remainder of the Ebeye oceanside shoreline comprises vertical seawalls (50 m), poorly constructed rock revetment (170 m) and seawalls with loose material in front (190 m). An existing rock revetment occupies the northern most part of the Ebeye shoreline (380 m), and approximate 950 m of the adjacent causeway to Lojjairok. The vertical wall at Lojjairok Island is approximately 350 m long.

Reef flats generally lie on both lagoon side and ocean side around the island. At Ebeye, ocean reef flats are on the windward side, and are generally shallower, wider and exposed to stronger wave energy than the reef flats on the lagoon side. The ocean reef flats are characterized by a well-adjusted spur and groove system. The consolidated hard rock layer is around 0.6-1.2 m deep from the surface with softer and unconsolidated rock below, while the lagoon reef flats consist of softer rock[62]. The sediment at the bottom of the excavation pits could be coarse material and unconsolidated white coralline sand[63], which is consistent with the sediment in nearby islands (Gellinam and Omelek) reported in the *Environmental Impact Statement* by U.S. Army Strategic Defense Command in 1989.

[61] *US Army Corps of Engineers. (1986). Final Environmental Impact Statement US Department of the Army Permit Application Discharge of Fill Material for the Kwajalein Atoll Causeway Project.*
[62] *U.S. Army Strategic Defense Command. (1989). Final Environmental Impact Statement - Proposed Actions at U.S. ARMY KWAJALEIN ATOLL.*
[63] *US Army Corps of Engineers. (1986). Final Environmental Impact Statement US Department of the Army Permit Application Discharge of Fill Material for the Kwajalein Atoll Causeway Project.*

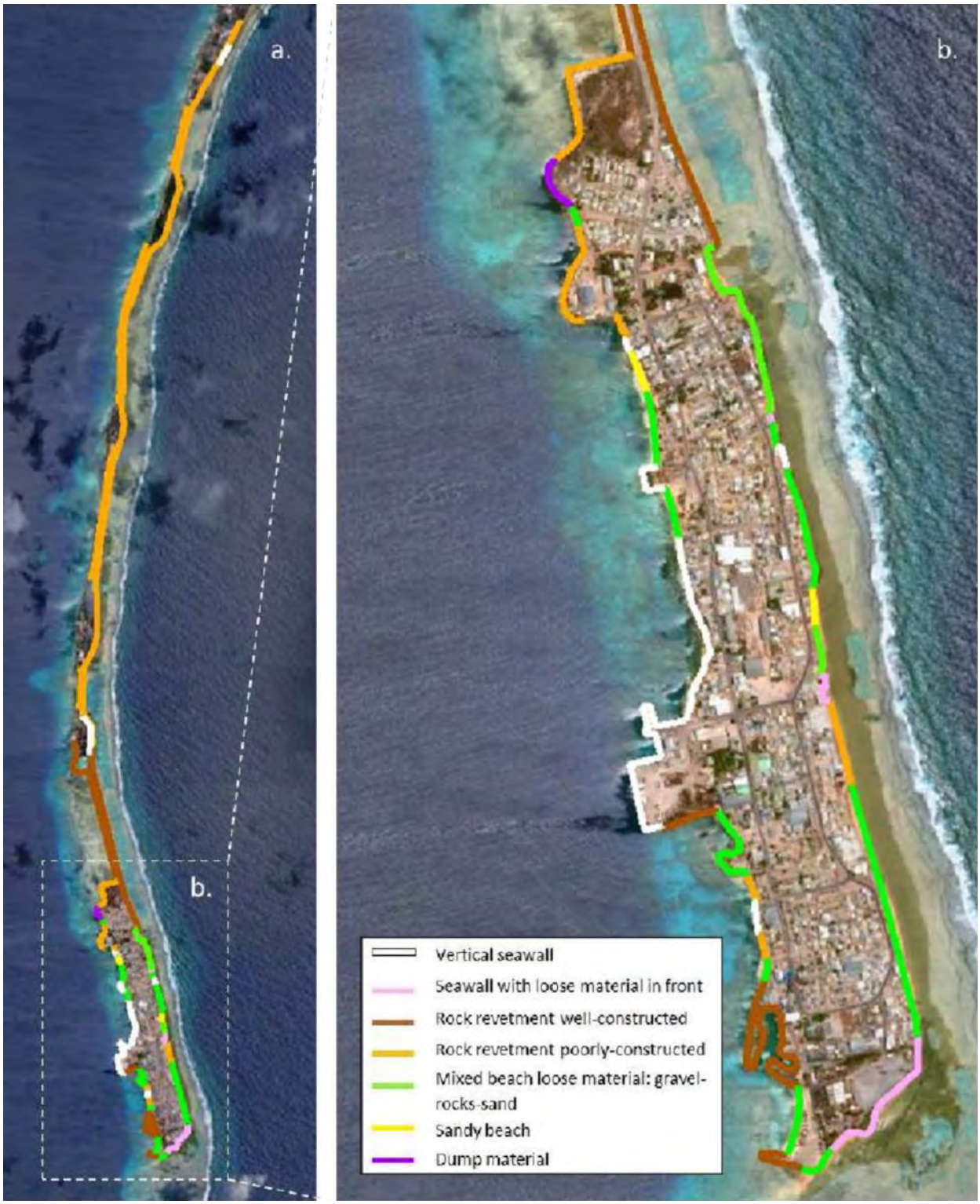


Figure 5-2: Observations of the types of coastal defenses and/or materials [64]

A preliminary geotechnical investigation was carried out for RHDHV by local contractor JoeMar Construction. The work involved diving into six existing excavation pits in the reef flat and excavating 12

[64] *Deltares (2016) Coastal Risk Assessment for Ebeye, Technical report 1230829-001, edition B*

test pits at the shoreline. The purpose of this work was to establish the approximate level of the hardpan and to characterize the overburden material. It was not possible with the equipment available to excavate into the hardpan. Location fix for all the work was gauged using the LiDAR survey plan with air photo underlay (estimated accuracy X/Y+/- 1.5 m, Z +/- 0.15 m). The diving inspections indicated a hardpan top level ranging between RL -0.4 and -1.2 with hardpan thickness between 0.9 and 2.3 m with average 1.4 m. The interpretation of hardpan surface level under the footprint of the shoreline coastal protection structure is summarized in **Table** 5-1.

Table 5-1: Interpreted hardpan levels

Chainage	Interpreted hardpan surface level under crest of shoreline structure (RL)	Comments
-300 to -20	-0.4	Soft reef observed. Hardpan not encountered near shoreline. Further geotechnical investigations are required.
-20 to 100	-0.25	Hardpan visible at the beach toe line
100 to 350	-0.4	Hardpan visible at -0.4m below the beach surface. Expected to slope up landward at approximately 1:100.
350 to 550	-0.5	
550 to 600	-0.4	
600 to 750	-0.4	Hardpan visible at the beach toe line.
750 to 900	-0.5	
900 to 1350	-0.4	Hardpan visible at RL -0.3 at Ch 1260 and RL -0.2 at Ch 1350.
1350 to 1500	-0.6	Conservative selection in the beach alcove area.
1500 to end	-0.6 to -0.8	Hardpan becomes visible below RL -0.8. Further geotechnical investigations required to confirm.

The remainder of the Ebeye oceanside shoreline comprises vertical seawalls (50 m), poorly constructed rock revetment (170 m) and seawall with loose material in front (190 m). An existing rock revetment occupies the northern-most 380 m excluding the causeway. A photo showing the mixed beach shoreline taken adjacent to the main north-south road near the southern end of Ebeye is presented in **Figure 5-3**.

Figure 5-3: Perspective of oceanside coastal defenses and/ or materials derived from Deltares observations, looking north

5.1.7 Coastal Hydrology

5.1.7.1 Water Levels

Tidal levels used for the seawall design are taken from the National Oceanographic and Atmospheric Administration (NOAA) for Kwajalein Island located 5 km from the site.

Table 5-2: Tidal planes for Kwajalein Island 5.5 km from Ebeye

Datum	Level (m)	Description
	1.248	Maximum Observed Tide (9/8/10)
HAT	1.065	Highest Astronomical Tide
MHHW	0.627	Mean High High Water
MHW	0.521	Mean High Water
MTL	-0.004	Mean Tide Level
MSL	0.000	Mean Sea Level
DTL	0.030	Mean Diurnal Tide Level
MLW	-0.528	Mean Low Water
MLLW	-0.567	Mean Low Low Water
LAT	-0.935	Lowest Astronomical Tide
	-1.213	Lowest Observed Tide (12/2/82)
STND	-1.457	Standard Datum

Source: Station 1820000, Kwajalein Marshall Islands, 1983-2001, NOAA

5.1.7.2 Future Water Levels

The SLR projections for Kwajalein Atoll area adopted by Deltares[65, 66] and RHDHV[67] are reproduced in **Table 5-3**. These projections are based on the IPCC (2014) *AR5 Fifth Assessment Report*.

Table 5-3: Sea level rise projections for Ebeye.

Climate change emissions Representative Concentration Pathway (RCP)	SLR projections (m)		
	2030	2050	2100
4.5	0.12	0.23	0.53
8.5	0.13	0.26	0.78

5.1.7.3 Wave Climate

The seasonal wave climate at Kwajalein, considered representative for Ebeye, is summarized in **Figure 5-4**. This shows that waves between 0.4 and 1.9 m in height occur most of the time approaching mainly from E to NE, with waves tending more to the east-southeast in the summer months from June through September.

[65] *Deltares (2016) Coastal Risk Assessment for Ebeye, Technical report 1230829-001, edition B*
[66] *Deltares (2021). Coastal Risk Assessment for Ebeye, Update based on 2019 LiDAR elevation data, 11205176-002-ZKS-0004, 29/9/21*
[67] *RHDHV (2022). Ebeye Coastal Protection Engineering Design and Construction Supervision Preliminary Design Report (Deliverable 13)*

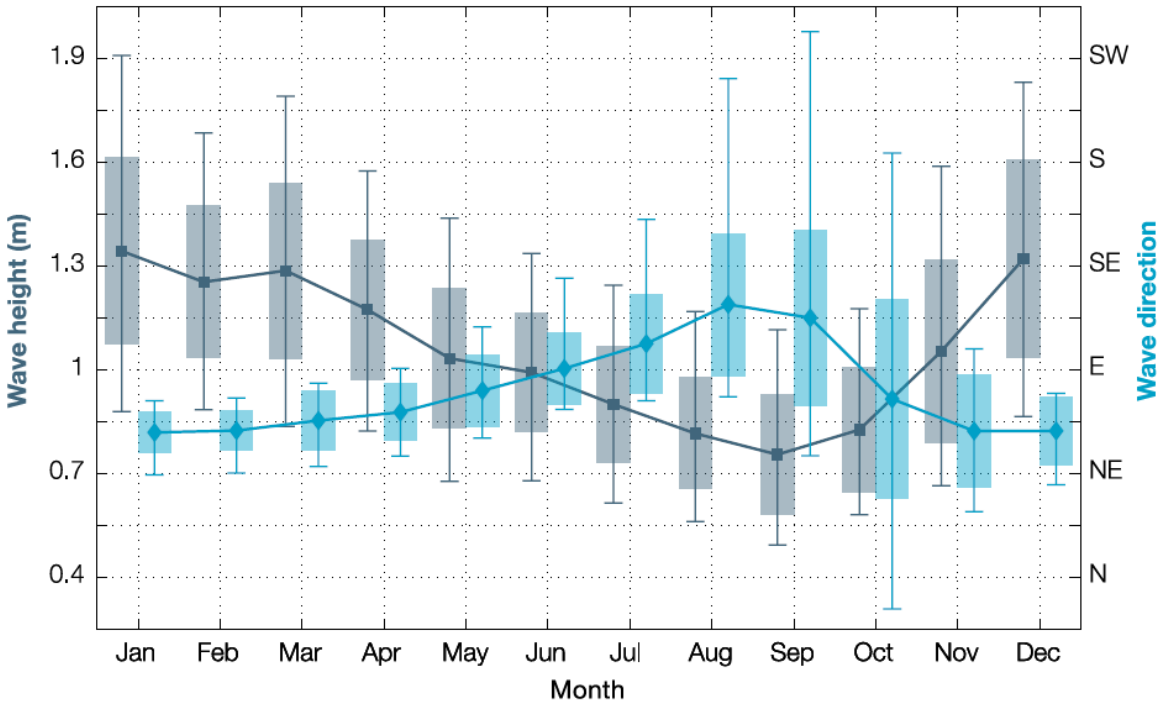


Figure 5-4: Seasonal wave climate at Kwajalein

(Note: Annual cycle of wave height (grey) and wave direction (blue) at Kwajalein based on data from 1979–2009. The shaded boxes represent one standard deviation around the monthly means, and the error bars indicate the 5–95% range, showing the year-to-year variability in wave climate. The direction from which the waves are travelling is shown [68]

Wave calculations at today's HAT water levels for different return periods were calculated by Deltares using the XBeach model. Distinction has been made between typhoon-induced waves with relatively short-wave periods of 10s accompanied by low frequency waves of typically 1 to 2 minutes and swell waves with wave periods of around 20s also accompanied by low frequency waves of 1 to 2 minute wave periods.[69] The Deltares calculations were made using HAT, however RHDHV reduced the results by 0.44 m to be based on MHHW as a more reasonable and less 'rare[70]' tidal constituent for establishing design water levels in the design. **Table 5-4** presents these MHHW adjusted typhoon-induced and swell wave.

[68] *https://www.pacificclimatechangescience.org/wp-content/uploads/2013/06/8_PACCSAP-Marshall-Islands-11pp_WEB.pdf*
[69] *2016, Deltares Coastal Assessment for Ebeye: Technical Report*
[70] *As an astronomical tide level alone, HAT has a theoretical recurrence in the order of 20 years.*

Table 5-4: Adjusted offshore and reef flat wave conditions reported by Deltares [71, 72]

ARI	Typhoon Conditions (T_p≈10s)		Swell Conditions (T_p≈20s)	
	Offshore H_s (m)	Reef Flat H_s (max) (m)	Offshore H_s (m)	Reef Flat H_s (max) (m)
1	1.50	1.51	3.13	0.92
5	3.16	1.61	3.56	1.22
10	4.61	1.65	3.74	1.38
30	7.21	1.72	4.04	1.57
50	8.57	1.75	4.17	1.68
100	*10.11*	*1.79*	*4.36*	*1.81*
200	*11.74*	*1.84*	*4.54*	*1.95*

In reviewing the project site as a whole, in terms of wave action, it is noted that mining pits occur in the reef flat. There is one mining pit opposite the center of Ebeye, and a number at the northern end of the town. The northern pits are mostly beyond the likely extent of the proposed coastal protection works. Deltares[71] found that mining pits, on average, led to a 20% increase in swell and typhoon wave heights at the shoreline and a 4% reduction in infragravity wave heights. While the effect of mining pits on wave conditions at Ebeye was not directly reassessed in Deltares[72], it is noted that the reported reef flat wave heights and water levels were derived from wave and water level conditions extracted from the XBeach model at a series of points along the coastline including areas located inshore of the mining pits. That is, the effect of the mining pits on waves and water levels and is implicitly included in the model results presented in Deltares (2021) and reproduced for the design.[73]

5.1.7.4 Currents

Local alongshore gradients in waves breaking over the reef may lead to a difference in wave setup and possible return (rip) currents over the reef, under specific wave angles and wave height conditions. Return currents could lead to an offshore transport of sediments into the mining pits which would effectively be removed from the coastal system, contributing to erosion. Deltares did not quantify the rip currents which, based on RHDHV experience, could be up to 1-2 m/s. Tidal and wind-induced currents would be an order of magnitude lower than rip currents.

Localized flows of wave overtopping water would typically be dispersed over the island which generally grades from the east side foreshore across to the lagoon. The seawall includes drainage to cater specifically for rainfall runoff, but which would also contribute to the return of overtopped flows directly back to the ocean. Overtopping currents and return overtopping flows may be concentrated, potentially also up to 1-2 m/s.

The Kwajalein Atoll has what is considered an open lagoon. The unidirectional wave-generated water currents constantly enter the lagoon through openings between adjacent islands, regardless of the state of tide. These waves are formed when the swells generated by the trade winds break along the upper ocean slope of the atoll's reefs. During the high tide period, the currents are strongest and can flow through on

[71] *Deltares 2016, Coastal Assessment for Ebeye: Technical Report*
[72] *Deltares 2021, Coastal Risk Assessment for Ebeye Update Based on 2019 LiDAR Elevation Data*
[73] *RHDHV 2022, Ebeye Coastal Protection Engineering Design and Construction Services Preliminary Design Report*

the reefs between islands at speeds of 1-2 m/s[74]. Such a channel exists between the southern tip of Ebeye and the northern tip of Kwajalein Island, and the currents propagating along shore and through this channel may be contributing to the erosion observed at Ebeye's southern tip.

5.1.8 Coastal Processes

5.1.8.1 Sediment Transportation

The following has been derived from observations from two different sources: observations from Google Earth and observations in SOPAC reports[75] and Deltares[76].

RHDHV has used recent aerial photographs to estimate the existing volume of sand along the oceanside shoreline. Beach pockets sand ranging in shoreline length between approximately 10 m and 100 m can be discerned, interpreted to occupy a shallow veneer of sand. Based on the understanding of reef surface levels and foreshore ground levels from the 2019 LiDAR, total volumes of beach sand are not expected to exceed 1,000 m^3.

Beaches along the Ebeye oceanside shoreline are identified and numbered from north to south (**Figure 5-5**).

[74] *US Army Corps of Engineers. (1986). Final Environmental Impact Statement US Department of the Army Permit Application Discharge of Fill Material for the Kwajalein Atoll Causeway Project.*
[75] *Smith, R. (2013). Technical Note – Coastal Erosion Assessment, Ebeye, Kwajalein Atoll, Marshall Islands. Ocean and Islands Programme*
[76] *Deltares (2016) Coastal Risk Assessment for Ebeye, Technical report 1230829-001, edition B*

Figure 5-5: Sediment Transport Study Areas
Note - Lojjairok (top left), Causeway (top right), beach areas on the ocean side of Ebeye (bottom)

With comparison of aerial photos of the study site from 2003 to 2019 from Google Earth, the sediment transport changes are shown below in **Table 5-5**:

Table 5-5: Observation of Sediment Change from 2003 and 2019

Study Area	Observation Description
Lojjairok	Consistently minor amount of sediment, similar profile between 2003 and 2019
Causeway between Lojjairok and Ebeye	Minor amount of sediment accreted in the middle of the causeway and slightly shifting towards south
Beach 1 (major beach at KADA depot)	Sediment transported towards the south end over time, and beach nourishment or other works might have occurred between December 2011 and October 2014

Study Area	Observation Description
Beach 2	Sediment accreted, and the accretion appeared to be more obvious since beach nourishment or other events at Beach 1
Beach 3	Similar profile between 2003 and 2019
Beach 4	Increased exposure of rocks at the north side of the beach, where there was a building demolished
Beach 5	Erosion slowly occurred in the south corner of the beach
Beach 6 (major beach fronting private properties)	Similar profile between 2003 and 2019
Beach 7 (near the graveyard next to Donton Store)	Minor beach erosion at the upper half beach, overall similar profile between 2003 and 2019
Beach 8 (major beach near graveyard)	Similar profile between 2003 and 2019
Beach 9	Similar profile between 2003 and 2019
Beach 10	Erosion occurred along the whole beach between 2003 and 2017, and a breakwater was constructed between 2017 and 2019
Beach 11 (east of Ebeye Beach Park)	Erosion occurred at the south end of the beach and accretion occurred at the north end of the beach between 2003 and 2017. Insufficient images to determine the changes due to breakwater construction between 2017 and 2019
Beach 12 (at the southern tip of Ebeye)	Sediment accreted and the sand spit shifted westward

A semi-qualitative conceptual sediment transport model has been developed for the study area. Far field sediment transport processes from Ningi Island to northern end of Kwajalein Island are shown in **Figure 5-6**, and localized processes at Ebeye Island seawall are shown in **Figure 5-7**. The conceptual sediment transport models present the key mechanisms and pathways for sand transport for this Project. These models are based on the synthesis of previous investigations and existing datasets.

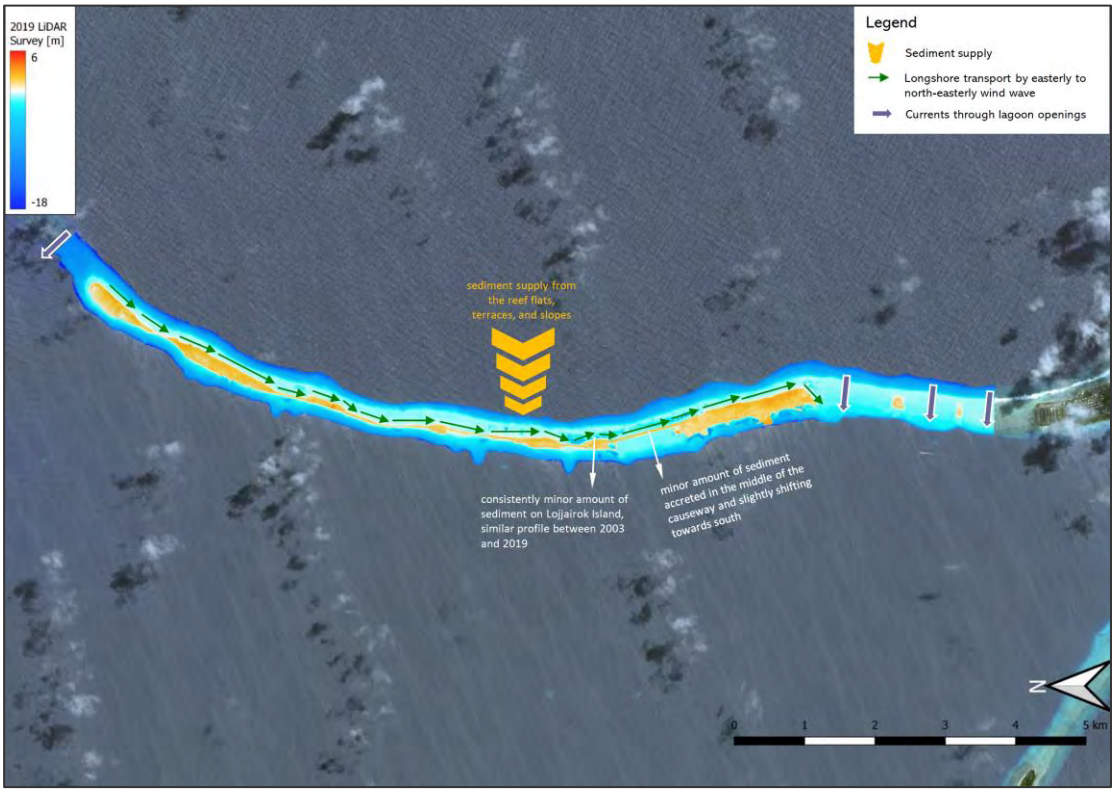


Figure 5-6: Main sediment transport mechanisms and pathways of far-field sediment processes.

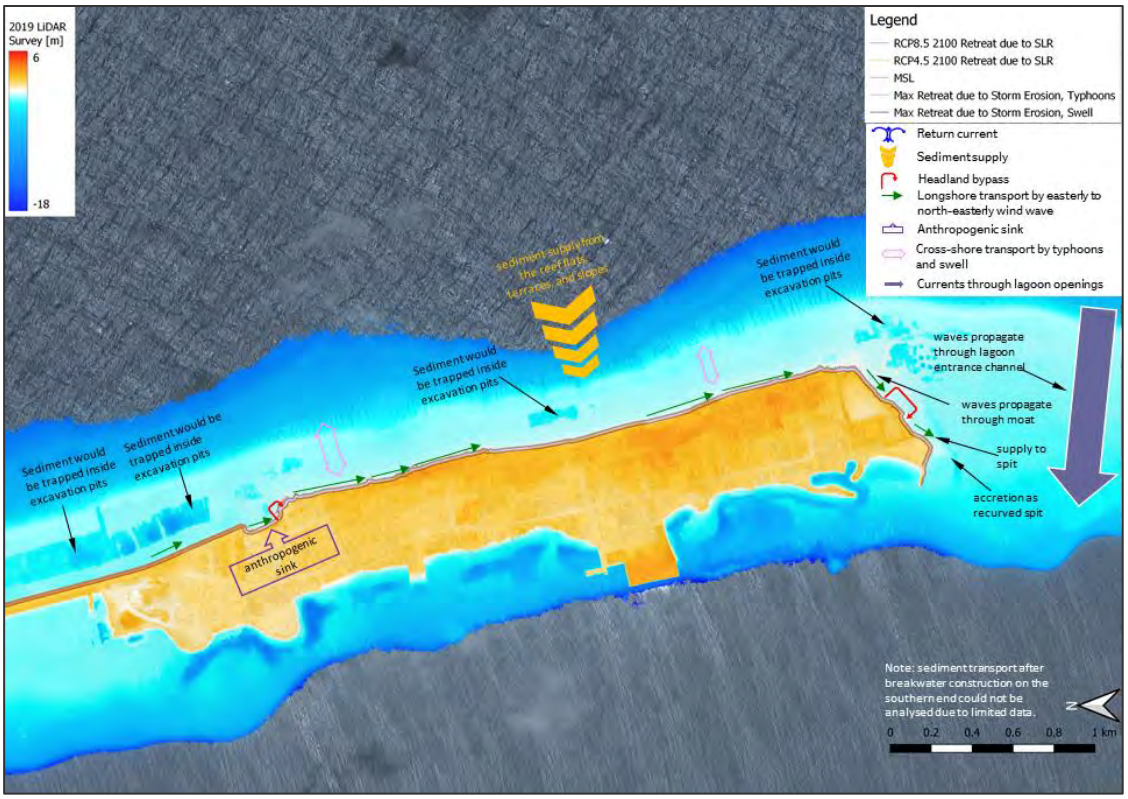


Figure 5-7: Main sediment transport mechanisms and pathways of seawall zone sediment processes.

Under far field processes, sediment is supplied from the reef flat terraces and slopes to the oceanside shoreline of the atoll. However, this supply may be slowing under sea level rise due to increased water depth over the reef resulting in lower sediment production and reduced net sediment delivery to the shoreline. The reduced delivery of sediments is contributing to a generally observed and predicted erosion although minor sediment accretion is observed along the causeway, between Lojjairok and Ebeye Islands. Beach sands and gravels along the shoreline are mobilized under waver action and driven from north to south under the main easterly and north-easterly waves, and tidal currents are generated through the lagoon openings.

At the seawall zone along Ebeye Island, the sediment transport behaviour essentially mirrors the far field processes, but is modified by man-made excavation pits and channels. The excavation pits along the eastern shoreline were quarried in the early 1980s, apparently to source revetment materials. The pits set up circulations on the reef flat caused by spatial differences in wave refraction, leading to deposition and trapping of mobilized sand. This process has contributed to the erosion threat along the shoreline. The southern end of the island is reportedly exposed to relatively strong wave erosion which has led to beach retreat and undermining of local shoreline walls. It is apparent that a man-made channel in this area to quarry beach rock has funnelled wave action and exacerbated the local erosion risk.

At South Ebeye Beach existing breakwater, on the lagoon side, aerial photos show no significant long-shore sediment transport from the south or southwest to the beach, and no sediment supply from the beach to the south or north. The sand spit that forms from time to time at the island's southern end is primarily aligned towards the southwest, away from the breakwater and beach. This is because Ebeye's wind climate is characterised by east to northeast trade winds, resulting in wind-sea and swell waves from that direction. These waves, impacting the shoreline from the east, are unlikely to reach the subject breakwater or significantly impact sediment transport at the beach, which faces west and is located north of the breakwater.

5.1.8.2 Coastal Erosion

Coastal erosion is in general a complex phenomenon which can be the result of many different causes, some of them natural and some of them anthropogenic, acting at different temporal and spatial scales.[77] As described in the 2016 Deltares report, in order to understand the full spectrum of the coastal erosion situation on Ebeye, several different models would be required that can look at these issues at different spatial and temporal scales. Furthermore, very detailed data (e.g. in terms of bathymetry, grain size characteristics, historical overview of man-made interventions, etc) would be required which was not available or collected for the original and updated coastal hazard assessment.

To inform their coastal risk assessment and subsequent recommendations, Deltares relied on modelling for structural erosion (as a result of sea level rise) and storm induced erosion. For the purposes of understanding the need and priority considerations for coastal defenses, these models are considered sufficient by the RHDHV coastal engineering experts.

Design Engineers Assessment

Parts of the Ebeye coastline are currently experiencing coastal erosion. Some of the storm water outfalls in the south-east of the islands, are now completely exposed, indicating that coastline erosion in some locations might have already exceeded the 15-20m of exposed outfall.[77]

[77] *Deltares (2016) Coastal Risk Assessment for Ebeye, Technical report 1230829-001, edition B*

The SOPAC report of costal erosion assessment on Ebeye[78] assessed the costal erosion at the south end near the Ebeye plant station clearly shows strong wave erosion occurred at the south end of Ebeye (**Figure 5-8**), resulting in the footing of the wall being undermined and reinforcement steel being exposed. Furthermore, erosion of sand caused the fronting beach to retreat on the south end. On the eastern side of the rock groyne, high wave energy also caused erosion and formed a steep gradient on the shingle beach. There is a channel that runs parallel to the beach between the current shoreline and beach rock outcrop and current flows through the channel from west to east even at low tide.[78] The formation of it is not related to wave erosion, and it may be the result of extensive quarrying of the beach rock between 1970 and 2003[78].

Figure 5-8: Geomorphologic features of the shoreline and reef flat (SE Ebeye)[79]

On the south end of Ebeye, the sand spit has remained a similar shape, but slightly extended towards the lagoon side between 1940s and 2019. The 2019 aerial photo shows a new spit has formed adjacent to, and just south of, the original spit. There is also rock groyne in the middle of the south end of Ebeye, which became a noticeable feature in the 1977 aerial photo. This groyne became more prominent in the

[78] *Smith, R. (2013). Technical Note – Coastal Erosion Assessment, Ebeye, Kwajalein Atoll, Marshall Islands. Ocean and Islands Programme.*
[79] *Smith, R. (2013). Technical Note – Coastal Erosion Assessment, Ebeye, Kwajalein Atoll, Marshall Islands. Ocean and Islands Programme*

midpoint of the southern shoreline as the south-eastern corner of Ebeye retreated inland, until the groyne was removed during the construction of the breakwater between 2017 and 2019.

Sediment has deposited along the north-eastern and south-eastern shorelines of Ebeye and formed beaches where there were previously none shown in the 1947 map. The 1947 map marks a sandy stretch in center of the eastern side which is still present in the 2019 photograph, but the area and volume of sand cannot be compared due to the limited detail depicted in these figures. However, according to Deltares coastal erosion has occurred on the south-eastern shoreline, where storm water outfalls are exposed.

There is also visible land development and reclamation, particularly at the northern end of Ebeye, where the north-western spit has been subsumed. Excavation pits, located in the southern end, middle and northern end of the reef flat on the ocean side, were quarried in 1983 for revetment materials. The rock revetment of the causeway, which was constructed in late 1980s at the northern end of Ebeye, was reported to be “well-constructed” in the Deltares report. This is consistent with the assessment in the report of SOPAC 2013. There are no obvious erosion signs in the Google Earth photo either, indicating that there is little sediment erosion to the oceanside of the causeway.

Structural Erosion

Deltares[80] placed six transects perpendicular to the oceanside coastline of Ebeye (**Figure 5-9**). Structural erosion due to sea level rise was estimated based on the Bruun rule. The Bruun rule assumes that with a rise in sea level, the equilibrium profile of the beach and shallow offshore moves upward and landward[80]. This simple model calculates the retreat by including an increase in sea level, cross shore distance to the water depth taken by Bruun as the depth to which nearshore sediments exist (depth of closure), and B is the height of the dune.

The calculations for structural erosion were made at the RCP4.5 and RCP8.5 emissions scenarios. In **Figure 5-10** the results of Deltares structural erosion due to seal level rise calculations (AR5 predictions) are shown for Transect 3 and using updated information in Deltares 2021. The graph shows the coastline retreat values due to sea level rise for different timeframes and RCP scenarios. Deltares considers the retreat values for these transects are representatives of all transects at the lagoon and ocean side of the island. Potential long-term structural erosion due to sea level rise is estimated to be 1.5 to 2.5m by the end of the century.

[80] *2016, Deltares (2016) Coastal Risk Assessment for Ebeye, Technical report 1230829-001, edition B*

Figure 5-9: Transects 1 to 6 used by Deltares (2016) to calculate structural and storm induced erosion

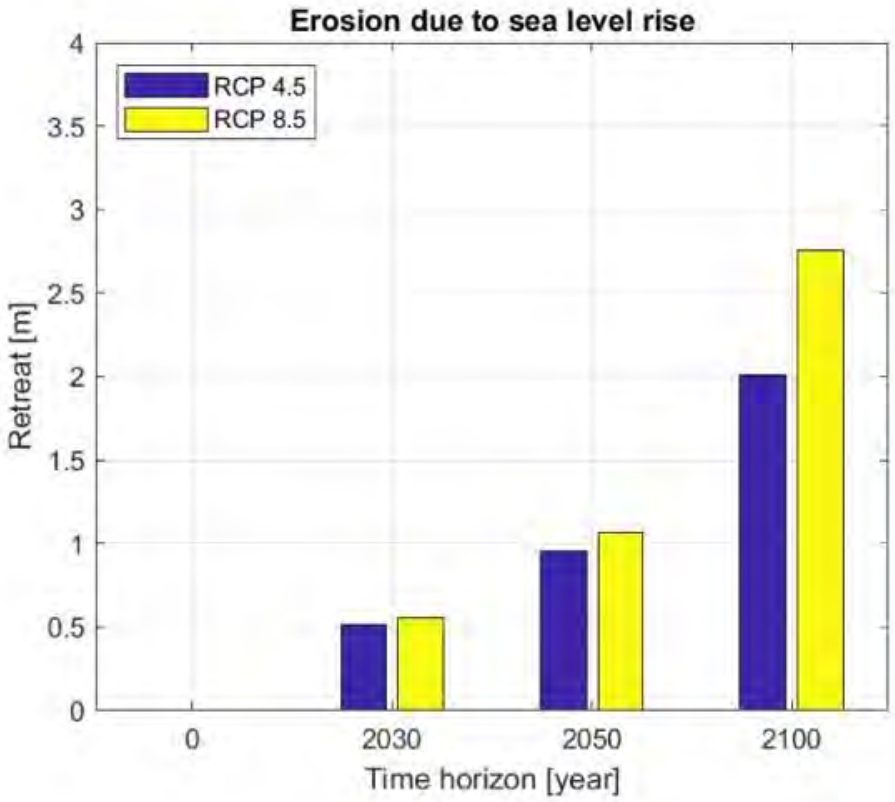


Figure 5-10: Coastal erosion due to sea level rise for transect 3 [81]

Storm Induced Erosion

Deltares used the Van Rijn method to estimate coastal erosion during storm events. This model used a detail cross-shore model (CROSMOR) to simulate the erosion process by using a defined reference storm (storm with a constant storm surge level, wave height and duration of 5 hours). This results in a simplified dune erosion rule for the calculations.

The results of the Van Rijn method for storm induced erosion are presented in **Figure 5-11** (Transect 3) which has a beach with fine sediment (D50=-0.35mm). The figure shows the coastline retreat distances after a storm for different time horizons (horizontal axis) and return periods (coloured bars). When the storm surge level (SSL) exceeds the berm height, no retreat values can be calculated and hence those bars are missing. Potential erosion of up to about 10m may result from an extreme storm event.

[81] *Deltares 2021, Coastal Risk Assessment for Ebeye Update Based on 2019 LiDAR Elevation Data*

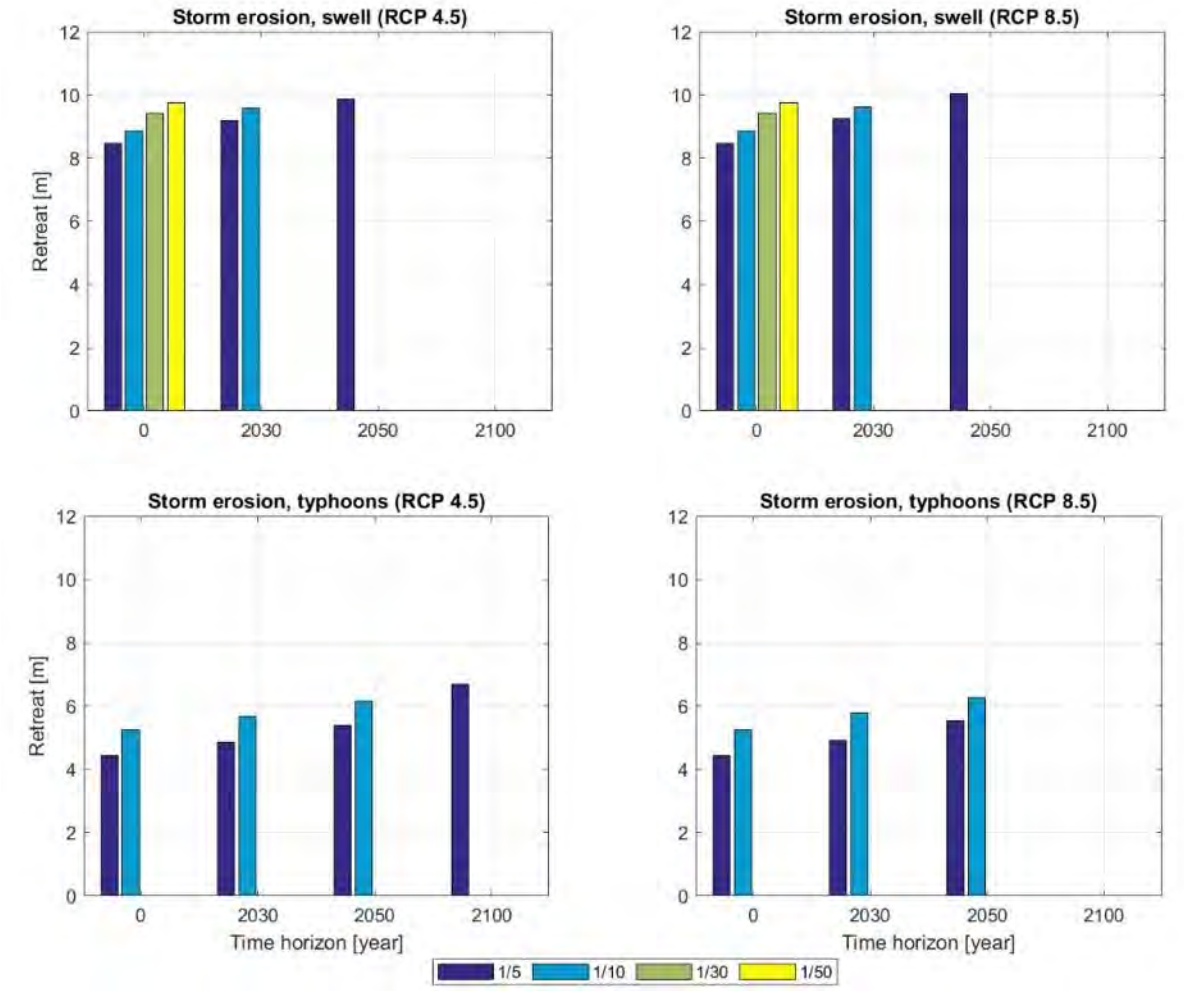


Figure 5-11: Coastal erosion for Transect 3 (D50 = 0.35mm)

(Note - due to swell events (top panels) and typhoon (bottom panels) for climate change scenarios RCP 4.5 (left panels) and RCP 8.5 (right panels). Retreat values are shown for each time horizon and for the return periods of 5 (dark blue), 10 (light blue), 30 (green) and 50 (yellow) years[82].)

In addition, several observations are made by Deltares[82] regarding the storm induced erosion results:

- Sediment size has the greatest influence on storm erosion. For coarse gravel beaches, coastal erosion due to storms in minimal, whereas fine sediment is easily erodible with retreat estimated up to 10m;
- Retreat values are higher for swell events than for typhoon events due to the large dependence on wave period;
- Retreat values increase for increasing return values, as nearshore wave heights are larger. This effect is stronger for typhoon waves, a wave height corresponding to the different return periods vary significantly. For larger return periods the storms surge levels even exceed the crest height with the still water level flowing directly over the berm crest. In these situations, no retreat distance could be calculated;
- Retreat values increase for increasing sea levels, as still water levels are higher and as more wave energy reaches the coast for larger reef flat water depths; and

[82] *Deltares 2021, Coastal Risk Assessment for Ebeye Update Based on 2019 LiDAR Elevation Data*

- It is important to note that storm erosion is an intermittent process and that beaches tend to rebuild themselves naturally during periods of milder wave conditions.

5.1.9 Natural Hazard, Vulnerability and Risks

Typhoons, droughts and storm waves are the main extreme events that impact the Marshall Islands. Typhoons affect the RMI late in the wet season (June to November). In the 33-year period between the 1977 and 2010 seasons, 78 typhoons developed or crossed into the Marshall Islands Exclusive Economic Zone, an average of 22 typhoons per decade. The number of typhoons varies widely from year to year, with none in some seasons but up to 11 in others. During an El Niño event the sea-surface temperatures increase in and to the east of the Marshall Islands. This allows more intense typhoons to form. Droughts generally occur in the first four to six months of the year following an El Niño. Following severe El Niño events, rainfall can be reduced by as much as 80%. The dry season begins earlier and ends much later than normal during an El Niño.

RMI is situated along a relatively quiet seismic area but is surrounded by the Pacific "ring of fire," which aligns with the boundaries of the tectonic plates. These boundaries are extremely active seismic zones capable of generating large earthquakes and, in some cases, major tsunamis that can travel great distances. No significant earthquakes have been observed in recent history. However, in 1899, a large earthquake off the eastern coast of New Ireland, Papua New Guinea generated a tsunami that caused a considerable amount of damage in the RMI.

Earthquake hazard in the Marshall Islands is classified as very low, there is reportedly less than a 2% chance of potentially damaging earthquakes in the area in the next 50 years.[83] There is a 40% chance in the next 50 years of experiencing, at least once, very weak levels of ground shaking. These levels of shaking are not expected to cause any significant damage to well-engineered structures.[84]

5.2 Biological Environment

5.2.1 Terrestrial Environment

The terrestrial environment of the RMI is made up of forests, agriculture and wetlands which have been shaped by Marshallese land management practices. RMI has a limited number of terrestrial species which are endemic and a low number of terrestrial species in general. Little to none of the true original vegetation remains of the Marshall Islands. The original ecological system was altered by the first Marshallese settlers and also during the colonial era.[85]

The vast majority of the Ebeye island is built environment. Vegetation primarily consists of plantings among residences and gardens, such as coconut, tropical almond (*Terminalia catappa*), noni (*Morinda citrafolia*) and ornamentals.[86]

In addition to residential/garden planting, Australian pines (*Casuarina litorea*) are also common, planted as windbreaks, and along property boundaries. Beach cabbage (*Scaevola taccada*) dominates the shoreline north of the community, on the causeway to Guegeegue village[86].

[83] *http://thinkhazard.org/en/report/157-marshall-islands/EQ*
[84] *http://siteresources.worldbank.org/EXTDISASTER/Resources/MarshallIslands.pdf*
[85] *Fosberg, R. F. (1990): "A Review of the Natural History of the Marshall Islands". National Museum of Natural History Smithsonian Institution, Washington, D.C., USA*
[86] *ADB 2020, Initial Environmental Examination RMI: Additional Financing of Ebeye Water Supply and Sanitation Project*

Within or immediately adjacent to the seawall alignment, there are two vegetated areas. One is a 'knoll' type area which is predominately covered in low lying scrub with on specimen of Australian pine which will be removed under the current alignment. Further along the wall at 1,300 m, there is a small stand of trees planted within a garden, adjacent to a private graveyard (**Figure 5-12**). These are outside the alignment footprint.

Figure 5-12: Trees and vegetation on grassy knoll (left) and along private graveyard (right)

Observed fauna consisted mainly of introduced species such as dogs, cats, and rats. Resident and migratory shorebirds can be found on occasion along the fringing reef.[87]

5.2.2 Marine Environment

5.2.2.1 Reef Flat (Ocean and Atoll Side)

Observations of the ocean-side reef environment made by RHDHV have confirmed that the reef flat within and immediately adjacent to the seawall alignment consists of bare rock with some algal and macroalgal coverage and the occasion small coral. No coral outcrops were observed by either team and the area was observed to be in a highly degraded state. This was verified by aerial drone surveys of the foreshore reef flat which showed only bare rock, algae or macro algae in areas outside the borrow pits with scattered small corals which are not considered to be biologically valuable in this setting.

The reef flat further out from the immediate foreshore area has been subject to a walk-over and the wider reef flat is consistent with the above statement. The reef flat in the vicinity of the sea wall alignment and in the likely areas of haulage routes is of negligible to low ecological value.

The reef flat to the west of the causeway was similar in nature and of low ecological value. Indeed, some further excavation works have occurred more recently closer to Lojjairok where a landing facility is being built for the forthcoming causeway repair project. A walkover of this site has identified no to little ecological value in the flats or the excavated areas. Note that the offshore (atoll side) areas are home to very rich coverage of coral (see below in **Section 5.2.2.3**).

5.2.2.2 Borrow Pits

Within the ocean-side reef flat there are four main borrow pit areas (**Figure 5-13**). These pits are former quarry sites where material was extracted for use on the island but are now mainly used for recreational swimming. Areas 1-3 are in front of the proposed seawall alignment, whilst Area 4 is in front of the already built revetment.

[87] *ADB 2020, Initial Environmental Examination RMI: Additional Financing of Ebeye Water Supply and Sanitation Project*

It is not envisaged that works will need to occur in or immediately next to any of these pits. Any works or haulage will occur on the reef pan and at no point will material or plant be required to go into the pits. As these areas are highly modified quarry sites, which are exposed to the tides and wave conditions (i.e. highly dynamic area), ecological value is limited to the edges of the pits or those areas where rocks and boulders were left. The sandy bottoms offer limited ecological value.

Figure 5-13: Borrow pit groupings (highlighted in yellow) in relation to the seawall alignment (red).

(Note - Groupings are referred to are: 1 = power station, 2 = central, 3 = big bay area, 4 = revetment pits).

As part of the field work during the design phase in 2021, swim surveys were conducted within some of these borrow pits. Namely the power station (1 in **Figure 5-13**) and the central borrow pits (2 in **Figure 5-13**). In 2023, RHDHV undertook further swim surveys in Borrow Pits 4, 3 and 2.

The 2021 swim survey was filmed, and the footage has been assessed to provide high level findings on the ecological importance of the pits. The video footage has been used to identify substrate types, coral identification to at least the genus level, high level assessments of coral health and general fish assemblages.

CENTRAL BORROW PIT: Video footage of the central borrow pit shows a very degraded environment with little to no corals observed. The substrate is mostly bare rock and there is a high level of solid waste (pipes, bags, buckets, etc) throughout the pit (**Figure 5-14**). This pit has no to low ecological value.

Figure 5-14: Examples of dominant substrate condition in central borrow pit

POWER STATION BORROW PIT: This borrow pit is located approximately 80 m from the outermost extent of the proposed alignments. Video footage shows that there are large areas of coral coverage. Comparing the video footage to aerial imagery of the borrow pit, **Figure 5-15** indicates the extent of coral cover within the pit. Of the approximately 3,000 m^2 borrow pit, approximately 880 m^2 (29%) is indicated as being coral habitat of yet unverified ecological composition or health. It is indicated that the corals are situated on the north-eastern edge of the pit which is the closest side to the alignment.

Figure 5-15: Borrow pits at the power station end of the seawall alignment with reef areas highlighted in yellow.

Examination of the footage and observational data by the field team indicates that there is low diversity of coral with only four or five species present. Identified through the video footage are: *Montipora altasepta*, *Pavona varians*, and *Montipora incrassate* (**Figure 5-16**). *Montipora altasepta* is by far the most common of the species recorded. Monitpora are a fast-growing branching coral commonly found on reef flats and slopes and are widespread in tropical oceans. This genus is second in the number of reef-dwelling coral species after Acropora[88].

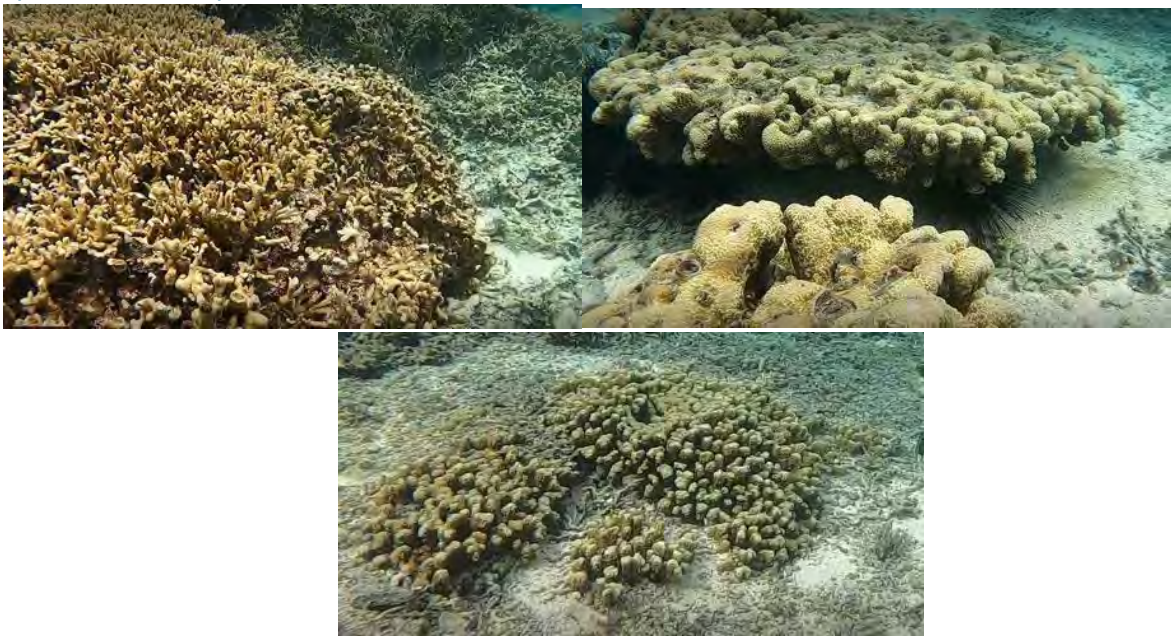


Figure 5-16: Images from the Power Station borrow pit.

(Note - Monitpora altasepta (top left), Pavona Varians (top right) and Monitpora incrassate (bottom)).

[88] *http://species-identification.org/species.php?species_group=corals&id=19&menuentry=groepen*

Video footage and survey observations find that the benthic substrate of the pit is mostly comprised of dead coral remnants and rubble (**Figure 5-17**). Where there is live coral cover (LCC), the coral was assessed during the survey to be in poor to fair health. Corals are also observed covered in filamentous algae.

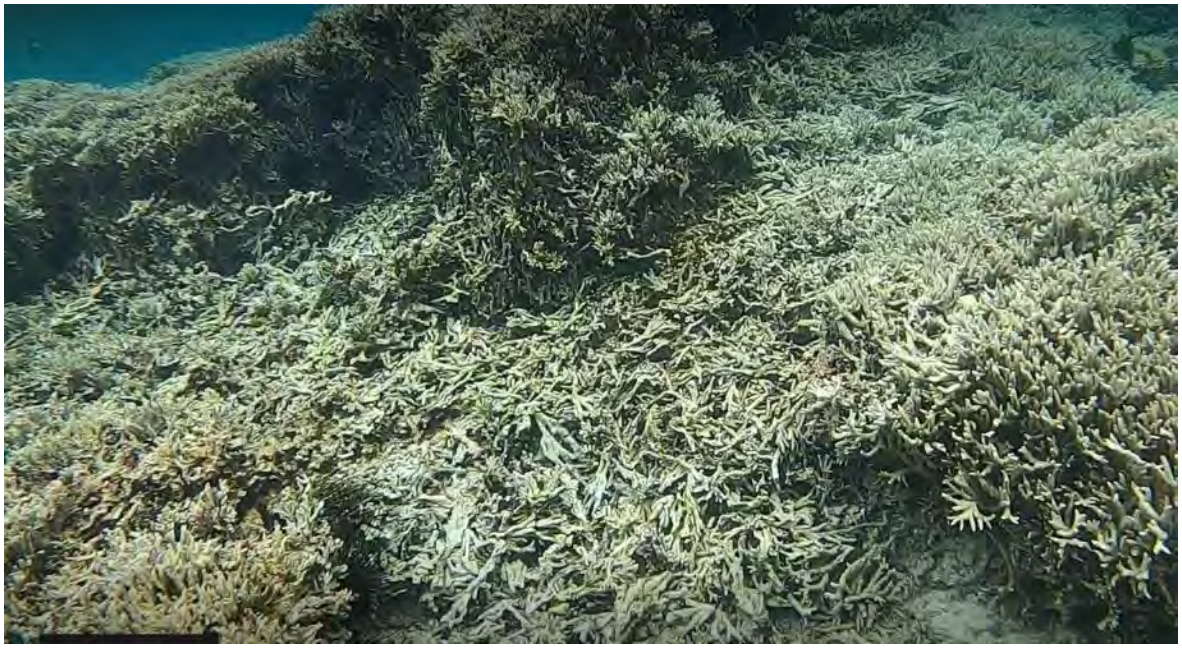


Figure 5-17: Dead coral patches which dominate reef areas in the Power Station borrow pit.

Benthic invertebrates observed included a few sea cucumbers, a few crown of thorn (COT) starfish (*Acanthaster planci*) and an abundance of long spine black sea urchins (*Diadema setosum*) (**Figure 5-18**). The COT prey on almost all coral species and can eat their way through 10 square meters of coral in a year.[89] As the survey was undertaken during the day, and given the nocturnal nature of COT, it is reasonably assumed that they are more abundant than observed in the video. COT at the level observed in the borrow pits is considered an outbreak and the success of the COT is linked to the health of the reef – they do better in already stressed reef environments[90].

The urchins are an important herbivore on coral reef and contribute to resilience by grazing algae and creating habitat for young corals to settle. However, urchins can also have negative impacts on coral reefs. In some situations, where the processes of reef calcification may be depressed and/or urchin populations reach outbreak densities, the scraping effects of urchin feeding can remove coral recruits, reduce cover of important coralline algae ref and lead to unsustainable bio-erosion. There are a number of possible reasons for sea urchin outbreaks. They may be the result of depletion of natural predators, such as triggerfishes and wrasses or reduced food competition that might result from over-harvesting of herbivorous fishes. Nutrient pollution on coral reefs may also contribute to urchin outbreaks by increasing algal growth[91].

This benthic assemblage indicates an ecosystem in poor health and degraded.

[89] *https://www.barrierreef.org/the-reef/threats/Crown-of-thorns%20starfish*
[90] *https://oceana.org/marine-life/crown-thorns-starfish/*
[91] *https://reefresilience.org/stressors/predator-outbreaks/urchins/*

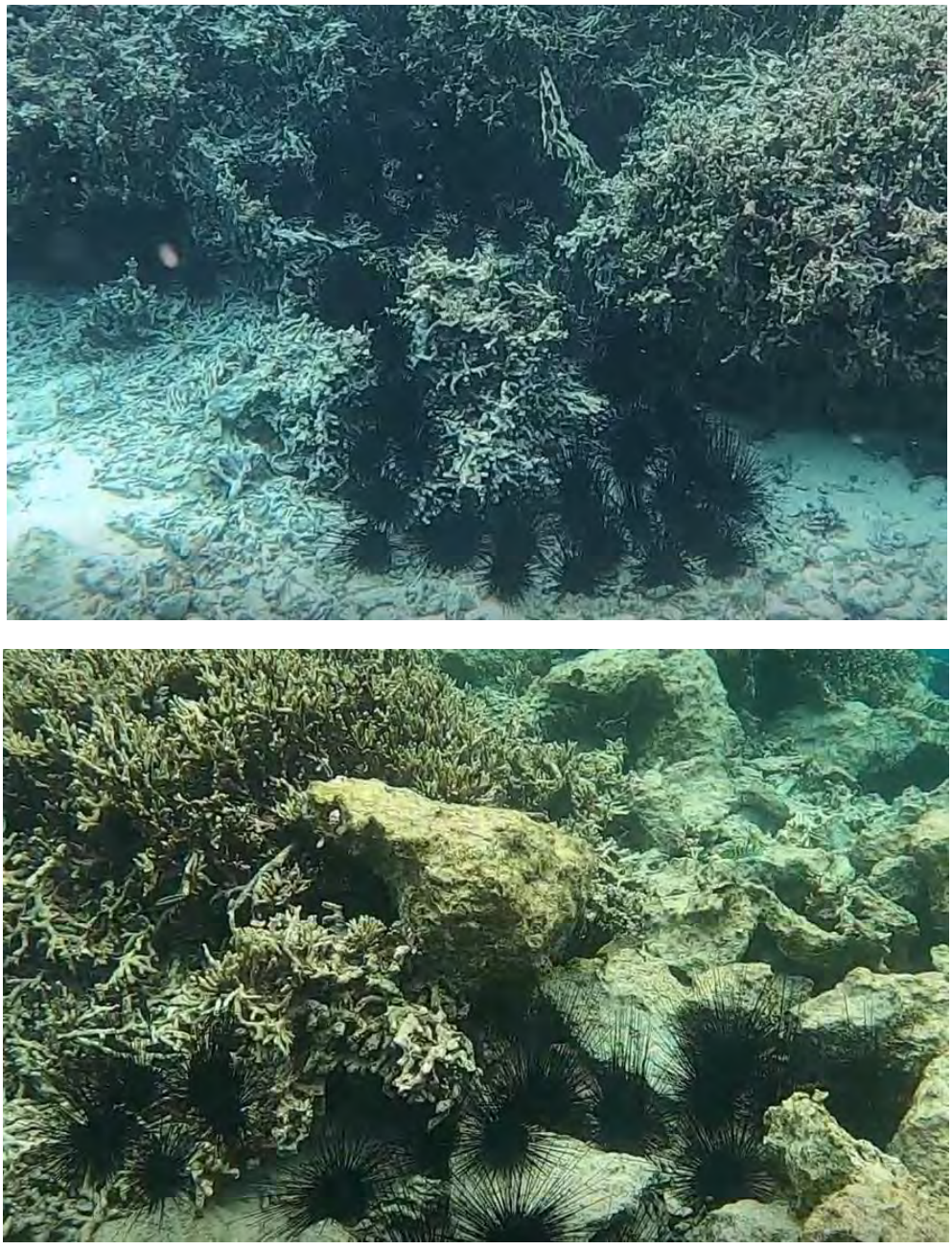


Figure 5-18: Long Spine sea urchin are found in abundance within the Power Station borrow pit

Fish species observed are the typical small herbivorous families that are to be expected in this type of reef environment: surgeonfishes, damselfishes, butterflyfishes, etc. The abundance and distribution of fish observed in the video footage does not, at a high level, indicate an ecologically valuable area.

Whilst no valuable or significant reef habitat was recorded within this borrow pit, its proximity to the Project alignment means it will potentially be exposed to environmental risks and impacts during construction. Avoidance and minimization measures will be required to limit any impact to the borrow pit, but no further surveys are required unless there are unforeseen seawall design changes or the Contractor's proposed construction methodology risks direct physical loss of / or impact to the borrow pit.

EXISTING REVETMENT BORROW PITS: Video footage was not gathered for this borrow pit area in 2021. RHDHV however did undertake a swim survey in 2023 and found this borrow site to offer some ecological interest. Basically, some coral has re-established along the pit walls and on any hard substrate left after quarrying. It is an area, however, which is mostly devoid of notable habitat due to the highly dynamic conditions.

BIG BAY BORROW PITS: Video footage was not gathered for this borrow pit area in 2021. The area has several pits, and aerial imagery indicates that the pit closest to the Project footprint (**Figure 5-19**) does not have observable coral colonies. Imagery indicates that there are coral colonies in the outer pit which is approximately 65 m from the seawall alignment. In 2023, RHDHV confirmed that there was some scattered coral but the area is mostly barren.

Figure 5-19: Borrow pits in relation to the Big Bay area.

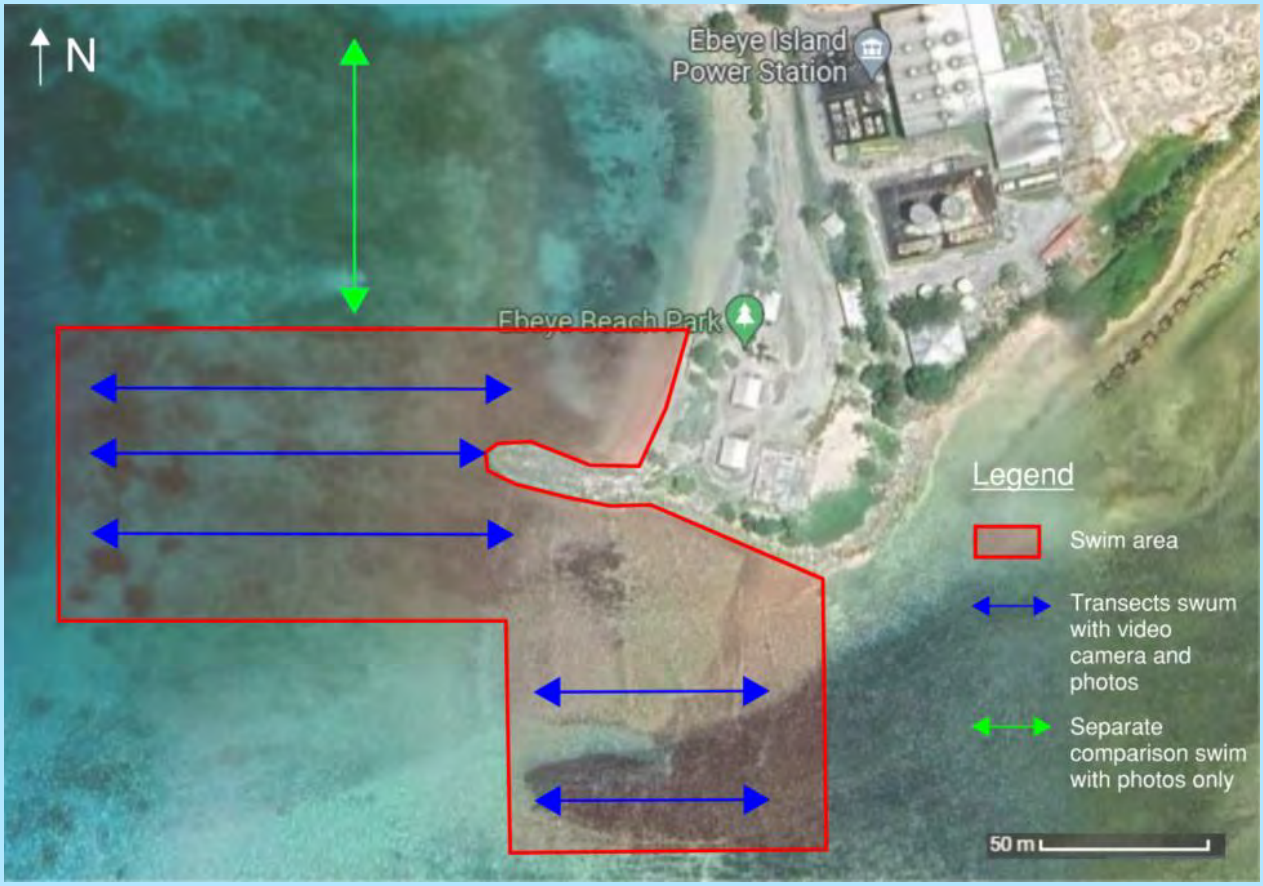
(Note - Borrow pit highlighted in red will be directly impacted by the seawall alignment while the outer pit highlighted in yellow may be subject to impacts from construction).

5.2.2.3 Atoll Side Coral Reef

In 2023, RHDHV undertook swim surveys on the atoll side of the island in the southwest (coral reef surrounding the Power Station and South Ebeye Beach) and to the south and north of Lojjairok (PII and JoeMar Sites). It is considered that in those areas unaffected by human development and extraction, that the coral is in many places healthy and of significant coverage. However, there are also notable areas of sand and non-coral areas, which offer suitable sites for landing of materials.

It is recommended that the contractor's proposed landing site for materials is chosen for not only its technical (i.e. deep water), economic (i.e. proximity) and social (i.e. not in town) benefits, but more importantly for its environmental benefits (i.e. minimal destruction of coral habitat). The potential materials landing sites that have been identified to date have already been explored in **Section 3.4.4**. In summary however, and as reported in the Consultation Summary Report (**Appendix A**), the following was noted (see **Table 5-6**).

Table 5-6: Atoll side coral findings from May 2023 site visit

Site Assessed and Notable Findings
South Ebeye Area assessed    Technical Findings Shallow approach at low tide. Area could be used for lay down of rock material on the hard pan. However, area is subject to rip currents according to locals. In close proximity to southern limit of works. Environmental Findings The coral in this area is limited to rocky outcrops and principally in depths greater than 3-4m. The coral coverage is patchy in areas but there are notable healthy habitat areas with good coverage. There are large extents of sand and also areas of bleached corals. Given the shallow nature of the approaches, impacts with ship / barge keels should be avoided. Summary Proximity of site to the southern limit of works will reduce travel time of haulage. If used as a landing area, impact to BBQ area and beach are to be minimized as site is of high social importance. Impacts to coral from ship/ barge keels should be avoided.

Site Assessed and Notable Findings

Photos of South Ebeye Site

Site Assessed and Notable Findings

PII Site to the North of Ebeye – Directly to the south of Lojjairok

Technical Findings

The PII site is in an orderly state and appears to have been built with a solid structure and berthing / landing area. The area is clean and currently there appears to be little waste or washed sediments (from construction run-off) in this area. There would also appear to be decent depth allowance at low tide, although this would have to be assessed more accurately in the future.

Environmental Findings

The site is of exceptional ecological value with coral habitat in the area easily achieving +90% coverage in large areas. There is a diverse assemblage of coral and fish species, and the majority of the coral looks very healthy. There are large patches of barren sand immediately next to the shoreline and then offshore coral habitats as well, perhaps 50m offshore.

Summary

The PII site looks to be well managed and (currently) not impacting upon local corals on a quick survey observation. There is an existing rock revetment and landing ramp at the site, and there is potentially enough depth offshore to allow barges to access this site. The coral in this area is spectacular and would need to be avoided at all costs.

Photos of the PII Site

Site Assessed and Notable Findings
JoeMar Site to the North of Ebeye – On Loi Technical Findings This site is being used for coral sand quarrying presently. Sand and coral are being extracted from the seabed and then used to sand to use in concreting. This site is deeper than other sites considered and has a very basic wharf and landing site. Some of the revetment is made up of scrap metal which might make deliveries difficult. This site is the furthest away in terms of distance from Ebeye. Environmental Findings Given the nature of the sand and coral extraction that is currently being undertaken, the habitat in the area of the wharf, the southern side of the finger pier and all the way down to the southern ramp is almost devoid of coral life. Those areas around the site still have good coral coverage. However, given the nature of the extraction works, there was a large amount of sand and silt in the area and most notably on top of the corals themselves. The water quality / visibility in this area was notably poorer than that PII area to the south (snorkelled within an hour of each other on a slack tide). Summary This site is technically less advantageous given the longer haulage route, the need to drive on the causeway and through the nearby community, and the current poor berthing facilities. It is socially less desirable given the local settlement but is conversely environmentally more acceptable given that the coral has been removed from this site through previous operations.

Site Assessed and Notable Findings

Photos of the JoeMar Site

5.2.3 Vulnerable and Endangered Species

The International Union on the Conservation of Nature (IUCN) Red List[92] identifies 101 vulnerable, eight endangered and one critically endangered species. Of these listed species, two are terrestrial (Micronesian Forest Skink and Micronesian Imperial Pigeon) and neither of which have been recorded in Kwajalein.

The current IUCN Red List database provides summary information regarding the number of threatened and protected species by country (**Table 5-7**). This indicates that for RMI there are a total number of 1,163 animal species listed including those that are endangered, vulnerable and near threatened. A large proportion of those species are lower risk/least concern and/or data deficient. These include several species of sharks and rays, sea snakes, whales, marine turtles and corals from at least 12 families. Green turtles (*Chelonia mydas*) are the most common threatened species seen in waters, however, neither they, nor any other Red List turtle species, nest on beaches within the AOI.

Table 5-7: IUCN Red List categories for RMI

Category	EX	EW	CR	EN	VU	NT	LR/cd	DD	LC	Total
#Species	0	0	1	10	81	106	0	35	930	1,163

(Note - EX - Extinct, EW - Extinct in the Wild, CR - Critically Endangered, VU - Vulnerable, LR/cd - Lower Risk/conservation dependent, DD - Data Deficient, LC - Least Concern)

5.2.4 Invasive and Alien Species

A study conducted in the RMI in 2015 recorded 523 alien species that impact the environment, and of these 130 are classed as 'invasive' based on evidence of impact. Most of those recorded species are plants, with some animals. The most harmful ones to native flora and fauna are cats and rats. Many terrestrial and marine invasive species are threatening biodiversity. Most notably, the well-established Merremia vine (evident as the dominant species within the seawall alignment footprint), the yellow crazy ant and the red-vented bulbul are already having negative impacts by taking over ecosystem niches.[93] Across the RMI, Kwajalein has the second highest number of invasive species with 187 recorded which is expected given that the atoll is the second largest port of entry to RMI.

Biosecurity measures exist at international ports of entry which is mostly driven by prevention of invasive economic pests (e.g. African snail and oriental fruit fly).

5.3 Social and Built Environment

5.3.1 Land Use

Land is extremely limited in Ebeye due to the densely populated nature of the island (see **Section 5.3.2**). The land is largely covered in buildings either houses, service structures such as churches schools, hospital and government buildings, or commercial structures such as shops and small industry.

The island is broken down into 10 Wetos (village style units) as follows in order from the northern part of Ebeye: (1) Tobikle, (2) Lojkomlak, (3) Ekojaja, (4) Loien, (5) Monkubok, (6) Monin, (7) Lole (8) Bouj (9) Batien, (10) Jebalur. These Wetos are densely populated by houses and buildings as well as in some

[92] *https://www.iucnredlist.org/search?landRegions=MH&searchType=species*
[93] *SPREP, 2016, The Republic of The Marshall Islands State of the Environment Report*

cases yard fences. There are 3 public cemeteries and a few recreation areas such as a basketball and tennis court.

There is no land available for cropping and there are very few residential gardens.

The nearby islet of Loi is not as densely populated as Ebeye. It has a cemetery at the southern end, a quarry at the northern end that is run by a local contractor (JoeMar), and scattered houses throughout. There is a lot of green space on the islet as a result. A road runs from south to north and offers access to other parts of the atoll chain.

5.3.2 Demographics

Ebeye is the most populous island of the Kwajalein Atoll. With only 80 acres (32 ha or 0.14 square miles of land) and an estimated 11,408 people recorded in the 2011 RMI Census. In terms of density, Ebeye is the most densely populated/crowded island in the RMI with 9,614 people per square mile. Ebeye has become the sixth most densely populated island in the world. Furthermore, over 55% of the population is estimated to be under the age of 15[94].

Total households' in Ebeye in 2011 numbered 1,103 with an average of 9 persons residing in each household. By the 2021 Census, the number of households had risen to 1,182, however number of residents per household had decreased to 7. Houses are densely located and are wedged back-to-back to utilize all available space. An approximate 26% of households in RMI are female headed and these often face greater vulnerability than male headed households due to employment opportunities, networks and traditional roles.

Preliminary census results in the RMI are showing a dramatic decline in the country's population between the 2011 and 2021 census. The 2011 census report records the country's population at 53,158, however preliminary census 2021 results in the RMI are showing a dramatic decline of 26% in the country's population (to 39,262). It is notable that the Kwajalein Atoll population numbers have also dropped from 11,408 in 2011 to 9,943 in 2021 (12.8% drop)[95]. Note that the 2021 Census is a preliminary census report and not all data is publicly available yet.

As shown in **Figure 5-20** below, the population of Ebeye is skewed towards younger aged persons with median age of 21 in 2021[95].

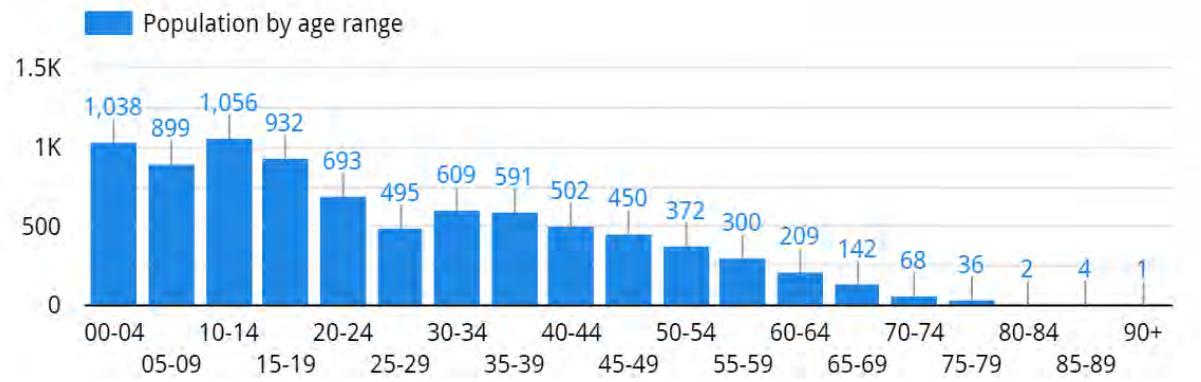


Figure 5-20: Ebeye Population Age Range from Preliminary Census 2021

[94] *RMI Census 2011 Online at: Marshall Islands Census | Republic of the Marshall Islands Environmental Data Portal (sprep.org)*
[95] *RMI 2021, Preliminary Census Data*

As the islet of Loi is a lot smaller than Ebeye and not densely populated, it is unlikely that its population will be more than a few hundred. As such, the next few subsections focus on the island of Ebeye only.

5.3.2.1 Migration

MIGRATION TO EBEYE: Most of the residents of Ebeye are the descendants of islanders evacuated from other islands in the Kwajalein atoll. Before WWII, Ebeye was a small community, supporting itself through fishing. In the 1960s, the US started using Kwajalein as a support base for the nuclear testing conducted at Bikini Atoll and Enewetak Atoll. Subsequently, the US relocated all the Marshallese residents of Kwajalein Atoll Islands to a planned community in Ebeye. The evacuees were given plywood housing and potential job opportunities in Kwajalein.

MIGRATION FROM EBEYE: As noted above, the RMI have had a considerable population decline between the 2011 and 2021 Census periods losing 25,000 people to out-migration, double the previous 10-year rate[96]. This has included 7,314 from Majuro in the current preliminary results.

However, outmigration from Ebeye encouraged by economic and employment opportunities in the USA has also been supported by the Compact of Free Association (COFA) between the USA and RMI and outmigration has been steady over recent years. It is reported that, while neither RMI nor the USA record migration patterns, migration is one directional with it being uncommon for USA based Marshallese to return and resettle back in the RMI[96].

Furthermore, the Marshall Islands border was closed for 2 years due to COVID and only 10 government-sponsored repatriation groups had returned by the time of the 2021 census collection (about 600 people returned in these groups). Yet during this period over 3,000 Marshallese left the country on regular flights to the US, resulting in a large net outflow of the population.

5.3.3 Education

Relevant education data has been heavily reliant on the now dated 2011 RMI Census, complemented by information from other sources such as the 2017 First Education Summit on Ebeye and currently gradual information is coming in from the Census 2021 data.

Ministry of Education data indicate that just over 15,000 students were enrolled in RMI schools in 2010. However, school enrolment went down since this period. While increasing to 15,942 in 2015, numbers of school children declined by 17 percent through 2021, when 13,274 students were enrolled[97]. However, the growing emphasis on schooling does suggest that the level of education in the community is improving. With 85.5% of 6-13 years and 74% of 14-18 years (a total of 3,112 students in 2017) attending school, education levels on Ebeye are gradually increasing. As indicated in **Figure 5-21** below, 75% of the population have at least completed high school (risen from 65% in 2011). There is little difference between numbers of male and females completing high school.

Numbers of students who have completed college or tertiary appear to have dropped from 22 percent (2011) to 10 percent (2021). More males than females reportedly completed higher levels of education in 2011 (13.1% males had some college education compared to 9.9% women in 2011). Only 2% of the population reportedly had no schooling in 2011, compared to all 2021 whereby all residents have had some level of schooling. Literacy rate in Ebeye in 2021 is recorded at 89.5 percent[97].

[96] *RNZ news 2021 Marshall Islands census numbers show heavy out-migration | RNZ News Marshall Islands Journal*
[97] *RMI 2021, Preliminary Census Data*

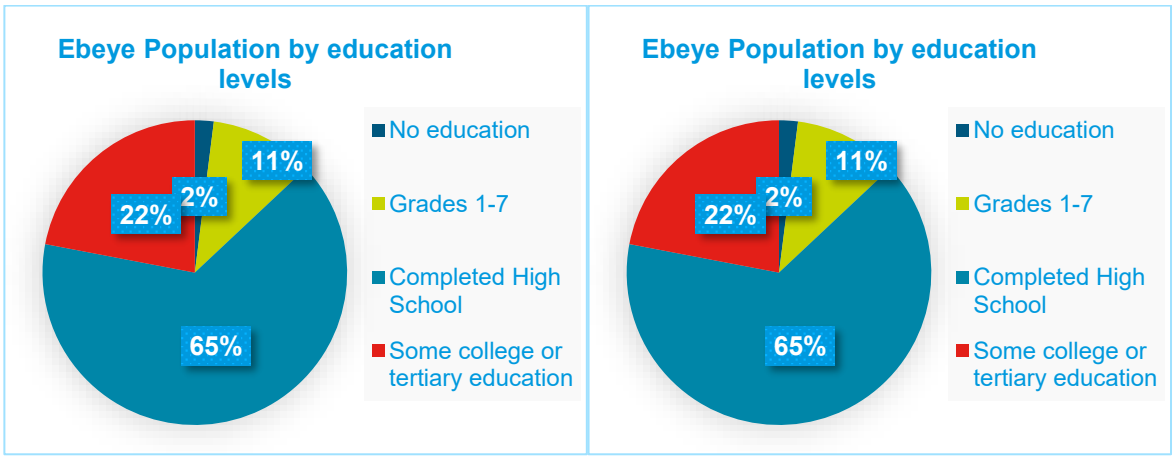


Figure 5-21: Education level of Ebeye residents in 2011 and 2021.

(Source: RMI Census 2011 (left) and RMI Preliminary Census 2021 (right)).

5.3.4 Health

In RMI, the health care system is supported by two hospitals, one in Majuro, one in Ebeye and 58 health care centers in the outer atolls and islands. These hospitals provide primary and secondary care but limited tertiary care[98].

The past decade has seen improvements in health indicators, especially with decreases in maternal and child mortality (3% in 2006). Live births are also declining across RMI over the past decade. From over 1,406 in 2010, in Majuro, Ebeye and the outer islands. this number declined to 980 births in 2019 and 1,002 births recorded in 2020, a 30 percent drop from 2010.

Sedentary lifestyles and imported processed foods have resulted in a sharp rise in adult obesity and non-communicable diseases[98]. Traditional foods such as breadfruit, coconut, and reef fish are largely unavailable on Ebeye. Nearly all of the food is imported, with a heavy reliance on processed / manufactured foods such as white rice and canned meats, pizza and soda. Consequently, diabetes-related diseases and cancer are now the leading causes of death on the island (**Table 5-8**)[98]. The nuclear testing conducted in parts of the country in 1954 also contributed to excessive cases of cancer which continue to leave a negative legacy.

Table 5-8: Main Causes of Death in the Marshall Islands, 2016

Main causes of death	Number	
	Male	Female
Diabetes related	63	46
Cardiovascular disease	39	17
Cancer (all types)	14	18
Hepatitis B	16	9
Injury/accident/drowning	11	3

Source: Ministry of Health.

[98] *ADB 2020, Initial Environmental Examination RMI: Additional Financing of Ebeye Water Supply and Sanitation Project*

High population and dense living conditions have contributed to communicable disease conditions such as tuberculosis and leprosy. Other issues include malnutrition in children, poor immunisation coverage, high teen pregnancy rate and increasing sexually transmitted diseases[99]. An outbreak of dengue fever in 2019 was linked to poor solid waste dumping[100]. Forty percent of boys and 30 percent of girls are stunted, impacting their development throughout life[101].

The Ministry of Health has partnered with the World Health Organization (WHO) to incorporate climate change impacts into its plans and policies, focusing particularly on improved drinking water safety and rainwater harvesting, as well as household and community-based water quality monitoring[99]. By 2017[102] waterborne diseases were among the most frequent cases presenting for treatment in the Ebeye Hospital. A new desalination plant has been effective in increasing people's access to safe, reliable water since 2017. There is already evidence that the incidence of waterborne disease, particularly gastroenteritis, has decreased following the commissioning of this new desalination plant[102].

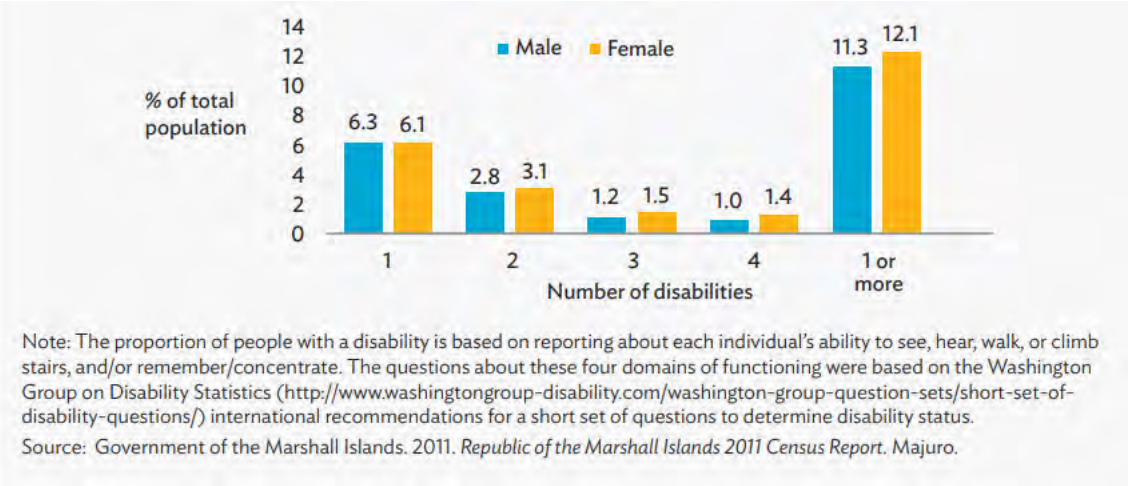
People with a Disability

As noted below, Ebeye has ratified the Convention on the Rights of Persons with Disabilities. Under this Convention: 'Parties reaffirm that every human being has the inherent right to life and shall take all necessary measures to ensure its effective enjoyment by persons with disabilities on an equal basis with others'.

The total disabled in Ebeye in 2021 was reported at 196 persons (2.3% of the population) (**Figure 5-22**). This includes the following breakdown in disabilities:

- 43 with seeing issues;
- 51 with hearing issues;
- 70 with mobility issues;
- 36 with memory related disabilities;
- 23 with selfcare needs; and
- 52 with communication problems[103].

[99] *ADB 2020, Initial Environmental Examination RMI: Additional Financing of Ebeye Water Supply and Sanitation Project*
[100] *ADB 2020 'IEE' Republic of the Marshall Islands: Ebeye Solid Waste Management Project*
[101] *ADB 2020 Marshall Islands Gender Equality Overview – Key Statistics for informed decision-making in celebration of Beijing +25 Online at: https://www.adb.org/.../marshall-islands-gender-equality-overview.pdf*
[102] *ADB 2017, Initial Environmental Examination RMI Water Supply and Sanitation Project*
[103] *RMI 2021, Preliminary Census Data*



Note: The proportion of people with a disability is based on reporting about each individual's ability to see, hear, walk, or climb stairs, and/or remember/concentrate. The questions about these four domains of functioning were based on the Washington Group on Disability Statistics (http://www.washingtongroup-disability.com/washington-group-question-sets/short-set-of-disability-questions/) international recommendations for a short set of questions to determine disability status.

Source: Government of the Marshall Islands. 2011. *Republic of the Marshall Islands 2011 Census Report*. Majuro.

Figure 5-22: Prevalence of Disability, by Sex and Number of Disabilities, 2011

5.3.5 Employment and Economy

The Marshall Islands has a narrow economic base, limited long-term economic growth and fiscal sustainability, and is vulnerable to severe weather and climate change. Economic growth has tended to be reliant on the fishing, construction and transport sectors. Furthermore, there continues to be a heavy reliance on donor support and remittances from relatives living overseas.

5.3.5.1 Subsistence, Livelihoods and 'Poverty'

In most Pacific countries, poverty is a sensitive topic arising from strong cultural beliefs and practices of 'caring and sharing' for those vulnerable, so no one goes hungry. The western concept of poverty challenges the traditional foundation of the society and strength of its culture. Yet the 2010 Majuro and Kwajalein Household Water Survey (Economic Policy, Planning and Statistics) concluded that poverty was a real and serious problem in urban areas of the RMI, with households facing problems such as no water, no electricity, high unemployment, stagnant wages, rising prices, a need for improved government services, and access to information[104]. Poverty rates vary across rural and urban areas and according to source of income. The highest poverty rates are for adults working in businesses operated by their household or a family member. Those in formal employment experience consistently reduced rates of poverty.

A recent ADB[105] study assessed that according to the 2011 Census data, approximately 23% of the Ebeye population have been living on less than $0.94 per day with little or no subsistence income (based on average of 9 persons per household). The 2011 RMI Census reported that 15.2% of all Ebeye households reported no income and another 7.8% reported less than $3,000 annual income. However, those working on Kwajalein missile defense base can make $10-12 an hour, providing a good source of household income.

Approximately one third of households in RMI are female headed. The poverty rate is higher for people living in female headed households (FHH) (approximately 10% compared to 7% in male headed households). In Kwajalein the rate of poverty in FHH is recorded as double (7.7%) to that of male headed

[104] *RMI 2019 Household Income and Expenditure Survey*
[105] *ADB 2020 Marshall Islands Gender Equality Overview – Key Statistics for informed decision-making in celebration of Beijing +25 Online at: https://www.adb.org/.../marshall-islands-gender-equality-overview.pdf*

households (MHH) (4.2%). Furthermore, more households in Kwajalein are FHH (44%) than other parts of RMI (26% overall)[106].

5.3.5.2 Employment

Most adults working in RMI are formally employed (**Figure 5-23**), with only 6 percent working on their own or a family business. However, source of employment type varies between urban and rural areas of the country, with employment as an employee predominantly in urban areas (93 percent versus 49 percent) and self-employment and household businesses much more common in the rural areas of RMI[106]. Formal employment in RMI heavily reliant on the government sector (41%) constituting 40 percent of GDP (including state owned enterprises). The USA Test Site on Kwajalein accounts for nearly one-third of the country's economic activity which in 2011 included approximately 900 workers who reside on Ebeye[107].

Despite financial assistance from the USA, 30 percent of the population in the island's two cities are living below the basic-needs poverty line due to scarce natural resources, high unemployment rates and wealth inequality[106]. Median Income is USD$9,700 and around 44 percent of the population of Ebeye receive remittances from overseas to supplement incomes[108]. Remittances are also a widespread source of income with remittances received by about two thirds of households in Kwajalein. The median annual remittance rate is highest in Kwajalein ($530) compared to Majuro ($434)[106].

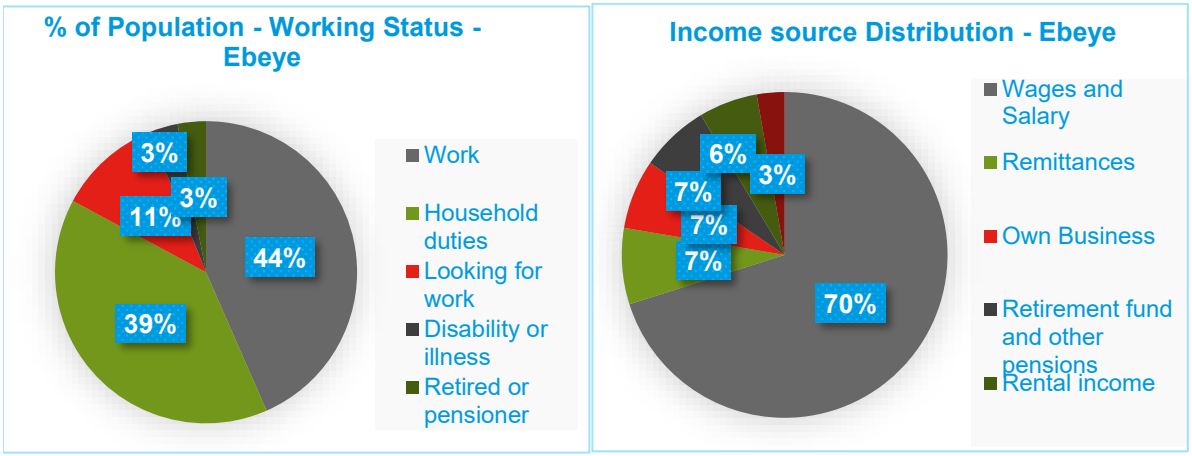


Figure 5-23: preliminary Census 2021 working status statistics from Ebeye. Source: RMI Preliminary Status 2021

For those households that rent, it is reportedly a significant part of gross income, which is due to the high rental values (HIES 2019). This is especially applicable in urban areas including Ebeye.

GENDER AND EMPLOYMENT: The 2011 Census noted that more women produce goods for sale (17% men compared to 27% women), while men are more likely to be public or private sector employees (76% men compared to 65% women) across RMI.

5.3.6 Sexual Exploitation and Abuse and Sexual Harassment

Across RMI national gender-related priorities include eliminating high levels of domestic violence, providing adequate maternal and child health care services to rural and fast-growing urban areas,

[106] *RMI 2019 Household Income and Expenditure Survey*
[107] *ADB 2020 Marshall Islands Gender Equality Overview – Key Statistics for informed decision-making in celebration of Beijing +25 Online at: https://www.adb.org/.../marshall-islands-gender-equality-overview.pdf*
[108] *RMI 2021, Preliminary Census Data*

reducing teenage pregnancy, retaining young men in education, and promoting equal access to economic opportunities[109].

International Human Rights Conventions Ratified by the RMI:

- The Convention on the Elimination of Discrimination against Women (CEDAW) was ratified in 2006;
- The Convention on the Rights of the Child (CRC) was ratified in 1993; and
- The Convention on the Rights of Peoples with Disabilities (CRPD) was ratified in 2015.

National Legislations which seek to protect women and children in Marshall Islands include:

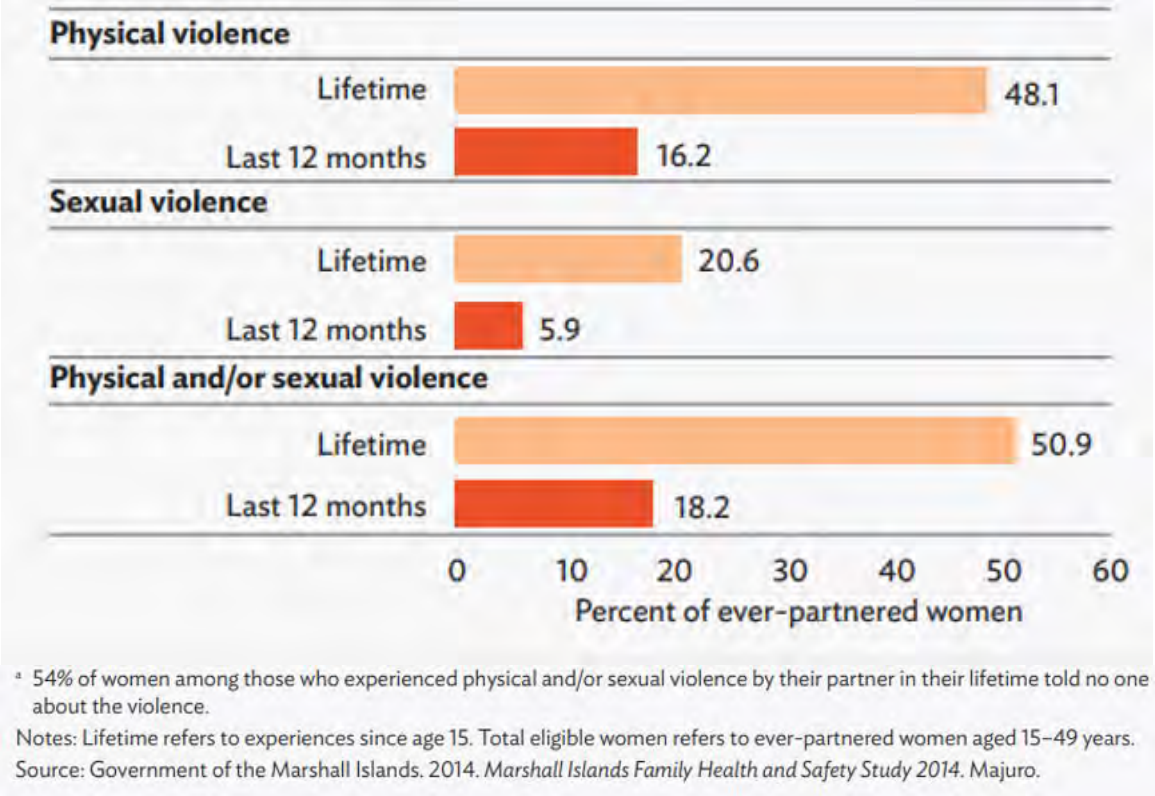
- Domestic Violence Prevention and Protection Act of 2011;
- Child Rights Protection Act of 2015;
- Human Rights Committee Act of 2015;
- Rights of Persons with Disability Act of 2015; and
- Prohibition of Trafficking in Persons Act of 2017.

Furthermore, a national gender policy was endorsed in 2015. The first woman president in the Pacific countries was sworn in 2016 in the Marshall Islands. This is advancement from 2011 whereby there was only 28 percent economic participation of women, and in 2018, 9 percent political participation of women[109].

The Marshall Islands is matrilineal and, culturally, women have high status, although have limited influence in decision making spheres and there are high reported rates of intimate partner violence (51%) and physical violence on children (61% for girls and 62% for boys) [109]. **Table 5-9** shows the percentage of partnered women who experience intimate partner violence reported from studies undertaken in 2014.

[109] *ADB 2020 Marshall Islands Gender Equality Overview – Key Statistics for informed decision-making in celebration of Beijing +25 Online at: https://www.adb.org/.../marshall-islands-gender-equality-overview.pdf*

Table 5-9: Prevalence of Intimate Partner Violence amongst ever-partnered women 2012



Furthermore, only 6 percent of police officers are women which reduces the women's access to female police officers if they must report any Sexual Exploitation and Abuse and Sexual Harassment (SEA/SH). Ebeye had 4 female police officers compared to 54 male police officers in 2017[110].

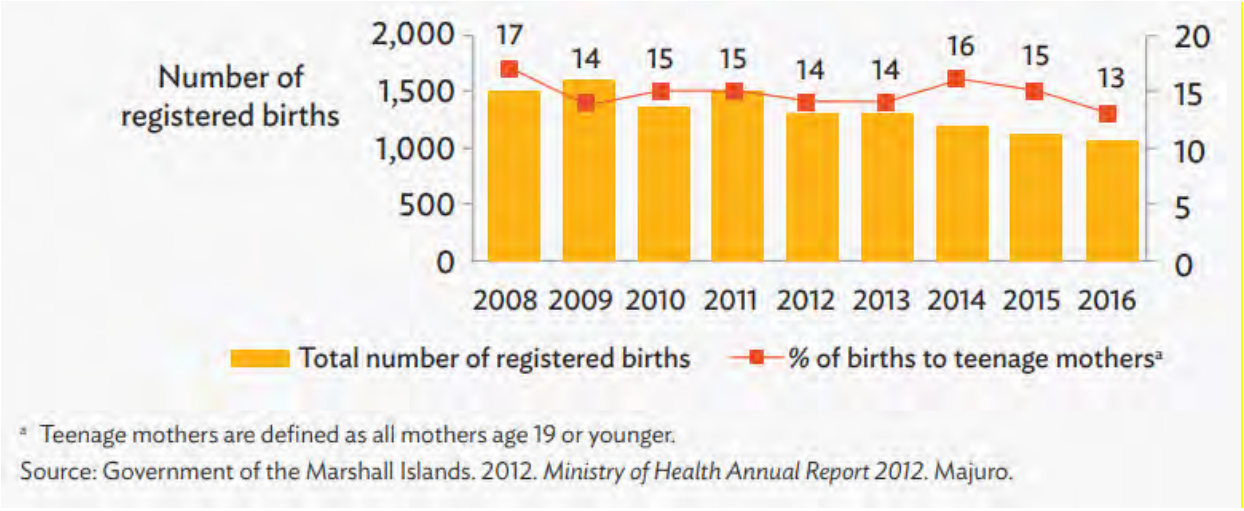


Figure 5-24: Teenage Mothers as Percentage of All Registered Births, 2008 - 2016

Teenage pregnancy rates are high at 13 percent of all registered births in 2016 (**Figure 5-24**). However, teenage pregnancy rates, while continuing high, have decreased by 34 percent since 2014 from 73 to 48

[110] *ADB 2020 Marshall Islands Gender Equality Overview – Key Statistics for informed decision-making in celebration of Beijing +25 Online at: https://www.adb.org/.../marshall-islands-gender-equality-overview.pdf*

births per 1,000 women aged 15–19[111]. This is slightly lower than the Pacific average for teenage pregnancies of 51 births per 1,000 women aged 15–19 in 2018.

5.3.7 Island Structure and Governance

The RMI is a self-governing republic in a Compact of Free Association, (as amended), with the USA. The Compact, ending in 2023, provides monetary and other support, including granting Marshall Islands citizens access to live and work in the USA.

The RMI has a bicameral parliament. The 12-member appointed Council of Iroij (upper house) which is made up of 12 traditional leaders, requests the 33-member elected Nitijela (lower house) to consider bills affecting customary law, land tenure, or any traditional practice. Women can also be traditional leaders.

The Cabinet is the executive branch of the government, directs the actions of the public service, and is answerable to the Nitijela for its actions. The judiciary consists of a supreme court, a high court, a traditional rights court, and community courts.

There is a local government in Ebeye, which has an elected council, mayor and appointed officials and a local and federal police force.

5.3.7.1 Strategic Planning

The Vision of the Strategic National Plan of 2018 states the following: “We believe that through the adoption of Outer Island Development as a key component of our sustainable development strategy, we would be able to achieve the following results:

- Devolution and de-concentration of political and administrative functions
- Infrastructure and maintenance development
- Development of productive resources
- Human resource development

Ten goals seek to achieve these results:

- Operating in an Interdependent World
- Enhanced Socio-Economic Self Reliance
- An Educated People
- A Healthy People
- A Productive People
- A Law-abiding People
- A God Loving People
- Respecting Individual Freedom and Fundamental Human Rights
- Respecting Culture and Traditions
- Environmental Sustainability (RMI National Strategic Plan).

Priorities in planning and activities focus on these key areas.”

5.3.8 Land Tenure and Rights

Important to this Project are the intricacies and sensitivities surrounding land ownership as well as how it relates to the design and construction of the coastal protection works and also to the associated facilities

[111] *ADB 2020 Marshall Islands Gender Equality Overview – Key Statistics for informed decision-making in celebration of Beijing +25 Online at: https://www.adb.org/.../marshall-islands-gender-equality-overview.pdf*

required for the Project (stockpile sites, construction camps, etc.). In traditional Marshallese culture, the people identify very closely with the land and water, as life has always been dependent on reef and open water resources. A complex set of rules was devised for the ownership and use of land. There are three primary classes of land ownership as determined by the three social classes in the RMI: Iroij (chief); Alap (owner or elder); and rijerbal (worker or commoner). Every Marshallese family belongs to one of these classes and therefore has land ownership and/or use rights somewhere in RMI. Families may also be an Iroij or Alap for one or more islands and a rijerbal on other islands. A land lease is not legally binding anywhere in the Marshall Islands without the signatures of all three title holders - Iroij, Alap and senior rijerba[112].

While the kinship system is matrilineal, whereby land and rights are inherited through the mother, male chiefs traditionally have authority over land ownership. The majority of the land in Ebeye is occupied with permission from the traditional chiefs (Iroji/Alap): 71 percent with permission from Iroji/Alap, 21 percent by family rights or closely related to title holder, while around 4 percent hold land title[113]. As the Ebeye population has grown exponentially, the limited land has at times incurred some 'tensions' between 'original landowners and those from other atolls.

Traditional cultural obligations mandated that those already living on Ebeye take in family members who chose to migrate when relocated by USA interests in the 1960s. The influx of displaced persons and migrants has led to the overcrowding on Ebeye[114].

T*he Public Lands Act 1966* declares that all marine areas below the high watermark belong to the national government. However, the owners of land fronting to the sea and lagoon can fill in, erect, construct and maintain piers, buildings, or other construction on or over the water or reef adjoining to their land. They have the ownership and control of such construction; provided, the owner first obtains written permission of the Chief Secretary before beginning such construction.

5.3.8.1 Master Lease

The Master Lease between the Traditional Landowners of Ebeye and the Kwajalein Atoll Development Authority (KADA) is an important part of the RMI legal framework, especially in the unique context of landownership and development planning in Ebeye whereby traditional landowners' involvement is integral. The Master Lease itself preserves the supremacy of the landowners, by among other conditions, requiring as a pre- condition the prior consent of landowners for any development. This is well understood and accepted by locals and government officials who manage consultations and negotiations through a culturally sensitive approach that acknowledges the Iroijs important role.

In January 2017, a new Master lease was signed by Kwajalein Atoll landowners for Ebeye-to-Guegeegue land providing formal endorsement to the development of public infrastructure in Ebeye and other islands. This master lease replaces a 30-year master lease that had expired in 2016. As a result, any land requirements including land that will also be required temporarily during Project construction for staging areas for operations are leased by the government from the traditional owners, within a Master Lease agreement. Consequently, the management of Project, social and environmental impacts must comply with the requirements of RMI laws and regulations, the Master Lease, as well as World Bank Safeguards Policies.

112 US Department of State, 2019 Investment Climate Statements: Marshall Islands. Online at: Marshall Islands - United States Department of State

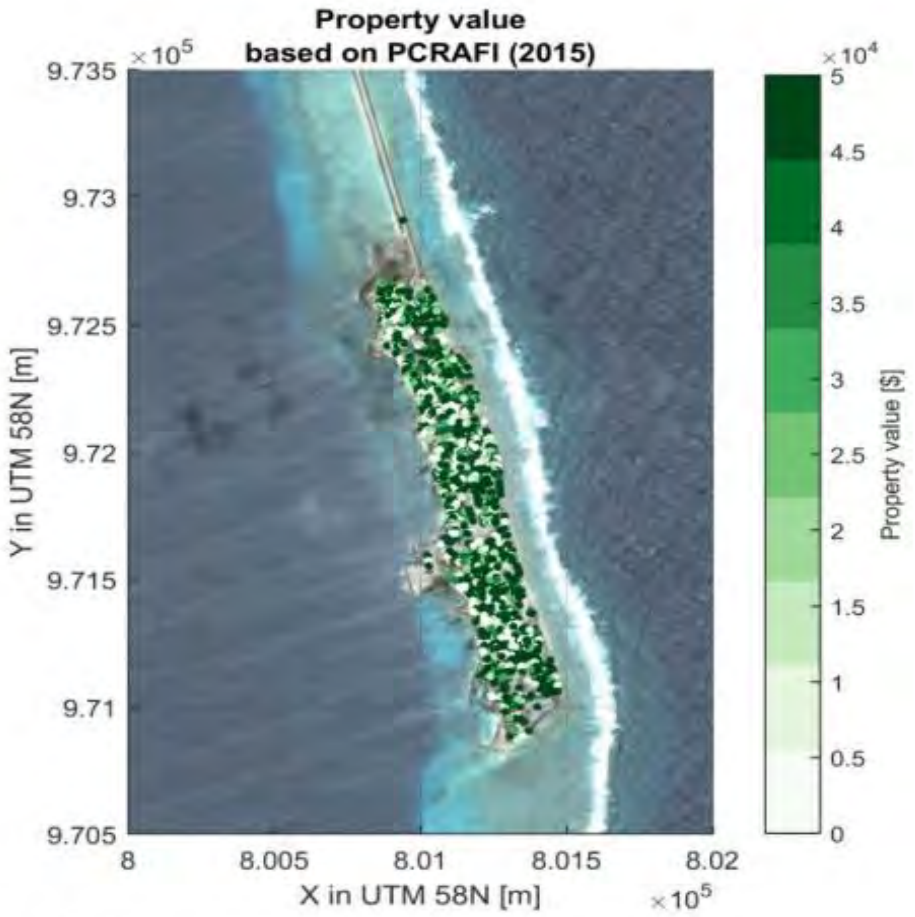
113 ADB 2020, Initial Environmental Examination RMI: Additional Financing of Ebeye Water Supply and Sanitation Project

[114] RMI 2021, Preliminary Census Data

Within the context of the Master Lease, it is acknowledged that traditional landowners or Iroij, continue to be held in extremely high esteem by not only their constituencies, but also the Government. It's an acquired hereditary status entrenched in Marshallese culture and the Iroij title is passed down through generations. This status has substantial powers vested through the Constitution as members of the Council of Iroijs. The Council is advisory and consultative in its role but the high public regard with which Iroijs are held means they have enormous influence in the law-making process, on matters of national importance, and especially on issues of customs, traditional practices, land acquisition and related matters. Subsequently, where lands owned by Iroijs are of interest to the Government for public purposes, the process of acquisition is a negotiation between equal parties – Government and Iroijs.

5.3.8.2 Property Values

Deltares offered some insight into Property values on Ebeye, based on PCRAFI 2015 data (**Figure 5-25**) from their Risk Assessment. However, there is no associated data or discussion to provide a useful baseline of property costs, conditions of sale or even rental values in either the Deltares report or the PCRAFI 2015.[115]



re 1.9 Exposure data (property values) for Ebeye island (PCRAFI, 2015).

Figure 5-25: Property Value based on PCRAFI[115]

[115] *Deltares (2016) Coastal Risk Assessment for Ebeye, Technical report 1230829-001, edition B*

As Deltares reiterated that 'hazard' is related to the physical aspects of 'risks, exposure and vulnerability…. and especially refer to exposed assets and people and can refer to the total value of properties found in the inundated area. Vulnerability referring to the damage inflicted on exposed property…' (Kron 2005)[116]. To assess risk and make necessary adaptations, each of the three components need to be quantified (risk, exposure and vulnerability) and subsequent means to address the risk measured against this baseline. Additional to these three elements adaptability is essential to overcoming vulnerability and building resilience. While exposure information is available in the PCRAFI (2015)[116], separate damage estimates to properties on Ebeye to current climactic effects is unclear and of little use.

5.3.8.3 Rental Prices

House ownership (**Figure 5-26**) in Ebeye is high with 56.3 percent owned outright and a further 13.8 percent owned with an associated loan. Five percent of homes are rented[117]. Nearly 58 percent of houses are below 100ft[117].

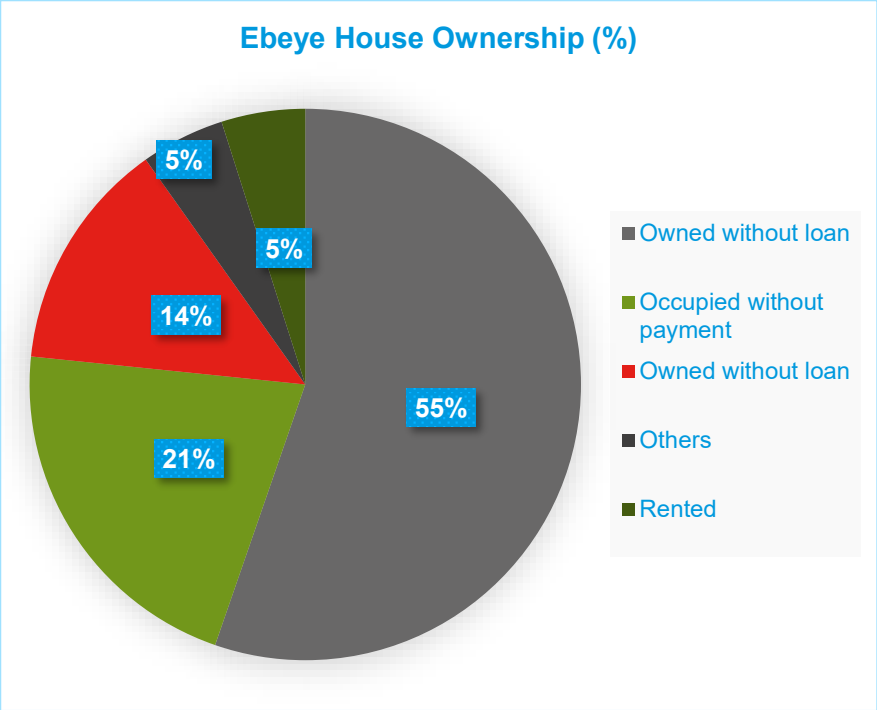


Figure 5-26: Home ownership statistics [117]

While a basic rental price assessment of a sample of 31 households in vulnerable areas of Ebeye was undertaken by RHDHV in October 2021, there is little information on changing prices of rentals and affordability in Ebeye. The sample of 31 respondent households across 8 Wetos were surveyed with questions ranging from house ownership to rental costs. Wetos responding are shown in **Figure 5-27**.

[116] *Deltares (2016) Coastal Risk Assessment for Ebeye, Technical report 1230829-001, edition B*
[117] *RMI 2021, Preliminary Census Data*

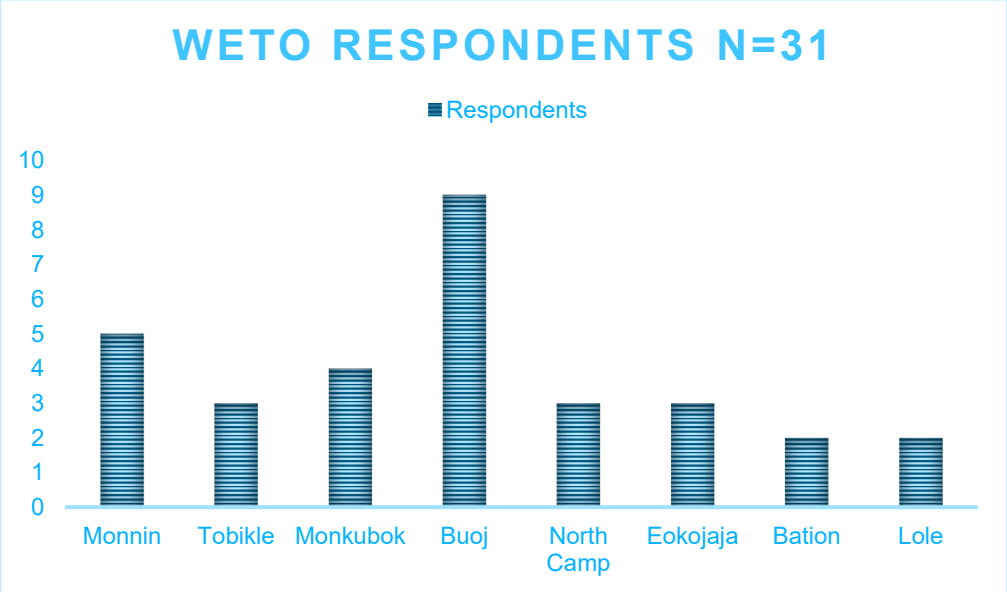


Figure 5-27: Household sample 2021[118]

As shown in **Figure 5-28** below, the rental short survey with 31 respondents indicates the following rental versus home ownership responses:

- Two respondents (one man and one woman) rented from landowners;
- One male rented from the government;
- Twelve respondents lived with other family members who either rented or owned their house. Ten respondents indicated that they do not pay rent; and
- Amount of rental payment appeared irregular ranging between $20 a month to $5000 a month. It is uncertain whether people were reluctant to state amounts or did not understand the question.

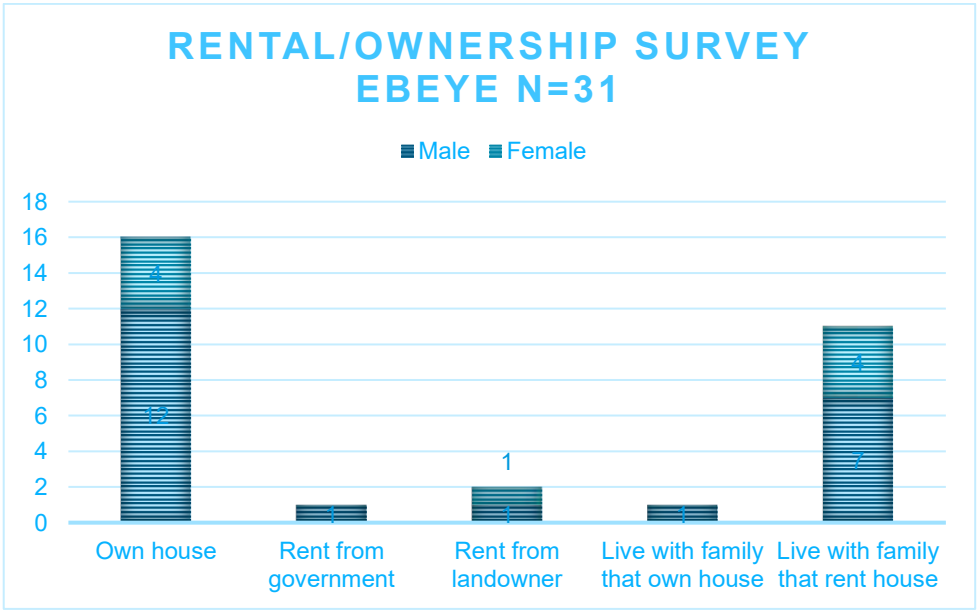


Figure 5-28: Home ownership status by survey respondents[118]

[118] *RMI 2021, Preliminary Census Data*

5.3.9 Community Services and Utilities

While service utilities are reported to be widely available across Ebeye, there has been a chequered history of periods of shortages in electricity, sewage and potable water. The 2010 Majuro and Kwajalein Household Water Survey (Economic Policy, Planning and Statistics)[119] concluded that poverty was a serious problem with many households facing such problems as no water or electricity.

The local government of Ebeye has a limited annual budget which does not enable it to consistently provide basic public services such as sewers, electricity, and water. This has resulted in a heavy reliance on donor assistance to support infrastructure for necessary services.

The contractor and the construction methodology need to be aware of regular island services and amenities and will make sure that the community is not prevented from undertaking their normal activities. This might include island waste collection services, postal delivery and collection, the collection and transportation of fuel oils, and the running of all and any local businesses. If disruption to any of these services is likely then the affected businesses need to be consulted and mitigation measures identified (i.e., routing of haulage, timing of works) and put into place proactively.

5.3.9.1 Solid Waste Management

On Ebeye, most household waste is collected and transported to the islands landfill (**Figure 5-29**) by KALGOV free of charge. Some households wastes are transported to the final disposal site by private vehicles but there are no rubbish tip fees. Public waste generated at public institutions such as government offices are also collected by KALGOV. Some of the commercial wastes, for example from the big supermarket, are collected and transported to the final disposal site by the company's own truck, but no tipping fee is charged.

Other wastes consist of commercial, institutional, business and from public park areas. These are all collected and transported to the landfill site by KALGOV free of charge. Some business wastes are transported directly to the landfill site as it is quite near to the generation source.[120]

There is currently one public disposal site at the north end of Ebeye Island. The site is 1.6ha (4 acre) 100m long by 160m wide. In 2017 works were carried out to improve the management of the disposal site. This included: (i) installing a hospital waste incinerator (current operational status of that is unknown); (ii) building for housing administration and equipment was constructed; (iii) improvements were made for segregating recyclables; and (iv) security controls were introduced at the site entrance.
Occasional spreading of the waste is carried out by heavy machinery, but it is not compacted.

[119] *https://cales.arizona.edu/region9wq/pdf/Marshall_Islands_Water%20Survey%20Report.pdf*
[120] *Kwajalein Atoll Local Government, 2019 Kwajalein Atoll Solid Waste Management Plan 2019-2028*

Figure 5-29: Landfill on northern end of Ebeye

Surveys carried out during the development of the Ebeye Solid Waste Management Strategy 2019 - 2028[121] showed that in 2018 the average incoming waste amount is 11.2 ton/day, while the average number of incoming vehicles is 23 per day. 68% of the incoming waste is collected by KALGOV, the remaining 32% of the incoming waste are bought to the site directly by households, business entities, etc.

5.3.9.2 Water

For years Ebeye has suffered an inefficient public water supply system that was only able to service households for up to one hour of safe drinking water per week[122]. The main source of water on Ebeye was a public tap located in the center of town. People collected water in various containers and some even carted water across from the Kwajalein military base. Some serious infectious and non-infectious diseases were attributed to this unsatisfactory water supply (**Figure 5-30**) – see below incidences 2000 to 2012. Many of these diseases have been brought under control since the water upgrade.

[121] *Kwajalein Atoll Local Government, 2019 Kwajalein Atoll Solid Waste Management Plan 2019-2028*
[122] *ADB 2017, Initial Environmental Examination RMI Water Supply and Sanitation Project*

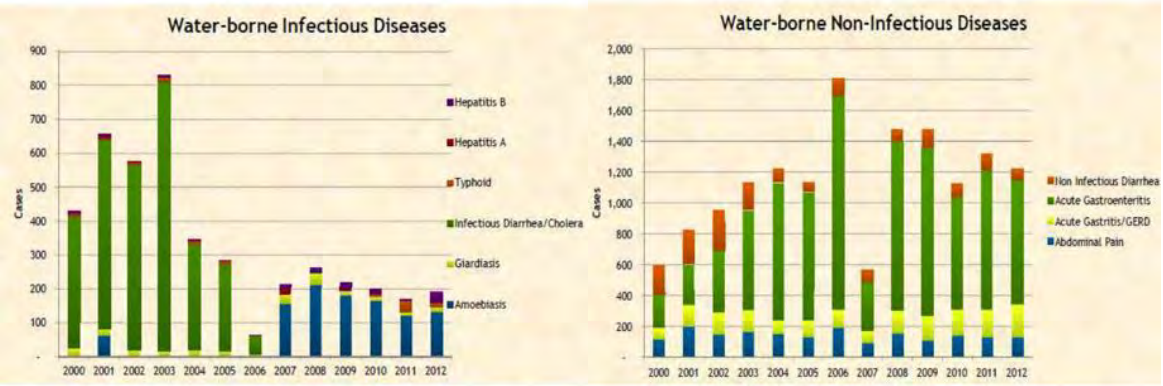


Figure 5-30: Ebeye Waterborne Infectious and Non-Infectious Disease Cases[123]

The island relies on a desalination plant for 78 percent of water supply. While the old desalination plant produced about 500,000 litres of freshwater per day nearly half of that was lost due to leaks in the supply network and problems with the processing equipment[123]. By 2017 the old Ebeye desalination plant was replaced, the water supply and sewerage networks were expanded to service an additional 300 households[123] (**Figure 5-31**).

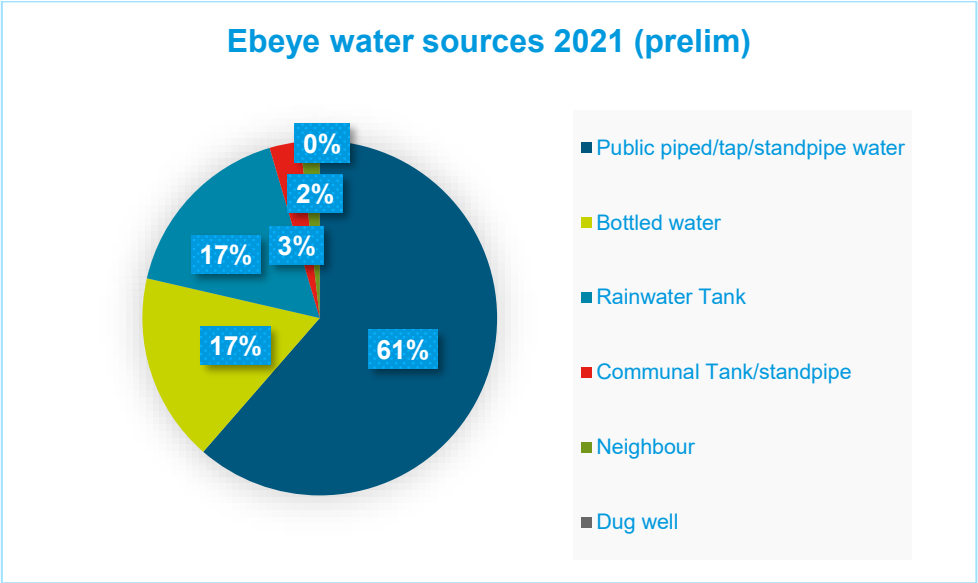


Figure 5-31: Ebeye water sources[124]

By 2021, as shown in **Figure 5-31** the majority (~ 61%) of households had public water, supplemented by bottled or rainwater (~ 17% respectively). The previous communal tank only serviced less than 50 households. This is in sharp contrast to the 2011 Census period whereby only 2 percent had public running water; 53 percent relied on rainwater for drinking; 10 percent purchased bottled water, a largely unsustainable practice with limited plastic bottle disposal capacity available on the island. [123] It is interesting and somewhat alarming to note that bottled water consumption has nearly doubled over the past decade in Ebeye.

Furthermore, there has been a sharp increase of households (96.7%) who have a flush toilet in 2021[124].

[123] *ADB 2017, Initial Environmental Examination RMI Water Supply and Sanitation Project*
[124] *RMI 2021, Preliminary Census Data*

5.3.9.3 Energy Sources

While electricity coverage for Ebeye households was high, with 89 percent reportedly connected to electricity[125], the system suffered considerable power failures. By 2019, the local power utility's generators repeatedly broke down, resulting in extended power outages and the need for power rotation requiring the power company to turn off half the island while the other half had power. Rental generators fulfilled temporary electricity needs by the end of 2019. A project with World Bank funding supported the purchase of 2.5-megawatt generators in 2019. Furthermore, Japan has provided funding in 2021 for a 600 kilowatt solar system to reduce the island's dependence on diesel fuel-generated power.

Subsequently, **Figure 5-32** highlights 2021 RMI preliminary Census data showing that 82.1 percent of Ebeye households are connected to the electricity grid, generator ownership remains at around 5 percent of households and 11 percent have solar panels and/ or equipment.

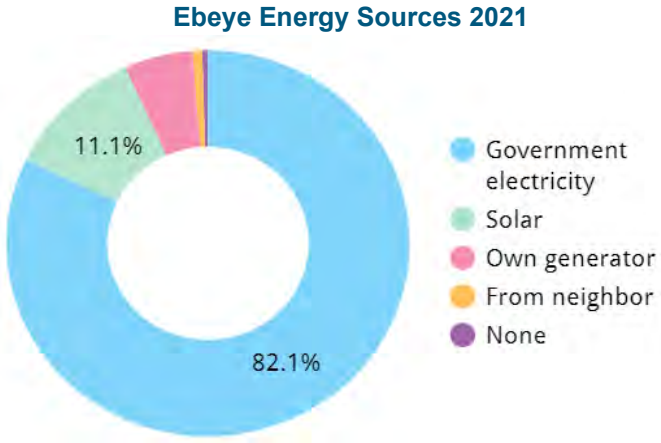


Figure 5-32: Ebeye Energy Sources[126]

Cooking predominantly uses propane gas, followed by electricity as shown in **Figure 5-33**.

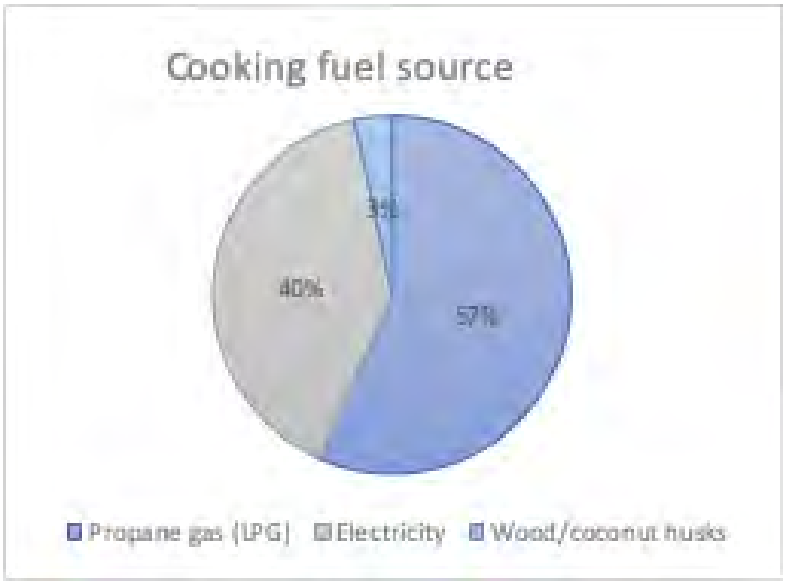


Figure 5-33: Cooking fuel sources[126]

[125] *RMI Census 2011 Online at: Marshall Islands Census | Republic of the Marshall Islands Environmental Data Portal (sprep.org)*
[126] *RMI 2021, Preliminary Census Data*

5.3.9.4 Transport

Motor vehicle traffic levels are typically light, though minor traffic congestion is encountered along the main streets at the end of the workday, mostly due to taxi vehicles. Road traffic is normally one-way in a clockwise direction around Ebeye. However, it was noted that from time-to-time roads may be closed or traffic directions altered to anti-clockwise if required for construction works etc. This is not uncommon.

As stated above, in Noise Quality, it is observed that most residents do not own private vehicles and the main mode of transportation is by bicycle or walking. It can be reasonably assumed the traffic levels do not exceed 100 vehicles per hour, or an average of 15 miles per hour (24 km/h).[127]

5.3.10 Physical Cultural Heritage Resources

Three public cemeteries and one private graveyard have been identified along or close to the alignment (**Figure 5-34**). Given the footprint of the Project, which is along the shoreline, it is unlikely that there will be any other Cultural Heritage Resources present or threatened.

However, it must be recognized that respondents in Focus Group Discussions (FGDs) also noted that the shorelines have an important traditional significance. During funerals, family members of the deceased go to the shorelines and collect dead coral rocks to lay next to the grave. Furthermore, it has been regularly voiced in FGDs, concerns about graves falling into the sea. Just as concerning is the burial itself which respondents have noted depends on the tides.

Comments voiced in these meetings are as follows:

- "*Some of the graves in Mon Kubok cemetery have started to fall into the ocean.*"
- "*Before, we had the liberty of digging our graves deep. Now we have to depend on the tides. We can only dig during low tide because during high tide, water rises up the hole and you end up with a shallow grave. It is very sad to let down our loved ones into a pool of water when these graves are dug deep, their coffin end up floating. This has become normal here in Ebeye.*"

[127] *ADB 2020, Initial Environmental Examination RMI: Additional Financing of Ebeye Water Supply and Sanitation Project*

Figure 5-34: Graveyards and private cemetery along oceanside coast of Ebeye

6 Stakeholder Engagement and Consultation

6.1 Introduction

Effective and sensitive stakeholder engagement is critical to ensure the successful outcomes of this Project. The PREP II SEP continues to be the driving instrument for ongoing stakeholder engagement and community consultation and will be implemented in parallel to and will compliment this ESIA/ESMP. Information gathered during the consultation process on the social, economic or environmental situation of Ebeye has been included in the baseline description. Wherever possible, concerns have been addressed either through design solutions or mitigation measures and included in this document.

Views from the local residents, stakeholders, surrounding institutions and development partners who in one way or another are affected or interested in the proposed Project were sought through administering of questionnaires, interviews and public meetings. All stakeholder engagement for this Project was carefully managed and undertaken during the design phase of the Project in association with the national CIU, PIU, local government and World Bank. This was to ensure that local social and cultural sensitivities were respected as well as information provided about the Project was factual, consistent and timely. Furthermore, the engagement has been consultative in approach to provide the opportunity for 'two way' communication, ensuring community ideas and interests were considered in the seawall design.
See below a stakeholder matrix (**Table 6-1**) which highlights the key stakeholders inherent to this Project as well as notes their differing concerns and needs within the stakeholder engagement process.

Table 6-1: Ebeye Sea Wall Stakeholder Matrix

Stakeholder	Stage of Project	Impact		What is important to the stakeholder	How can stakeholders contribute to the Project	Strategy to engage / inform the stakeholder
		Description	**Level of impact**			
Customary leaders and officials from key communities along the stretch of the island	All phases	Key decision makers → encourage local ownership of benefits and trade-offs in all aspects Project	Medium to high	Respect and acknowledgement of position, roles and responsibilities	Provide authority for Project, local cooperation and ownership → smooths the processes of construction	Consult and provide information at each phase of the Project
Ebeye directly affected ocean side residents	All phases	Need to recognize sea wall limits and build local resilience especially for weather events	High – during Project	Access to property and seafront Safety for families Visual amenity Family graveyards - protection from the sea	Suggestions for lighting and sea access management Local labour	
Ebeye ocean coastal businesses	All phases	Need to recognize sea wall limits and build resilience	High – during /after Project completion	Access to business Safety of clients Visual amenity	N/A	
Schools	Design and Implementation	Need to recognize sea wall limits and undertake student drills and safety training	High – during implementation	Safety of children and staff	Emphasize safety to children and parents	

Stakeholder	Stage of Project	Impact		What is important to the stakeholder	How can stakeholders contribute to the Project	Strategy to engage / inform the stakeholder
		Description	**Level of impact**			
Churches	All phases	Respond to disasters Need to encourage more resilient actions i.e. drills, safety zones, cemetery fencing	High	Access and safety of church goers Respect for church hours Respect for funerals during construction at cemeteries	Provide information to church goers	Consult and provide information at each phase of the Project
Relevant Government and utility agencies	All phases	Coordinate, consultation, engagement and capacity building	High	Specific areas of focus	Ongoing consultation and sharing of updates with relevant agencies, linking to related agency initiatives.	

6.2 Public Consultations to Date

A summary of the stakeholder engagement and community consultations undertaken in the design development of the seawall is as follows:

- Public consultations - two sessions of public consultations were held in Ebeye in 2021;
- Focus Group Discussions (FGDs) - additional Focus Group sessions were held, where determined necessary, as the design and impact assessment process progressed;
- Key Informant Interviews (KII) - key government and non-government informants, and traditional leaders; and
- Regular updates were provided to key Ebeye stakeholders especially those traditional and local government leadership, initially by Project consultants followed by CIU/PMU as well as local government officials.

6.2.1 Workshop 1

In May 2021, two public participatory planning sessions, multiple KII and multiple FGDs were held in Ebeye to enable the design team to verify results of the 2018 Preliminary Stakeholder Survey, consider local priorities and concerns. To help inform the LOS, seawall design and the MCA, Workshop 1 focused on:

- Explaining the Project and Project design process;
- Providing open two-way dialogue for community members and stakeholders to have an opportunity to explain characteristics of each community, their vulnerabilities to sea and climate events and their priorities in terms of safety, water inundation, soil erosion, visual amenity, sea based livelihoods etc The open dialogue was framed around identified risks and various key facts were provided – such as the likelihood of a shoreline wall needing to be 4m high; and
- Facilitating the communities in prioritizing areas of interventions that will be integrated into the Project design.

Workshop 1 highlighted a selection of 10 concepts from which the MCA was developed to apply to the proposed design for final selection of preferred design.

Workshop 1 also presented conceptual facets of seawall design as they related to Ebeye and was derived from community inputs from the first session. This was an opportunity to assess the level of understanding and awareness of the impacts of climate change in Ebeye and raise awareness of what is occurring without the proposed wall.

Participants in the FGDs (**Table 6-2**) were guided by the Consultant's national team in association with the Ebeye government officials and Ebeye PIU team.

Table 6-2: Focus Group and Key Informant Discussions

Date	Group	Participants	Disaggregated sex		Age groups	# Disabled persons present
			M	F		
May 2021	Iroijlaplap and Alaps Courtesy meeting	16	13	4	All >18	2
	KALGov	10	10		All >18	
	Private sector	4	3	1	All >18	
	Women's group	12		12	All >18	
	Youth Group	10	7	3	9 >18; 1<18	
	Church leaders	2	2		All >18	
	Fisherfolk	1	1		All >18	
	Leroij Anta			2	All >18	1

The Summary outcomes of Workshop 1 are shown below in **Table 6-3.**

Table 6-3: Key Outcomes of Consultation Workshop 1

Workshop 1 Key Outcomes (Including FCGs)	
Key Comment Areas	**Specific Comments**
Extent of Coastal Protection	• Request from island leadership for the seawall to be extended to protected Ebeye's neighboring islets. • Concerns over whether extended impacts of the seawall on currents may lead to erosion on neighboring islets. • Suggestions for coastal planting on neighboring islets.
Access across the seawall	• Access across seawall was raised by all groups. • Access must be safe for people with disabilities, safe for children, safe for fishermen carrying their equipment and safe for people crossing the seawall to collect salt water.

Workshop 1 Key Outcomes (Including FCGs)	
	• The fishermen don't use any particular place to access the reef flat and boats aren't stored, launched or hauled on the oceanside of Ebeye.
Child Safety	• Concerns were raised by all groups, but particularly the women's group, over the safety of children playing on the seawall after it is constructed. • There are concerns that any high walls would create a significant risk of injury from falling. • Concerns were raised by all groups of the safety of children during construction – at the construction camp and at construction sites.
Necessary land reclamation	• The community leaders and KALGOV recognized the benefits of small areas of land being created as part of the coastal defense design. There is a need for more grave sites, tracks/roads, or community bins for garbage collection service which the Project might be able to help provide. • Fishermen recognized that the creation of a recreational walkway would have benefits for the community.
Large scale land creation	• All groups voiced their support over the conceptual future possibilities that a reef flat seawall would provide in terms of land creation. It was understood by all parties that the objecting of this seawall design is not to create land and that there is no plan for the Project to explore or finance that option. • Traditional leaders, KALGOV, women's groups and the private sector provided the strongest support for this potential future development. • The fishermen and the youth group recognized the future risks of this community aspiration in terms of reducing the effectiveness of the seawall in the future and creating unwanted currents between the reef flat and the shoreline. • All participants understood that large scale land creation is not an objective of this Project.
Ocean Breeze	• The island leadership is encouraging people to build up rather than out which they feel helps to negate the negative impact from reduced breeze. • As the majority of community members preferred a reef flat option for the seawall, they didn't not consider breeze an important design consideration.
Key Outcomes Workshop 2: October 21st and 22nd 2021	
Main discussion points across both sessions: - Questions over impact on marine ecology of reef flat option (Ranked 5th in the MCA). Concerns over whether there would be:	

Workshop 1 Key Outcomes (Including FCGs)

- Impacts to the coral reef on the reef crest. RHDHV advised that little to no impacts are expected on the reef crest environment.
- Impacts to the benthic species between the reef flat structure and the shoreline. RHDHV advised that the reef flat structure would not likely have any gaps along its length, but both ends will be open. Benthic organisms would be able to move into the near shore reef flat area at those ends, but otherwise their movement across the reef flat would be blocked along the structure's length. This consideration will form part of the E&S work.

- Question about whether the rock at the toes of MCA 1st ranked seawall would become slippery. RHDHV responded that for sections which are not buried under sediment and below the high tide mark, there would be some slippery areas, but the majority of exposed rock would be above high tide therefore wouldn't get slippery.
- Questions over length of shoreline to be protected. RHDHV explained the varying degrees of vulnerability highlighted in the latest Deltares coastal hazard map and described how 'equitable protection' will be the objective of the design which means that the seawall may look slightly different in some areas depending on the risk level. The next stage of design will enable this question to be answered in more detail.
- RHDHV clarified that while the top 5 MCA ranked options we're ranked 1 to 5, this didn't necessarily reflect the order of the designs after the preliminary design stage and that this order can very likely change depending on what the preliminary design phase uncovers. The top 3 may be different to the MCA top ranked 3.
- Both sessions asked about frequency of crossing points along wall. RHDHV responded that initial thinking is to have 20 crossing points – one every 100m, but this is not settled on and can be varied. Will ultimately depend on input from communities and technical considerations as to where the points are.
- Both sessions sought clarification on timelines. This was provided by the PREP II team who confirmed that construction was anticipated to start mid-2023 and last for 12 to 18 months.

6.2.2 Workshop 2

A secondary participatory planning session was held in Ebeye in October 2021 after the MCA had been applied to the 10 concepts. Consultations were held on 20th and 22nd of October on Ebeye and a total of 55 participants from key stakeholder groups and the community attended the sessions.

The purpose of these sessions was to seek input to and validation of the top 5 ranked concepts. A presentation was given by RHDHV to describe:

- Summary of outcomes of May consultations;
- Overview of Ebeye coastal hazard map, function of seawalls and overtopping;
- Description of MCA criteria and process;
- Brief summary of concepts which ranked 11 to 6 in the MCA;
- Detailed description, including imagery, of top 5 MCA ranked concepts; and
- Next steps in design process.

6.2.3 Workshop 3

The Ebeye leadership team, GoRMI, PIU and CIU and the World Bank, arranged a third round of consultation which took place on Ebeye from the 21st to the 24th February 2023. This 3rd Round of community engagement was required in order to solicit Ebeye resident views on the P90 design options,

the likely environmental and social (E&S) outcomes, and to identify any outstanding concerns and mitigation requirements.

Refer to **Appendix A** for the '*3rd Round of Consultation Summary Report*' that summarizes the consultation and site visit findings, and consultation questions.

6.2.4 Workshop 4

A fourth workshop took place in May 2023. The findings of this 4th round have been summarized in **Appendix A**.

6.3 Grievance Redress Mechanism

The purpose of a Grievance Redress Mechanism (GRM) is to provide a suitable, centralized mechanism for the Project that can also be applied to meet the World Bank's safeguard requirements. The GRM aims to reduce the risk for the Project, through providing Aggrieved Persons (AP) and communities with a constructive and effective means of airing concerns and issues and achieving solutions. Specifically, the Project GRM is established to enable the APs to appeal any disagreeable decision or action arising from the implementation of the Ebeye Seawall Project and in particular related to any land acquisition impacts and measures. The basic rights and interests of every person affected by poor environmental performance or social management of the Project are protected during the phases of design, construction and operational activities.

Ideally, grievance procedures will be in place from the beginning of the social and environmental assessment process and exist throughout construction and operations through to the end of Project life. It is recognized that complaints can come at any time, including predesign, design and post installation. It should be noted that the GRM is subject to updates throughout the project's lifecycle. The Contractor and other relevant parties are to familiarize themselves with the most recent version from the CIU PREP II Safeguards website prior to proceeding[128].

Figure 6-1 sets out an overview of the PREP II GRM for all aspects of the Project, showing involvement of the relevant parties.

The GRM aims to address all complaints received, regardless of whether they arise from real or perceived issues. Any stakeholder (male or female) who considers themselves affected by the Project activities will have access to this procedure at no cost or threat of any negative repercussions.

This Process will ensure the following:

- A prompt, easy to understand, consistent and respectful mechanism to support the receiving, investigating and responding to complaints or grievances from community stakeholders. Timely with an investigation into an incident commencing within 48 hours of the report and be resolved within 2 weeks, unless there are exceptional circumstances;
- Ensure proper documentation of complaints or grievances and any corrective actions taken;
- Contribute to continuous improvement in performance of Ebeye Seawall through the analysis of trends and lessons learned;
- Easy to access; and
- Participation in the grievance process does not preclude pursuit of legal remedies under the laws of RMI.

[128] *https://www.ciudidasafeguards.com/prep2*

It therefore follows that the resolution of complaints and grievances where possible will be at the lowest level for resolution. All minor land or property related complaints that can be resolved, will be resolved immediately on site. The focus of the GRM is to resolve issues in a customarily appropriate fashion at community level and record details of the complaint, the complainant, and the resolution.

Guiding Principles, the grievance process is based upon the premise that:

- **Safety** – nothing will happen that puts the aggrieved person of further risk of harassment, violence or retaliation by the alleged perpetrator or anyone else.
- **Choice** – the aggrieved person can choose what happens and be involved in decision-making including what action(s) are taken and what information about the incident is shared.
- **Consent** – the aggrieved person will provide consent at each stage of the complaint handling process.
- **Confidentiality** – the aggrieved persons privacy and confidentiality will be protected including that all information that is captured about the incident will be kept confidential.
- **Informed** – the aggrieved person will be provided comprehensive information so that they know what is happening and what will happen at each stage of the process.
- **Supported** – the aggrieved persons will be referred to and supported to access specialist services to assist in their recovery including accessing police, court, health, and social services.
- **Respect** – the aggrieved persons will be treated with dignity and respect at all times.
- **Non-discrimination** – the process will not discriminate based on sex, age, race/ethnicity, ability, sexual orientation or gender identity, or other characteristics. Decision-makers do not have perceived or actual bias towards those involved in the report, particularly towards the alleged perpetrator or the aggrieved person.

All the guiding principles listed above also apply to children, including the right to participate in decisions that will affect them. If a decision is taken on behalf of a child, the best interests of the child shall be the overriding guide and children's legal guardian will be associated to this decision whenever possible without exposing a child to further risk.

6.3.1 Community Level Grievances

Issues can relate to the influx of labour, any disturbance from the workers accommodation, encroachment across land boundaries, safety concerns, noise, dust and resource use. Any such issues will be expected and planned for.

Based on the original ESMF and discussions with relevant stakeholders in government and locally in Ebeye, the following process has been strengthened to address any issues and concerns that an AP may have. The key point of contact for the AP will be PREP II Ebeye PIU Communications Officer, who will liaise directly with both the Contractor and the Engineer. The party receiving the complaint will document all matters and issues of concern from the local community and forward copies of all grievances to the Contractor, Engineer and PIU, operating under the Executing Agency.

Project level concerns and complaints will be addressed promptly and transparently with no impacts (cost, discrimination) for any reports made by Project APs. Furthermore, all reports and discussions will remain confidential.

6.3.2 Project Level GRM

A GRM was developed for the PREP II Ebeye Seawall Project in 2020 as highlighted in **Figure 6-1**. This was developed to ensure the Project's social and environmental safeguards performance. The purpose of the GRM is to record and address any complaints that may arise during the implementation phase of the Project and/or any future operational issues that have the potential to be designed out during

implementation phase. It will address concerns and complaints promptly and transparently with no impacts (cost, discrimination) for any reports made by Project APs. The GRM works within existing national legal and cultural frameworks, providing an additional opportunity to resolve grievances at the local, Project level.

The key objectives of the GRM are:

- Record, categorize and prioritize any grievances;
- Settle the grievances via consultation with all stakeholders (and inform those stakeholders of the solutions); and
- Forward any unresolved cases to the relevant authority. As the GRM works within existing
- legal and cultural frameworks.

The PREP II GRM remains relevant for the management grievance at the Project level.

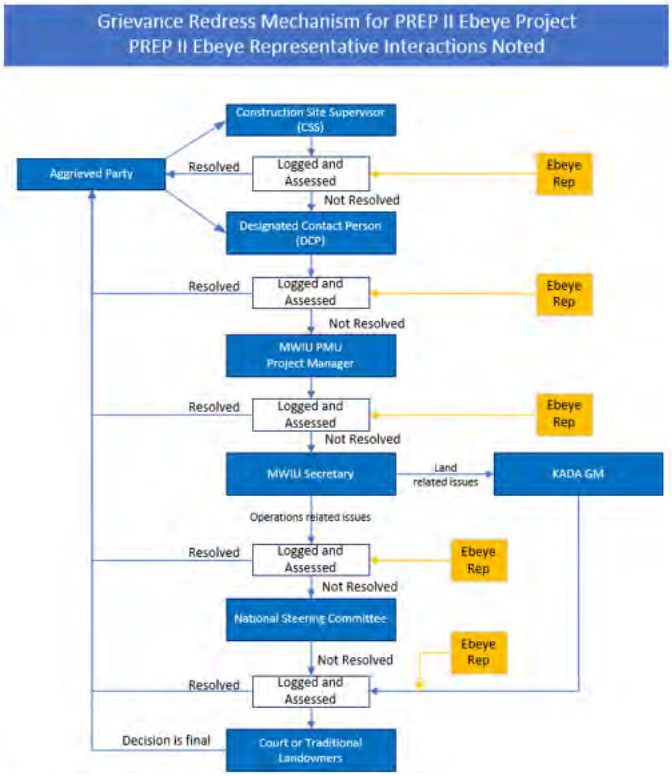


Figure 6-1: GRM Process for PREP II Ebeye Seawall Project

6.3.3 Grievance Redress Mechanism Process

The MWIU PMU will manage the overall GRM, utilizing formal, informal and traditional grievance procedures suitable to the Ebeye context. Generally, complaints and grievances will be resolved at the community level as much as possible under the management of the Construction Site Supervisor (CSS). **Table 6-4** below further explains the relevant roles and responsibilities associated with the Grievance Redress Process from the perspective of the Ebeye Project.

The GRM outlines the process for documenting and addressing Project grievances (and complaints) that may be raised by aggrieved persons or community members regarding specific Project activities,

environmental and social performance, SEA/SH incidents, the engagement process, and/or unanticipated social impacts resulting from Project activities. It describes the scope and procedural steps and specifies roles and responsibilities of the parties involved. The GRM is subject to revision based on experience and feedback from stakeholders.

The CIU Safeguards PREP II webpage presents the updated PREP II GRM that includes pathways for dealing with SEA/SH grievances. The document can be downloaded at https://www.ciudidasafeguards.com/prep2.

Communities and potentially affected persons will be advised of the GRM in the early stages of engagement and informed of:

- The potential impacts of the Project and how these impacts are to be minimized;
- How they can access the GRM (i.e. key people and complaint forms);
- Who to speak to and how to make a complaint;
- Who to speak to and how to lodge a grievance;
- The timeframes for each stage of the process;
- The GRM being confidential, responsive and transparent; and
- Alternative avenues of dispute resolution where conflicts of interest exist.

Table 6-4: GRM Process

Stage	Process	Duration
1	AP takes their grievance to either the Construction Site Supervisor (CSS) or Designated Contact Person (DCP) – obviously in the pre-construction period there will be no CSS and the DCP is the appropriate person. Once construction commences, the CSS becomes the initial local point for information. If the AP contacts any of the Project Representatives, they will communicate the grievance to the DCP or CSS. They are required to pass this information to the DCP within 12 hours using the PREP II Grievance Report Form (**Section 6.3.4**). **Pre and post construction** – After receiving the complaint, the DCP will document or "log" the concern in the PREP II Complaints Register. Complaints records (letter, email, record of conversation) are stored together, electronically or in hard copy. Each record is allocated a unique number reflecting year and sequence of received complaint (e.g. 2022 – 1; 2022 – 2 etc).	Any time
2.	**Pre-construction** - On receipt of the complaint, the DCP will determine whether the concern is related to the Project, and if it is, the investigation will begin immediately. The DCP will determine if the complaint relates to a serious or sensitive matter and if it does, an investigation will commence immediately. The DCP will also notify the Central Implementation Unit and the World Bank that an incident has occurred, although the names of the individuals involved will not be disclosed. If the grievance is project related but is not of a serious of sensitive nature, the DCP will advise the PREP II Project Manager and CIU	Immediately after logging of grievance

Stage	Process	Duration
	Safeguards team. The DCP and PREP II Project Manager will attempt to resolve the concern to everyone's satisfaction within 24 hours, or within 2 weeks if consultation with other parties is required. For complaints that were satisfactorily resolved by the DCP, the incident and resultant resolution will be logged by the DCP and reported to the PREP II Project Manager. **Post- construction** – CSS endeavors to resolve issue immediately. Where AP is not satisfied, the CSS will refer AP to the DCP. For complaints that were satisfactorily resolved by the CSS, the incident and resultant solution will be logged and reported to the PREP II Project Manager. If unsuccessful, DCP then notifies MWIU PMU Project Manager.	
3.	The MWIU PMU Project Manager endeavors to address and resolve the complaint and inform the AP. If it is a land issue, the MPW Project Manager will advise the MPW Secretary, and the latter will consult KADA on the matter for a solution. For complaints that are satisfactorily resolved by the MWIU PMU Project Manager, the incident and resultant resolution will be logged by the MWIU PMU Project Manager and reported to the Ebeye PREP II Representative and PREP II Project Manager.	2 weeks
If the matter remains unresolved, or complainant is not satisfied with the outcome		
4.	The MWIU Secretary will then refer the matter to the Project Steering Committee for a resolution. The PREP II Project manager will log details of issue and resultant resolution status.	1 month
5.	If it remains unresolved or the complainant is dissatisfied with the outcome proposed by the Project Steering Committee, he/she is free to refer the matter to the appropriate legal or judicial authority. A decision of the court will be final.	Anytime
6.	For Component 2, if it is a land related issue, KADA may seek the assistance of the Traditional Landowners, and their decision will be final	Immediately after stage 3.

6.3.4 Complaint Form

Complaints may be received in any form, from anyone, including anonymously. Anyone in the team may receive a complaint at any time, including Contractors. All complaints shall be immediately forwarded to the Ebeye Representative as the DCP or to the CSC once construction has commenced. All such contacts will be recorded and screened.

The following template (see **Table 6-5**) is for recording grievance complaints. Each incident shall be recorded and the forms filed appropriately by the PREP II Ebeye Representative. Screening will determine whether the complaint is Project related and if the complaint is not Project-related then it is closed (or referred to the correct agency.

Table 6-5: Grievance Report Form example

Name & Position of Grievance Recipient:
Contact Information of Grievance Recipient:
Grievance Reference #:
Name of concerned party (or anonymous), gender and age (or approx.) Address: Telephone: Email:
Date and time complaint received: How complaint was received: Date and Time Project Manager was notified: How Project Manager was notified:
Date of 2-week deadline for initial resolution or escalation:
Date, time, and location of event leading to concern
Does the complaint involve injury, death, violence, sexual abuse, exploitation, harassment, violence against children or potential criminal activity? Yes or No
Is anyone at immediate danger or risk? Yes or No If yes, describe risk and any actions that have been taken to protect people or property
Does the complaint involve Project or implementing agency staff, consultants or contractors? Yes or No
Detailed account of concern (include names of persons involved if known)

Proposed solution or remedy sought by aggrieved party (if known)
Name and Position of DCP receiving this Grievance Form: Date and time Grievance Form Received:
Dates and steps taken to resolve concern by DCP or other parties
Outcome of resolution process

7 Determination of Impacts

The proposed works have the potential to create a variety of impacts through its implementation. These impacts can be either positive or negative depending on the activity and receptors involved. The impact of this Project on the physical, biological and social environment has been assessed using the methodology described in this chapter.

7.1 Methodology for Identification of Impacts

To guide the development of the seawall design, a screening checklist was used to primarily identify impacts directly linked to the seawall design. Screening was iterative during the design process and was used to avoid or minimize significant impacts, where identified and where possible. These impacts and design influences were reported previously in the DCR and PDR.

Following the development of the final design, the development of the Quantity Surveyor's report which identifies likely construction methodologies, and the Contractor's preliminary construction methodology, the environmental and social screening was rerun and identifies whether the potential impact needs further investigation or whether they are a type of construction related impact which are generally well understood, are limited in nature and can be readily managed through implementation of the ESMP (**Appendix B**), which incorporates industry best practice as defined in the World Bank Environment Health and Safety (EHS) Guidelines[129].

A precautionary approach was taken with any interactions with a meaningful degree of uncertainty, which is common for the approval stage of a Project.

7.2 Methodology for Quantitative Assessment of Impacts

The assessment and quantification of the impacts requiring further investigation identified through the use of the expanded environmental and social screening as described above was carried out using the toolkit methodology provided in the Secretariat for the Pacific Regional Environment Program (SPREP) *Regional EIA Guidelines*[130], where once impacts requiring further investigation are identified, they will be assessed through quantitative evaluation to be finally classified.

The methodology to assess and quantify environmental and social impacts has been based on the following steps, which are discussed in more detail in the sections below:

1. Determine the Consequence Rating;
2. Assess the Probability;
3. Determine the Significance;
4. Level of Confidence; and
5. Determine the Residual Impact.

[129] *https://documents.worldbank.org/en/publication/documents-reports/documentdetail/157871484635724258/environmental-health-and-safety-general-guidelines*
[130] *SPREP 2013, Regional Environmental Impact Assessment Guidelines*

7.2.1 Step 1: Determine Consequence Rating

Assign a rating and score for each of the 3 criteria (A-C) listed in the tables below, and then add the scores to determine the consequence rating for an impact.

A. **EXTENT** - the area over which the impact will be experienced. The SPREP Toolkit establishes 4 values of extent.

Table 7-1: Extent of Impact Definition

Rating	Definition of Rating	Score
Local	Confined to the project or study site	1
Wider catchment	Extends beyond the project site to the wider, surrounding area	2
Island or national	Extends to the whole island or nation	3
Regional or global	Extends to the Pacific region or potentially beyond	4

B. **INTENSITY** – the magnitude of the impact i.e. whether the impact will result in minor, moderate or major environmental, economic and social (including human health) changes. The SPREP Toolkit establishes 3 values of intensity.

Table 7-2: Magnitude of Impact Definition

Rating	Definition of Rating	Score
Low	Minor or negligible changes, disturbances, damages, injuries or health effects. likely to generate minimal interest or concern amongst the local community/affected stakeholders. *Examples: dust and exhaust gases from construction machinery; temporary or single exceedance of a pollution limit or threshold; first aid cases; minor discomfort or irritation from construction noise; increased traffic on local roads to transport construction materials to a project site.*	1
Medium	Moderate changes, disturbances, damages, injuries or health effects. likely to generate more prolonged interest or concern amongst the local community/stakeholders. *Examples: generation of hazardous waste; large fish kill incident; frequent exceedance of a pollution limit or threshold; clearance of village food gardens; influx of workers from overseas for project construction; moderate disruption of daily life/work activities within a village; intermittent production of foul odour near a village; infrastructure damage from flooding or strong winds.*	2

Rating	Definition of Rating	Score
High	Major or severe changes, disturbances, damages, injuries or health effects. likely to generate widespread and intense interest or controversy amongst local, national and regional communities/stakeholders. *Examples: clearance of endangered species habitat; drawdown of limited groundwater supplies; large increase in suspended sediment levels from dredging; destruction of cultural artefacts; forced relocation of village settlements; permanent disabilities or fatalities; loss of coastal buildings and infrastructure due to extreme weather events.*	3

C. **DURATION** – the timeframe over which the impact will be experienced and its reversibility

Table 7-3: Definition of Duration

Rating	Definition of Rating	Score
Short Term	Up to 2 years – impact is reversible or limited to when particular development activities or environmental events are taking place. remediation or recovery is possible.	1
Medium Term	2 to 15 years – impact is reversible or limited to when particular development activities or environmental events are taking place. remediation or recovery is possible.	2
Long Term	More than 15 years – impact is permanent or gradually reversible with sustained remediation and recovery efforts.	3

The combined score of the three criteria (extent, intensity, and duration) corresponds to a consequential rating as follows (see **Table 7-4**).

Table 7-4: Consequential impact rating

Combined Score (A+B+C)	3 – 4	5 – 6	7 – 8	9 – 10
Consequence rating	Minor	Moderate	Major	Massive

7.2.2 Step 2: Assess the Probability

Assess the probability of the impact occurring according to the following definitions (**Table 7-5**).

Table 7-5: Probability of the Impact Occurring Definition

Probability – the likelihood of the impact occurring	
Improbable	Unlikely to occur during project lifetime <20% of occurring
Possible	May occur during project lifetime 20% - 60% chance of occurring
Probable	Likely to occur during project lifetime > 60% - 90% chance of occurring

Probability – the likelihood of the impact occurring	
Highly Probable	Highly likely to occur, or likely occur more than once during project lifetime >90% chance of occurring

7.2.3 Step 3: Determine the Significance

Determine the overall significance of the impact as a combination and probability ratings, as set out in the matrix below (see **Table 7-6**).

Table 7-6: Determination of Significance Table

		PROBABILITY OF OCCURANCE			
		Improbable	Possible	Probable	Highly Probable
CONSEQUENCE OF IMPACT	Minor	Very Low	Very Low	Low	Low
	Moderate	Low	Low	Medium	Medium
	Major	Medium	Medium	High	High
	Massive	High	High	Very High	Very High

7.2.4 Step 4: Level of Confidence

State the level of confidence in the assessment of the impact as high, medium or low. The level of confidence will depend on the extent and type of information available, whether it is qualitative or quantitative, and whether it is based on direct measurements, extrapolated data, estimations or expert opinion.

7.2.5 Step 5: Determine Residual Impact

STEP 5A: Identify and describe practical mitigation measures that can be implemented effectively to reduce the impact.
STEP 5B: Assume mitigation measures have been implemented and then reassess the impact, by following steps 1 to 4 again. The point of the second assessment is to examine how the impact extent, intensity, duration and/or probability are likely to change, after mitigation measures have been implemented.

7.3 Identification of Impacts

7.3.1 Project Activities Likely to Produce Impacts

To identify the Project activities that could result in an environmental or social impact, the following aspects have been considered:

- Actions involving emissions of pollutants (air, noise and water);
- Actions involving a modification of hydrological patterns;
- Actions involving a modification in the soil quality and structure;
- Actions acting on the biotic environment (flora and fauna);
- Actions involving damage of the landscape;
- Actions affecting infrastructure (services); and
- Actions modifying the social, economic and cultural environment.

Project activities have been determined based on what the Design Consultant considers to be the most likely and common approaches applied to similar projects, as well as a preliminary methodology from the Contractor. These are the approaches which have been considered as part of the Quantity Surveyor's assumptions when developing the Bill of Quantities. The following activities (**Table 7-7**) and their associated project phase have been identified for the purposes of impact identification.

Table 7-7: Project activities that could result in impacts

Phases	Actions
Site Preparation	Ancillary Project sites (laydown areas including hard pan, etc.)
	Terrestrial land clearing and clearance
	Construction and/or placement of ancillary facilities (offices, accommodations, machinery, etc)
	Transportation of equipment, materials and machinery
	Storage of equipment, materials and machinery
Construction	Clearance of material within seawall alignment
	Work on tidal reef flat
	Infilling behind alignment
	Construction of seawall
	Operations of ancillary facilities (workers accommodations, fuel storage, lights at night, operation of generators, etc)
	Operation of heavy machinery
	Site restoration
	Transportation of consumables, materials, equipment and workers
	Storage of materials, machinery and equipment
Operations and Maintenance	Seawall in place
	Upkeep of maintenance corridor
	Repair and maintenance of seawall / clearance of litter

7.3.2 Environmental and Social Receptors

The ESIA/ESMP report focuses on environmental and social components that may be most affected by the project actions and those that are a concern to the government, community members and stakeholders. The components are called Environmental and Social Receptors (ESR). Below are the ESR of concern for this project, identified through design phase screening and verified in the ESIA/ESMP screening (see **Table 7-8**).

Table 7-8: Environmental and Social Receptors of Concern

Category	Receptor
Water Resources	Surface water Freshwater

Category	Receptor
Geological Resources	Aggregates Soils Shoreline sediments
Coastal Hydrodynamics	Wave patterns Current regime Sediment transport
Atmospheric Environment	Air quality Noise Vibration
Marine Environment	Benthic environment (including live coral cover and macroalgae) Fish and fish habitat area Water quality Fisheries resources Marine species of concern (IUCN Red List)
Terrestrial Environment	Shoreline vegetation
Community Services and Infrastructure	Transportation network (marine and terrestrial) Utilities (water, energy, waste management and disposal) Consumables Solid and septic waste disposal Housing and accommodation
Land and Resource Use	Cultural and Gender Recreational Economic Residential
Gender and Social Environment	Cultural patterns or activities Access to opportunities (education, youth, women, disabled persons, etc.) Livelihoods
Community Health and Safety	Community health (SEA/SH, communicable disease, influx of labour, etc.) Community safety (accidents, unplanned events, etc.)

7.3.3 Impact Tables

Table 7-9 to **Table 7-11** present the quantification of impacts using the methodology described above. They present the identified impacts, the key management approaches and also present the residual significance (Step 5 of the Quantitative assessment of impacts process which has been described above).

As described in **Section 7.1**, these impacts have been identified through the final design and environmental and social screening. Impacts not included in the tables below are those which are generally well understood in infrastructure projects, are not unique, and have well recognized management measures as defined in the World Bank EHS Guidelines (e.g., dust suppression, Occupational Health and Safety (OHS) standards, storage and disposal of hazardous waste, etc)[131]. The Environmental and Social Management Plan captures the requirements for all impacts associated with these standard works.

To the greatest extent possible, impacts have been avoided or minimized through the iterative design process described in this ESIA/ESMP.

[131] *https://documents1.worldbank.org/curated/en/157871484635724258/pdf/112110-WP-Final-General-EHS-Guidelines.pdf*

Table 7-9: Pre-Construction Stage Residual Impact Significance

Actions	Post-Screening Impact Identified	Extent	Intensity	Duration	Conseq-uence	Proba-bility	Significance	Key Measures Applied	Residual Significance	Confidence
Water Resources (Freshwater, Surface Water)										
Arrival of international or off-island workforce	Increased demand for freshwater to accommodate workforce	3	2	1	Moderate	Highly Probable	**Medium**	Contractor is to ensure that they don't negatively impact the public water supply and Project cost has included for a Contractor purchased portable desalination unit (or similar).	**Very Low**	High
Atmospheric Environment										
Land Clearing and Clearance Construction and/or placement of ancillary facilities	Vibration damage to poorly constructed houses/buildings from use of heavy machinery and during haulage	2	3	2	Major	Possible	**Medium**	Contractor Pre-Construction Survey includes condition survey within 10 m of work areas. Condition assessment will be used as guide to reinstatement on completion of works. Contractor to utilize at least 3 vibration monitors (moving across the site) during the works.	**Low**	High
Marine Environment										
Shipping of materials and equipment Storage of equipment, materials and machinery	Decrease in sea water quality during shipping operations or from use of machinery when placing any materials on the reef flat for storage	2	1	1	Minor	Possible	**Very Low**	ESMP mitigation measures for spill prevention and response; mitigation measures for machinery condition	**Very Low**	High
Social Environment										
Construction and/or placement of ancillary facilities Haulage of materials and equipment	Contractor doesn't fully utilize local labour force thereby minimizing employment for community members	3	3	1	Major	Possible	**Medium**	ESMP measures for influx of labour and management of workers, including contractual requirements to utilize local labour where possible	**Medium - Positive**	High

Actions	Post-Screening Impact Identified	Extent	Intensity	Duration	Conseq-uence	Proba-bility	Significance	Key Measures Applied	Residual Significance	Confidence
Consultations and Engagement	Lack of, or poor-quality consultations and engagement with the community during the pre-construction activities could lead to grievances and lack of support for the Project.	3	3	1	Major	Possible	**Medium**	Stakeholder Engagement Plan to be regularly updated and implemented	**Low**	Medium
Community Services and Infrastructure										
Arrival of international or off-island workforce	Demand for housing on Ebeye increases to accommodate estimated workforce	2	2	1	Moderate	Possible	**Low**	ESMP measures for influx of labour and management of workers - Provision of dedicated workers camp / ship	**Very Low**	High
	Demand for food and supplies increases to accommodate estimated workforce	2	2	1	Moderate	Possible	**Low**	Contractor to supply all food needed for the workers Other ESMP measures for influx of labour and management of workers	**Very Low**	Medium
	Demand for power, medical, waste disposal increases to accommodate workforce	3	2	1	Moderate	Possible	**Low**	ESMP measures for influx of labour and management of workers Provision of backup diesel generator.	**Very Low**	High
Community Health and Safety										
Arrival of international or off-island workforce	Increased instances of SEA/SH, anti-social behaviour and transmission of STIs resulting from the arrival of international workforce.	3	3	1	Major	Possible	**Medium**	ESMP and Contract Document requirements for codes of conduct and ongoing worker training	**Low**	Medium

Actions	Post-Screening Impact Identified	Extent	Intensity	Duration	Conseq-uence	Proba-bility	Significance	Key Measures Applied	Residual Significance	Confidence
Land and Resource Use										
Negotiations and/or approvals for ancillary Project sites	Modification of land use for ancillary sites on non-government sites.	1	2	1	Minor	Possible	**Very Low**	Non-private land is prioritized for these sites subject to KADA approval. The PREP II Resettlement Policy Framework is to be followed for securing voluntary and temporary use of land for Contractor's use during project implementation.	**Very Low**	Medium
	Risks to Project timeframes if consultations and negotiations and for private land use are not properly managed.	3	2	1	Moderate	Possible	**Low**	Implementation of SEP	**Low**	High
	Timely payments not made to owners for leasing premises and/or compensation for use of private land for ancillary facilities.	1	3	2	Moderate	Possible	**Low**	Non-private land is prioritized for these sites subject to KADA approval. The PREP II Resettlement Policy Framework is to be followed for securing voluntary and temporary use of land for Contractor's use during project implementation.	**Very Low**	Medium

Table 7-10: Construction Stage Residual Impact Significance

Actions	Impact Identified	Extent	Intensity	Duration	Conse-quence	Proba-bility	Significance	Key Measures Applied	Residual Significance	Confidence
Water Resources (Freshwater, Surface Water)										
Arrival of international or off-island workforce	Increased demand for freshwater to accommodate estimated workforce	3	2	1	Moderate	Possible	**Low**	Contractor is to ensure that they don't negatively impact the public water supply and Project cost has included for a Contractor purchased portable desalination unit (or similar).	**Very Low**	High
Construction Activities (concrete mixing, dust suppression, etc)	Increased demand from islands water supply to meet construction needs causing reduction in water available to communities or households.	3	2	1	Moderate	Possible	**Low**	Contractor to assess local water supply against construction needs and make arrangements for alternative supply if island supply is unsuitable. Provision of desalination plant and/ or reverse osmosis plants if required.	**Very Low**	High
Atmospheric Environment										
Clearance of material within seawall alignment Infilling behind alignment Operations of ancillary facilities Construction of seawall Operation of heavy machinery Haulage and transportation	Vibration induced damage to poorly constructed houses/buildings from use of heavy machinery, during haulage and during construction works	2	3	2	Major	Possible	**Medium**	Contractor Pre-Construction Survey includes condition survey within 10 m of work areas. Condition assessment will be used as guide to reinstatement on completion of works. Contractor to utilize at least 3 vibration monitors (moving across the site) during the works.	**Low**	High
Marine Environment										
Work on tidal reef flat	Decrease in sea water quality during shipping	2	1	2	Moderate	Possible	**Low**		**Low**	Medium

Actions	Impact Identified	Extent	Intensity	Duration	Conse-quence	Proba-bility	Significance	Key Measures Applied	Residual Significance	Confidence
Storage of equipment, materials and machinery	operations or from use of machinery when placing any materials on the reef flat for storage							ESMP mitigation measures for spill prevention and response; mitigation measures for machinery condition		
Excavation of material within the seawall alignment Construction of seawall Infilling behind alignment Storage of materials, machinery and equipment Operation of ancillary sites	Increased sedimentation in the coastal environment during construction at the shoreline and from poor sedimentation and erosion control measures	2	1	1	Minor	Possible	**Very Low**	ESMP mitigation measures for sedimentation and erosion control.	**Very Low**	High
Construction work on tidal reef flat Operation of heavy machinery Clearance of materials within seawall alignment Storage of equipment, materials and machinery	Damage to reef flat and associated marine benthic fauna from placement of stockpile and use of machinery on reef flat. However, negligible ecological value on reef flat, in particular that adjacent to the land where the material would be stored. No plant will remain on the flat and will always be stored appropriately on land.	1	2	2	Moderate	Highly Probable	**Low**	ESMP controls for stockpiling on reef flat. Noted that ecological value of reef flat is limited but stockpiling should be kept to area of areas of least ecological sensitivity. RORO site will be pre-approved by the Engineer, PIU/ CIU and RMIEPA following underwater video footage of surrounding reef flat.	**Low**	High
Social Environment										
Construction of seawall Operation of heavy machinery	Contractor does not maximize use of local labour force leading to minimal creation of	3	3	1	Major	Possible	**Medium**	ESMP measures for influx of labour and management of workers, including contractual requirements to utilize local labour where possible.	**Medium Positive**	High

Actions	Impact Identified	Extent	Intensity	Duration	Conse-quence	Proba-bility	Significance	Key Measures Applied	Residual Significance	Confidence
Transportation of materials, equipment and workers	employment opportunities and limited upskilling for community members									
Presence of workforce										
Operations of ancillary facilities										
Clearance of materials within seawall alignment										
Clearance of materials within seawall alignment	Access to reef flat for fishing activities may be limited or altered during construction work or from any materials stockpiled on reef flat	2	2	1	Moderate	Highly Probable	**Medium**	Contractor's TMP requires pedestrian access around work sites. SEP is implemented. Contractor Community Liaison Officer (CLO) regularly engages with community to seek input and inform.	**Low**	High
Construction of seawall										
Construction work on reef flat										
Storage of materials, machinery and equipment on reef flat										

Actions	Impact Identified	Extent	Intensity	Duration	Conse-quence	Proba-bility	Significance	Key Measures Applied	Residual Significance	Confidence
Construction and use of RORO facility	Access to South Ebeye Beach may be limited during construction work	2	2	1	Moderate	Highly Probable	**Medium**	Ensure RORO site is approved by the Engineer, PIU/ CIU and RMIEPA prior to construction of the facility. SEP is implemented. Contractor CLO regularly engages with community to seek input and inform.. BBQ area to remain publicly accessible for the duration of the works. Use of the area adjacent to the BBQ hut will be limited to the area required to turn one articulated dump truck and for two articulated dump trucks to pass one another. Temporary fencing and spotters required. TMP and safety management plan to ensure that the public, particularly children, cannot access the area and be at risk from moving plant. Area to be reinstated after completion unless requested by the client.	**Low**	Medium
Community Services and Infrastructure										
Operation of ancillary sites	Increased levels of traffic, particularly heavy vehicles, on the road causes damage to and/or deterioration of roads and other infrastructure.	2	3	1	Moderate	Highly Probable	**Medium**	Contractor Pre-Construction Survey includes dilapidation survey of roads. Survey will be used as guide to remediation on completion of works. Traffic through the town and via the port would be minimized as much as possible.	**Low**	High
Haulage of plant, equipment and material from offloading point										
Operation of heavy machinery										
Excavation and clearance of materials within seawall alignment.	Detonation of UXO leading to significant injury or death of community	3	3	1	Major	Possible	**Medium**	Contractor required to undertake detection and removal of UXO prior to excavation works. Chance find procedure in place.	**Low**	High

Actions	Impact Identified	Extent	Intensity	Duration	Conse-quence	Proba-bility	Significance	Key Measures Applied	Residual Significance	Confidence
Construction work on reef flat	members or Project workers									
Presence of workforce	Demand for housing on Ebeye increases to accommodate workforce leading to increased rents and/or reduced availability of accommodation for the community	3	3	1	Moderate	Highly Probable	**High**	ESMP measures for influx of labour and management of workers - Provision of dedicated workers camp	**Low**	High
	Demand for food and supplies increases to accommodate workforce	3	3	1	Major	Highly Probable	**High**	ESMP measures for influx of labour and management of workers	**Low**	Medium
	Demand for power, medical, waste disposal increases to accommodate workforce	3	3	1	Major	Possible	**Medium**	ESMP measures for influx of labour and management of workers. Provision of backup diesel generator.	**Low**	Medium
Anchorage of vessel in the lagoon west of the RORO facility	Interference with transit route for the ferries and incoming cargo vessels	1	3	1	Minor	Highly Probably	**Medium**	Any location of ATONs and anchoring of vessels will need to be agreed upon with Ebeye Port Control and the US Navy	**Low**	Medium
Community Health and Safety										
Presence of workforce	Increased instances of SEA/SH, antisocial behaviour and transmission of STIs resulting from interactions with the international workforce.	3	3	1	Major	Possible	**Medium**	ESMP and Contract Document requirements for codes of conduct and ongoing worker training	**Low**	Medium
Operation of ancillary sites Construction of seawall	Risk to safety of children if unauthorized access to the Project sites during the day or night.	3	3	1	Major	Probable	**High**	Technical specifications require Contractor to install man-proof fencing around all works sites, including demolition work.	**Medium**	High

Actions	Impact Identified	Extent	Intensity	Duration	Conse-quence	Proba-bility	Significance	Key Measures Applied	Residual Significance	Confidence
Construction work on reef flat Storage of materials, machinery and equipment Use of heavy machinery								Contractor to liaise with Ebeye police for provision of additional security. Also work with community to assist with education of children as to the dangers of the work site		
Offloading and haulage of materials	High levels of haulage required for the seawall construction creates risk of accident and injury to pedestrian and other vehicles in Ebeye.	2	3	2	Major	Probable	**High**	ESMP Transportation Management Plan requirements. TMP will be informed through consultations with key stakeholders and subject to additional approval by KADA. Traffic through the town and via the port would be minimized as much as possible. Plant movement will be kept to the works areas and clearly demarked and fenced off.	**Medium**	High

Table 7-11: Operational Stage Residual Impact Significance

Actions	Impact Identified	Extent	Intensity	Duration	Consequence	Probability	Significance	Key Measures Applied	Residual Significance	Confidence
Water Resources										
Presence of Seawall	Changes to drainage patterns and speed through the construction of the seawall and associated drainage. This will create a situation which is at least the same, but possibly better than the current status with potential for standing water and poor drainage.	2	2	3	Major	Probable	High	Fill level behind majority the wall raised to +1.4m MSL. Maintenance instructions provided to KADA	**Medium**	High
		2	1	3	Moderate	Improbable	Low	Fill level behind majority the wall raised to +1.4m MSL. Maintenance instructions provided to KADA	**Low**	High
	Drainage function of seawall may be hampered if maintenance corridor isn't maintained properly. This could lead to a decrease in drainage speed and gradually lead to comparative increases in flooding and result in ponding at normal high tide.	1	1	3	Minor	Possible	**Very Low**	Design acts as a natural drain. Maintenance instructions provided to KADA. Minimal maintenance required for drainage function	**Very Low**	High
Coastal Hydrodynamics										
Presence of Seawall	Potential changes to the movements of sediments along the face of the seawall following their reinstatement compared to the natural coastline	1	1	3	Minor	Possible	**Very Low**	Impact minimized through design alignment	**Very Low**	High

Actions	Impact Identified	Extent	Intensity	Duration	Consequence	Probability	Significance	Key Measures Applied	Residual Significance	Confidence
Social Environment										
Presence of Seawall	Loss of beaches under the seawall alignment would result in the community losing the cultural and recreational value afforded by beaches.	1	2	3	Moderate	Highly Probable	Medium	Alignment is set close to shoreline and may allow for reinstatement of some beach areas. Stairs and ramps designed to allow for access to key beach areas. Impact to beaches is unavoidable due to need for coastal protection. Noted that current beaches are small and would be lost in future years to coastal squeeze and sea level rise / erosion.	**Medium**	High
	Presence of seawall with dedicated crossing points will change the way in which the community uses and interacts with the reef flat environment, including the borrow pits. This will be felt disproportionately by the elderly and community members with mobility difficulties.	1	2	3	Moderate	Highly Probable	Medium	Multiple access points are provided along the alignment including one all access ramp	**Low**	High
	Breeze will be reduced immediately behind the seawall and has the potential to reduce the comfort and wellbeing experienced within impacted households.	1	2	3	Moderate	Highly Probable	Medium	Seawall crests have been bought to lowest safe level. Some impact on sea breeze in the most adjacent properties is unavoidable and outweighed by the protection afforded to over topping and waves (i.e. most seaside properties are currently derelict due to ocean damage, not wind issues).	**Medium**	High

Actions	Impact Identified	Extent	Intensity	Duration	Consequence	Probability	Significance	Key Measures Applied	Residual Significance	Confidence
Community Health and Safety										
Presence of Seawall	Reduction in the level and duration of storm wave inundation could lead to a reduction in standing water and therefore a reduction in communicable diseases..	2	2	3	Major	Possible	Medium Positive	Design acts as a natural drain.	**Medium Positive**	Medium
	There are safety risks associated with children playing on a new seawall structure that cannot be avoided through design. Design measures can reduce the risks of severe injury to children and other people climbing on and falling from the structure, but cannot totally remove them	1	1	3	Minor	Possible	Low	The new revetment is similar in design to the existing structure and is well recognized by all parts of the community. All rocks should be packed together as tightly as possible and voids minimized where they can be. Local community and KADA consultation encourages participation with parents and children on the dangers of playing on the rocks, particularly in high wave conditions.	**Very Low**	High
Land and Resource Use										
Presence of Corridor behind wall	The creation of the maintenance corridor may lead to encroachment by any neighboring properties leading to difficulties in proper maintenance of seawall.	1	2	3	Moderate	Probable	Medium	KADA to manage through engagement with landowners and property owners. No development should be allowed in the maintenance corridor. This also includes landscaping and the development of trees / plants etc	**Medium**	Medium

Actions	Impact Identified	Extent	Intensity	Duration	Consequence	Probability	Significance	Key Measures Applied	Residual Significance	Confidence
Seawall Infill Materials	Some areas of infilling at the +1.4m MSL cross the Weto boundaries and in some areas have the potential to impact structures and property.	1	2	3	Moderate	Highly Probable	Medium	Instruction on design drawings call for lowering of fill level to avoid property impacts.	**Low**	High
Presence of Seawall	Landscape and oceanward will be permanently altered and may change outward views.	1	2	3	Moderate	Probable	Medium	Design has lowered the crest level of the wall as much as possible. Fill behind wall will elevate ground level which will minimize height of wall on the island side. Impact is unavoidable. Noted that the current landscape is dominated by rubbish and waste which will be removed and is already partially occupied by a similar revetment structure which blends well into the island sea and landscape.	**Medium**	High

7.4 Identified Impacts and Mitigations

Section 7.3.3 provides the assessed impact rating both pre and post mitigation. In the following subsections, those impacts assessed to be either 'medium' or 'high' negative prior to the application of mitigation measures are further discussed. It also highlights where there have been limitations in the impact assessment process due to lack of data or detailed design and details required action to address these gaps.

Each subsection below also characterizes some of the key protective measures that have been designed to mitigate or avoid environmental and social impacts. A full list of all protective measures for all identified impacts is included in the ESMP (**Section 8**).

7.4.1 Environmental Impacts

7.4.1.1 Freshwater Consumption

With the arrival of foreign workers onto the islands for the period of construction, there will be an increased demand for freshwater. It is estimated that the average person requires 100 litres of water per day[132]. It is unlikely that the local water supply is sufficient for 22 workers as this additional pressure would leave the community water supply vulnerable to disruption of supply or shortages.

It will be a requirement of the project for water conservation measures to be used to minimize the demand and the project will need to provide all freshwater needs of the workers and for construction separately to the local supply. It is a requirement of the project to maximize the use of local labour and minimize the number of foreign workers used on the island to further reduce demand.

In order to ensure that there are no negative impacts on the community water supply, the Contractor has committed to the facilities at the workers accommodation camp and workshop/ office including a portable reverse osmosis (RO) plant and desalination unit to produce potable water, as well as a water filter/ treatment unit and five 10,000L water tanks.

The Contractor has advised that they are expecting to use 200L per person per day for up to 22 persons, or 4.4kL/day. The RO plant, desalination plant and rainwater collection are expected to meet this requirement. Water draw from the local authority is expected to be ad hoc during the project.

7.4.1.2 Wastewater Discharges

The main potential impacts on groundwater resources are likely to come from the Contractor's project workers during the construction phase. Workers' toilets and other sanitary facilities (showers and basins) will generate sewage and wastewater which, if not properly managed, can cause nutrients, pathogens and other bacteria to enter the ground water.

While groundwater is not used on the island for drinking water, it is possible for this pollution to enter the coastal marine environment which could potentially impact the shellfish species gleaned from the reef.

The ESMP as such requires the contractor to capture and treat all wastewater and sewage in a way which does not negatively impact the environment.

[132] *https://stories.undp.org/pacc-tuvalu*

7.4.1.3 Vibration and Noise Impacts

Construction Phase: Vibration and increased noise levels will be experienced at the Contractor nominated offloading site, along the haulage routes and also potentially at the ancillary sites from the operation of machinery. Increased vibration and noise is also likely at the coastal defense construction sites and would move as the construction site moves along the alignment of the seawall.

There is the potential for impacts to be significant at the individual household/building level as many are poorly constructed and maintained and may, as a result, suffer damage from the vibration and also not be well insulated to protect from construction noise.

With regard to vibration, the Contractor will be required to undertake a pre-construction survey which includes condition assessments of buildings within 10 m of the worksites, at the proposed unloading site and along the haulage routes. The condition survey will be used as the standard for any rectification measures needed upon completion of works.

The existing level of damage to properties would need to be assessed to fully understand the significance of this impact. This is an impact which has the potential to generate a number of grievances and would need careful planning in order to determine what level of damage can be accepted by the Contractor given the poor condition of some buildings or homes.

The ESMP contains a full package of mitigation measures for minimizing and/or managing noise impacts during the construction works. The Contractor will need to ensure that these measures are followed and that noise impacts are discussed with the stakeholders to see where measures could be improved etc. It is noted that all construction impacts on noise and vibration would be limited to the timing of the works themselves (i.e. temporary in nature).

Operational Phase: Concerns were raised during community consultations over whether there would be any vibrations resulting from waves hitting the seawall which could potentially cause damage. This is not a known issue and is not reported in any of the literature examined by the design engineers.

However, waves breaking along the shoreline are noisy due to the water turbulence and also the sands and gravels being rolled up and down the beach. Reported background noise levels along a shoreline range between approximately 60dB to 80dB depending on wave height[133]. This can be compared to background sound levels for typical (non-coastal) rural areas with negligible transportation ranging between 30 and 40 dB, up to 45 to 55 dB for industrial urban areas, depending on the time of day[134].

The Ebeye revetment would not be expected to significantly change the surf noise at the shoreline. The surf noise may be reduced because the mobile sands and gravels are no longer exposed to the swash. Also, the surf noise could be deflected up and over the foreshore houses by the walls. The rocks in the revetment will not move except under severe storms when the extensive noise from the waves would be expected to drown out any noise from the movement of the rocks.

7.4.1.4 Reef Flat Ecology

The Contractor has proposed to construct an RORO landing facility on the atoll side of the island to facilitate offloading of construction materials (as identified in **Section 2.4.1**). They have also proposed to stockpile rocks on the reef flat and also transport that material along the reef flat.

[133] *J Acoust Soc Am . 2010 May;127(5):2771-9, Air-borne sound generated by sea waves Karl Bolin, Mats Åbom*
[134] *TfNSW, 2016 Construction Noise and Vibration Guideline*

It is proposed that all areas of reef flat be available to the Contractor (**Figure 7-1**) for stockpiling. This is because the ecological value is limited both on the flats and in the manmade borrow pits.

Figure 7-1: Extent of hardpan approved for use as a stockpile site by the Project.

As discussed in **Section 5.2.2.1**, the live coral cover on the reef flat in general is very sparse and the species assemblage is not considered to be unique or important. Live coral is confined to the pit areas in the majority and even then coverage is intermittent and limited. To ensure the impact is minimized, the Contractor will be required to ensure that any reef flat area they propose for stockpiling and haulage are of low habitat value / presence (this is pretty much the whole area on the flat). Approval of stockpile sites and haulage lanes must be approved by the supervision team and included in the C-ESMP.

Provided that the stockpiling and use of heavy machinery is carried out in compliance with the ESMP, the significance of the residual impact is considered to be low.

The borrow pits are unsuitable for stockpiling due to their depth and will, therefore, not be impacted by stockpiling.

Construction works will also likely result in sediments becoming suspended in the water column along the reef flat and within the borrow pits. While this is likely to cause the area to become turbid in the short term, with the change of tides, any sediments will quickly become dispersed in the ocean currents and any sediments that do settle in the borrow pits will likely be dispersed by wave action and are not expected to cause any significant impacts to the corals within.

It is considered that there are multiple locations in which the Contractor can come to shore without the keel of the ship/ barge touching the seabed / coral (especially at high tides). The proposed new RORO facility, and navigation route for barges from anchored ship to the unloading facility at Ebeye's South Beach will need to be constructed with minimal impact on coral. The Contractor should spend adequate time selecting anchorage sites and navigational routes and then seek approval from relevant stakeholders, including (but not limited to) KAJUR, Ebeye Port Control and the US Navy. The identified site and routes are to be included in the C-ESMP. It is paramount that existing coral habitats are not affected directly by any of these works and that indirect impacts should be minimized as far as possible. It is recommended (but not mandatory) that the Contractor undertakes a full survey of the coral in the selected anchorage site, navigational route and RORO facility location pre and post works. At the very minimum, it is a requirement to take an underwater video of the surrounding reef flat prior to constructing the RORO facility for Engineer's approval.

7.4.1.5 Sediment Transport

Section 5.1.8 of this report summarizes sediment transport processes on the ocean side in Ebeye and provides a semi-qualitative conceptual sediment transport model for the Ebeye seawall zone and far-field zone.

The natural causes of coastal erosion in Ebeye are storm erosion, climate change and sea level rise. Although cross-shore storm erosion is intermittent and the beaches will recover during the periods of milder wave conditions, climate change and sea level rise lead to reduced amount of sediment supply from the reef flat, terraces and slopes, lower sediment transport rates to the coast and 2-2.75 m shoreline retreat.

Excavation pits of the reef in front of the shoreline is one of the causes of erosion in Ebeye. They generate local gradients in alongshore transport and return currents which lead to permanent loss of sediment supply to the shoreline, and thereby local erosion occurred. The other anthropogenic cause is the moat/channel between the current shoreline and beach rock outcrop at the southern side of Ebeye. This channel generates easterly permanent flow and affects local sediment transport pattern. This may result in local erosion at the beaches and accretion of spit at the southern end of Ebeye. There is limited data published after recent construction of a breakwater, therefore the impact of the breakwater could not be investigated in this report.

The increasing effect of climate change and rising sea levels, along with the impact of excavation pits and moat/channel, would erode the beaches on the oceanside of islands and create conditions which would not support permanent sand deposits.

The proposed coastal protection structure is to be built along the shoreline, as close as possible to the island to minimize the importation of fill material. It will mirror the existing alignment of the shore to the extent this does not lead to problematic wave reflections from tight internal angles, and unnecessary construction difficulties and cost. Tidal and wave induced currents that may presently develop along and across the shore and reef, will not be impacted by the works. No new pits are to be excavated, and no pits filled as part of these works. The full length of the shoreline is proposed to be protected, incorporating the existing revetment and extending around the southern end of the island for the full extent of the power station.

The impact of the seawall on the pre-existing sediment transport movement is expected to be inconsequential when considered with all other factors presented in this report.

Impact of proposed RORO facility

Ebeye's wind climate is characterised by east to northeast trade winds resulting in wind-sea and swell waves from that direction. These waves, impacting the shoreline from the east, are unlikely to reach the subject breakwater or significantly impact sediment transport at the beach, which faces west and is located north of the breakwater.

Locally generated lagoon waves come from the west, with a height of 0.5-1.0 m[135]. The estimated maximum closure depth, according to methods in the Shore Protection Manual, is approximately 1.5 m below Mean Low Water, or - 2.0m MSL. This depth, where the influence of wave action on cross-shore sediment transport becomes insignificant, is about 25m west of the breakwater head based (based on

[135] *Deltares (2016) Coastal Risk Assessment for Ebeye, Technical report 1230829-001, edition B*

2022 hydrosurvey). It follows that a minor impact is likely to occur at the southern end of the beach as a consequence of the breakwater extension due to the slight difference between the west-northwest direction of the breakwater and the direction of the waves. However, this would be temporary with full beach recovery expected once the breakwater is removed post-project.

Aerial photos from Google Earth show no significant long-shore sediment transport from the south or southwest to the beach, and no sediment supply from the beach's to the south or north. The sand spit that forms from time to time at the island's southern end is primarily aligned towards the southwest, away from the breakwater and beach.

In summary, the breakwater extension is not expected to modify the longshore sediment transport in the area. Minor changes may occur, but these would be temporary limited by the duration of the temporary breakwater extension, and fully recoverable. With the peak of the foredune only around 0.6m MSL, sea level rise is considered a minor influence on processes in the area and is not material to this opinion.

7.4.1.6 Impact to Beaches

Beaches and bays identified in **Figure 7-2** will almost be completely covered by the rock revetment seawall structure and will be modified from their current state on completion of works. The beaches are shown in relation to the design, alignment and existing property boundaries which have been priorities for avoidance. The extent of the beaches informing this assessment is based on aerial imagery. The actual size and extent of sandy beaches will be confirmed as part of the Contractor's pre-construction survey.

Figure 7-2: Key plan for beach impacts

While these beach environments will be lost, it has been estimated by the coastal engineering design team that the beaches as they currently exist would not remain under a do-nothing scenario. In the absence of a seawall, the increasing impacts of climate change and rising sea levels will ultimately erode these beaches and create conditions which would not support permanent sand deposits.

Beach materials will be excavated on commencement of works and beach sediments will be stockpiled during construction. The Technical Specification stipulates that on completion of works, the beach and foreshore sediments will be reinstated where it is not covered by the seawall. It shall be reinstated to its pre-construction shape and profile or as otherwise directed by the Engineer and to the satisfaction of the Engineer.

The Technical Specification also requires that material used for reinstatement shall be beach and foreshore gravels and sand, free of rubbish or any other anthropogenic material. Where bunds, beach or foreshore materials are used for temporary protection of the works, the bunds shall be mechanically screened to remove rubbish or any other anthropogenic material to the satisfaction of the Engineer prior to the material being reinstated on the beach and foreshore.

Where it is actually possible to reinstate sediments, they are likely to settle into the gaps between rocks to some extent. The Technical Specification requires that subsequent settlement of sand and gravel into the

rock revetment voids shall be monitored by the Engineer and rectified by the Contractor for an agreed period after initial beach and foreshore profile reinstatement.

At the back of the alignment, consideration will also need to be given about demarcating the existing property boundaries. Decisions over methods for demarking property boundaries will be the responsibility of the client team, however suitable approaches will be discussed as part of the Project engagements with the client.

As per **Section 7.4.1.5, t**he impact of the RORO facility to South Ebeye beach is expected to be minor with full beach recovery expected once the breakwater is removed post-project (unless requested by the client to retain).

Beach Area 1: CH -200 to 160

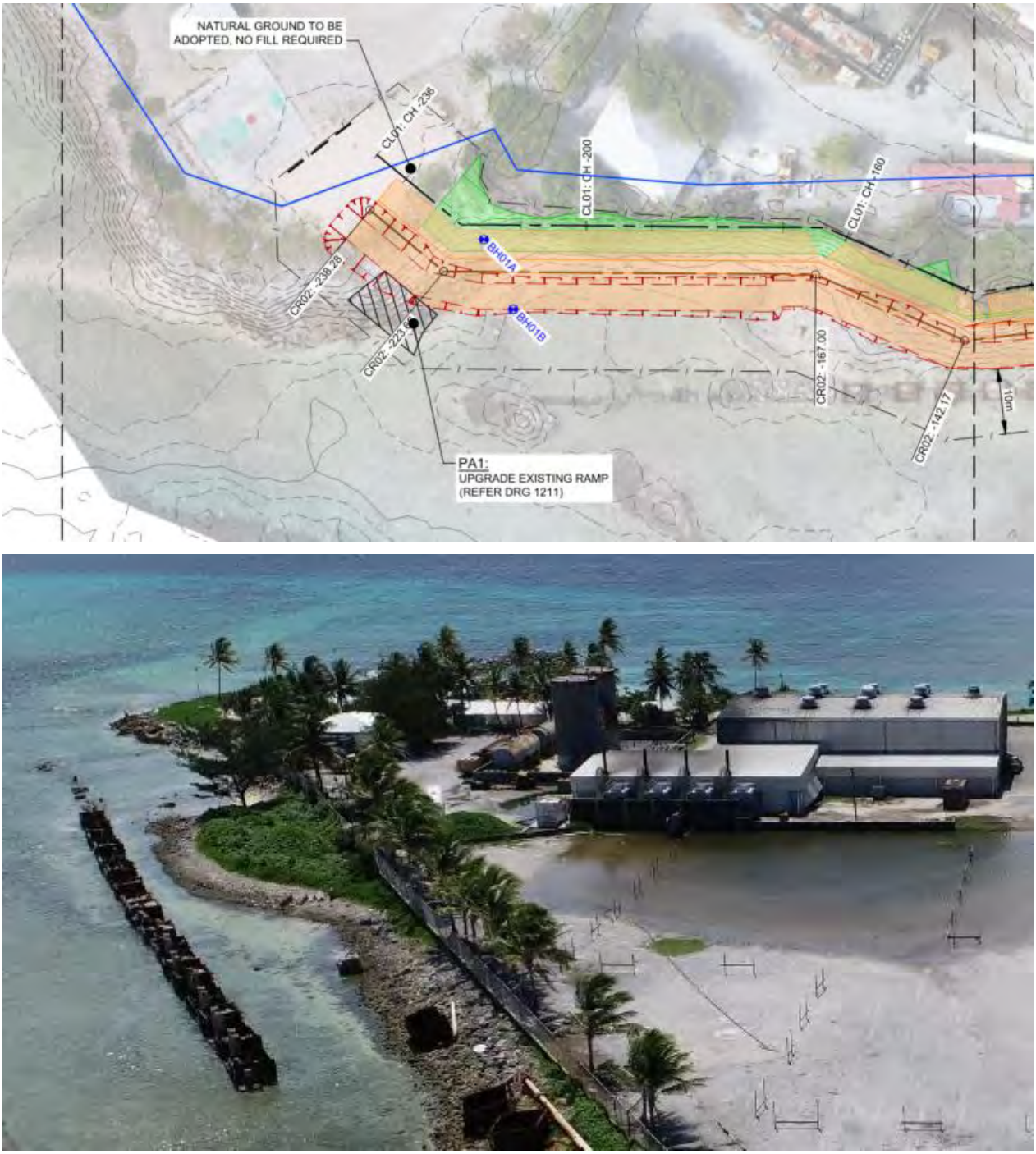


Figure 7-3: Beach Area 1

Beach Area 1 (95m^2): This beach area (**Figure 7-3**) is currently used for recreation and also sometimes as a space that people use to wait for lower tide when wanting to cross between Enen Rok and Ebeye. The area also provides a protective function to the KAJUR plant behind.

The vehicle access at the southern end of the seawall is pedestrian friendly to maintain access to the beach.

Grassy Knoll Area (885m²): The main use of this grassy area is for recreation, fishing and leisure. There are also protective functions (as a buffer) for the power plant that will ultimately be replaced by the seawall structure.

Beach Area 2: CH 200 to 340

Figure 7-4: Beach Area 2

Beach Area 2 (1200m²): This beach area (**Figure 7-4**) is mainly used as an access point for the reef flat and crest. There are also some leisure uses in this area such as a children's play area and fishing. An all-access ramp point has been provided here to maintain access to the reef flat.

Beach Area 3: CH 400 to 500

Figure 7-5: Beach Area 3

Beach Area 3 (1130m^2): This beach (**Figure 7-5**) is another popular access point to the oceanside for fishing. It is sometimes used as a play area, but it is generally a bit quieter due to the proximity of the graveyard. The closest access point is 100 m north of the beach.
The graveyard will benefit from a halt to the current erosion that it is experiencing.

Beach Area 4: 780 to 900

Figure 7-6: Beach Area 4

Beach Area 4 (680m^2): This beach (**Figure 7-6**) is used mainly for access to the oceanside particularly at low tide for recreation and fishing. This beach provides an important space for children and parents to socialise in the evenings. The importance of recreational spaces such as this is heightened given the constricted land areas for such activities in Ebeye. This beach is well used particularly on weekends when a lot of kids spend time there playing. Fishing does occur here on the weekends too (in the mornings) but morning fishing on the lagoon side is more prevalent than at this beach. The final design includes a stair access convenient to this location.

Beach Area 5: Ch 1,460 to 1,540

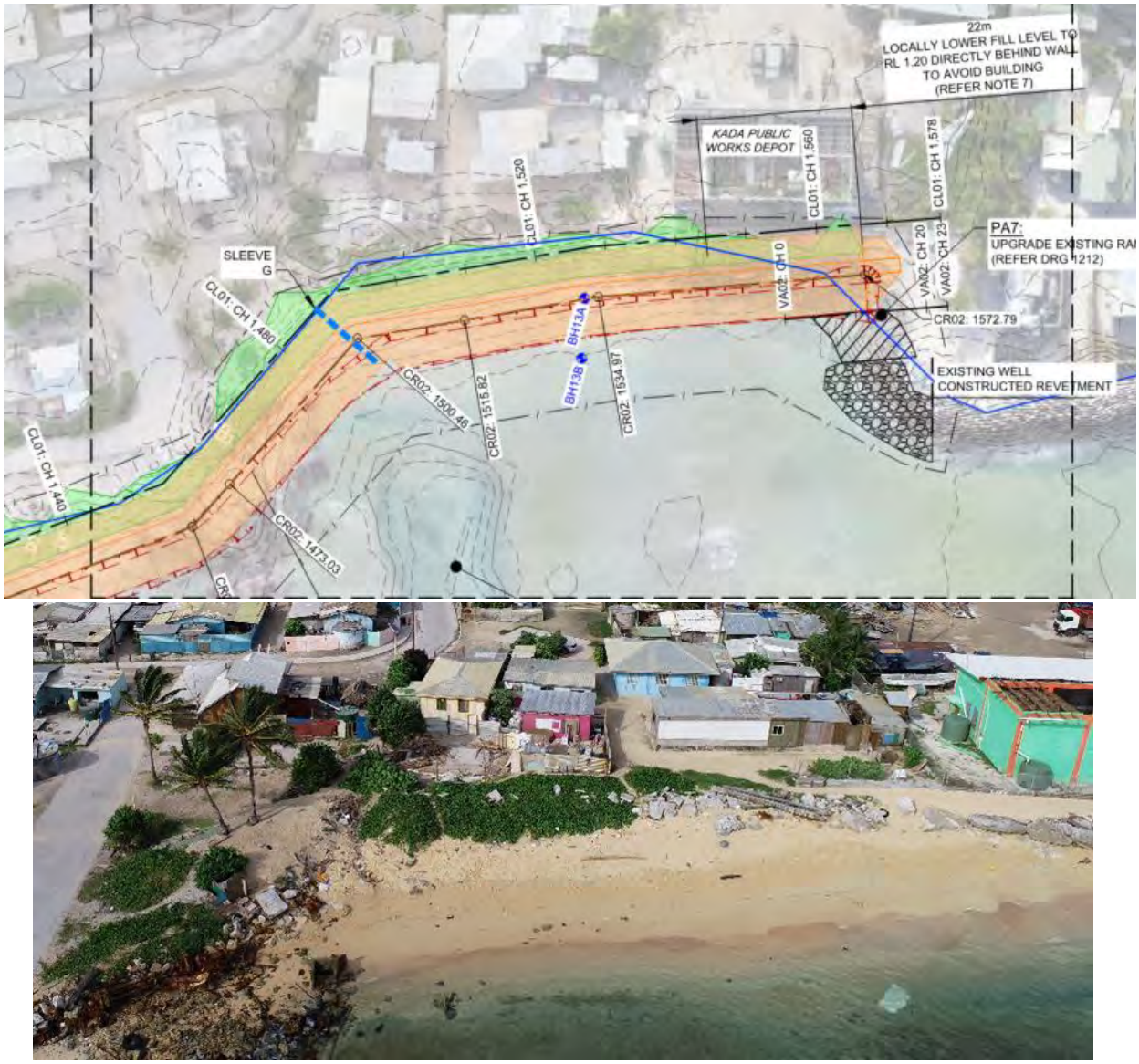


Figure 7-7: Beach Area 5

Beach Area 5 (710m^2): The main feature or use of this beach (**Figure 7-7**) is the open space it provides particularly as a playground for kids. It is also used as an access point for fishing on the oceanside. The vehicle access at the northern end of the seawall is pedestrian friendly to maintain access to the oceanside.

7.4.2 Social Impacts

7.4.2.1 Livelihood and Economic Opportunity

Construction Phase: There is an expectation within the community that the construction of the seawall will lead to job creation and economic opportunities on a number of levels: construction jobs, increased activity in shops, catering opportunities, housekeeping services, etc. To generate temporary employment

opportunities, will require dedicated efforts from the Contractor to actively advertise related opportunities within the broader local Ebeye community in Marshallese.

There is the potential for lost economic opportunity should the Contractor not utilize local labour for construction. While there will be a need for an international workforce, it will be considered that all unskilled workers are recruited from Ebeye. Lost employment opportunities could lead to dissatisfaction among the community members and generate grievances.

It is anticipated that there will be 20-25 employment opportunities available during the construction period. While the majority of those will come from international sources to begin with, the Contractor is encouraged to utilize as much local resources (RMI and Ebeye) as possible and undertake training of local staff. These jobs will be temporary and vary in duration.

The contract encourages the Contractor to employ staff and labour (including subcontractors) with appropriate qualifications and experience from sources within the country.

The Contractor will be required to develop a Worker Management Plan as part of their C-ESMP which will describe the recruitment process along with the requirement to justify where local labour isn't being used for mid to low skill roles. An effective Worker Management Plan will ensure that the risk of this impact is low.

There will be unavoidable impact on the way in which fisherfolk access the reef flat during construction as the shoreline will be an active construction site. The ESMP requires that the Contractor allow for pedestrian access around the work sites at all times to try and minimize these impacts. The TMP is required to consider inputs from key stakeholders on Ebeye and they are required to recruit a Community Liaison Officer (CLO) prior to the commencement of works. The CLO will work with the fisherfolk to minimize the disruption as much as possible. The disruption will be short term in nature and has a low residual significance.

Operational Phase: Seawall design has been used to minimize this impact to a very low significance rating. On completion of the Project, there will be four staircases crossing the design as well as one all-access ramp and also access to the reef flat around each end of the seawall. This will enable people to access the reef flat easily to carry out fishing or gleaning activities. Furthermore, the alignment footprint is very minimal on the reef flat itself, therefore no fishing grounds are being lost through this Project. The CLO will also liaise regularly with representatives from people's disability organisations to ensure temporary access are addressed during construction.

7.4.2.2 Land and Non-land Assets

Design Finalization: While small parcels of land may be temporarily required for the construction of the sea wall (i.e. material, equipment and plant storage, accommodation), under the current proposed alignment there would be no requirement for permanent land acquisition. Under the current alignment, it can also be seen that there are no homes or buildings that will require resettlement. As identified in the design alignment permanent footprint, the preferred path of the seawall, to the greatest extent possible, sits on the shoreline and remain outside the Weto and property boundaries that have been provided by the GoRMI.

While there will be no acquisition of land for the seawall itself, the general fill level at the back of the wall has been set at +1.4m MSL which does cross the Weto boundary (indicated by solid blue line in the drawings) in several places. This is the lowest feasible level to avoid ponding of tidal water behind the wall during regular tidal events over the life of the structure. However, there are instances along the shoreline

where private properties are below +1.4m MSL. In these areas, to avoid physical impacts to these structures, it is not possible to keep the fill level immediately behind the wall at +1.4 MSL and will need to be lowered. If the fill here were not lowered, then rainwater runoff in severe storms where it passes over the low-lying properties, could potentially not infiltrate or drain away quickly leading to excessive ponding which may inundate house floor levels. Accordingly, the fill level has been lowered locally directly behind the wall in nine separate segments totalling 10% of the wall length, to tie into existing low levels and to avoid these potential impacts. During heavy rainfall events (i.e. up to a 1 in 100-year Annual Exceedance Probability (AEP) flood), the designer has estimated that ponding of water behind the proposed wall could be up to 200 mm at the rear face of the wall. Therefore, the Contractor will undertake topographic survey of all habitable building floor levels within 30 m of the rear face of the wall to confirm that there are no habitable floor levels below the estimated ponding levels.

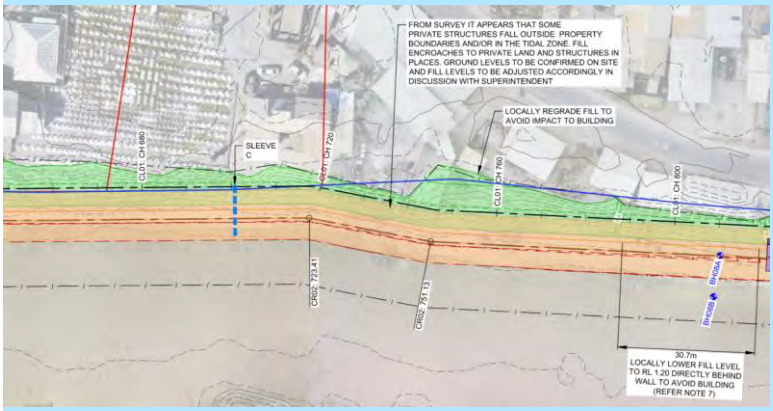
Overall it is expected that raising the level of properties within the Weto boundary creates a positive impact for the landowners as it provides increased resilience and reinstates some areas of level land which have been previously lost to structural erosion. Permission will need to be sought from landowners during the Contractor negotiations to ensure they are happy with this approach. Note, if landowners do not want these areas filled, they will have to be left as is with the knowledge that they will become ponded areas.

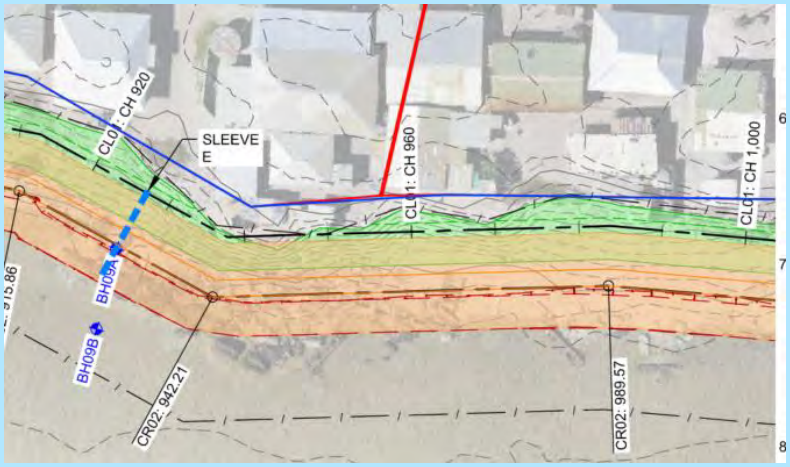
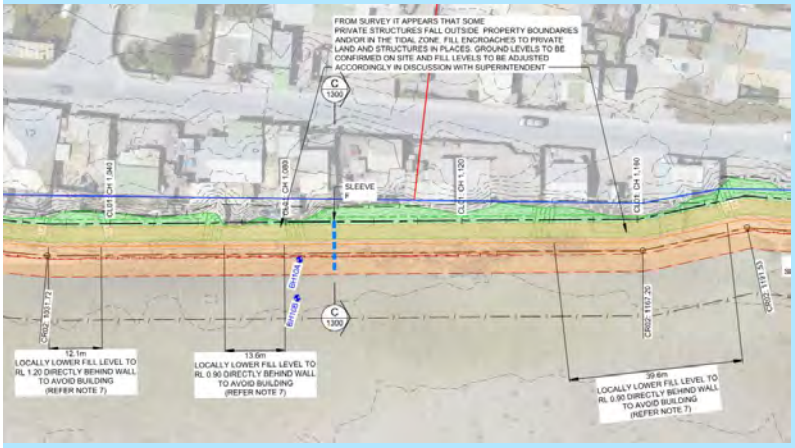
Permission from the landowners for sites to receive fill material to raise the ground level will be sought by KADA (in discussion with MWIU).

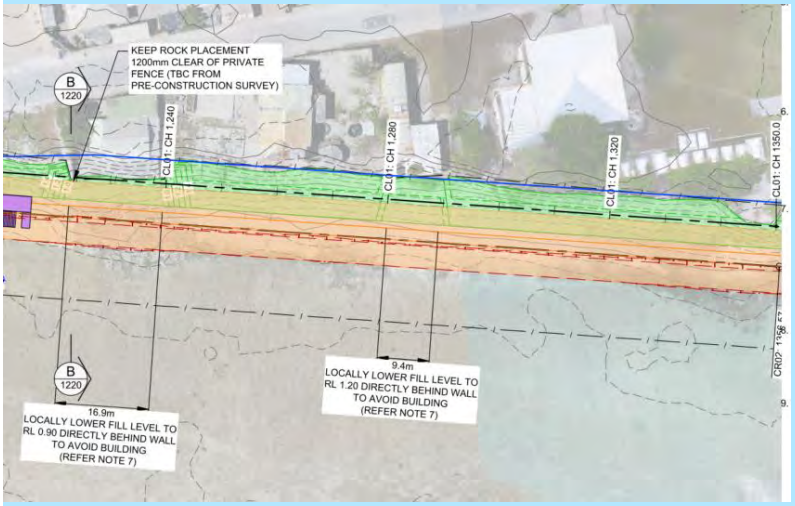
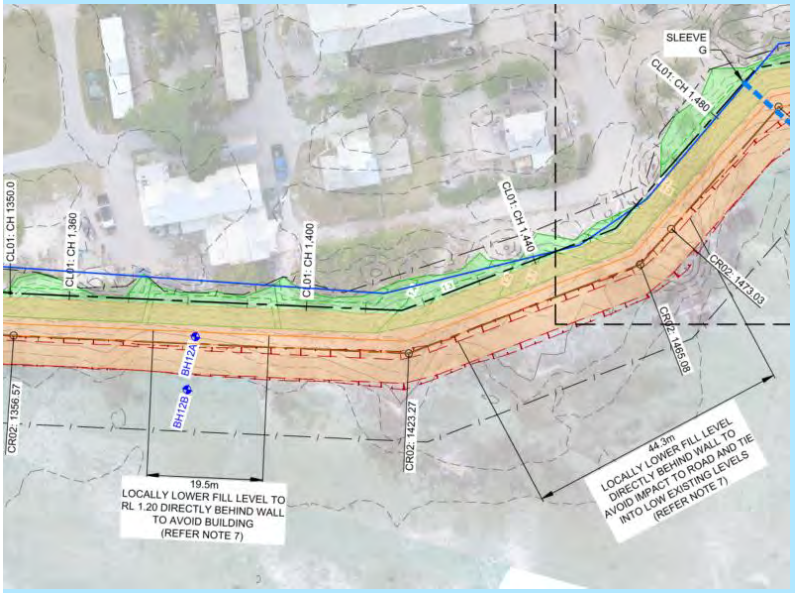
Table 7-12 below provides a summary of the main areas of fill beyond the Weto boundary along with impacts and/or design adjustments.

Table 7-12: Back of wall fill levels to +1.4 MSL

Drawing Snippet	Preliminary Assessment
	**CH 0 to 40** Fill crosses Weto boundary (solid blue line) at the KAJUR compound.

Drawing Snippet	Preliminary Assessment
	**CH 360 – 520** Fill crosses Weto boundary on beach slope. No vegetation impacted. No structures impacted. Need to ensure protection of cemetery from fill (fill level to be adjusted locally where required) and during construction. Graveyard will benefit from protected shoreline.
	**CH 520 – 640** Fill crosses Weto boundary on beach slope. No impacts to structures, no impacts to trees or vegetation
	**CH 640 – 800** No vegetation within fill area. Graveyard located at CH 720-740, levels need to be adjusted locally to avoid impacts to graveyard structures. As noted in the drawing, from the survey results it appears that some private structures fall outside the property boundaries and/or in the tidal zone. Fill encroaches to structures using the RL1.4m contour. Ground level to be confirmed on site and adjusted accordingly in discussion with the Engineer. CH 760 – instruction to locally regard fill to avoid impact to building. CH 790-810 – instruction to locally lower fill level to RL1.2 for 30.7m directly behind wall to avoid buildings

Drawing Snippet	Preliminary Assessment
	**CH 920, 960 – 1,000** Fill crosses Weto line on beach slope. No structures and no trees impacted.
	**CH 1,030 – 1,170** No vegetation or trees impacted. As noted on drawing, from the survey it appears that some private structures fall outside property boundaries and/or in the tidal zone. At the current level, fill encroaches to private land and structures in places. Ground levels to be confirmed on site and fill levels adjusted accordingly in discussion with Engineer. CH 1,030 – instruction to lower fill locally to RL1.2 for 12.1m behind wall to avoid building CH 1,070 – instruction to lower fill locally to RL0.9 for 13.6m directly behind wall to avoid building CH 1,160 – instruction to lower fill locally to RM1.10 for 39.6m directly behind wall to avoid building

Drawing Snippet	Preliminary Assessment
	**CH 1,240 – 1,330** Fill crosses Weto boundary on beach slope. CH 1,230 – instruction to lower fill locally to RL0.90 for 16.9m to directly behind wall to avoid building. CH 1,280 – instruction to locally lower fill to RL1.20 for 9.4m directly behind wall to avoid building CH 1,320 – private graveyard and tress at this location. Survey on ground to determine whether there is any impact to tress and then adjust locally to avoid.
	**CH 1,360 – 1,480** Potentially some vegetation within fill area. Survey on ground to determine whether there is any impact to trees and whether adjustment of fill levels is required. CH 1,380 – instruction to locally lower fill to RL1.2 for 19.5m directly behind wall to avoid impact to building CH 1,440 – instruction to locally lower fill directly behind wall to avoid impacts to road and tie into existing levels.

Drawing Snippet	Preliminary Assessment
	**CH 1,500 – 1,560** Fill crosses Weto boundary at beach slope at KADA Public Works Depot. Potentially some tress within fill area at CH 1,510. Survey on ground to determine whether there is any impact to trees and whether adjustment of fill levels is required.

Construction Phase: For construction work, packages of land will be required for the temporary siting of stockpiles, temporary works sites and accommodation of workers. KADA, in consultation with MWIU, will allocate an area under its control, or otherwise work closely with local landowners to secure alternative sites. Land will be fully restored before the end of the project.

The Contractor has proposed using land within the Power Station on Ebeye as a construction office and workshop, and an area on Loi for a workers accommodation camp. They have advised that preliminary discussions have taken place with landowners of the proposed temporary sites. Both the Kwajalein Atoll Joint Utilities Resources (KAJUR), who own the power station and surrounding area, and Kawa, who own land on Loi, have given their support for the temporary use of their land during the project. The PREP II Resettlement Policy Framework, particularly Annexure 2, will need to be followed for securing voluntary and temporary use of land prior to mobilisation.

Operational Phase:
The design of the seawall will require ongoing critical maintenance of the corridor behind the wall to sustain the structural performance of the seawall and to ensure drainage is occurring as planned. Failure to adequately maintain the fill lines and levels in the corridor could lead to unexpected behaviour of freshwater drainage which eventually could potentially lead to flooding of private properties.

Fine sediments will not be permitted to accumulate over the surface of the fill as this will impair infiltration of rainfall runoff and potentially lead to excessive ponding and flooding. These fines will be swept up and removed annually but with caution exercised not to reduce the 200 mm minimum sand cover to the rock bags in the block.

It is expected that the drainage through the rock revetment will be efficient. The revetment is, in essence, one big drain – water ponding behind it will simply flow through the gaps in the rocks. Since the rocks are large, so too are the gaps.

7.4.2.3 Physical Cultural Heritage

Identification of sensitive receptors has so far confirmed three public cemeteries and one private graveyard along the Ebeye seawall alignment (**Figure 5-34**) which will need to be protected during construction and be considered in the design of final fill levels to maintain the appropriate level of dignity

and respect at these sites whilst affording them the maximum protection available through the raised ground level[136]. Unless approved by the Engineer, no excavation is to encroach within 5 m of any marked graves, and no fill is to be placed within of any marked graves. Note that these offsets already comply with the IFC design. Consultation will be required to ensure that all graves are clearly marked prior to commencement of works.

The design alignment places the back of the wall approximately 8 to 10 m away from sites 2, 3 and 4 in **Figure 5-34**. Site 1 is across the road from the coastline and therefore just needs impacts managed during construction.

It expected that the overall impact on the cemeteries and the graveyard will be positive as the coastal erosion of the shore currently impacting them will permanently end. Unfortunately, rising sea levels will mean that a higher water table and ingress of water into graves will continue.

7.4.2.4 Impacts to Wind Flow

The extent to which the seawall would block sea breezes is dealt with as a community design aspiration with the matter having a lower priority by foreshore residents than coastal protection, safety, accessibility and longevity of the structure[137].

Impacts to breeze (wind shielding) have been modelled using the methodology described in the Design Investigation Protocols (see **Table 7-13**). In summary, this involved modelling empirical wind tunnel and field data (obtained from Kwajalein Atoll RTS weather station) against a conservative maximum crest level of +3.0m MSL (maximum crest height is +2.8m MSL). The results are presented below and represented in two distinct impact categories:

- 100%-50% (x_{50}); and
- 50%-0% (x_0) shielding distance, for a conservative design wall crest level.

The **Table 7-13** shows the reduction of wind from the construction of the seawall. Inevitably, there will be some shielding of properties from wind along the entire length of the seawall. This varies depending on the seawall and land height, and shielding is stronger in some areas than others. For example, shielding is higher between ch100 and ch200, but even in this location, it is less than 35 m from the crest. Overall, the reduction of wind in adjacent properties is felt to be negligible.

[136] *Note that under World Bank Policies graveyards are considered 'physical, cultural resources'*
[137] *Marshall Island Conservation Society, Ebeye Seawall Participatory Planning Workshop 1 Report, August 2021*

Table 7-13: Wind shielding extent inland along the Ebeye Coast for a 3.0 m wall

Chainage	Foreshore crest level (F) (m)	3.0 m Wall Crest Level (minimum)				Reduction in wind shielding distance (%)
		Wall crest level (W) (m)	Wall height (H) (m)	100-50% shielding distance from crest (x_{50}) (m)	50-0% shielding distance from crest (x_0) (m)	
0	0	3	3	30	75	17%
100	2	3	1	10	25	38%
200	2	3	1	10	25	38%
300	2.3	3	0.7	7	17.5	46%
400	2.4	3	0.6	6	15	50%
500	2.1	3	0.9	9	22.5	40%
600	2.3	3	0.7	7	17.5	46%
700	1.8	3	1.2	12	30	33%
800	2.1	3	0.9	9	22.5	40%
900	2	3	1	10	25	38%
1000	2.7	3	0.3	3	7.5	67%
1100	2.8	3	0.2	2	5	75%
1200	2.3	3	0.7	7	17.5	46%
1300	2.3	3	0.7	7	17.5	46%
1400	1.9	3	1.1	11	27.5	35%
1500	1.5	3	1.5	15	37.5	29%
1600	2.8	3	0.2	2	5	75%
1700	2.8	3	0.2	2	5	75%
1800	2.8	3	0.2	2	5	75%
1900	2.8	3	0.2	2	5	75%

7.4.3 Community Services and Infrastructure

7.4.3.1 Availability of Housing

There is insufficient available accommodation on Ebeye to house the majority of workers that would be required for the project. There is one hotel on Ebeye and a limited number of apartments to rent. The Contractor, as such, will be required to provide workers accommodation for the majority of the staff with the possibility of local accommodations being used during construction of the camp.

The need for workers accommodation will be minimized through the prioritization of local recruitment and hence decreasing the number of non-residents working on the Project.

The site plan will be detailed in the C-ESMP. Where possible, overseas workers will be housed in areas that are not too close to communities, which is challenging in Ebeye due to the limited housing and the crowded conditions. Yet, it will be important for the management of social concerns caused by the arrival of foreign workers to provide some space for both the community and the Contractor workers.

The Contractor has proposed using an area on Loi for a workers accommodation camp (as discussed in **Section 2.4.1**). Preliminary discussions have already taken place with the landowners of this location.

7.4.3.2 Food Supplies

The majority of food consumed on Ebeye is imported via Majuro. Agriculture and fishery activities on the islands are at a subsistence level rather than commercial, therefore there isn't expected to be enough grown or caught locally to support additional demands from the workers and Ebeye doesn't have enough food stock to cope with additional demands from foreign workers.

The Contractor will have to supply all food needed for the workers, which brings with it a potential for the community members to miss income generating opportunities should they not be used to cook the food unless appropriate measures are put in place.

The Contractor will need to make arrangements to supply food required by the workers, which may include organising with local supermarkets or local caterers.

The Contractor will be expected to deal with all food waste in a sustainable manner.

7.4.3.3 Solid Waste Generation

The project advocates good waste management practices. The preferred hierarchy and principles for achieving this is: (i) waste avoidance (avoiding using unnecessary material on the Projects); (ii) waste re-use (re-use material and reduce disposing); (iii) waste recycling (recycling materials such as cans, bottles, etc.); and (iv) waste disposal (all other waste to be taken to approved landfills).

The key waste streams that are likely to be generated through the project works, include: excavation wastes that were unsuitable or surplus to requirements during the works; waste from construction equipment use and maintenance (including liquid hazardous waste); wastewater from general project works and workers accommodations; and general wastes including scrap materials.

For any non-organic, non-reusable and non-recyclable materials, there is a significant potential for overburdening the islands landfill if it is used for disposal of the waste. The Ebeye landfill is small scale and designed to cope with the needs of the local community rather than civil works project waste. Overburdening of landfill in small islands can lead to leachate pollution of groundwater and the marine environment due to over filling of landfill and a human health hazard due to inappropriate dumping of materials. As such,

licensed and controlled landfills are to be used to dispose of project waste. Biodegradable wastes may be managed at the northern dumpsite under the direction of KALGOV only. No other landfills in RMI are to be used.

Additionally, poor management of solid waste at work and accommodation sites can lead to a number of impacts such as pollution of local environments, community and worker health hazard and increase in pests such as rats and flies.

Management of all waste will be subject to strict controls listed in the ESMP and a Solid Waste Management Plan will be developed by the Contractor as part of their C-ESMP following the guidance provided in **Appendix E**.

7.4.3.4 Utilities

The project will require electricity and water for construction activities and for the workers accommodation. The islands supply is fragile and excessive consumption or demand from the project, particularly for energy heavy activities could increase the risk of disruption to the community.
With mitigation measures in the ESMP and with the expectation that the Contractor will power the plant from diesel generators, the design has a very low residual significance.

The Contractor will receive some electricity supply from the power station; however, this will be discussed with KAJUR to identify when the Contractor needs to supplement their supply via generators.

The Contractor will be responsible for their own water provision for the construction works and also likely for potable water. It is proposed that the Contractor will provide a portable reverse osmosis plant and a desalination plant to satisfy their water requirements, with minimal reliance on the local water supply in Ebeye.

7.4.3.5 Road Network

Haulage of construction materials will be significant. There will be up to 5,000 truck movements, half of which will be fully laden delivering rocks to the stockpile sites.

The Contractor's proposed RORO facility at Ebeye South Beach and the location of the construction office/ workshop within the Power Station adjacent to the RORO facility removes reliance on existing roads for haulage, with a proposed temporary access/ haul road to be constructed in the intertidal zone along the seaward edge of the wall alignment. Local Roads would therefore only be used for transport of general goods and services (i.e. food and supplies), and for workers to commute along the causeway from the accommodation camp at Loi to Ebeye.

It remains likely that the road surfaces would be damaged or will degrade due to their existing condition. Specifically, KADA have provided advice that there are sections of the causeway linking Guegeegue to Ebeye which are weakened and might be vulnerable to heavy damage. Any failure of the causeway would create a significant impact to the community and could potentially be a lengthy impact if repairs of the causeway are complex. This would significantly impact the community, particularly those who commute across the causeway to work and would also cause a significant impact to Project progress.

The Contractor is required to undertake a dilapidation survey as part of their TMP. This will be used as the baseline for rectifications at end of works.

7.4.3.6 UXO

The risk of UXO from World War II in the Marshall Islands remains with an unknown number of explosive devices remaining uncleared from many atolls. Kwajalein and surrounding atolls were heavily fortified by

the Japanese forces during the early years of World War II until the USA forces captured the atoll in February 1944[138]. Locals recall stories of Japanese dumping munition, and armaments including warplanes in the Ebeye lagoon before surrendering. A 2013 USA funded 'hazard reduction' Project targeting the northern atolls of Taroa and Mili also recommended a survey of UXO for Ebeye and other atolls as a requisite to hazard reduction[139]. To date this survey has not been implemented.

To address this risk, and before commencing demolition or excavation work, the Contractor shall:

1. Conduct a historical review to determine the potential, if any, for remnant UXO or explosive ordnance (EO) within the Contractor's Work Area;
2. Retain a suitably qualified subcontractor to undertake a marine magnetometer survey to assist in the determination of possible UXO locations within the Contractor's Work Area; and
3. Report outcomes of the review and surveys to the Engineer and make appropriate recommendations.

In the event of locating UXO, all work activities in the area are to cease immediately and the UXO isolated. The Engineer shall be immediately notified of the situation and work shall not recommence until the area is determined safe and released by the Engineer. If instructed, the Contractor shall prepare a method statement for dealing with UXO that is to be approved by the Engineer should UXO be encountered. The Contractor shall provide training to all staff for identification of UXOs.

7.4.4 Community Health and Safety

7.4.4.1 Maintenance of Seawall

Due to the structural support and drainage functions that the corridor behind the wall provides, ongoing maintenance upkeep of that corridor will be a critical task for KADA and will need to be integrated across all relevant annual plans and strategies within KALGOV. The required maintenance and operations protocols, along with costs are provided in the Design Report. Failure to implement the maintenance plan would have several significant risks to the Ebeye community.

The rocks in the leeward side of the revetment crest could potentially become unstable if the fill level dropped below the underside of the leeward edge rock. Repair works to the revetment should be relatively straightforward and similar to the existing causeway for a single excavator so long as local access to the damaged section was not impaired by encroaching private structures.

7.4.4.2 Influx of Labour

Aside from the various worker related impacts referenced throughout this section, the temporary introduction of foreign workers to the remote island communities for the construction period can result in several specifically social impacts. While the arrival of this labour can have positive effects (e.g. increased opportunity for capacity building and economic development), often this results in or contributes to adverse social impacts. While the Contractor has proposed accommodation for 22 foreign workers, the following is based on a precautionary approach whereby utilizing local labour is not maximized (as is the standard approach for an ESIA/ ESMP).

If not planned for and effectively managed, labour influx can impact on the following social areas:

[138] *Wikipedia: Pacific War World War II – Gilbert and Marshall Islands Campaigns. Downloaded 20Jan2017.*

[139] *Article: "Clearance Operations in the Pacific Islands" by Len Austin, Golden West Humanitarian Foundation; Published in: The Journal for ERW and Mine Action. Issue 18.3; Fall 2014. http://www.jmu.edu/cisr/journal*

1. **Risk of social conflict:** Conflicts may arise between the local community and the construction workers, which may be related to religious, cultural or ethnic differences, or based on competition for resources. Tensions may also arise between different groups within the labour force, and pre-existing conflicts in the local community may be exacerbated. Alcohol and drugs can add to the issues from either group, hence leisure activities need to be managed carefully. Drugs are not permitted for Contracting staff, so this and zero alcohol consumption enforcement must apply. All Contracting staff (local and international) will be subject to an individual code of conduct (COC) which must cover behaviours and consequences of poor decisions. The CIU safeguards team will provide an orientation when new workers arrive in RMI which includes the COC as well as grievance and incident reporting procedures. The COC will include specific requirements for SEA/SH issues, including possible sanctions if behaviour occurs. This will be signed by all workers including management.

- **Impacts on community dynamics:** Depending on the number of incoming workers and their engagement with the communities, the composition of the local community, and with it the community dynamics, may change significantly. Pre-existing social conflicts may intensify as a result of such changes including domestic violence issues. This risk needs to be carefully monitored by the CLO.
- **Local inflation of prices:** A significant increase in demand for goods and services due to labour influx may lead to local price hikes and/or crowding out of local residents. Currently there is no evidence that housing rentals will rise, however this may need to be monitored carefully especially if foreign workers prefer to rent. However, it is the current expectation that the Contractor will provide accommodation in a readymade camp for all incoming staff. It is noted that Hotel Ebeye may be used by temporarily based staff on occasion.
- **Sexual Exploitation and Abuse and Sexual Harassment (SEA/SH):** The increased income and/ positions of perceived increased power of men employed for the Project may lure women and even children into exploitative situations. They can be more readily sexually exploited and there may also be an increase in demand for sex workers.
- **Harm to children:** The increased number of foreign workers with more disposable income than readily available on the island can provide a sad bargaining chip for some poor families to exploit their children. Children can also be lured by unscrupulous persons with the promise of something enjoyable. Subsequently there are numerous cases across the Pacific of children being sexually exploited. As noted through this report all Contractor workers will be provided with SEA/SH awareness which includes the clear message that sexual exploitation of children is a crime. The workers will be expected to sign individual Codes of Conduct following the training.
- **Increased risk of communicable diseases:** The arrival of foreign contracting workers can create an increased risk of HIV/AIDS and other STIs. Workers may bring communicable diseases to the project area, including STDs and COVID-19. This can result in an outbreak of the infectious disease in a remote and unprepared island setting which would ultimately lead to significant health outcomes and even deaths. For other communicable diseases, they would create an additional burden on local health resources which would be a significant burden in an island setting. There is only one hospital on Ebeye and this already relies on workers from other Pacific Island countries to staff and cater for existing residents. While emergency cases will have to be treated at the hospital, the Contractor's camp will need a first Aid post and all foreign staff will require medical cover and emergency airlift insurances.

7.4.4.3 Sexual Exploitation and Abuse and Sexual Harassment (SEA/SH)

The arrival of foreign labour, as well as local workers having higher disposable incomes, creates an increased risk for HIV/AIDS, HT and/or SEA/SH. In line with the World Bank's revised the Good Practice

Note 'Addressing SEA/SH in Investment Project Financing Involving Major Civil Works'[140], SEA/SH by project workers are the types of SEA/SH most likely to occur in or be exacerbated by projects like this. Therefore, risk mitigation and response strategies focus on SEA/SH which may be perpetrated by project workers.

The perpetrators of SEA/SH can be anyone associated with the project and may include not only construction workers, but also consultants and project staff supervising the civil works or undertaking technical assistance activities or studies hired to protect a project site.

While labour influx clearly increases the risks of SEA/SH, the changes in local power dynamics that can arise with a new project, such that local workers or partners of local women and girls may also be at increased risk of becoming perpetrators of SEA/SH. For example, issues can arise locally over such concerns as: husbands not wanting wives to work in a male dominated workplace; local girls may be drawn to the promise of money or other opportunities from foreign workers.

The Contractor is responsible for implementing actions to help reduce or eliminate instances of HIV/AIDS, HT and SEA/SH induced by the project. Workers will be required to sign Codes of Conduct describing their responsibilities as will subcontractors. As part of this process, the Contractor will implement a SEA/SH Prevention Action Plan to mitigate these risks (see **Section 8.2.3**).

7.4.4.4 Child Protection and Safety

Construction:

Traffic Safety: Concerns have been raised by the community based on past experience over the safety of children around active construction sites and the Contractor's Temporary work areas. There are limited recreational opportunities for children on Ebeye and children spend a lot of time, particularly during the night, outside looking for things to do. All work sites will be tempting for children to play on and that presents a significant safety risk. The ESMP and technical specifications require the contractor to provide man-proof fences around worksites, including demolition work, however, additional measures such as night security will also be needed. In addition to this, outreach efforts led by PIU in schools and church groups will target raising awareness of the safety risks of construction sites and equipment.

Violence Against Children: Workers will comply with the following requirements from the CoC regarding violence against children.

1. Not participate in any sexual contact or activity with children under the age of 18, except in the case of a pre-existing marriage. Mistaken belief regarding the age of a child or "consent[141]" from the child are not an acceptable defense or excuse.
2. Ensure the protection and safety of children under the age of 18 by:
   - Informing their manager of the presence of any children in project offices or sites who are or may be exposed to hazardous activities.;
   - Ensuring that another adult is present when working close to children wherever possible;
   - Not inviting unaccompanied children, who are not my family, into their home;
   - Not accessing child pornography;
   - Refraining from physical punishment or discipline of children; and

[140] *https://pubdocs.worldbank.org/en/632511583165318586/ESF-GPN-SEASH-in-major-civil-works.pdf*

[141] *Consent is defined as the informed choice underlying an individual's free and voluntary intention, acceptance, or agreement to do something. No consent can be found when such acceptance or agreement is obtained using threats, force or other forms of coercion, abduction, fraud, deception, or misrepresentation. Consent cannot be given by a child under the age of 18, even where legislation in the RMI has a lower age.*

- Taking appropriate caution when photographing or filming children for work-related purposes.

Operational: An important aspect of the seawall design has been considering how the structure will be used by community members, especially children. Given the lack of spaces for children to play on Ebeye, it can be confidently assumed that the seawall will, to some extent, become a de facto playground. There will be an element of risk from the design as it will provide new opportunities for playing compared to the current situation and it would be improbable to create a situation where there is no change from the current level of risk. As such the design has sought to provide a structure which does not present a notable risk of significant injury, and which integrates as many risk minimizing design approaches as feasible.

The rock revetment design is very similar to the existing rock revetment already on the island. There is a risk of injury from getting hands or feet stuck in gaps between the rocks, but overall this design presents a low safety risk to children and others.

7.4.4.5 Road User Safety

Given the crowded conditions on the island, the roads are used not only for car transport but also for walking and as children's playground. The high estimated number of deliveries as described in **Section 2.4.3** along the road can lead to serious injury or worse, if road rules are not observed by drivers and pedestrians and if the risks aren't fully appreciated by all parties. Usual haulage management approaches used on projects of this scale (such as night haulage) don't necessarily minimize the risk in the Ebeye context due to the high number of pedestrians, particularly children, on the street at night. Project traffic overall will provide one of the most challenging construction phase risks to manage.

The Contractor will be required to develop a highly robust and detailed TMP following all of the requirements in this ESIA/ESMP noting that these requirements may be adjusted by KADA and based on stakeholder engagement prior to the commencement of works. The TMP will incorporate a Traffic Management Plan for pre-approval by KADA, KAJUR, KALGOV, RMIEPA, Ebeye Leadership Group, Local Police and National Police, with input from stakeholders including RMIPA, Stevedores, NTA, local businesses and the local community. The TMP should allow for any traffic from Ebeye Port if utilized.

The TMP will need to be approved by these parties and then a supervision framework put into place such that its performance and efficiencies can be reviewed on a regular basis (i.e., weekly or fortnightly). The TMP needs to be reviewed and lessons learned incorporated, such that it evolves and improves as the project progresses.

It is essential that the TMP has the local community's support and 'buy-in', and that they are able to influence its development. Equally, it is essential that the local community can report issues and incidents easily and speedily.

The Contractor will be supported by the Engineer, PIU and KADA to ensure that their TMP meets the required standards to minimize the risks.

In addition to this the CIU/PIU will ensure that children and community members are provided with safety awareness to maintain safety especially during construction. It is also important that the GRM is well advertised.

The Police will need significant support with traffic management. The sheer volume of traffic haulage movements and the intensity of local population movements mean that the TMP and actual works must be

managed and supervised at all times. Whilst the Police will need to be in charge / in control of safety and road safety, they do not have the resources to manage the controls needed and the Contractor will need to provide adequate support to them in this regard. It was identified that there are 30 Local Police and 20 National Police on the island.

The proposed RORO facility at Ebeye South Beach and the location of the construction office/ workshop within the Power Station adjacent to the RORO facility removes reliance on existing roads for haulage, with a proposed temporary access/ haul road to be constructed in the intertidal zone along the seaward edge of the wall alignment. Local Roads would therefore only be used for transport of general goods and services (i.e. food and supplies), and for workers to commute along the causeway from the accommodation camp at Loi to Ebeye.

7.4.5 Cumulative Impacts

The International Finance Corporation defines cumulative impacts are those that result from successive, incremental and/or combined effects of an action, Project or activity when added to other existing, planned, and/or reasonably anticipated future ones leading to impacts that would not be expected in the case of a standalone development.

For context purposes in terms of program, the following milestones are approximately expected (based on the Contractor's preliminary construction methodology and World Bank timeframes):

1.	Award of contract	May 2024
2.	Preconstruction and planning commences	May 2024
3.	Mobilization commences	January 2025
4.	Construction commences	February 2025

7.4.5.1 Construction Phase

In the context of the Ebeye seawall project – particularly the construction phase, there are several known upcoming projects with construction elements which have the potential to result in cumulative impacts.

The known projects are as follows:

1. Repair and upgrade of the causeway to Guegeegue;
2. Rehabilitation of the road and road drainage;
3. Asset inspection and upgrade of Ebeye Port; and
4. Installation of solar power plant (underway).

It is acknowledged that if multiple Projects are being built at the same time, that anticipated impacts from these construction works are likely to be greater (in cumulation). This is going to be the case for many impacts but in particular those listed below:

- Pressure on housing availability and the potential for an increase in rental prices (as a result) to accommodate foreign workers;
- Increased pressure on the islands' food supply, water supply and utility networks from the presence of foreign workers;
- Increased risk of SEA/SH from the presence of foreign workers;
- Increased safety risks or risk of accidents from construction related traffic;
- Increased chances of road dilapidation or damage from construction traffic;
- Additional burden on Ebeye's landfill creating significant waste legacy; and

- Increased pressure on land availability to accommodate multiple construction work sites or accommodation camps.

A potential positive impact of these works happening at the same time, is the respective shortening of the period of impact to the community from elongated phases of construction (i.e., lessening of construction fatigue over a long period of time).

Our knowledge of the timeframes for the above projects is limited. The below highlights the potential for cross-over in program:

- **Repair and upgrade to causeway to Guegeegue –** A reclaimed platform is currently being built with a view to the causeway to Lojjairok being upgraded and tarmacked within the next 6-12 months. As such, there is unlikely to be any cumulative impacts. However, it will be important for the seawall scheme to ensure the causeway is returned to pre-works conditions. Noting that the proposed methodology would be to keep to the hard pan as much as possible and to drive across the causeway at right angles.
- **Rehabilitation of the road and road drainage – –** This project was highlighted to the Seawall Design team in February 2023 (3rd Consultation Meeting – **Appendix A**). A Terms of Reference is still to be developed and the likelihood of this project occurring at the same time as the seawall project is probably very slim given that an appointed consultant and finalised design is some way off.
  A meeting was held with ADB, GoRMI, KADA and RHDHV on 23rd October 2023 understand any cross-over in terms of the scope of work. The design now incorporates drainage sleeves into the existing seawall design, in order to accommodate drainage solutions from the future project.
- **Asset inspection and upgrade of Ebeye Port –** The asset inspection of Ebeye Port project was undertaken in June 2023. The project is hoping to go to bid in 2024 with a view to award in late 2024, with 6 months of construction envisaged sometime thereafter. At the time of writing, this has not yet occurred. If this project would go ahead, it may not begin until 2025 at the earliest, which would still mean that this work would most likely overlap with the Seawall project for a short period of time. However, construction works will be restricted to the ports area itself and most likely will be confined to low level repairs to the walls, fenders and moorings. As such, cumulative impacts are going to be experienced with regard to the above bullet points.
- **Solar Power Plant –** This project is currently underway and will be completed before commencement of the seawall construction. There will be no cumulative impacts as a result.

From the above, the following actions need to be taken by the client, supervising team and the Contractor:

1. Undertake a full dilapidation survey of roads, services and buildings in the construction area to be able to assess repairs that might be required. This should extend to the causeway and any transit routes from the north.
2. Liaise with Ebeye Port to understand how the two projects might work together for efficiency purposes (i.e., accommodation, plant and materials storage, use of similar skills and services).
3. If and when cumulative project impacts are identified, the Contractor and / or supervising team should re-examine the following (as examples) to determine if more measures are required:
    a. Traffic Management Plan;
    b. Construction sequencing;
    c. Materials delivery and storage;
    d. Worker's accommodation plan;
    e. SEA/SH for all projects; and
    f. Contractor cooperation meetings and way forward.

The precautionary approach adopted within this ESIA will help to reduce cumulative impacts to the greatest extent possible through the avoidance of impacts or there further possible amelioration from the outset.

7.4.5.2 Operational Phase

There are no significant cumulative impacts identified from the presence of the seawall itself. As yet, there haven't been any actions, activities or behaviours which will impact on the same area, and which would result in a greater level of impact than if they were happening individually.

8 Environmental and Social Management Plan

8.1 Introduction

This section along with Appendices B and C form the basis of the Environmental and Social Management Plan (ESMP) which has been developed for project implementation. As well as detailing the required measures, this section also includes instructions for ESMP implementation highlighting safeguard roles and responsibilities during project implementation, institutional capacity development and training requirements for project implementation and a projected budget for this. The ESMP also contains instructions for integration of safeguards into contract documents.

Appendix B contains the recommended mitigation and/or management measures for the Ebeye seawall pre-construction, construction and maintenance phases. The mitigation measures proposed in the ESMP table have covered different phases and different project activities in accordance with best international practice and recommendations in the World Bank EHS Guidelines[142]. The tables include details of the mitigation measures required, the cost allocation, responsible entity and the applicable project phase. The table also cross references the measures which address the impacts which required further assessment in **Section 7.3.3**.

Monitoring checklists are also provided in **Appendix C** for the project site. The tables are divided into three sections: (i) one-off preconstruction checklist; (ii) weekly checklist for the construction phase; and (iii) supervision checklist for the maintenance phase of the seawall.

The PREP II PIU carries overall responsibility for safeguards supervision and for monitoring of effective implementation of the ESMP. KADA is responsible for incorporating the maintenance phase supervision requirements into their SOPs and annual work plans.

The Contractor has responsibility for the overall implementation of the ESMP through their Contractor ESMP to achieve compliance with the requirements contained herein. The Contractor also has responsibility to implement elements of the SEP as summarized throughout this ESMP.

8.2 Supplementary Management Procedures

8.2.1 Land Use for Temporary Works

Temporary sites The Contractor has proposed the following temporary site locations:

1. Accommodation camp on Loi (north of Ebeye);
2. South Ebeye Beach and breakwater for construction of a temporary Roll On/ Roll Off (RORO) loading facility;
3. Rocks or other similar materials stockpiled on the reef flat on the oceanside of Ebeye; and
4. Ancillary sites (construction office, laydown stockpile sites, equipment storage etc.) within the power station land at the end of the rock wall.

See **Figure 2-3**, **Figure 2-4** and **Figure 2-5** for proposed temporary site locations and set ups.

The Contractor has advised that preliminary discussions have taken place with landowners of the proposed temporary sites. Both KAJUR, who own the power station and surrounding area, and Kawa, who own land on Loi, have given their support for the temporary use of their land during the project.

[142] *https://documents1.worldbank.org/curated/en/157871484635724258/pdf/112110-WP-Final-General-EHS-Guidelines.pdf*

The procedure for securing voluntary and temporary access to private lands will be in accordance with the PREP II Resettlement Policy Framework. This includes the following: :

1. The Contractor and KADA, in consultation with MWIU work closely with local landowners to secure temporary works sites.
2. The Contractor and KADA identifies the landowners, the boundaries of their properties, and non-land assets which can be affected by the project and produces a scoping report which lists the owners, marks out the boundaries of the land in a sketch map and lists down non-land assets which may be removed during civil works.
3. Voluntary land access will be negotiated in accordance with the PREP II Resettlement Policy Framework between the Contractor and KADA (in consultation with MWIU) on behalf of the project and the landowner. PIU, through the CIU E&S Safeguards Team, and the Engineer's Social Safeguards Specialist will provide support to the Contractor and KADA in these negotiations.
4. The Contractor and KADA verifies that any arrangements agreed during negotiations have been actioned prior to use of site.
5. The Contractor is to ensure that land is fully restored before the end of the project.

If required by World Bank, a Land Use Due Diligence Report can be prepared by CIU Safeguards to independently confirm lease details, existing land use, and verification that there will be no economic or physical displacement.

Land Acquisition: There are no permanent land acquisition needs for the project. While not anticipated, should there be a need for any permanent land acquisition, a resettlement plan will be developed, approved and implemented prior to any construction works.

8.2.2 OHS

During construction and operation, the health and safety is to be managed through a Site-Specific Contractor Safety Plan (CSP) and application of international EHS standards (World Bank/ International Finance Corporation EHS Guidelines). The Contractor's health and safety documentation will incorporate all aspects of the project including ancillary sites.

Civil works shall not commence until the Engineer has approved the CSP, the Safety Officer is mobilized and on site, and staff have undergone induction training.

The following are the requirements for OHS:

Health and Safety

Funding for OHS training and activities is provided in the bill-of-quantity as a provisional sum. The Contractor's costs shall be financed from this on proof of record (e.g. time sheets, material invoices etc.) for the following:

- Recruitment of provider for delivery of HIV/AIDS education training;
- Recruitment of provider for delivery of Human Trafficking (HT) and SEA/SH training;
- Expenses related to HIV/AIDS, HT and SEA/SH training;
- Provision of Safety Officer when acting in the role of Safety Officer;
- Personal Protective Equipment (PPE) for all workers on the site, and visitors as appropriate;
- Safety signage, safety literature, HIV/AIDS literature, condoms, voluntary counselling and testing, HT Literature, SEA/SH literature etc.;
- Alcohol testing of staff to enforce a zero-alcohol tolerance policy; and

- Labour costs for attending: (i) dedicated safety training such as working at heights, confined space training, spotters training, driving heavy loads on public roads, first aid training etc.; (ii) HIV/AIDS education training; and, (iii) SEA/SH training (including HT). The contractor shall make staff available for initial training of 1.5 days, and a total of at least 0.5 days per month for other such formal trainings.

For the purposes of the project, in addition to the national OHS standards the employer is adopting a Code of Practice for occupational health and safety based on good international industry practice. Contractors are required to have in place an occupational health and safety management system which is compliant with, or equivalent to, OHSAS 18000[143] and is acceptable to the client. The contractor shall specify which occupational health and safety standards are to be applicable to the project and provide evidence of application of such standards on a project of similar size and complexity during the past 5 years. The standards to be adopted may include those of Australia, Canada, New Zealand, the EU and the US, which are referred to in the World Bank Group EHS Guidelines.

Civil works shall not commence until the Engineer has approved the OHS plan, the Safety Officer is mobilized and on site, and staff have undergone induction training.

The Contractor shall at all times take all reasonable precautions to maintain the health and safety of the Contractor's personnel. In collaboration with local health authorities, the Contractor shall ensure that first aid facilities and sick bays are available at the Site, including having a site vehicle available that can be used to transport Contractor's and Employer's international and local personnel to medical facilities. The Contractor shall ensure that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics.

The Contractor shall appoint a certified Safety Officer at the Site, with qualifications acceptable to the Engineer, responsible for maintaining safety and protection against accidents. This person shall have the authority to issue instructions and take protective measures to prevent accidents. Throughout the execution of the Works, the Contractor shall provide whatever is required by this person to exercise this responsibility and authority.

The Contractor shall post in clearly accessible places information on how to transport injured Contractor's and Employer's Personnel to medical facilities, including the precise location and contact details of such medical facilities, name and contract details of the site designated Safety Officer.

The Contractor shall ensure that all workers on the site have appropriate PPE of an appropriate standard including: (i) impact resistant safety eyewear; (ii) safety footwear with steel toe, sole and heel; (iii) high visibility clothing; (iv) long sleeves and long pants suitable for operating environment; (v) safety helmet with provision of sun protection as necessary; (vi) gloves (carried and worn when manual handling); (vii) hearing protection when working in close proximity to noisy equipment and in all underground environments. For site visitors, the above equipment will be supplied as appropriate based on assessed risks and depending on number of visitors and where they will be on site. See http://tinyurl.com/nzta-ppe-requirements for additional information.

Within 5 working days of the end of the calendar month the Contractor will be required to report to the Engineer on their performance with the following OHS indicators using the Project's reporting tool:

[143] *http://certificationeurope.com/ohsas-18000-health-safety-managment-standards/*

- Number of fatal injuries (resulting is loss of life of someone associated with the project or the public);
- Number of notifiable injuries (an incident which requires notification of a statutory authority under health and safety legislation or the contractor's health and safety management system);
- Number of lost time injuries (an injury or illness certified by a medical practitioner that results in absence of work for at least one scheduled day or shift, following the day or shift when the accident occurred);
- Number of medical treatment injuries (the management and care of a patient to effect medical treatment or combat disease and disorder excluding: (i) visits solely for the purposes of observation or counselling; (ii) diagnostic procedures (e.g. x-rays, blood tests); or, (iii) first aid treatments as described below);
- Number of first aid injuries (minor treatments administered by a nurse or a trained first aid attendant);
- Number of recordable strikes of services (contact with an above ground or below ground service resulting in damage or potential damage to the service);
- Number of aggregate haulage truck movements (including variations from speed limits, prescribed routes and vehicle breakdowns or accidents);
- Lost Time Injury Frequency Rate (the number of allowed lost time injury and illness claims per 100 full-time equivalent workers for the injury year specified); and
- Total Recorded Frequency Rate (the number of recordable injuries [recordable/lost time/fatal] per 100 full-time equivalent workers for the injury year specified).

The monthly reports shall also include as a minimum:

- Number of alcohol tests;
- Proportion of positive alcohol tests;
- Number of site health and safety audits conducted by contractor;
- Number of safety briefings;
- Number of near misses;
- Number of traffic management inspections;
- Number of sub-contractor reviews;
- Number of stop work actions; and
- Number of positive reinforcements.

For each fatality, injury or near miss incident, the Contractor shall provide a corrective action report within the monthly report detailing steps taken to ensure risks of a repeat incident are minimized.

OHS reporting will be coordinated with the C-ESMP reporting to ensure that all reporting requirements are combined into a single monthly report which captures all requirements of the C-ESMP and CSP report.

Reporting of accidents and injuries

Contractor shall include in its OHS Plan a set of procedures for responding to and preventing workplace accidents, including vehicle accidents, SEA/SH incidents and violence against children incidents.

All workplace accidents shall be recorded and included in regular contract progress reports.

All serious workplace accidents, which are those accidents that involve serious injury requiring off site medical treatment shall be recorded in detail including all aspects of the accident, including details of: the

location and type of work; those directly involved; any witnesses; and all other relevant matters including steps taken to remedy the situation and treat the injured people.

All serious accidents shall be reported to the PIU within 48 hours of their occurrence. Once the PIU receives the notification of a serious accident, they must inform the World Bank within 48 hours of being notified.

The Contractor, in conjunction with the Engineer shall formally investigate the causes of all serious accidents and set up preventative steps to avoid a repeat. The accident investigation and report shall be forwarded to the PIU within 5 working days of the accident taking place.

PIU shall review the report within 5 working days of receipt and forward to the World Bank with comments and the steps taken to avoid similar serious accidents in future.

The PIU will issue instructions to the Engineer to instruct the Contractor amend all work practices and procedures or implement such other safety or preventative measures as may be deemed necessary to help ensure there are no repeat or similar accidents.

8.2.2.1 COVID-19

The Contractor is responsible for ensuring they are adhering to the latest GoRMI COVID-19 guidelines at the time of developing their C-ESMP. This will be advised by PIU following the national advice.

The Contractor will ensure the usual measures in the areas of: (i) simple ways to prevent the spread of COVID -19 in the workplace; (ii) guidelines for conducting meetings and trainings; (iii) things to consider when workers travel; (iv) getting the workplace ready for the arrival of COVID-19, and; (v) other information and resources.

PIU will ensure that the Contractor has the latest COVID-19 information relating to quarantine, isolation periods and testing requirements prior to mobilization to site. The Contractor Safety Plan will full describe the Contractor's strategy for managing COVID-19.

8.2.3 HIV Prevention and SEA/SH

All employees (including managers) will be required to attend training prior to commencing work to reinforce the understanding of HIV/AIDS, human trafficking and SEA/SH. Subsequently, employees must attend a mandatory training course at least once every 3 months for the duration of mobilization. Managers will be required to attend an additional manager training prior to commencing work on site to ensure that they are familiar with their roles and responsibilities in ensuring the HIV/AIDS, HT and SEA/SH standards are met on the project. This training will provide managers with the necessary understanding and technical support needed to begin to develop a plan for addressing HIV/AIDS and SEA/SH throughout the lifetime of the project, including monitoring and reporting.

HIV-AIDS Prevention

While mobilized for work, the Contractor shall produce and conduct an HIV/AIDS Information, Education and Communication (IEC) campaign. The Engineer shall provide to the Contractor a list of approved service providers which shall include recognized NGOs and/or recognized local health departments. From the provided list, the Contractor shall enter into agreement with one service provider to undertake the HIV/AIDS IEC campaign. The Contractor will pay the direct costs for HIV/AIDS awareness and training, that is the provision of; induction training, awareness and education materials, stocking and restocking of condoms as well as an approved trainer for training sessions run on a 3 monthly basis for the duration of

the works. The cost of the campaign shall be funded by the Contractor from the provisional sum provided in the bill-of-quantity.

The Contractor shall undertake such other measures as are specified in the Contract to reduce the risk of the transfer of the HIV virus between and among the Contractor's personnel and the local community, to promote early diagnosis and to assist affected individuals. The Contractor shall not discriminate against people found to have HIV-AIDS as part of the campaign.

The contractor shall ensure that monthly toolbox refreshers are provided to the workers to revisit IEC materials.

Prior to contractor mobilization, the approved service provider shall prepare an action plan for the IEC campaign based on the 'Road to Good Health Toolkit' (www.theroadtogoodhealth.org) which shall be submitted to the Engineer for approval.

The action plan will clearly indicate (i) the types and frequency of education activities to be done; (ii) the target groups (as a minimum to all the Contractor's employees, all Sub-Contractors and Consultants' employees, and all truck drivers and crew making deliveries to Site for construction activities as well as immediate local communities); (iii) number of condoms provided; and (iv) referral locations for STI and HIV/AIDS screening, diagnosis and counselling. The awareness and prevention program shall detail the resources to be provided or utilized and any related sub-contracting proposed. The program shall also include provision of a detailed cost estimate with supporting documentation. Payment to the Contractor for preparation and implementation this program shall not exceed the Provisional Sum dedicated for this purpose.

The IEC campaign shall be conducted while the Contractor is mobilized in accordance with the approved approach. It shall be addressed to all target groups identified concerning the risks, dangers and impact, and appropriate avoidance behaviour with respect to, of Sexually Transmitted Diseases (STD)—or Sexually Transmitted Infections (STI) in general and HIV/AIDS in particular.
The HIV/AIDS Awareness and Prevention Program will be included as an annex to the Contractors ESMP and reported against monthly.

SEA/SH

The Contractor is required to identify and implement a Gender-based Violence (GBV) Prevention Action Plan (addressing SEA/SH issues) and a Gender Action Plan. The gender component would cover employment stakeholder engagement and sensitisation training. Both plans would not need to be exhaustive but will summarize Contractor expectations, outline measures and actions to be taken and consider appropriate resources. Roles and responsibilities will also be defined. The gender action plan will include an accountability and response framework and Codes of Conduct for all employees. The Codes of Conduct will be based on, at a minimum, the standard code of conduct provided in the contract documents. The Contractor, through its CLO and with support of an external training provider, shall establish the plan. While it may be appropriate for the CLO to be involved, it may not be appropriate for them to be responsible for implementation, particularly depending on the sex of this individual. The CLO will undertake COC training during community awareness sessions.

The Engineer shall provide to the Contractor a list of approved service providers which shall include recognized NGOs and others for conducting training on SEA/SH and COC. From the provided list, the Contractor shall enter into agreement with one service provider to undertake the SEA/SH IEC campaign. The cost of the campaign shall be funded by the Contractor from the provisional sum provided in the bill-

of-quantity. The COC will include specific requirements for SEA/SH issues, including possible sanctions if behaviour occurs. This will be signed by all workers including management.

All Contractor employees (including managers) will be required to attend an induction training prior to commencing work to reinforce the understanding of human trafficking (HT), COC and SEA/SH.

Subsequently, employees must attend a mandatory training course at least every 3 months for the duration of mobilization and the contractor shall ensure that at least one toolbox refresher is conducted each month to review IEC materials provided.

The Mitigation Table in **Appendix B** details the requirements for managing the influx of labour to minimize the risks posed to the communities to these issues.

The gender action plan and codes of conduct will be included as an annex to the Contractors ESMP and reported against monthly.

In addition to these requirements, the Contractor is to ensure that all overseas project staff undergo a cultural familiarization session as part of their induction training. The purpose of this induction will be to introduce the project staff to the cultural sensitivities of the local communities, their concerns on previous experience with outside workers cited during project consultations, and the expected behaviours of the staff in their interactions with these communities. The PIU shall provide the Contractor with a list of approved service providers and others for conducting this training.

The Contractor shall ensure that no children under the age of 18 are employed.

The WMP will also provide detail of how the Contractor will provide for workers camp facilities, workers camp operations and the management of off duty workers.

8.3 ESMP Implementation

8.3.1 Integration of E&S Management Plans into Project Management

The ESMP and the requirement to prepare a C-ESMP with all relevant sub-plans, will be included in the Contractor's contract.

The safeguard requirements of this ESMP and the applicable standards will be referenced in appropriate parts of the Technical Specifications and Contractor's contract. The PREP II CIU Safeguard Specialists will be required to review all contract documents prior to approval.

Prior to commencement of works, the Contractor will be required to attend a half day pre-construction safeguards workshop with the CIU Safeguards Specialist to ensure that all parties understand their obligations under the terms of the Contract.

8.3.2 Roles and Responsibilities

There are several agencies and parties who have responsibility to implement, monitor and report on the Ebeye Seawall ESMP. Details of the responsibilities assigned to each role are summarized in this section.

8.3.2.1 National Steering Committee

A National Steering Committee (NSC) has been formed and provides project oversight and guidance at the national level. It is formed from the existing National Disaster Committee with additional stakeholders (for instance, KADA or the Kwajalein Local Government) as might be identified during project implementation. The Office of the Chief Secretary has the overall internal coordination responsibility for the project, and acts as the secretariat to the NSC.

8.3.2.2 Ministry of Works Infrastructure and Utilities

The MWIU PMU is responsible for implementing the Ebeye Seawall Project. It will be strengthened with the appropriate technical experts for this role. Close safeguards support is provided by the MOFs CIU. The MWIU PMU, with support from the CIU, will be directly responsible for procurement, contract management and supervision of coastal protection measures including implementing this ESMP. Specifically, for the Ebeye Seawall the MWIU will:

- Work closely with RMIEPA to review prepared safeguards instruments to ensure World Bank requirements are satisfied;
- Disclose safeguards instruments locally and submit approved instruments for disclosure on the Bank's website;
- Submit request for a No-Objection Letter (NOL) to the World Bank, and on receipt of the World Bank's NOL, mobilize works contractor(s);
- Procure contractors for activities implementation including the preparation of all required documentation;
- Work closely with KADA and as required, the contractor to ensure unhindered access to working sites, including informing traditional landowners; and
- Resolve complaints received or otherwise ensure that unresolved issues are referred to the National Steering Committee for resolution as per Grievance Redress Mechanism.

8.3.2.3 MOF CIU

The MOF CIU has environmental and social safeguards capacity provided from international experts. The CIU Safeguards Specialists functions include, among others, planning, capacity building, environmental and social impact assessment, land access due diligence and documentation, contract management and supervision of activities with safeguards requirements. Specifically in relation to the Ebeye Seawall, the MOF CIU will:

- Assist and advise RMI Environment Protection Agency (EPA) on the World Bank's environmental categorization and their corresponding safeguards instruments to ensure compliance with the Bank's Safeguards Policies;
- Ensure that prepared safeguards instruments are properly reviewed taking into account the approved TORs;
- Conduct due diligence on imported aggregate sources to ensure they comply with source country safeguards and good practice;
- Ensure the approved safeguards instruments are sent to the World Bank for disclosure on its website;
- Monitor ESMPs, review safeguards compliance, prepare and submit monitoring reports;
- Manages the review process of Contract ESMPs up to formal approval;
- Applying for all RMIEPA approvals and permits;

- Strengthen MWIU internal capacity in World Bank safeguards policies and their requirements through appropriate mentoring and counter-parting arrangements with Project consultants, and other methods of knowledge transfer; and
- Resolve complaints received or otherwise ensure that unresolved issues are referred to the National Steering Committee for resolution as per Grievance Redress Mechanism.

8.3.2.4 Project Implementation Unit

The PREP II PIU will manage the day-to-day implementation of the PREP II activities for the GoRMI. The PIU has an office and permanent staff based on Ebeye who provide the face of the Project to the Ebeye community. The PIU will have a role in receiving and managing grievances, leading community consultations and stakeholder engagement and providing day to day high level compliance oversight of the construction works. The PIU will prepare monthly reports on safeguard implementation progress. Specifically, in relation to the Ebeye Seawall, the PIU will:

- Work closely with all contracted parties to ensure that PREP II objectives are delivered in a compliant manner consistent with RMIEPA and World Bank requirements;
- Monitor and evaluate project activities and outputs and report the findings by monthly progress reports. These reports will include all aspects of safeguards compliance of the Project including the results of scheduled monitoring, and instances of non-compliance, any environmental incidents and any GRM submissions/responses;
- Conduct quarterly safeguard audits with the Engineer's safeguard specialist and other staff;
- Monitor and manages all complaints/incidents reported to the Project GRM;
- Facilitate meaningful consultations with stakeholders and communities to enable them to provide meaningful input and direction into the Project;
- Publicly disclose any project information and reports including this ESIA/ ESMP in hardcopy on Ebeye;
- Provide support and recommendations to the Engineer for any instances of Contractor non-compliance;
- Receive and review monthly reports from Engineer and share reports with MOF CIU;
- PMU with the support of MWIU CIU is responsible for managing recurring instances of non-compliance by the Contractor as they are referred by the Engineer; and
- Responsible for managing all instances of non-compliance by the Engineer.

8.3.2.5 Design and Supervision Consultant

The Design and Supervision Consultant (referred to as the Engineer) is responsible for the design of the seawall and for day-to-day oversight of the construction works for the project, including safeguard compliance. The Engineer is the only party who is contractually able to provide instruction to the Contractor. The Engineer will work closely with the Contractor on a daily basis to ensure that the project is implemented in a compliant manner consistent with the detailed designs provided and the ESMP. It is the Engineers responsibility to:

- Avoid or minimize environmental and social impacts through the design process;
- Support the CIU and PIU to undertake meaningful consultation with stakeholders and communities;
- Daily monitor the Contractors work for compliance with the C-ESMP and ESMP as per the measures detailed in **Appendix B** and **Appendix C** providing safeguard monitoring results in their monthly reporting to PMU. As part of their C-ESMP monitoring responsibilities, the Engineer will ensure that a suitably qualified and experienced safeguard specialist is resourced to provide regular site inspections and is available for support at other times to respond to incidents, non-compliances, review of C-ESMP, and other tasks;

- Develop a Supervision Monitoring Plan to demonstrate how the monitoring requirements of the ESIA/ESMP will be achieved;
- Manage the review process of C-ESMP for approval. The Engineer must ensure that all current safeguard instruments have been reviewed internally as well as by the PMU and final approval from World Bank has been secured before disclosure;
- Work with Contractor and PMU to provide meaningful input and direction into community consultations;
- Manage instances of non-compliance by the Contractor and reporting all instances to PMU. They are also responsible for escalating recurring instances of non-compliance by the Contractor to PMU for action; and
- Manage and responding to all direct complaints/incidents received by their representatives as per the GRM process in **Section 6.3** and reporting all instances to PMU for inclusion into Project database.

8.3.2.6 Contractor

It is the Contractor's responsibility to:

- Ensure the Contractor's Project team includes experienced safeguard specialists with sufficient in-country time allocation and financial resources specified in the Contract;
- Prepare and have the C-ESMP cleared by the Engineer in accordance with the ESIA/ESMP prior to commencement of works;
- Carry out the Project implementation in accordance with the C-ESMP;
- Not undertake any works or changes to works unless first approved in an updated -C-ESMP;
- Conduct daily and weekly safeguard inspections of the works to ensure compliance and reporting the results of these inspections to the Engineer.;
- Proactively update the C-ESMP as construction methodology or other features change;
- Undertake community consultations on the draft C-ESMP in coordination with the PMU;
- Advise the Engineer of any changes to works or methods that are outside the scope of the ESIA/ ESMP for updating;
- Post all notifications specified in the final ESIA/ESMP at the site entrance;
- Report all environmental and OHS incidents to the - Engineer for any action;
- Provide monthly reports of all safeguard monitoring, SEA/SH reporting, incidents, complaints and actions to the Engineer; and
- Maintain a database of all complaints, incidents or grievances received. Any issues which cannot be dealt with immediately will be reported to the Engineer.

8.3.3 ESMP Budget

The cost of implementing the Engineer requirements of the ESMP are included in the existing Engineer contract.

It is the contracted party's responsibility to ensure that they have provided adequate financial resources to undertake all responsibilities as prescribed in this ESMP.

The following is an approximate budget (see **Table 8-1**) for implementing the ESMP requirements by the PIU and CIU, based on the tables in **Appendix B** and **C** and following the suggested budget in the ESMF. These items are over and above those considered to be covered by normal operations on a civil works Project and will be allocated as part of the client's Project implementing costs.

Table 8-1: Approximate budget for ESMP

Budget Item	Detail	Cost Estimate (USD)
Stakeholder Engagement	Catering, venue hire, media, materials, travel and accommodation in Ebeye, translation and interpretation services, etc.	30,000
Training	Venue, stationery, refreshments, training materials.	10,000
Disclosure of safeguards instruments	Translation, report production, distribution	5,000
Monitoring and reporting	Travel and accommodation costs in Ebeye; report production costs; external monitoring agency.	60,000
GRM related costs	Personnel, communication, transportation, office support costs	30,000
	Estimated Total PIU/CIU Budget	**135,000**

8.4 Contractor's Environmental and Social Management Plan

The Contractor is responsible for overall implementation of this ESMP through developing the Contractor's Environmental and Social Management Plan (C-ESMP) which will be their governing document for the implementation of their required specified requirements herein this ESIA/ESMP. The C-ESMP will contain the contractor's methodology and planning for adhering to their safeguard requirements. Additionally, the C-ESMP will detail how the Contractor plans to resource their team with personnel and financial resources as per the Contract. **Appendix D** in this ESMP provides a guide for the expected content of the C-ESMP.

The C-ESMP and associated management plans will be developed, approved and disclosed prior to commencement of civil works. The Contractor is required to produce the following management plans as part of their C-ESMP. These management plans are referred to throughout the ESMP.

Solid Waste Management Plan: The SWMP guidelines in **Appendix E** provide the governing principles for solid waste management and disposal for the Seawall Project. It provides the minimum standards for each waste stream and gives the Contractor guidance on how to implement waste separation, storage and disposal. The guidelines also set the content for the SWMP and it is a requirement of the Contractor to provide all the required content as a minimum.

Worker Management Plan: The contractors will be required to provide a Worker Management Plan (WMP), explicitly detailing how the labour influx impacts will be minimized and the use of local labour maximized. The WMP will not only cover the physical elements, but also interactions with locals, impacts on island resources (e.g. water, waste), and potential price inflation effects. The plan will integrate any local labour regulation and will follow the requirements of the guidelines in **Appendix F**. The plan will include a prevention of SEA/SH Code of Conduct and training plan and will capture required prevention of SEA/SH risk mitigation and response measures as may be identified.

Transportation Management Plan: A TMP incorporating a Traffic Management Plan for will be pre-approved by KADA, KAJUR, KALGOV, RMIEPA, Local Police and National Police, and developed with input from stakeholders including RMIPA, Stevedores, NTA, local businesses and the local community. The TMP should allow for any traffic from Ebeye Port if utilized. The TMP will need to be approved by

these parties and then a supervision framework put into place such that its performance and efficiencies can be reviewed on a regular basis (i.e. weekly or fortnightly). The TMP needs to be reviewed and lessons need to be learnt, such that it evolves and improves as the project progresses. The TMP is required to detail how the safety of the pedestrians and vehicles will be maintained throughout the duration of works. Particular attention will need to be paid to separation of the public and heavy machinery at all times. The TMP will demonstrate how this will be achieved and will detail how the public will be informed of these measurements. Additionally, the TMP will include management of marine traffic including international and domestic transport of equipment and machinery. Management of ballast water will be included in the TMP. It is essential that the TMP has the local community's support and 'buy-in', and that they are able to influence its development. Equally, it is essential that the local community can report issues and incidents easily and speedily. Requirements/ guidelines for the TMP are included in the ESMP (**Appendix B**).

Spill Prevention and Emergency Response Plan: The Contractor will have a spill response plan in place to account for all potential instances. A Spill response plan will be developed to ensure that all fuels and lubricants used during the construction phase in machinery, equipment, generators and also on marine vessels are contained, collected, treated and disposed of. Under the requirements of the International Finance Corporation EHS Guidelines for Ports, Harbours and Terminals the spill response plan will:

1. Identify areas within the port zone and nearby vicinity that are sensitive to spills and releases of hazardous materials and locations of any water intakes;
2. Outline responsibilities for managing spills, releases, and other pollution incidents, including reporting and alerting mechanisms to ensure any spillage is reported promptly to the relevant authority;
3. Include provision of specialized oil spill response equipment (e.g. containment booms, recovery devices, and oil recovery or dispersant application vessels, etc), and;
4. Include regular training schedules and simulated spill incident and response exercise for response personnel in spill alert and reporting procedures, the deployment of spill control equipment, and the emergency care/treatment of people or wildlife impacted by the spill.

Requirements/ guidelines for the Spill Prevention and Emergency Response Plan are included in the ESMP (**Appendix B**).

Occupational Health and Safety Management Plan: The Contractor must develop an occupational health and safety management plan to address and prevent workplace accidents, including those related to vehicles. The plan must comply with the requirements set out in ESIA/ESMP, national legislation, and EHS Guidelines, and it must include several minimum measures. These measures include establishing clear pedestrian-safe access routes around the construction areas, providing safety training to workers before they commence work, including training for those working at heights, near electricity, and driver safety for heavy vehicle drivers. Additionally, the plan must include the supply of personal protective equipment like gloves and boots to construction workers, ensuring Material Safety Data Sheets are posted for all chemicals present at the worksite, and making sure that trained workers wearing proper protective gear remove and dispose of asbestos-containing materials or other hazardous substances. Moreover, the OHS Plan will also incorporate COVID-19 infection prevention measures and guidelines for responding to any infections among the workforce. These measures must be aligned with the latest recommendations from WHO and GoRMI requirements. Requirements/ guidelines for the Occupational Health and Safety Management Plan are included in the ESMP (**Appendix B**).

9 Institutional Capacity

The GoRMI has delegated the delivery and management of the PREP II Ebeye Seawall to the MWIU PMU. Capacity gaps within the PMU have been filled by recruiting experienced safeguards specialists for key roles in the Project. Two International Safeguards Advisors have been recruited and attached to the MOF/DIDA Central Implementation Unit (CIU). Other short-term consultants may be engaged from time to time as required.

The CIU Safeguards Team and Safeguards Consultants under MWIU, will train and mentor local counterpart staff and others. They will also contribute to capacity building of RMIEPA through the technical support and advisory role delivered during the screening of proposals, the review of safeguards instruments, and in ESMP monitoring and reporting.

The PREP II identifies areas for MOF/DIDA, MWIU and RMIEPA training including the following, most of which have been completed or are programmed at the time of writing the ESMF Version 2 (2020):

- World Bank's Safeguards Policies, in particular those triggered and relevant to the Project;
- Roles and responsibilities of different key agencies in safeguards implementation;
- How to effectively review World Bank safeguards instruments and to implement the ESMF; and
- Training on how to prepare TORs, review consultant proposals, and manage consultant's outputs.

The PIU office in Ebeye has recruited a Program Officer who is resourced to support the project in terms of stakeholder engagement and consultation and who will act as the focal point for the community on the island.

Furthermore, on-going support will be provided by the World Bank Task Team for the duration of the Project including for the initial activities environmental screening, categorization and review of prepared safeguards instruments.

Other parties who have monitoring or implementation responsibilities during project implementation (Engineer, Contractor) will be required as part of the contract to be resourced with a suitably experienced and qualified safeguard specialist.

It is the responsibility of the Contractor and Engineer to ensure that they allocate budget lines to have the necessary specialist capacity, tools and equipment for the mitigation and monitoring measures as stipulated in the ESMP. The ESMP includes a budget for the PMUs safeguard responsibilities.

Appendix A 3rd and 4th Round of Consultation Summary Report

REPORT

Republic of Marshall Islands Pacific Resilience Project - Phase II (PREP II)

Ebeye Coastal Protection Engineering Design and Construction Supervision (including Safeguards and Procurement Technical Assistance)

3rd and 4th Rounds of Consultation Summary Report

Client:	Republic of Marshall Islands Ministry of Works, Infrastructure and Utilities
Reference:	MH-PREPII-PIU-83435-QCBS Consultation Summary
Status:	Final/001
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Internal use only

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Attachments to Appendix A

1 Introduction

1.1 Background

RHDHV has been contracted by the Government of the Republic of the Marshall Islands (RMI) to provide design and supervision services for the construction of seawall infrastructure on Ebeye to protect the residents of the island from the impacts of rising sea levels. This initiative is funded by the World Bank through the Marshall Islands Pacific Resilience Project Phase II (PREP II) Project.

To date, the seawall design process has involved extensive stakeholder engagement to ensure that the design is technically, environmentally and socially acceptable and is based on strong local voice and ownership. Two community stakeholder engagement workshops have previously been conducted in 2021 to identify community needs and expectations for coastal protection and to consider various options. The design has now reached the P90 Stage (the point at which the design cost is estimated to be at 90% of the market cost) and a Preliminary Environmental and Social Impact Assessment (ESIA) has been drafted by RHDHV.

As such, the Ebeye leadership team, Government of RMI Project Implementation Unit (PIU) and the Central Implementation Unit (CIU) arranged a third round of consultation which took place on Ebeye from the 21st to the 24th February 2023. This 3rd Round of community engagement was required in order to solicit Ebeye resident views on the P90 design options, likely environmental and social (E&S) outcomes, and to identify any outstanding concerns and mitigation requirements.

Subsequently, a fourth round of consultation was organised and was undertaken on the 9th to 12th May in Ebeye. This additional round of design consultation was arranged to provide feedback from the third round of consultation, to demonstrate how consultees ideas and points were being integrated into the design and construction methodology, and to outline the next steps in project progression. This additional round was also instigated in order that the potential for project phasing be introduced and discussed.

RHDHV's Terms of Reference (ToR) for these additional works included assisting PREP II PIU and CIU with these additional rounds of consultations and to prepare a summary report after the events (i.e., this report). The PIU was responsible for dealing with workshop logistics, including organizing workshop venues and refreshments, arranging telecommunication and sound equipment and meeting invitations.

The CIU E&S team supported consultation planning and implementation, reviewed this summary report and provided feedback. The Marshall Islands Conservation Society (MICS) assisted in the facilitation of community focus group meetings and helped to translate materials into Marshallese. MICS have also provided a summary report which is provided as **Appendix A** to this report.

1.2 Purpose of Consultation

The objectives of the PREPII CIU led 3rd round of community consultations were as follows:

1. To inform the public of the seawall design and explain the rationale for this selection including engineering, cost, environmental and social factors.
2. To identify any significant issues related to the final design, including the construction process.
3. To update the draft ESIA to include the findings of these community consultations, and
4. To keep the Ebeye community informed about the seawall design process, the next steps and how people can get more information or raise concerns.

The objective of the fourth round of consultation was as follows:

- Further community consultation will be required to inform stakeholders and seek their views on additional environmental and social impacts risks and mitigation measures for scenarios associated with a phased approach to construction. The Consultant will integrate the results of these further consultations in the ESIA/ESMP.

1.3 RHDHV Core Tasks

RHDHV's core tasks in this 3rd Round of Consultation were as follows:

1. Attend the community and leadership group consultations organized by CIU Safeguards, present the final design and respond to any technical questions regarding the design that people may raise.
2. Outline the construction process and solicit people's views regarding accessary issues such as transportation of materials, use of the jetty, laydown areas, public safety etc.
3. Ensure any E&S risks and possible remediation options are identified and addressed in the final design, the updated ESIA, Environmental and Social Management Plan (ESMP) and the Contractor-ESMP.
4. Conduct site inspections and identify any remedial issues that need to be addressed with the leadership group.
5. Attend all stakeholder consultation sessions and document findings for inclusion in the updated preliminary ESIA.
6. Identify best location/s of end of first stage of seawall for a full-length seawall constructed in two stages.
7. Prepare summary report of the outcomes of the above (i.e., this report).

2 Presentation and Consultation with Community Representatives

A presentation was prepared by RHDHV for each of the consultation rounds. These presentations were reviewed by PIU and CIU prior to the community meetings. Each presentation is provided in this report in the Appendices.

On each consultation, RHDHV representatives presented the P90 design options to the following community focus groups:

- Local women's representatives
- Community leaders and regulators – including the National and Local Police Force, Port and Public Works officials and educators
- The Chamber of Commerce and local business representatives
- Youth leaders, and
- Local men's representatives

Following each presentation, a group discussion was held to enable participants to ask questions, raise issues and provide feedback. In total, 161 people (57 female and 104 male) attended the 3rd Round consultations[1] and 51 (24 female and 27 male) attended the 4th Round of consultations. Focus group meetings were held at two local venues and scheduled at times most suitable to participant groups.

In addition, prior to and following the community consultation focus groups, the RHDHV, PIU, CIU and MICS representatives met with the Ebeye Leadership Team and Council representatives to review the presentation materials, solicit feedback and to report on feedback received from the community.

This summary report identifies the main points captured during the above meetings and any other facts and salient points captured during RHDHV's visit to site on both occasions. This document will be included within the final ESIA document and also within the Request for Bid (RFB) documentation for reference purposes.

[1] *Some people attended multiple meetings. As such, this is a total number of attendees and the number of individuals who attended is probably 80% of this number.*

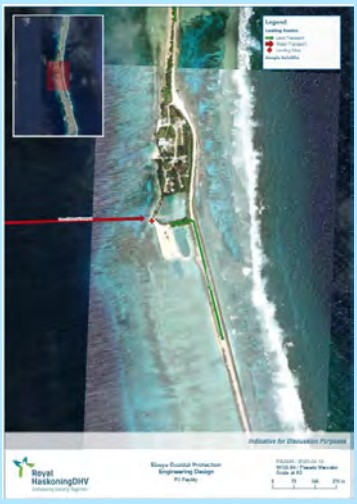
3 3rd Round – Summary of Consultation and Site Visit

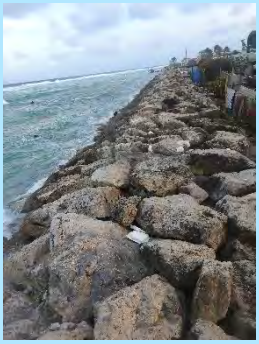
3.1 Consultation and Site Visit Findings

The following table outlines the key findings identified by the RHDHV representatives from their visit to the island in February 2023 and from discussions with the local community and key stakeholders. It summarizes what the team saw and what they were told. Any further investigation required to confirm the commentary below is outlined below.

ID	Topic / Issue	Findings and Notes
1	Ebeye Children	A large proportion of the island's population is made up of children under the age of 10. These children, when not at school or in bed, are free to roam the multiple streets and built-up areas of Ebeye and are, as such, often at risk to road traffic. They are inquisitive and not always aware of their surroundings and the risks that might be present, particularly at a young age. Children as young as 1 or 2 years of age were frequently seen walking the streets on their own and seemingly unsupervised.  The presence of unsupervised children in such vast numbers quite clearly presents a major risk for any construction works on island, both in terms of haulage and plant movements, and work / storage sites. Any haulage route will need to be carefully planned to avoid built-up areas where possible. If this is unavoidable then extensive and well thought through mitigation and controls will be required. These facts need to be conveyed strongly to the chosen contractor, along with expectations regarding their responsibilities in this area.
2	Traffic Management Plan (TMP)	The Contractor's Traffic Management Plan (TMP) will need to be drafted and then reviewed by key stakeholders, including the Ebeye Leadership Group and the Police. The TMP will need to be approved by these parties and then a supervision framework put into place such that its performance and efficiencies can be reviewed on a regular basis (i.e., weekly or fortnightly). The TMP needs to be reviewed and lessons learned incorporated, such that it evolves and improves as the project progresses. It is essential that the TMP has the local community's support and 'buy-in', and that they are able to influence its development. Equally, it is essential that the local community can report issues and incidents easily and speedily.
3	Haulage routes	It was considered that any haulage routes that went through the middle of Ebeye would be the riskiest and would lead to the most incidents. As

ID	Topic / Issue	Findings and Notes
		such, routes through the centre of Ebeye should only be utilised when absolutely necessary. Haulage from the north and south was considered to be better and safer, with the north being the preferable of the two. The site visit identified that the southern route is more constrained in terms of space. In addition, offshore is much shallower and there are fewer areas that allow for adequate landing facilities and material storage. Note: RHDHV undertook extensive walkovers and surveys during this consultation period and this is reported on, along with the above consultation, in the ESIA document (including maps of the indicative haulage routes).
4	One Way Road Traffic Direction	Road traffic is normally one-way in a clockwise direction around Ebeye. However, it was noted that from time-to-time roads may be closed or traffic directions altered to anti-clockwise if required for construction works etc. This is not uncommon. Parking on the side of the road should be avoided in all circumstances.
5	Police Role and Capacity	The Police will need significant support with traffic management. The sheer volume of traffic haulage movements and the intensity of local population movements mean that the TMP and actual works will need to be managed and supervised at all times. Whilst the Police will need to be in charge / in control of safety and road safety, they do not have the resources to manage the controls needed and the Contractor will need to provide adequate support to them in this regard. This will be explored further in the ESIA and in the Contractor Tender documents. It was identified that there are 30 Local Police and 20 National Police on the island.
6	Offshore bathymetry and Ecological Value	A limited boat survey identified that the southwestern side of the island has a much wider and shallower shelf than expected; whilst the areas to the north are deeper and provide better access for deep draft vessels. If deeper areas are not available, then incoming ships will need to tranship materials to barges further offshore. The western side of the island has a lot of very healthy coral. There are obvious reef systems and also a lot of scattered coral communities. Underwater photos and movies identified a lot of very healthy coral that would need to be avoided by any incoming ships and operations.
7	Available material landing sites	RHDHV were taken to a number of potential material landing sites which will be discussed further in the ESIA. Each of the sites has its own advantages and disadvantages, as follows:

ID	Topic / Issue	Findings and Notes
		- Southern area – proximity to children's swimming area, picnic area and the shallow offshore area make this site difficult to utilise. It is, however, attractive given the direct access to the southern end of the sea wall. It is likely that the offshore area (i.e., rock platform) could be a material storage area for large rock revetment) when building from the south. There would not be any room for anything more substantial in this area. Note that the approaches are very shallow so ship access would be limited to shallow draught barges only. - Ebeye Port – It was identified that the port could be used for delivery of specialist and valuable equipment. However, it should not be used for large volumes of material or frequently given that the road access leads straight into the populous part of town. In addition, the port is an important asset for Ebeye, and it is essential that it is not impacted upon through the delivery of large volumes of materials. To be avoided where possible and only utilised for high value and small volume items (i.e., specialist plant). - Waste Site Ramp ('Dump Town') – very shallow offshore and shallow at the limited ramp area. The onshore area is also very congested and there would be little area for manoeuvring or storage. Not likely to be considered further. - (Pacific International Inc. (PII) Ramp – this is a newly reclaimed ramp to the north of Ebeye. It has been constructed by PII using locally resourced material from the offshore reef areas. The ramp and area are close to Ebeye with good offshore access. The ramp is new and in ok condition and provides access to a wide storage area. Note that there appears to be a healthy reef system offshore of the PII Ramp though it also appears that the reclamation has damaged a lot of local marine areas. This site would provide access to the Causeway Road which would then provide direct route to the northern area of the town.  - JoeMar Ramp – Similar to the PII ramp, this site provides good offshore access and a wide area for landing and storage of materials. It is located to the north of PII and has been built recently by the JoeMar Company. The offshore areas here have also been badly affected by the reclamation and the ongoing quarrying activities and appear to have been badly affected in the near-by vicinity. This is a potential site for landing and storage as it also provided access to the Causeway Road and

ID	Topic / Issue	Findings and Notes
		the north of the town. It is, however, slightly further away than the PII ramp from the sea wall site. - Far North at Guegeegue Pier – the 50+ year old dock to the north on Guegeegue is considered to be too far away from Ebeye and the local area too congested to be considered further. The dock is at least 60 years old and in very poor condition. Based on the above, if materials are to be landed in the north and works progressed from that direction, then the PII and JoeMar ramps are considered to be the most likely landing areas. Further marine survey and haulage assessment is recommended to ensure that E&S issues are minimised where possible.
8	Construction from North and / or South	Discussions were held in multiple meetings on whether construction would come from the north or south, or both. There are advantages and disadvantages for all three options, and these will be considered further in the design and ESIA processes.
9	Southern Picnic and Swimming Area	This is a recently funded project and an area which is frequented by families. It should be avoided at all costs for safety and social reasons.
10	Ebeye Waste Site	It was discussed that there might be an opportunity for KALGOV to consider sending some of its waste (not at project cost) back on the ships that will be contracted to take shoreline waste away from Ebeye. This is not a project commitment but would make sense from an economic perspective locally. If waste was removed then the third haulage site makes a little more sense, but only if the offshore area is made deeper.
11	Community Consultation	It was noted that this is one of the first (if not the first) occasions in which the community has been asked for their thoughts and to feed into a major project design. The community, as such, was notably delighted to be part of the planning process and welcomed the chance to listen to and feedback to the design and client teams.
12	Appearance and Aesthetics	A number of consultees commented that a rock revetment would be preferable to a block sea wall as it would likely be more natural looking and more in keeping with the existing shoreline. No one during the consultation identified that they preferred the block sea wall design. 
13	Litter and Large Waste Items	The rock revetment, unlike the block wall, will provide voids which will likely accumulate litter and larger pieces of waste. The current shoreline is full of rubbish and the local culture appears to be one where waste disposal in the sea and on the beach is prevalent. If the rock revetment is not cleaned out semi-regularly, then over time the voids will be filled with rubbish which will be unsightly and potentially unhealthy. This point

ID	Topic / Issue	Findings and Notes
		needs to be stressed in project communication materials during construction. Whilst litter is not likely to affect the structural performance of a revetment, large tree branches and metal (i.e., pipes) could get stuck in the voids and could act as a lever in wave conditions. Such an event would be infrequent but possible and, again, it is highly recommended that the revetment is patrolled regularly to remove these types of offending objects.
14	Fishing from the Shoreline	There are about 40 local fishing vessels on the island, but the majority of fishing is undertaken from the shore and via long-line techniques. The consultees were happy to see the access points on the sea wall and identified that these would be used by coastal-side fishermen.
15	Island Services	The contractor and the construction methodology need to be aware of regular island services and amenities and should make sure that the community is not prevented from undertaking their normal activities. This might include island waste collection services, postal delivery and collection, the collection and transportation of fuel oils, and the running of all and any local businesses. If disruption to any of these services is likely, then the affected businesses need to be consulted and mitigation measures identified and put into place proactively.
16	Island holiday periods	The contractor needs to be made aware of all holiday periods on the island. The contractor should expect to not work on these dates.
17	Night-time and anti-social working hours	The contractor should avoid working at night-time except where absolutely necessary. Certainly, all night-time haulage and other vehicle movements should be restricted to day-time hours only given the risks to pedestrians (particularly the children). Acceptable working hours need to be established through consultation with the local stakeholders, in particular the Police and Local Government authorities. Any working hours that are considered to be anti-social should be avoided at all costs. For example, working overnight, during weekends or on public holidays can be considered anti-social because it may interfere with the worker's ability to spend time with their loved ones or engage in social activities.
18	Height of wall and sea spray	The height of the wall was discussed in all sessions. Its effect on limiting sea breezes was identified along with the fact that sea spray will not be stopped in entirety. It is important that the local community understand that these effects cannot be fully stopped, rather they will be reduced in most circumstances. Extreme events will still create inundation and sea spray issues for those residents closest to the sea wall.
19	Engagement of Local Workers	A number of consultees asked how many workers would be Marshallese / local vs. international. Of the 20-25 expected workers, it was considered that, in time, approximately half could come from the national

ID	Topic / Issue	Findings and Notes
	and Community Involvement	/ local community. The Contractor will be expected to maximise local employment and also provide gender diverse employment opportunities. This will be a requirement within the tender documents. In addition to engaging local workers, e the possibility of other forms of community involvement with sea wall development needs to be explored further. This could be through maintenance (i.e., litter clean up) or through art / design actions (i.e., painting of rocks). The seawall will become an especially important part of community life and well-being and needs to be looked after from the outset.
20	Conduct of Project Workers	The contractor will need to design and implement a Workers Management Plan, Code of Conduct, Grievance Mechanism and Incident Reporting Process that includes gender-based violence (GBV) and sexual exploitation, abuse and harassment (SEA/SH) and meets RMI Government and World Bank requirements. The contractor will also need to ensure that workers behave in a culturally appropriate manner and that any incidents involving the local population and recorded, investigated and actioned accordingly. The CIU will provide a risk management orientation session for all project workers.
21	Road Drainage	All of the existing road drainage culverts need replacing. Currently the seawall design allows for drainage of the seawall itself and not other structures, however, road drains could be inserted into the design relatively easily.  Note that RHDHV has heard subsequently that the ADB are funding a project to redesign the road drains. It is highly recommended that the RMI Government coordinates the two projects such that the road drains are incorporated into the sea wall design and built at the same time.
22	Communication and Education	It was discussed that an A4 pamphlet should be produced and provided to Ebeye residents. This pamphlet would describe the seawall, the intended construction and likely issues. It was agreed that this was a good idea and should be undertaken ASAP. The PIU will lead on this action.
23	Cumulative projects	The ESIA needs to take account of other projects that are planned for Ebeye and Guegeegue. This is acknowledged and RHDHV will attempt to ensure all known projects are included and considered.
24	Sandy beaches	Given sea level rise and the linear static of the new seawall, RHDHV identified that the sandy beaches (limited as they currently are) would likely disappear in time.

ID	Topic / Issue	Findings and Notes
25	UXO Survey	Undertaking a UXO survey is going to be exceptionally difficult / almost impossible prior to the clearance of waste. This is due to the large amount of metals currently found in the coastal zone. The UXO survey will be the contractor's responsibility.  This needs to be discussed further with the client and the eventual contractor. However, given the shallow nature of the sediment, how well traversed this site has been over the years and the corrosive nature of seawater, it is felt that the risk of UXO detonation might be limited. However, expert advice from a UXO Specialist must be sought going forward.
26	'Cheap' versus 'Cost Effective'	The team should not identify design options as being cheaper as cheaper does not necessarily mean better. The preferred option is likely to be more cost effective as it provides better value over other options whilst providing the same or better protection levels.

3.2 Consultation Questions

The following table identifies some of the key questions arising during this round of consultations that were fielded by the RHDHV team. Please note that more comprehensive notes were taken by the MICS team (**Appendix A**) given that the RHDHV team were presenting during the question and answering sessions. We have not repeated those questions below to avoid duplication.

ID	Key Questions	Answers and Notes
1	Will the area of land behind the sea wall be uniform in size?	No. The width and depth will vary depending on the alignment of the sea wall and the position of the property boundaries. No property boundaries will be intruded upon.
2	Will all material be brought in from outside sources?	Yes. However, the contractor will be requested to re-purpose (through crushing to make fill) existing shoreline materials where possible. Materials are likely to come from countries such as Australia, Vietnam and Fiji (for example).
3	Will the wall increase pressure on the existing sea wall to the north?	No. The new sea wall will not contribute any additional stresses to the existing sea wall.
4	Will ponding of water behind the wall still occur?	Yes, in extreme events. However, the wall has been designed to maximise the drainage of sea water from behind the wall under typical circumstances. Noted also that the drains of the road are not functioning presently, and these would need to be rebuilt alongside the seawall. The road drains are 'maintained' by KADA.
5	Could you disseminate the consultation presentation materials?	Yes – PIU and KADA to action.
6	Can we build / install telecom cables in the fill area behind the seawall?	No. This area has been designed to maximise drainage and should not be touched going forward. Any alteration of the area behind the seawall will impact on its design, functionality and efficiencies (i.e., drainage).
7	Will roads be repaired after the seawall works?	Yes, roads will be returned to their pre-works condition by the Contractor.
8	Where will the Contractor's Camp be located?	This will be up to the Contractor, but accommodation needs are likely to be low given that the total workforce is not expected to exceed 25. It was noted that there are land areas to the north that could accommodate temporary accommodations if available to lease over the medium-term. The PREP II Resettlement Policy Framework confirms that the Kwajalein Atoll Development Authority (KADA), in consultation with MWIU, will allocate an area under its control, or otherwise work closely with local landowners to secure alternative sites for temporary work sites. Voluntary land access will be negotiated between KADA (in consultation with MWIU) on behalf of the

ID	Key Questions	Answers and Notes
		Project and the landowner. Land will be fully restored before the end of the Project.
9	When will this project start?	It is anticipated to start in 2024, probably towards the end of the year.
10	Will the seawall impact marine life?	Yes, but we are preparing controls and measures which will limit or avoid these impacts. On the oceanside, impacts are likely to be negligible given the limited marine habitats in the active surf zone. On the atoll side there is more chance for impact on coral reefs and these needs to be controlled through an appropriate construction methodology and management plan. This will be covered further in the ESIA and discussed with the community
11	Where will the contractor get their supplies and utilities from?	The contractor will be expected to provide their own power, water and subsistence.

4 4th Round – Summary of Consultation and Site Visit

4.1 Consultation and Site Visit Findings

The following outlines the key findings identified by the RHDHV representatives from their visit to the island in May 2023 and from discussions with the local community and key stakeholders. It summarizes what the team saw and what they were told. Any further investigation required to confirm the commentary below is outlined below.

Confirmation and approval of other items was also received including:

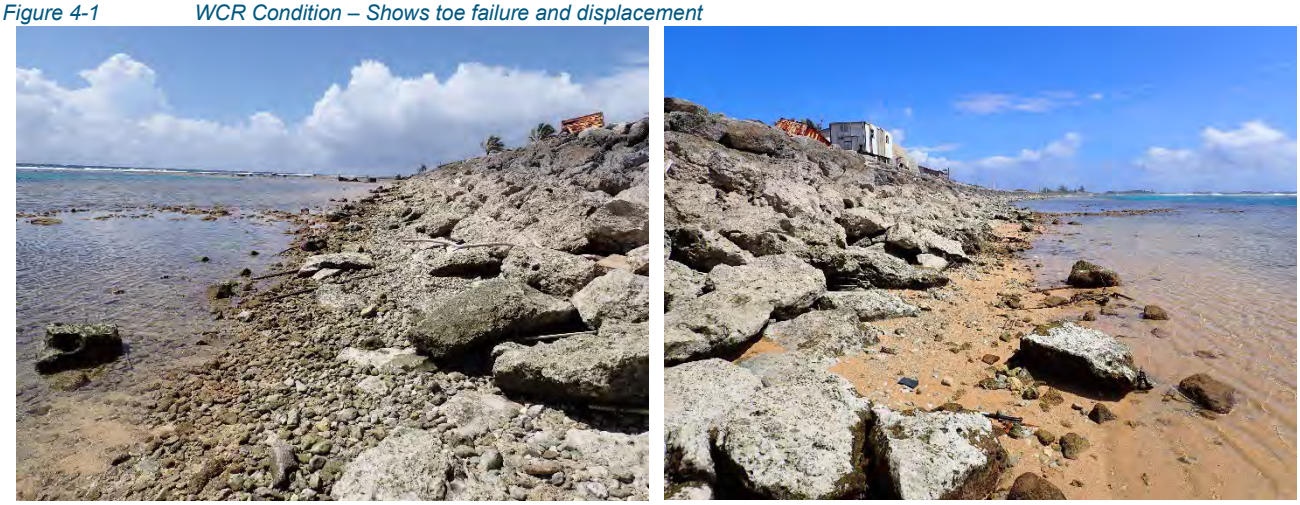
1. No night time working
2. Social hour working only
3. No holiday working
4. Ongoing consultation during construction with the contractor to ensure lessons learnt and all issues heard and acted upon.

ID	Topic / Issue	Findings and Notes
1	Haulage Routes	The following 'rules of the road' were identified and described to the stakeholders: - To minimise traffic through Ebeye Town as far as possible - To minimise the use of Ebeye Port as far as possible - To avoid haulage near to or directly on sensitive sites such as cemeteries and popular family area (i.e. Southern Picnic Area). To achieve the above the stakeholders were informed that RHDHV had set the following requirements in the RFB: - The port to be used for sensitive, expensive and fragile machinery and construction equipment only (i.e. not materials). - The Southern site would only be used for material lay-down and storage only, and then on the hard pan area. - That sites to the north had been investigated further to assess viability and value to this project in terms of receiving material. - The haulage from these sites would be kept to the hard pan where possible with ramps provided to keep haulage off the causeway as much as possible. - That the majority of construction would come from the north.
2	Ebeye Children	The above measures will principally be put into place to safeguard Ebeye children from road traffic incidents. The avoidance of trucks on the Town roads does that to a significant degree but it does not provide a total solution. This is because the children also utilise the ocean-side waters for swimming, surfing and general play. As such, the TMP will need to be developed in order to also focus on this area and the potential for incidents when working and driving down the oceanside hard pan.

ID	Topic / Issue	Findings and Notes
		As a suggestion, it is recommended that beyond the usual mitigation for avoiding road traffic accidents (i.e. fencing, closures, signs, security personnel etc.), that the contractor also consider ways in which to encourage children to the atoll side during the works. This might include for example temporary play parks and water parks on the western side for use in working hours. PIU and CIU have already identified that together with the local stakeholders, that a campaign of community information and awareness raising of the project and the risks of haulage will be initiated. In the next month a web site will be created with links to the Consultation Presentations and other useful information.
3	Road Drainage Project	The road drains are blocked throughout the island. The culverts leading to the ocean are also blocked and totally destroyed at the ocean end. They will need replacing at some point and preferably allowed for during the construction of the sea wall. We are aware that there is an ADB funded project to restore road drainage in Ebeye. RHDHV asked if any more information was available on the ADB funded road drainage project. PIU have sent an email introducing the ADB Team Leader to the RHDHV team. RHDHV to follow this up on return to Australia and to initiate a meeting to discuss the two projects and sequencing.
4	Stairs	The number and location of stair ways was discussed on a number of occasions during the week. The Womens Group asked for a separate session to discuss these locations which was then held on the Thursday night. At that meeting this group confirmed that they happy with all locations, with the exception of the most southerly staircase. They have asked if this stair can be removed completely given the fact that there is a rip current in this area (between the islands) and the presence of the stairs is likely to encourage children to swim in what is a potentially dangerous area. RHDHV have agreed to explore this further. Note that the P90 drawings will not be changed until after contractor negotiations (Deliverable 20). There was also discussion of the stairs and all access ramp at the final key regulator and stakeholder meeting on the Friday. It was agreed that the presentation be sent to this group such that they could assess the plan drawings further. They will come back to the design team if they have any requests with regard the location of the stairs and access ramps.
5	Inspection of Potential Landing Sites	Drone surveys and snorkelling surveys were undertaken at three potential material landing sites in order to better inform the ESIA. See **Section 4.2** below.

ID	Topic / Issue	Findings and Notes
6	Retention of surface water on island	During our stay on island, it was noticed and discussed that water retention problems are experienced from four principal directions: - Ground water – the coral is exceptionally porous and well draining but it does take time for water to be removed. If it has been raining for a while, or following a surge and high tide, the ground is likely to be saturated and thus prevents quick water removal - From the Atoll side – storms and winds from the west, whilst not predominant, do occur. This means that water can be pushed into Ebeye from the Atoll side. - From rainfall – whilst RHDHV were on island, about 30-50mm of rain fell and that created significant flooding issues on the island. As noted above, the drains are all blocked so the water has no where to run except through the pores in the coral rocks and through cracks and holes in the roads. - From the sea – ponding behind the current crests does occur after significant storms and king tides (for example). This is the primary purpose of the Ebeye Sea Wall project.
7	EPA and Landowner Approvals	The Ebeye Sea Wall project is still subject to land owner and EPA approval. This means that not only does the project need to be ratified by these parties but it must also receive the necessary permits and approvals required. This extends to all elements of the projects life-cycle from delivery of material to the construction of the seawall; to operational aspects and impacts. The P90 ESIA and design currently identify potential construction methods and also review possible landing and haulage sites. The bidding (and eventual preferred) contractors will suggest their own preferred methodology which will then need to be taken to the land owners for their consideration and approval, and also to the EPA for required consent. This will need to occur during the contract negotiation and contractor mobilisation periods.
8	Closer inspection of WCR	During the May Site Visit the RHDHV team undertook a closer inspection of the revetment to the north of the island. It was noted that the toe is failing places and that a large number of rocks are now becoming displaced, probably due to storm conditions. Photos are provided below.
9	Survey of Construction Damage	It was discussed on a number of occasions that the contractor will be asked to undertake pre and post-construction surveys of roads, houses and other infrastructure in the vicinity of the construction and haulage works. This is required to ensure that all damage that occurs (if any) is identified and repaired post works. Such dilapidation reports will need to be ratified by all parties prior to commencement of works.

Figure 4-1 WCR Condition – Shows toe failure and displacement



4.2 Material Landing Site Assessments

Further assessment was undertaken by RHDHV staff on this visit of the main landing sites under consideration. This was to further the team's knowledge of these sites in order to understand their merits and disadvantages better.

The potential haulage sites which were investigated further were as follows:

1. Southern Landing Site – hard pan to the south-west of the island and close to the family picnic and barbeque area.
2. PII Landing Site – area built by PII for use in other construction projects but which offers potential facilities for the landing of materials.
3. JoeMar Landing Site – area built by JoeMar as a sand quarrying site, located to the north of Lojjairok.

Please note that these area were investigated as possible sites for landing. No negotiations have been entered into with the land owners and/or the contractor and RHDHV do not know what permits and consents are in place for the two northern sites. All negotiations and permitting is expected to occur after preferred contractor is identified.

Our findings from the site assessments are provided in **Table 4-1** below.

Site Assessed and Notable Findings
Southern Landing Site – hard pan to the south of the power station Technical Findings Shallow approach at low tide. Area could be used for lay down of rock material on the hard pan. However, area is subject to rip currents according to locals so could only really be used for larger material storage. Not suitable for any other works or storage given limited space. Social Findings Popular area for picnics and barbeques to the south-west corner of the island. Community keen that we do not use this area for works unless absolutely necessary. Area is used by families for swimming.

Site Assessed and Notable Findings

Environmental Findings

The coral in this area is limited to rocky outcrops and principally in depths greater than 3-4m. The coral coverage is patchy in areas but there are notable healthy habitat areas with good coverage. There are large extents of sand and also areas of bleached corals. Given the shallow nature of the approaches, impacts with ship / barge keels should be avoided.

Summary

Unlikely to be used for anything other than the storage of large rock materials on the hard pan, to reduce the travel time of haulage during construction. Use of area likely to be limited due to social importance of this area and also the restrictions of limited draft available and notable coral outcrops.

Photos of Southern Site

Site Assessed and Notable Findings

PII Site to the North of Ebeye – Directly to the south of Lojjairok

Technical Findings

The PII site is in an orderly state and appears to have been built with a solid structure and berthing / landing area. The area is clean and currently there appears to be little waste or washed sediments (from construction run-off) in this area. This site is the closest technically feasible materials landing site to Ebeye. The rock for this site is being dug from the hard pan directly to the west of the causeway which is limiting the impact on nearby coral habitats. There would also appear to be decent depth allowance at low tide, although this would have to be assessed more accurately in the future.

Social Findings

This area is not next to a community area but it is immediately next to the Iroijlaplap's property. The route that haulage would take would not go through Ebeye Town or any other communities. There would appear to be few social issues at this site.

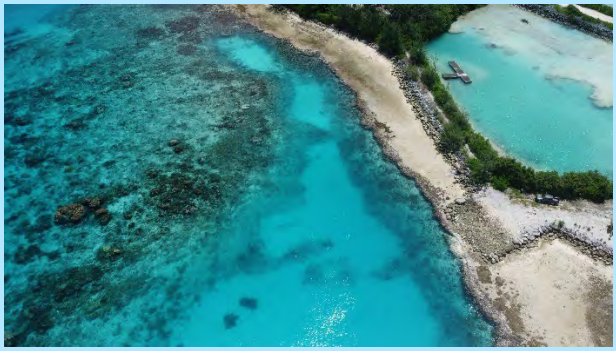
Environmental Findings

The site is of exceptional ecological value with coral habitat in the area easily achieving +90% coverage in large areas. There is a diverse assemblage of coral and fish species, and the majority of the coral looks very healthy. There are large patches of barren sand immediately next to the shoreline and then offshore coral habitats as well, perhaps 50m offshore.

Summary

The PII site looks to be well managed and (currently) not impacting upon local corals on a quick survey observation. There is a well-built revetment and landing ramp at the site, and there is potentially enough depth offshore to allow barges to access this site. The coral in this area is spectacular and would need to be avoided at all costs.

Photos of the PII Site



Site Assessed and Notable Findings

Suggested Mitigation Measures and Working Methodology

It is heavily recommended that all corals at the PII site are fully protected from any sea wall construction work. This means that all boat work must not collide with or damage the coral, either through landing, haulage or storage of material. An area of working, as to the left, is suggested should this become a likely landing area.

Again, it is not known whether space will be available at this site but if it were to be then material landing, haulage and storage should be restricted from occurring in the red zones. It is worth noting that all of the hard pan to the south could be used as rock storage given the low ecological value of the hard pan.

Haulage could also occur on the hard pan with access to the ocean side via a series of ramps over the causeway.

Site Assessed and Notable Findings

JoeMar Site to the North of Ebeye – On the island to the north of Lojjairok

Technical Findings

This site is being used for coral sand quarrying presently. Sand and coral are being extracted from the seabed and then used to sand to use in concreting. This site is deeper than other sites considered and has a very basic wharf and landing site. Some of the revetment is made up of scrap metal which might make deliveries difficult. This site is the furthest away in terms of distance from Ebeye.

Social Findings

This site is slightly more north of the PII site but is in the immediate vicinity of a small community of houses, gardens and also a large greenhouse (Taiwanese funded food growing project). This proximity to a settlement would most likely be an issue when it comes to the significant amount of material haulage required.

Environmental Findings

Given the nature of the sand and coral extraction that is currently being undertaken, the habitat in the area of the wharf, the southern side of the finger pier ad all the way down to the southern ramp is almost devoid of coral life. Those areas around the site still have good coral coverage. However, given the nature of the extraction works, there was a large amount of sand and silt in the area and most notably on top of the corals themselves. The water quality / visibility in this area was notably poorer than that PII area to the south (snorkelled within an hour of each other on a slack tide).

Summary

This site is technically less advantageous given the longer haulage route, the need to drive on the causeway and through the nearby community, and the current poor berthing facilities. It is socially less desirable given the local settlement but is conversely environmentally more acceptable given that the coral has been removed from this site through previous operations.

Photos of the JoeMar Site

Site Assessed and Notable Findings

JoeMar Site – Suggested Mitigation and Working Methodology

If this site was available for use and consent could be gained, then it is recommended that transportation, landing, storage and hauling of materials avoid the red areas in the drawing below. A TMP would be needed for the nearby settlement. Also, as soon as possible after leaving the island on which this site is located, the haulage should be moved onto the hard pan to reduce damage.

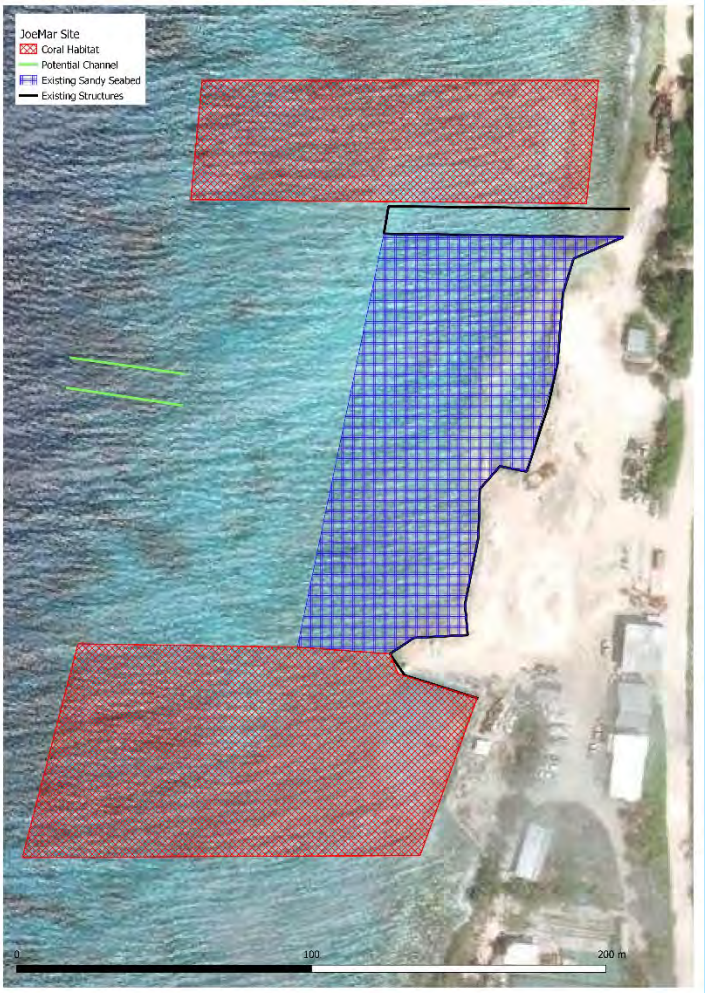
Site Assessed and Notable Findings


***Table 4-1** – Material Handling Sites Assessment findings from May visit*

4.3 Borrow Pit Assessment

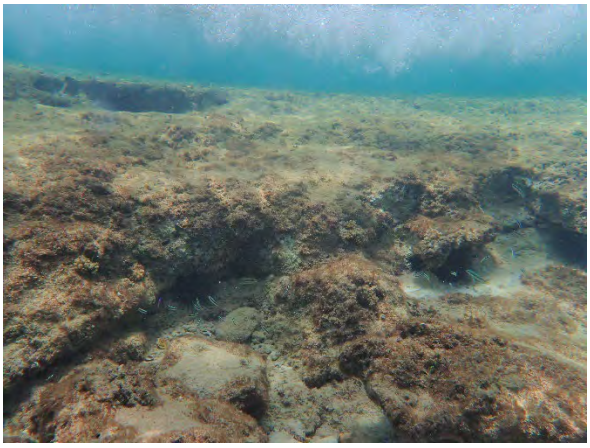
A further assessment of the borrow pits on the ocean side were undertaken in May. These borrow pits provided material to the WCR in the 1980s (when built) and also to other projects in Ebeye over time. A snorkelling assessment was undertaken to evaluate what ecological value these pits had some thirty years after their creation. Two borrow pits were snorkelled one immediately beside the WCR and one to the south by the main Ebeye Town.

Figure 4-2 Photos from Pit by the WCR

The WCR borrow pits are 2-3m deep with hard pan sides and a sandy bottom. There are isolated crops of rock. There is a decent assemblage of coral in these pits, mostly on the ocean side and in areas where wave action is not too demonstrative. Whilst not plentiful, the amount of ecological value (through the corals) in the pits is far more than the hard pans which were there previously.

The sand in these pits is accumulating over time and could be removed in part if needed. Furthermore, additional coral growth could be encouraged through the placement of further rock material into these pits to provide adequate coral habitat.

Figure 4-3 Photos from Pit by Ebeye Town



As this pit (age of pit is unknown) is closer to Ebeye, it appears to receive more waste disposition. It also has a lot less coral coverage, perhaps no more than 5% over the total area, and probably much less.

Attachment A – MICS Summary 3rd Round Consultation Report

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Ebeye Seawall Project

Third Consultations Report – Feb 21-24, 2023

1 Executive Summary

The Government of the Republic of the Marshall Islands (GoRMI) has commissioned design services for the construction of seawall infrastructure on Ebeye to protect the residents of the island from the impacts of rising sea levels. This initiative is funded by the World Bank through the Marshall Islands PREP II Project.

- ✓ This consultation follows on from the first two rounds of community consultations which were undertaken in 2021 in order to introduce the Ebeye seawall project and to get initial feedback on the wide range of design options that were being considered.
- ✓ This feedback was used to shortlist the design options based on a detailed analysis of coastal conditions, impacts of climate change (erosion, sea level rise, storm events etc.) engineering options, environmental and social (E&S) risks related to design and construction, and the available budget.
- ✓ The purpose of this latest round of CIU-led consultation (third round of consultations) was to present the final two design options for community input, and to identify any additional E&S risk factors that have not been adequately addressed in project planning so far. This information will be used to complete the Environmental and Social Impact Assessment (ESIA).
- ✓ The proposed designs presented to the community are for a full-length seawall which might be constructed using a phased approach tied to funding availability. Should there be a significant gap in construction between phases, further consultation with the community will be required to assess E&S risks associated with temporary end protection.

Representatives from the PREP II Project Implementation Unit (PIU), RMI Centralized Implementation Unit (CIU) Safeguards Team, the Ministry of Works, Infrastructure and Utilities (MWIU) and Royal HaskoningDHV (RHDHV) conducted the consultations on Ebeye, Kwajalein from February 21-24, 2023. The Marshall Islands Conservation Society (MICS) was commissioned to facilitate the consultations and to prepare this summary report. MICS also provided translation services of the presentations and questions into and from Marshallese where required.

Once the final comments from the February consultations are incorporated in the ESIA, a community confirmation meeting will be conducted to inform the community of the final design and submission of the ESIA.

2 Inception Meeting – February 21, 2023

The inception meeting for the third round of community consultations was held on February 21, 2023, with the Ebeye Seawall Project Team at the Kwajalein Atoll Development Authority (KADA), Conference

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Room. The team from Majuro included the MICS representatives and the design team from RHDHV, Martin Budd and Robert Hancock. After checking in at the MIR-Ebeye Hotel, the team proceeded to the Kwajalein Atoll Development Authority (KADA) building for the initial team meeting, led by Yumi Crisostomo, CIU Ebeye Representative/Ministryof Finance.

The team from Ebeye included the Executive Director for the KADA, key partners for this project such as the Kwajalein Atoll Local Government, Climate Change Directorate (CCD), RMI National Police and Public Safety, Office of the Chief Secretary/National Disaster Management Office (OCS, NDMO), Ministry of Finance (MOF) - Customs and Taxation Office, MWIU– Ebeye Office.

Main points from the meeting:

1. Introduce the two designs and proposed final design from RHDHV.
2. Review the meeting schedule for the week.
3. Review of the procedures for the consultations, site visits and other necessary matters.

The meeting started with introductions from the team members and a warm welcome to the design team who were finally able to visit Ebeye for the first time since the borders were closed for COVID19. The meetings on Ebeye were organized by the CIU team and anticipated to be positive and successful. The team was later joined by additional team members from the CIU and WIU offices in Majuro.

Participants at the Inception Meeting:

Name	Office
Anjojo Kabua	Executive Director, KADA
Ariston Fantiago	KADA
Bernadette Kabua	CCD
Yumi Crisostomo	CIU
Capelle Antibas	KADA
Edward Bobo	KADA
Wesley Lemari	NDMO
Ted Michael	MOF - Customs and Taxation
Bruce Jackson	PREP II
Kevan Wheeler	PREP II
Martin Budd	RHDHV
Robert Hancock	RHDHV
Garry Venus	PREP II

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Name	Office
Colleen Peacock	PREP II
Dolores Kattil	MICS
Dua Rudolph	MICS
Aliti Koroi	PREP II
Kimber Rilometo	PREP II
Melvin Dacillo	MWIU
James Myazoe, Jr.	MWIU

3 Meeting Schedules and Outcomes

The meetings for the 3rd round of community consultations targeted the main groups in the community and were sequenced to ensure that community members were well represented and the participants

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were able to respond and provide comments on the community's behalf, towards the final seawall designs, including issues regarding social and environmental safeguards.

Date and Time	Activity
Tuesday 21 February 2023	a.m. PIU/CIU/MICS Team Arrive Ebeye p.m. Briefing with Ebeye Leadership Group – OCS (Ebeye), KADA, Kwajalein Atoll Local Government (KALGov), Kwajalein Atoll Joint Utilities Resources, Inc. (KAJUR) Evening: Meeting with World Bank Task Team
Wednesday 22 February 2023	a.m Workshop 1 Women's Group p.m. Workshop 2 Government Group (Police, RMI-Ports Authority (RMIPA), KADA, KALGov, KAJUR) Evening: Meeting with World Bank Task Team
Thursday 24 February 2023	a.m Workshop 3 Ebeye Business Group p.m. Workshop 4 Youth Representatives
Friday 25 February 2023	a.m Workshop 5 Men's Group p.m. Debrief with Ebeye Leadership Group – Office of the Chief Secretary (OCS-Ebeye), KADA, KALGOV, KAJUR
Saturday 26 February	Return to Majuro

Brief Presentation Overview for each meeting/session:

Introductions: Each session started off with introductions from the team members and the participants. Yumi Crisostomo as the CIU representative in Kwajalein, led the introductory sessions along with providing lead up questions and responses during the meetings. In line with cultural and community practice, each session started off with a prayer to bless the meeting, the participants and the food.

After the introductions and key remarks from Anjojo Kabua, Executive Director for KADA, Bruce Jackson provided a brief overview of the visit and provided words of appreciation to the community for their contribution to the development of the designs, especially their patience and understanding on the process of preparing and now, presenting the final designs (rock or revetment). The team was very happy to finally participate in person, considering the long closure of the RMI's borders from COVID19 especially since the engineers were able to join us, so we are thankful that they are able to physically be here and to further show commitment for this project.

Project background: Dua explained how this consultation follows on the two rounds of community consultations held in 2021 on the World Bank funded Ebeye Seawall Project. He thanked the participants

for their feedback during the 2021 consultations as it was crucial for the design team (RHDHV) to shortlist the seawall options. He stated that the current cost estimates for the two options (rock or revetment) are over the available budget, however discussions are underway between the Project, GoRMI and WB to address the budget shortfall.

Purpose of consultation: Dua explained that the purpose of this round of consultations is to present the final design options and solicit community input. Additionally, this consultation will allow the community to identify additional E&S risk factors that have not been addressed so far in regard to the ESIA. He continued on stating that the designs are for a full-length wall which will be built using a phased approach tied to funding availability, and that should there be a gap in construction between phases, community consultations will be held to assess the associated E&S risks. Lastly, he explained how this consultation hopes to identify how best to keep the community informed of the seawall project.

3.1 Ladies Group

Meeting Participants:

Name	Gender	Representation
Marcella Sakaio	F	Mother, Ebeye Hospital, Catholic Church
Kalani Riklon	F	Mother, RMI Government

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Stephanie Ishimura	F	Mother, WUTMI
Clanda Luther	F	Community Representative
Ramanty Chong-Gum	F	Mother, VP, Educator
Ann Margaret Loeak	F	Mother, Ministry of Finance
Roanna Zachras	F	Mother, VP, Educator
Monica Kemem	F	Mother, Youth to Youth in Health
Jane Bobo	F	Mother, Public Service Commission
Bernadette Kabua	F	Mother, CCD-NEO
Valentina Riketa	F	Mother, Landowner Rep

Comments (C), Questions (Q) and Answers (A):

C: Puddle issues: Design needs to make sure that there are no standing water areas, ponds – ensure that the drainage on the wall is sufficient. Yes, the design allows for water to drain out naturally - there will still be water, but it will drain out back into the ocean side once the tides have receded. Rainwater will also be drained out.

Q: Some areas tend to receive higher impacts during king tides? The rock wall, as was tested, is well designed to minimize the force of the waves as the water will be washed over the rocks; and there may be less water coming in compared to a brick wall where there will be a stronger wave impact and over wash.

Q: How about the sourcing of building materials/aggregates/rocks? All materials will have to be brought in. No local aggregates or rocks will be used (except for the reworking of waste materials on the foreshore – e.g. old concrete) and this is based on WB requirements.

Q: Will there be change of the movement of the wave/affect the movement or shifting of water/waves? Similarly to the case of the causeway - but probably better compared to when the causeway was built. The new wall may minimize the flow of wave energy.

Other Comments:

- Less beach, genius design. Causeway has been there for a while so we know that the design will be good. Thanks for putting in access ways.
- Engineers noted that it will not be good for water to flow in hence the extension of the property from the initial property line (allow for drainage and less collection of water/puddles)

Q: Will the design control the pressure of the waves? Water pressure will be minimized. Better than a concrete seawall due to less impact on the wave energy/spray.

Q: Which design do you feel would be better? Rock vs. Concrete. Response was it all depends on the quality of designs and rocks or concrete. But a rock wall for Ebeye is more feasible and requires less time and resources as compared to concrete walls.

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- Infrastructure along the Oceanside will be safe.

Q: The ladies were asked which design they would choose? All in agreement with the rock revetment design.

- Regarding the movement of heavy equipment: route #3 poses the highest risk due to large movement of people while #4 has a lower risk as per movement of people. Group agreed to a proposed route, or #5, which would come around the southeast end of the island (by the power plant) or northwest (around the dump). A: There will be a traffic management plan in place – fencing, better supervision of the community/kids, etc. Continuous monitoring of the roads to check for dilapidations/road issues.

Q: Pressures on water, food, fuel? Contractor may have to bring in their own resources if there is a chance that they deprive the community of these resources. But note that there will be approximately 25 workers given a period and the plan is to hire as many local workers as possible.

- Risks of violence, harassment, exploitation - There will also be rules, a reporting system and a grievance mechanism in place for the contractors and staff.

C: Trash collection schedule will need to be modified.

Q: Will there be a lot of digging involved? As necessary in order to improve on the site, or for space for better placement of rocks.

Q: Will there be opportunities for local contractors? Yes, the plan is to hire as much local persons/contractors as possible.

Next steps: Recommend a better method to reach the community. Provide informational flyer/pamphlet on the two designs and other relevant activities in both English and Marshallese.

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3.2 Government Sector

Meeting Participants:

Name	Gender	Representation
Stan Rubon	M	WIU, Solid Waste Management
Julian Helson	M	KALGov
Blair Arelong	M	WIU, Heavy Equipment Operator
Edward Bobo, Jr.	M	KALGov
Christopher Jorlanin	M	KALGov
Aristin Santiago	M	KADA
Ben Jerry Jacklick	M	
Banner Korwan	M	

Comments and Questions:

Opening by Anjojo Kabua: The team is back on Ebeye to update the community on where we are with the project. We will need all of your help to manage the day-to-day movement of the community during operations and construction.

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Q: Drainage that is broken? Drains will be reinstated or replaced, as part of the project. Fire hydrants? Any piping? None unless the hydrants and/or piping are there and would be damaged.

Environmental and social risks:

Q: How are the materials coming in? Barges or ships.

From where? Japan, Vietnam, but we are seeking for most efficient port.

Comments:

Thoughts about the effects of the movement of the vehicles, trucks, etc. on the main road when construction begins. Ebeye needs a traffic management plan to be developed by the relevant agencies and authorities to ensure smooth operations while considering the safety of the community first.

Q: How many trips per hour? About 4 trips per hour but again, dependent on where the materials will be laid down.

Q: How big are the trucks? There will be different sizes based on the contractor.

C: Note that the trucks take up the whole road.

In regards to the transport sites: Option 3 is reasonable but dependent on the size of the vehicles. The intersection from the dock area may be too small to maneuver the large vehicles.

Another possible option would be to come through the area off the power plant. Any suggestions from the group? A: A more viable option would be to do that and try to avoid the more populated areas.

Where will the project start from? All dependent on access and the contractor.

The group recommend three potential transport sites: Beach Park, Dock (more risky), Dump

Q: Beach Park? How will that affect the kids and families that use the area? Traffic will have to be managed well. Closures should not take too long.

C: Is the capacity of the force enough to maintain traffic? Both KALGOV and contracted workers will assist in traffic control and management. Again, all of these activities will have to be addressed in the traffic management plan.

C: Public works: Must ensure continuity of utilities and services (trash, water, drainage, etc.)

- Contractors also have ground crews that will also assist.

C: Parking on the side of the road should be controlled to ensure movement of space.

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Recommendation for contractors: continuous communications with the authorities, weekly updates, etc. Project Management Unit will need to be set up on Ebeye to meet with the contractors on a regular basis to ensure flow of information.

Q: Any comments on UXO surveys and removal processes? This will be discussed should there be discovery of UXO in the area. Note that the RMI Historic Preservation Office (HPO) is the lead agency in charge of removal of UXO's.

Q: Water overtopping? Drop displacement? Minimal but there will be space as designed for maintenance, however, the size of the rocks will minimize drop displacement.

Q: Night work? Most likely day shifts but definitely during offloading which may run for longer hours. Extended daylight hours possibly. But that again depends on the community and how that affects them.

D: Immigrations? Permits? Port fees? These will all be arranged by the contractor.

Q: If roads are heavily damaged, will you repair? Yes.

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3.3 Private Sector

Name	Gender	Representation
Barry Nantara	M	DIY
Dola Phillip	F	DIY
Lan deBrum	M	Marshall Islands Development Bank MIDB/Small Business Owner
Romeo Alfred	M	National Telecommunications Authority (NTA), Kwajalein Diabetes Coalition
Rotha deBrum	F	Ralik Store
Beejay Jacob	M	Triple J

Comments and Questions:

Q: For the 20-25 contractors, what will the breakdown look like? We will still consider to have more local contractors employed than brought in.

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Q: Will they have to set up a camp? Yes, but where, etc., this will dependent on the needs of the contractor

Concern: How much telecom needs will they require? Again, this will have to do with the contractors but open for discussion when that comes. But best to be prepared as far as getting sim cards, cell cards, etc. They have to make sure not to add too much pressure to the regular services.

Q: Walking trail? Maintenance section, about 4ft wide. Can be used for walking.

Q: Landscaping? Beautification? Will be at the hand of the community but already in discussion within the local team.

Transportation management:

C: Schedule of community events and provide to the contractors to ensure that not too much activity happens during these events (holidays, special occasions, etc.)

Contractors must have a worker management plan. Information needed will have to be included in the plan. Mapping? NTA copper lines, KAJUR power lines – possibility of installing conduits along the corridor.

- Local contractors must follow the same rules as the contracted employees; ensure price monitoring in place so that there is no price gauging while contractors are in town; fuel issues;

C: Rock revetment – issues with logs and larger materials being stuck in the rocks and causing movement of the rocks. There has to be a maintenance plan in place.

Q: Where are the materials coming from? Fiji, Australia and other sites. Quarantine measures will take effect prior to bringing in the materials. But selection of where the rocks will come from will be dependent on the contractor but it has to be brought in as required by the World Bank. No exceptions.

KADA: The area will be closed for any construction of homes or businesses. It will remain open for beautification, exercising, etc. we'll need to determine what type of trees that should be planted.

Follow up: Replanting efforts. Community effort in getting seedlings/trees ready but for actual planting, that will depend on the contractors and of course with KADA.

Q: How thick will the fill area be? Depends on the property boundaries.

Q: When do we anticipate the project to start? End of next year. Tender takes at least 4 months, evaluation, etc. Mobilization will of course be very large and time consuming.

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3.4 Youth Representatives

Meeting Participants:

Name	Gender	Representation
Julian Helson	M	KALGov
Jerry Lanwi	F	KALGov
Patlee deBrum	M	RMI Environmental Protection Authority (RMIEPA)
Roxanna Airam	F	NTA
Dorine L. Korwan	F	KALGov
Jenuk Kabua	F	KALGov
Morrine Bettere	F	KALGov
Roy Escobanez	M	Youth to Youth in Health

Comments and Questions:

Q: What is meant by tilting of the fill/wall? Basically for better drainage.

- Parents need to do their share of making sure the kids are safe, they don't play within the construction sites, construction vehicles and equipment.

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Question for the engineers– Which one is better? Both perform the same however, costing is considered and also safety. ***Youth choose the rock wall!***

How long will the wall be there as compared to the Causeway with continuous repairs? The design can outlast 50 or more years due to the hard rocks that will be imported in. The rocks here are not as hard/coral rock and will not be used for this project.

- Just because it is cheaper does not devalue the design nor bring down the quality of the design.

Will the wall stop the erosion of the land? Yes, it will stop the erosion and some bits of land will be back but the area will remain open with no development. Note also that the revetment will be outside of the designated property lines.

Q: Will there be any sand development? Not really, besides the beach/sandy areas have already started to deplete due to other developments and of course, sea-level rise

C: Kojparok aelon in jen nej joraan ko an Climate Change im renaj jelot aelon kein ilo iio kane rej beddo tok – SLR, stronger storm systems, etc.) (We need to protect our islands from the effects of climate change especially for the future generations.)

Q: How will this traffic management plan be developed? Authorities will need to sign off the TMP before any work starts.

C: Traffic control will be very important considering that there are many children around and because of limited space, most play on or on the sides of the road.

PIU notes the importance of including the youth involvement, capacity building and developing projects to help keep the wall clean and beautiful.

- Ensure that the youth is represented in the weekly meetings and be involved in the decision-making process.

- Which option is better? The cement or the rock revetment?
    - Rock revetment is less costly.
    - Youth – agrees with rock revetment as it is more natural.
- Are the construction activities (e.g., movement of trucks) safe for the kids?
    - Yes, safety measures will be put in place as part of the traffic management plan.
- Will the seawall affect the marine life?
    - Marine management will be covered through the Environmental and Social Management Plan.
- Project Leadership Committee
    - Possibility to include youth as part of the committee.

- Youth capacity building
    - Include in the ESSP program – youth to build capacity with the project as part of the ESSP programs. The PIU should explore the potential for this linkage.

3.3 Men's Group

Comments and Questions

1. Ebeye Public Works: How are the materials coming in?
    - Barge, ships.
2. KADA - Where are the materials coming in from?
    - Outside: Japan or Fiji especially the aggregates
3. PREP II - How many trips/trucks?
    - Four trucks an hour
4. PREP II - any suggestion on any of the routes?
5. MIPD - How big are the trucks?

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- Could be big and could be small. The smallest truck will only be able to transport two rocks in one trip.

6. CIU - are there any of the routes presented that would not work at all?
    - Dump (#2), dock (option #3 - undecided) and beach park (new option)
7. KALGov - what will happen to all the activities happening at the beach park? The beach is used almost every day by the public.
8. Where will the contractors get their fuel from?
    - The contractors will most likely have or get their own fuel.
    - Capacity of KAJUR might disrupt the project if the island runs out of fuel
9. CIU - would the police need extra manpower to help with the traffic?
    - Police – there is enough manpower plus contractors will also participate in traffic control.
10. CIU - we also need to consider the schedule for waste collection.
    - PW – should be okay.
    - Colleen – we can include waste management and safety of the people in the traffic management plan.
    - PREP II (Bruce) – contractor will be informing the police in **advance** before any transportation activities.
    - PREP II (Bruce) – would it be better to consult with the police in advance before any transportation of materials?
        i. Police – yes, it is a must.
        ii. WIU – Regular meetings with all stakeholders?
        iii. Garry – this should be set out in the traffic management plan.
11. WIU – displacement of the rocks
        i. Space behind the wall to be utilized to maintain the seawall.
12. CIU contractors not to yell to their kids if they get to the construction areas.
13. KALGov – any plans to do construction works at night?
    - When necessary, especially to meet the deadline for the barge/ships.
    - Recommends that no construction works during the night for the safety of the children.
14. KADA (Anjojo) – what happens if the road is damaged?
    - Contractor will be required to fix it.
15. Haulage routes
    - Yumi explained the importance of discussing the routes most importantly for the safety of the community.
    - Note that Route #3 is through Stevedore and not the dock
16. Will the contractors leave their equipment after project completion?
    - Discussion for another time and directly with the selected contractor.

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Next Steps/Action Items

1. Update ESIA/ESMP to include all feedback provided by the participants during the consultations.
2. Brochure about the consultation and the next steps printed in English and Marshallese – CIU safeguards.
    a. Brochures provided to the communities.
    b. Conduct awareness programs before the construction works start.
3. Necessary to have safety and liaison personnel to help the police.
    a. There will be a safety and liaison officer for the project.

Summary:

Key Comment Areas	Specific Comments
Extent of Coastal Protection	· Concerns over whether extended impacts of the seawall on currents may lead to erosion on neighboring islets. · Concerns about puddles and stagnant water/proper drainage through the seawall . Concerns about wave impact and overwash
Child Safety during Construction,	· Continued concerns were raised by all groups of the safety of children during construction – at the construction camp and at construction sites . Traffic management plan . Routes for the movement of heavy equipment and materials . Times of operations and noise pollution

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Key Comment Areas	Specific Comments
Ocean Breeze	· The pressure from the wind behind the seawall will be minimized however, the wind will pick up as it naturally moves over the seawall thus it will not disrupt the breeze coming through the island to the ocean side.
Impacts on marine life	· There will be minimum impact on the marine life other than the fact that there will be less beach areas, which is happening anyway from the effect of climate change. The rock wall design can also help with holes and crevices which small marine creatures and algae, may populate.
Salt spray	The sea wall will provide increased protection from salt spray for those properties near to the shoreline. However, during extreme events spray will still be significant in all areas.
Vibration impacts	· During construction – concerns remain over the integrity of buildings which might be damaged from construction phase vibrations (haulage and construction). · There will be minimal vibration from the impact of waves on the rock wall design as compared to a brick wall.
Currents	· There will be movement of the currents along the seawall length but similar in impact with the causeway with decreased beach levels.

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Key Comment Areas	Specific Comments
Impacts from workers	· All imported and local workers will be expected to abide by all laws and will be held to the same accountability as the residents of Ebeye. . The relevant forces plan to hold weekly meetings to address such issues along with traffic management and possible pressures on the community in regards to utilities, food and water supplies and of course, regular government services such as trash pick ups.
Land Ownership	· KADA advised that there will be no development or construction on the seawall/reclaimed area. It will be utilized for health promotional activities such as walking, running. Extra space for the kids to play and possibly tree planting or beautification in some areas.
Vulnerable areas of the shore	· The majority of the participants agreed on the rock wall design and accept that while there will be some areas of concern as far as being vulnerable to the wall itself, having the wall and the protection of the shoreline is more important.

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Ebeye Seawall Consultation III
Date 2/22/23
Group Womens Group

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hospital/ nurse/ st. thomas	Marcella Sakaio	F	Buoj	natoanat@gmail.com
RMI govt./ mother	Kalani Riklon	F	Buoj	riklonkalani@gmail.com
WUTMI/ mother	Stephanie Ishimura	F	North Camp	tbolkeim08@gmail
Community rep	Clarda A. Luther	F	Ekgaya	
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	Yumi Crisostomo	F	CIU	
	Bruce Jackson	M	PREPII	
	Kevan Wheeler	M	PREPII	
	Martin Budd	M	PHDHV	
	Robert Hancock	M	PHDHV	
	Garry Venus	M	PREPII	
	Colleen Peacock	F	PREPII	
	Ddores D. Kattil	F	MICS	
	Dua Rudolph	M	MICS	
	Aliti Koroi	F	PREPII	
	Kimber Ribometo	M	PREPII	
	Melvin Dacillo	M	MWIU	
	James Myazoe JR	M	MWIU	

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Ebeye Seawall Consultation III
Date 3/24/2023
Group Youth

OFFICE

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TEAM →

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Ebeye Seawall Consultation III
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Ebeye Seawall Consultation III
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Ebeye Seawall Consultation III
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Edward Bobo	M	KADA	
Wesley Lemari	M	NDMO	
Ted Michael	M	MOF	
Bruce Jackson	M	PREP II	
Kevan Wheeler	M	PREP II	
Martin Budd	M	RHDHV	
Robert Hancock	M	RHDHV	
Garry Venus	M	PREP II	
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Attachment B – 3rd Round Presentation Document

Ebeye Coastal Protection COMMUNITY CONSULTATIONS

90% DESIGN FOR TENDER

Presentation by RHDHV

February 2023

Project Background

- ✓ This consultation follows on the first two rounds of community consultations held in 2022 to introduce the Ebeye coastal protection (seawall) project and get initial feedback on design options. The seawall is part of the PREP II project funded by the World Bank.
- ✓ Community feedback from 2021 was used to shortlist the design options which assess coastal conditions, the impacts of climate change (erosion, sea level rise, storm events etc.) engineering options, social and environmental risks related to design and construction, and the available budget.
- ✓ RHDHV has now completed 2 final design options – a concrete wall and a rock revetment wall
- ✓ Current cost estimates for these options are over the current available budget - the concrete wall option is higher cost relative to budget. This presentation only addresses the rock revetment option in detail
- ✓ Discussions underway between Project, GoRMI and WB to address budget shortfall

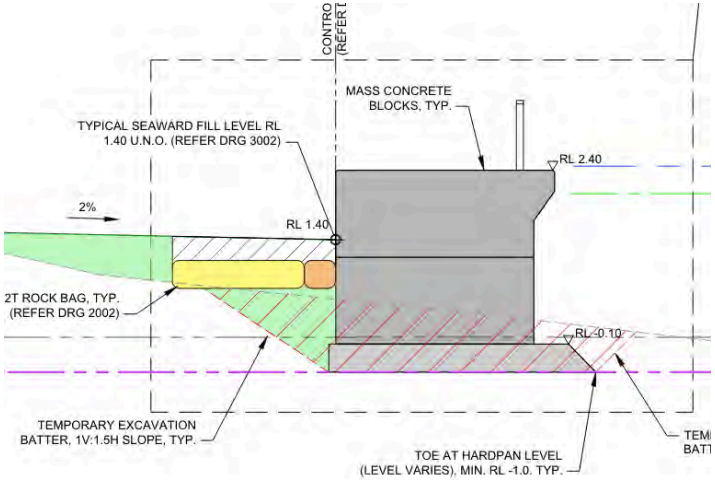
Purpose of Consultation

- ✓ **The purpose of this round of consultations is to present the final design options for community input, and to identify any additional environmental or social risk factors that have not been adequately addressed in project planning so far. This information will be used to complete the ESIA.**
- ✓ **The proposed designs are for a full-length seawall which will be constructed using a phased approach tied to funding availability. Should there be a significant gap in construction between phases, further consultation with the community will be need to assess associated environment and social risks.**
- ✓ **To identify how consultation and communication with the Ebeye community about the seawall design can be improved.**

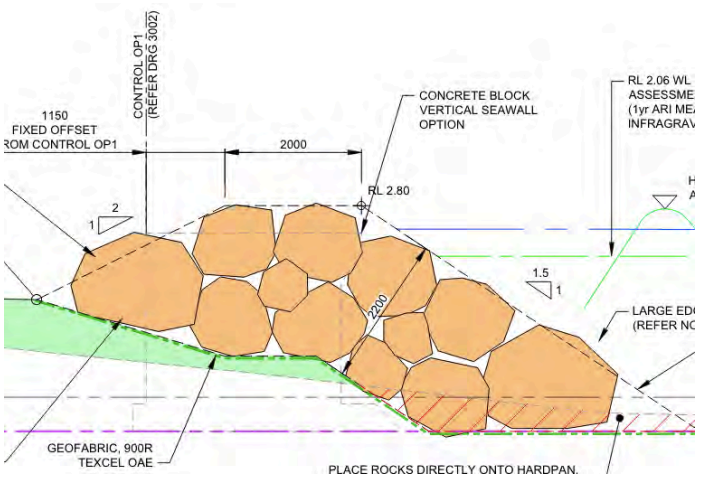
Final two design options were completed for Tender design through the following steps:

- Value Engineering
- Physical Wave Tank Modelling
- Environmental and social risks and impact screening
- Phase 1 now complete barring this consultation

Vertical Block Wall



Rock Revetment



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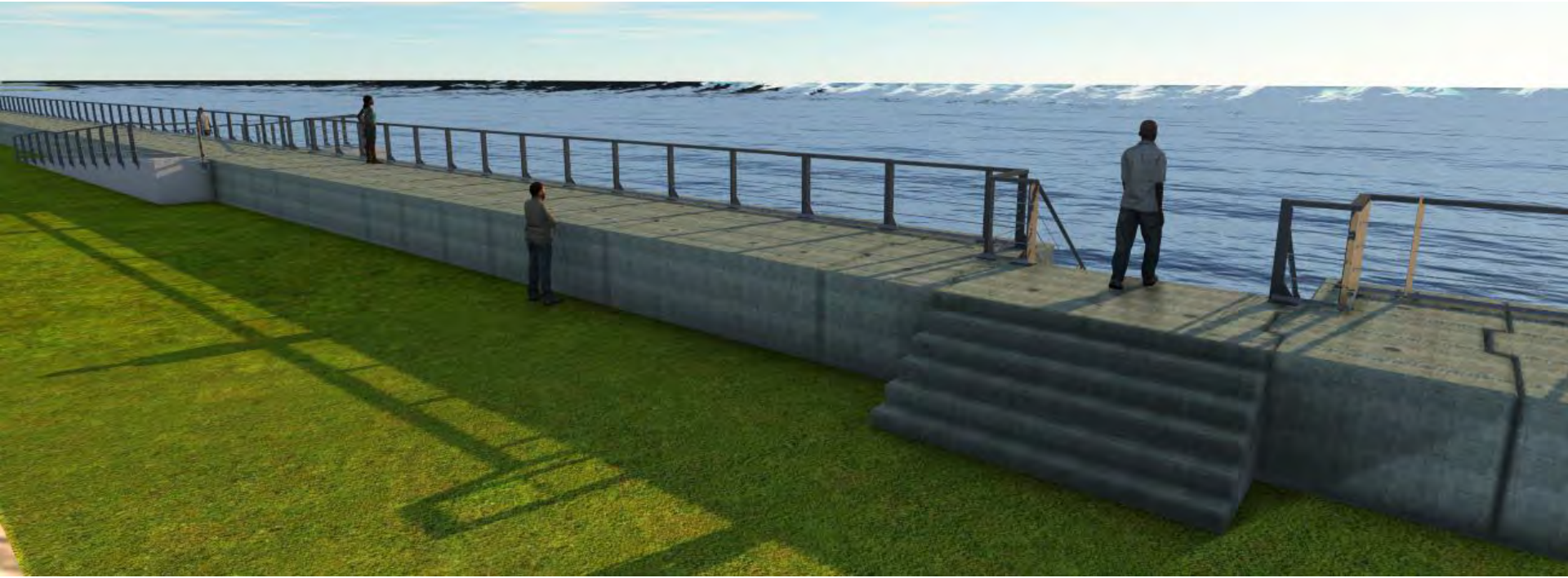
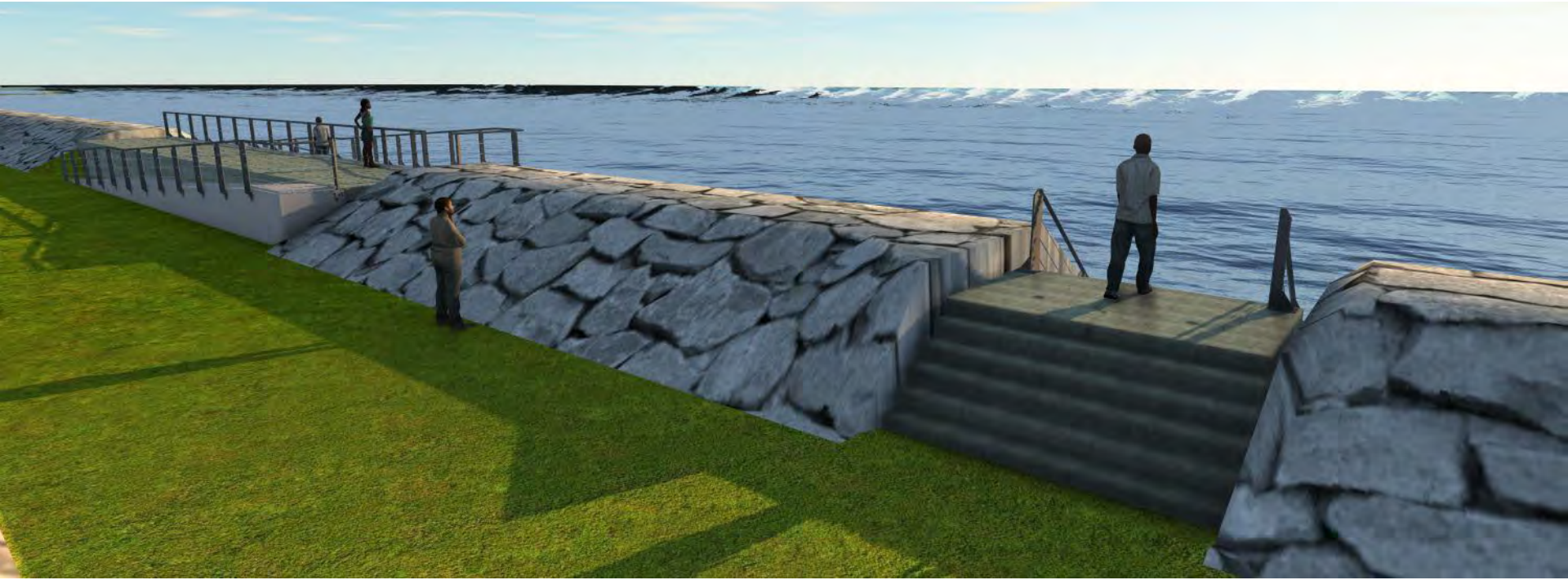
Concrete Block Wall

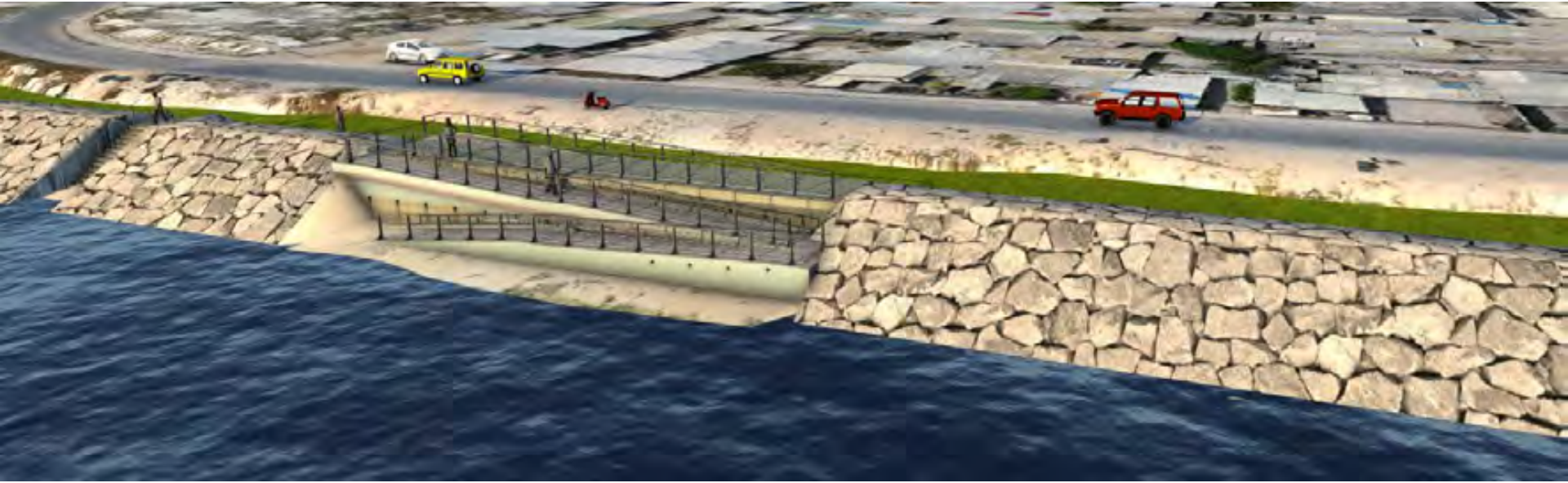


Concrete Block Wall

Rock Revetment



Rock Revetment



Wave Tank Modelling

- A section of the Ebeye oceanside shoreline, including reef flat, was built to scale in a wave tank.

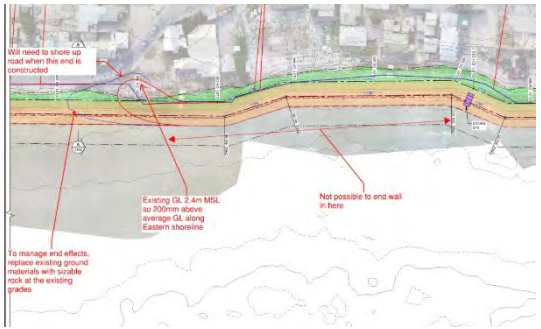
- Model was used to test various wave and storm conditions on:
  - Existing shoreline
  - Different arrangements of concrete block seawall and rock revetment designs
  - Performance of the existing rock revetment.

Figure 1: 1.2 m wide wave flume facility

Alignment with Guiding Principles

Guiding Principles in the development of design:

- No physical impacts to buildings, homes and structures
- Keep wall as far landward as possible to minimise imported fill
- Minimise changes in plan alignment to simplify construction and minimize weak points in the wall that could be exposed to focused wave loads
- Terminate new structure at the KADA depot and retain Existing Well Constructed Revetment which is demonstrated to achieve acceptable performance in its own right
- Potential for sea wall to be built in two stages (funding)
- Would mean need for end treatment (TBD and located)
- Logistics and timelines to be reassessed



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Alignment

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Alignment

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Alignment

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Alignment

Alignment

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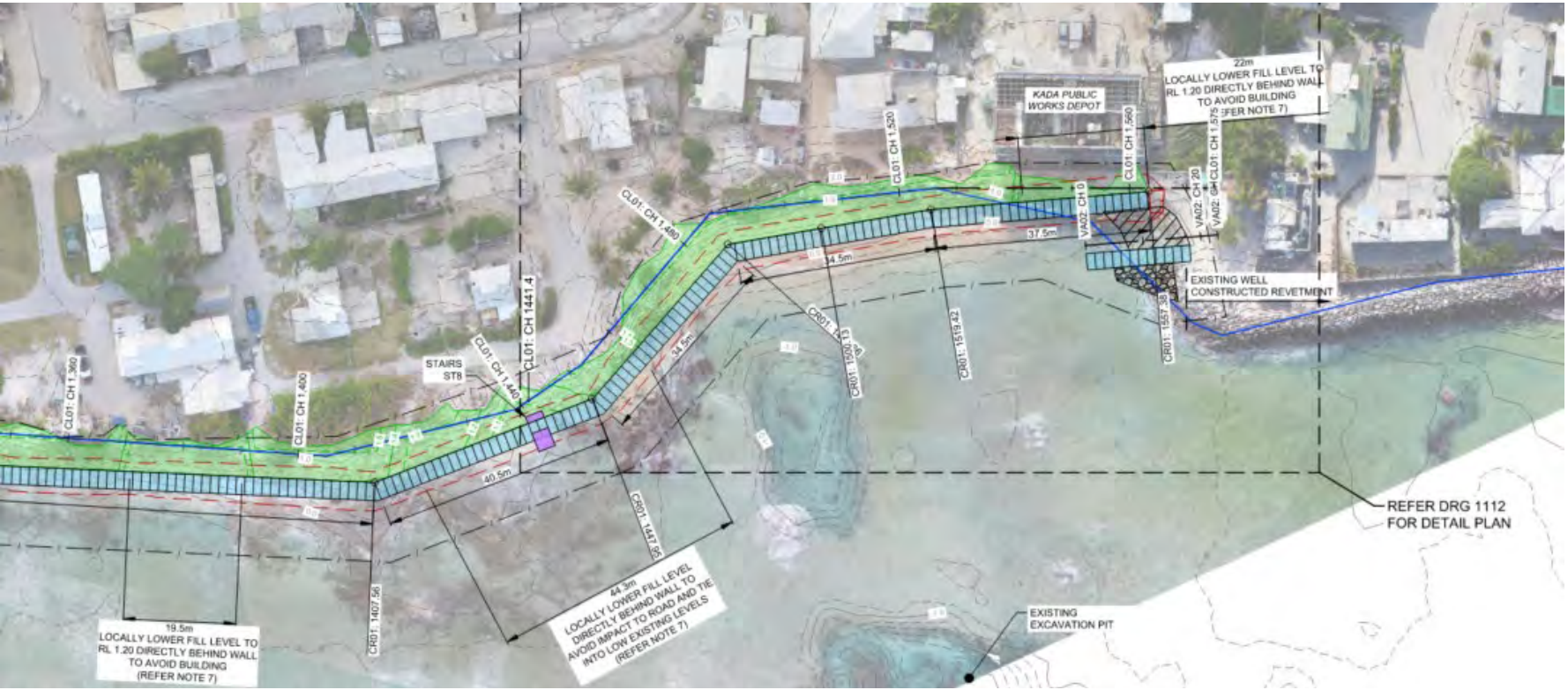
Alignment


FROM SURVEY IT APPEARS THAT SOME PRIVATE STRUCTURES FALL OUTSIDE PROPERTY BOUNDARIES AND/OR IN THE TIDAL ZONE. FILL ENCROACHES TO PRIVATE LAND AND STRUCTURES IN PLACES. GROUND LEVELS TO BE CONFIRMED ON SITE AND FILL LEVELS TO BE ADJUSTED ACCORDINGLY IN DISCUSSION WITH SUPERINTENDENT
CL01: CH 1002.0
CL01: CH 1.040
CL01: CH 1.080
CL01: CH 1.120
CL01: CH 1.160
CL01: CH 1.200
CL01: CH 1205.1
CL01: CH 1.240
CL01: CH 1.280
CL01: CH 1320
B 1301
B 1301
STAIRS ST7
135m
24m
231.06m
12.1m
LOCALLY LOWER FILL LEVEL TO RL 1.20 DIRECTLY BEHIND WALL TO AVOID BUILDING (REFER NOTE 7)
13.6m
LOCALLY LOWER FILL LEVEL TO RL 0.90 DIRECTLY BEHIND WALL TO AVOID BUILDING (REFER NOTE 7)
39.6m
LOCALLY LOWER FILL LEVEL TO RL 1.10 DIRECTLY BEHIND WALL TO AVOID BUILDING (REFER NOTE 7)
16.9m
LOCALLY LOWER FILL LEVEL TO RL 0.90 DIRECTLY BEHIND WALL TO AVOID BUILDING (REFER NOTE 7)
9.4m
LOCALLY LOWER FILL LEVEL TO RL 1.20 DIRECTLY BEHIND WALL TO AVOID BUILDING (REFER NOTE 7)
CR01: 1341.56

Alignment



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Alignment – Vehicle Access

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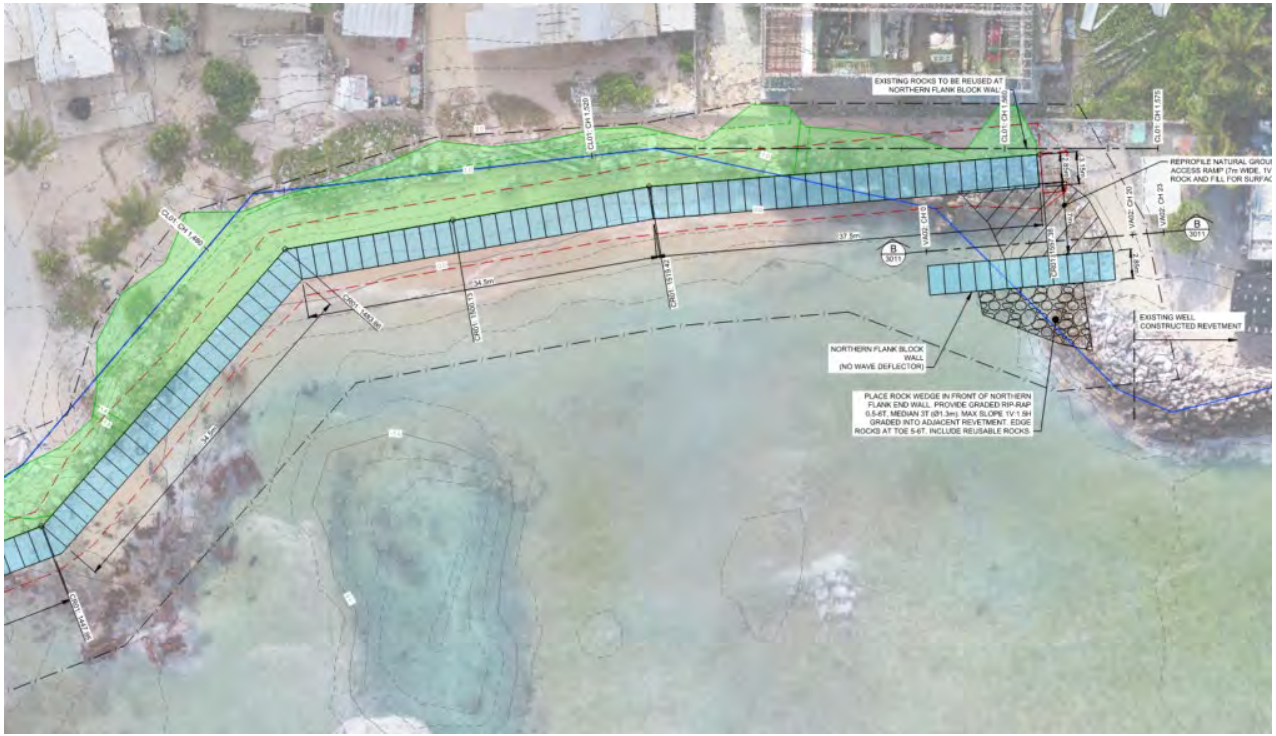
Alignment – Vehicle Access



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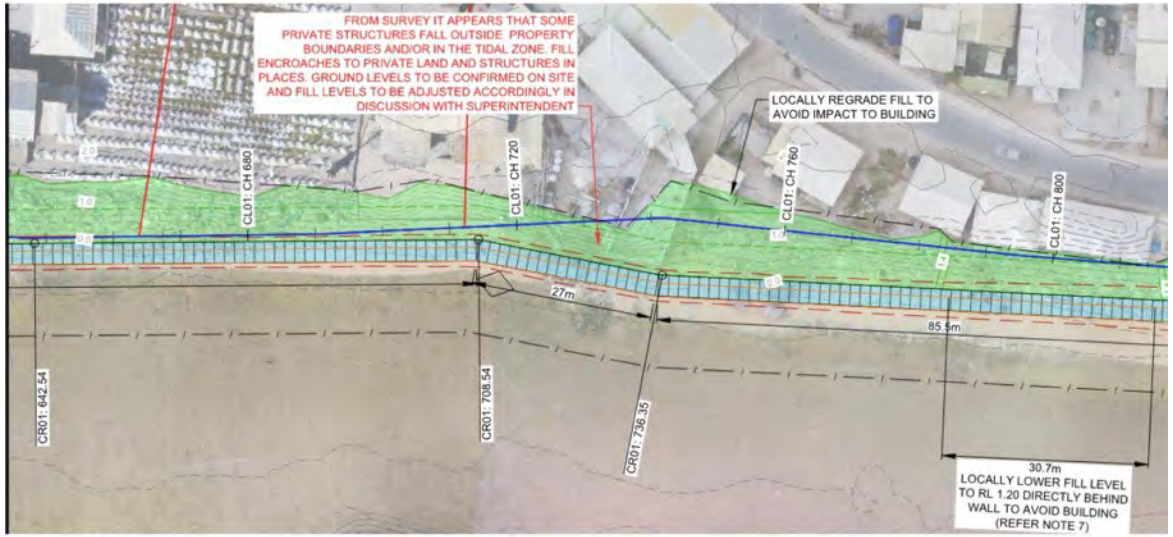
Alignment - Fill



- Fill will be locally adjusted in some areas based on site survey to avoid impacts to structures.
- Most of the areas beyond weto boundary will be filled at the back of beach slope
- Final design fill levels will be adjusted based on survey to avoid physical structures
- Tidal water may be experienced behind the wall in those locations, however it will drain when the tide recedes.

Environmental and Social Elements of Designs

Consideration	Rock Revetment
Performance in storm conditions	• Overtopping limited to 50L/s/m in 1yr storm at 2050 (29.1L/s/m). • Wall designed to be stable and suffer no material damage in a 100yr typhoon. • Drainage to the reef flat through the revetment caters for 100yr event rain run off with no backwater flooding to private buildings
Safety of Structure	• Very similar risks to existing rock revetment. • Potential injury risk from gaps between rock. Lower risk/safer design option
Loss of Beaches	• Wider footprint than block wall. • All existing beaches will be permanently and fully covered under this design.
Impacts on breeze	• Over half of the breeze will be reduced on average 6.4m behind structure • Less than half of the breeze will be reduced on average 16m behind structure

Environmental and Social Elements of Designs

Consideration	Rock Revetment
Changes in outward views	• Crest level will be on average 0.7m (2 feet) high looking out from the land. • Crest level of proposed rock revetment will be RL 2.8m – for comparison existing rock revetment crest level is RL 2.73 – very similar (difference only about 3 inches).
Drainage through wall	• Drainage will be faster through the gaps between the rocks
Construction Effort	• 20-25 workers over a 16-20 month construction duration.
Haulage Requirements	• Up to 5,930 estimated movements of trucks and heavy machinery during construction

Consultation Questions

1. *Are there any other environment or social concerns regarding the proposed seawall design?*

   If yes, what are your concerns?

   What could happen as a result of this issue?

   Who would be most affected?

   What should be done to address this issue, and who should be involved?

Proposed haulage routes and laydown areas

Environmental and Social Risks and Impacts

Key Impact Area	Proposed Key Management Measures	Residual Significance
There are expected to be a maximum of 5,900 truck movements along the haulage routes during construction	• Recognize Ebeye town center is an area of particular sensitivity. • Detailed Traffic Management Plan (TMP) to be pre-approved by KADA, KAJUR, KALGOV, RMIEPA, LOCAL AND NATIONAL POLICE with input from stakeholders including RMIPA, Stevedores, NTA, local businesses and local community. • TMP to be developed by Contractor. • Outreach and education to schools and community • Clear Grievance Redress Mechanism to be communicated to all parties. • Independent PREP II grievance oversight • Community liaison AND safety officer to be engaged by contractor • Pre-condition survey by Contractor with requirement to reinstate roads. • Close liaison with KADA, KAJUR, KALGOV, RMIEPA, LOCAL AND NATIONAL POLICE and Ebeye leadership during construction.	Medium Risk – *the management measures rely on close monitoring and on human behaviour*
Risk to the safety of children from playing in and around work sites during transport and construction	• Contractor to install child-proof fencing around all works sites. • Contractor to liaise with Ebeye police – Contractor responsible for provision of additional security.	Medium Risk – *the management measures rely on close monitoring and on human behaviour*
Increased demand for housing and supplies during construction	• Contractor to provide dedicated workers accommodation. • Maximise employment of local workers. • Contractor to supply all foods as not to impact local supplies.	Low

Environmental and Social Risks and Impacts

Key Impact Area	Proposed Key Management Measures	Residual Significance
Damage to poorly constructed houses/buildings/roads from use of heavy machinery and during haulage	• Contractor Pre-Construction Condition Survey within 20m of work areas. • Reinstatement on completion of works based on Condition assessment	Low
Fill levels behind the structures will cross weto boundaries in places	• Fill target +1.4m locally adjusted to ensure that no structures are impacted. • Some areas behind the weto boundary will benefit from small areas of restored/levelled land where erosion has occurred. • Where the level is adjusted to below +1.4m, some tidal water movement will be experienced behind the wall. This will ebb and flow with the tide and will not reach floor level of any homes. • Design ensures that all rainwater drains back through the wall and not towards homes. Wave overtopping flows at the shoreline will be significantly reduced but not eliminated – when these occur in large storms the seawater will drain to the lagoon as it does today.	Low in most areas but potentially moderate where tidal water occurs close to homes. Further evaluation following Contractor survey
Access to the reef flat will be permanently changed	• Crossing points designed at regular intervals along the wall • One all-access ramp has been provided in an easy to access location • Two vehicle entry points are provided at either end of the structure	Low

Environmental and Social Risks and Impacts

Key Impact Area	Proposed Key Management Measures	Residual Significance
Drainage and wall stability will depend on ongoing maintenance of corridor behind wall	• Designs have been made as easy to maintain as possible with the available budget • Engineer will provide KALGOV with a long term guide to maintenance and instructions for any repairs • KALGOV and KADA to work with community to ensure no structures encroach on the corridor	Moderate – this depends on ongoing budget being available and cooperation of community members not to build across weto boundaries
Increased instances of GBV, SEAH, anti-social behaviour and transmission of STIs resulting from the arrival of international workforce.	• Maximise employment of local workers • Code of Conduct forms part of workers contract • All project workers to receive ongoing training • Clear Grievance Address Mechanism • Worker Management Plan to set restrictions such as no visitors to accommodation and no drugs or alcohol.	Low due to the relatively low numbers of expected international workers
Others?		

Consultation Questions

2. Do you have any additional environment or social concerns regarding the construction of the seawall?

If yes, what are your concerns?

What could happen as a result of this concern?

Who would be most affected?

What should be done to address this concern, and who should be involved?

Next Steps

1. Consultants to integrate community feedback into the draft environmental and social assessment (ESIA) and management plan (ESMP)
2. Government and WB to approve 90% designs and ESIA/ESMP
3. CIU to disclosure the updated ESIA/ESMP and ensure community has access to the report
4. On approval of 90% designs, the project will advertise “Request for Bid”
5. Update the final ESIA/ESMP based on completed designs
6. Communicate outcome to community through summary report and consultation (within 6 months)

Final design (likely rock revetment) will be selected based on value-for-money in the Contractor’s tender response

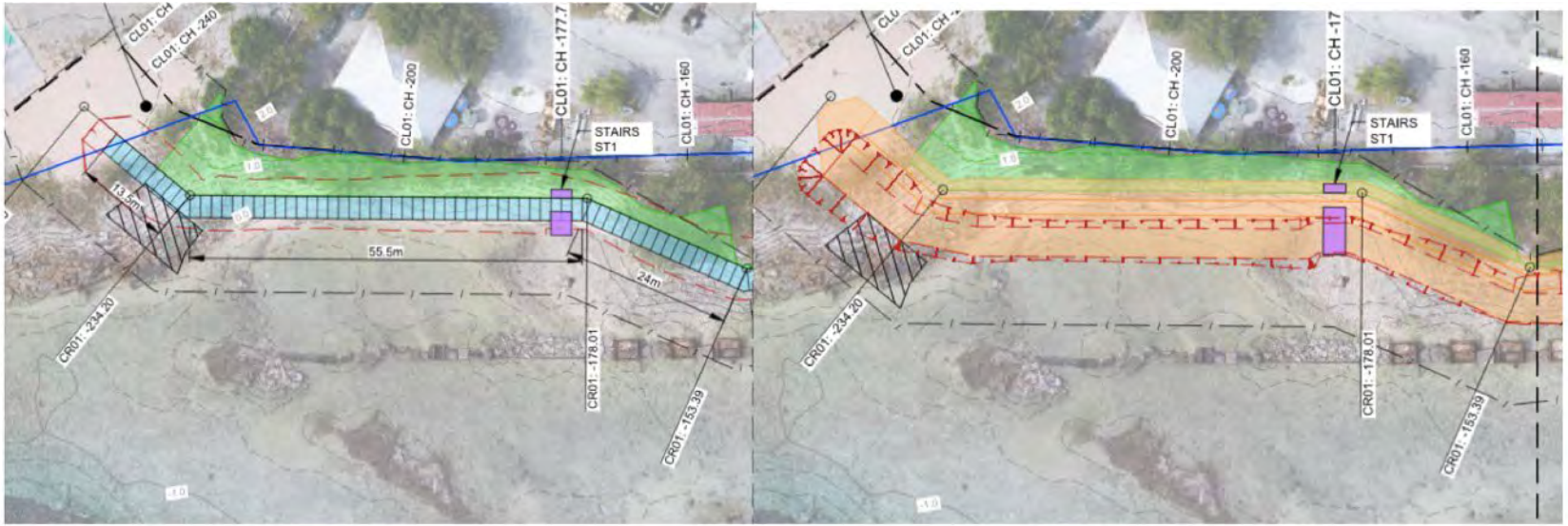
CONSULATION QUESTIONS

3. Do you think the Ebeye community has received enough information about the seawall design process so far?
    i. If not, what other information would you like and how is the best way to provide project updates?

4. Do you think the Ebeye community has been adequately consulted about the seawall design so far?
    i. If not, how could the consultation process be improved (participants, venue, location, timing etc.)

Impact Images for Background Information

Impact beach areas:



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Impact Images

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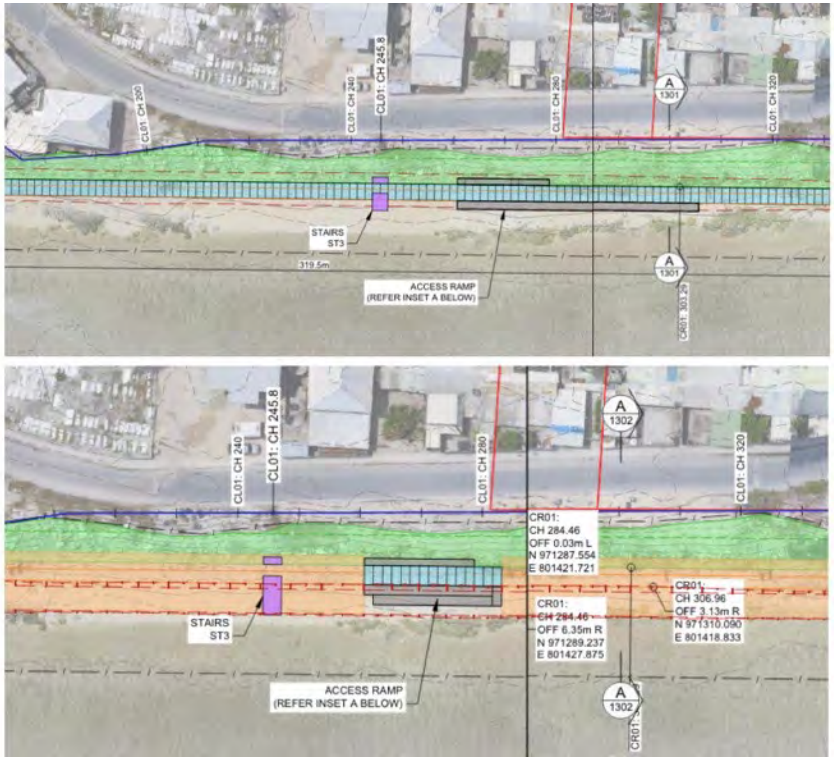

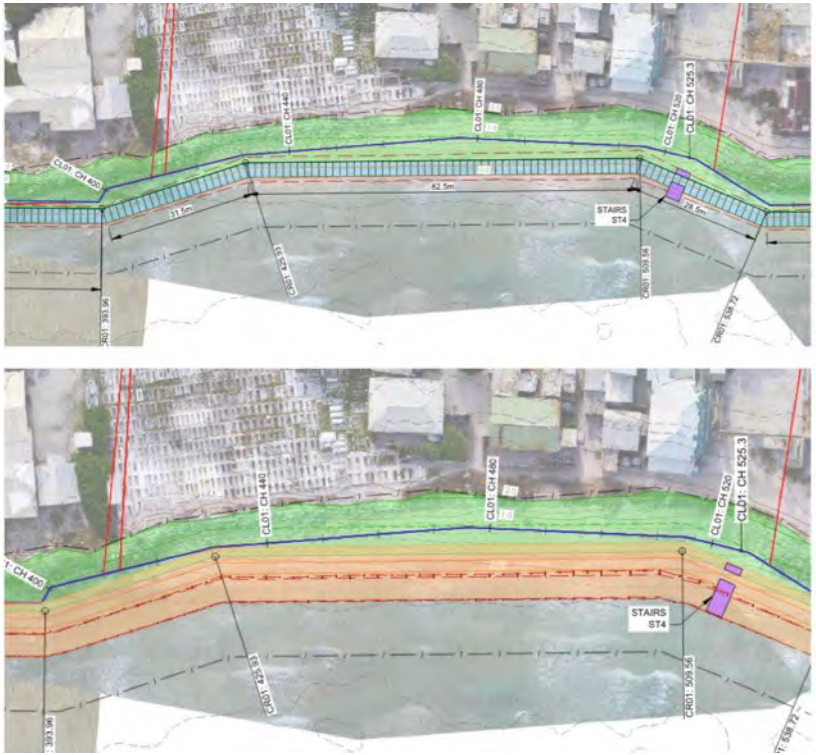

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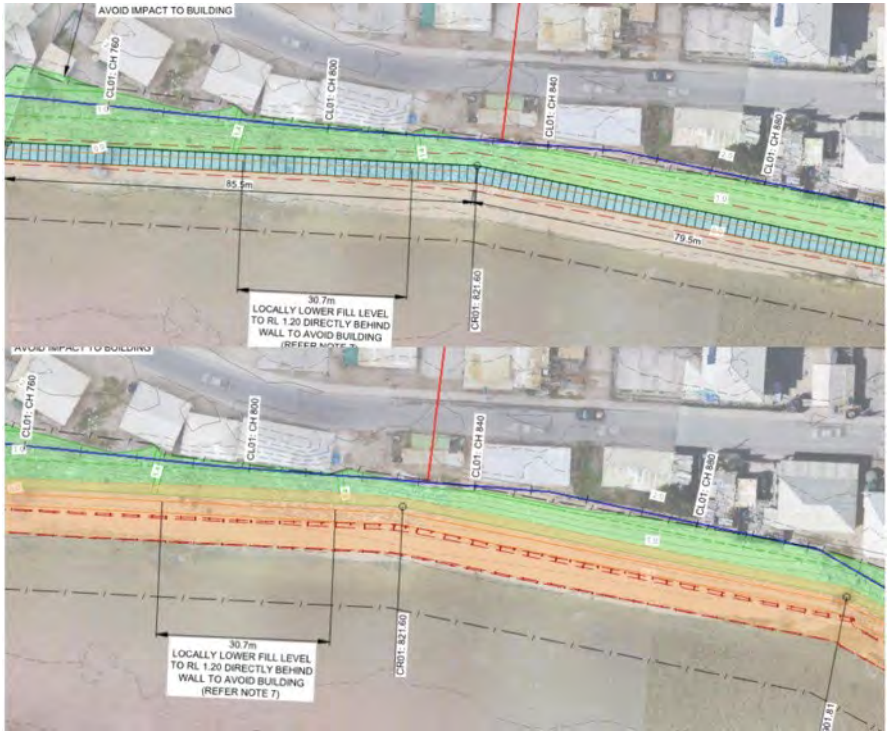

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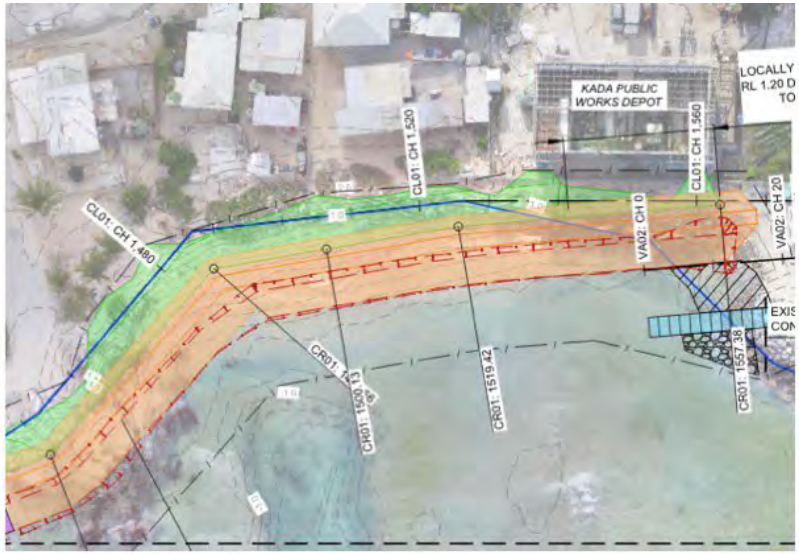

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Impact Images Locally Adjusted Fill Areas:

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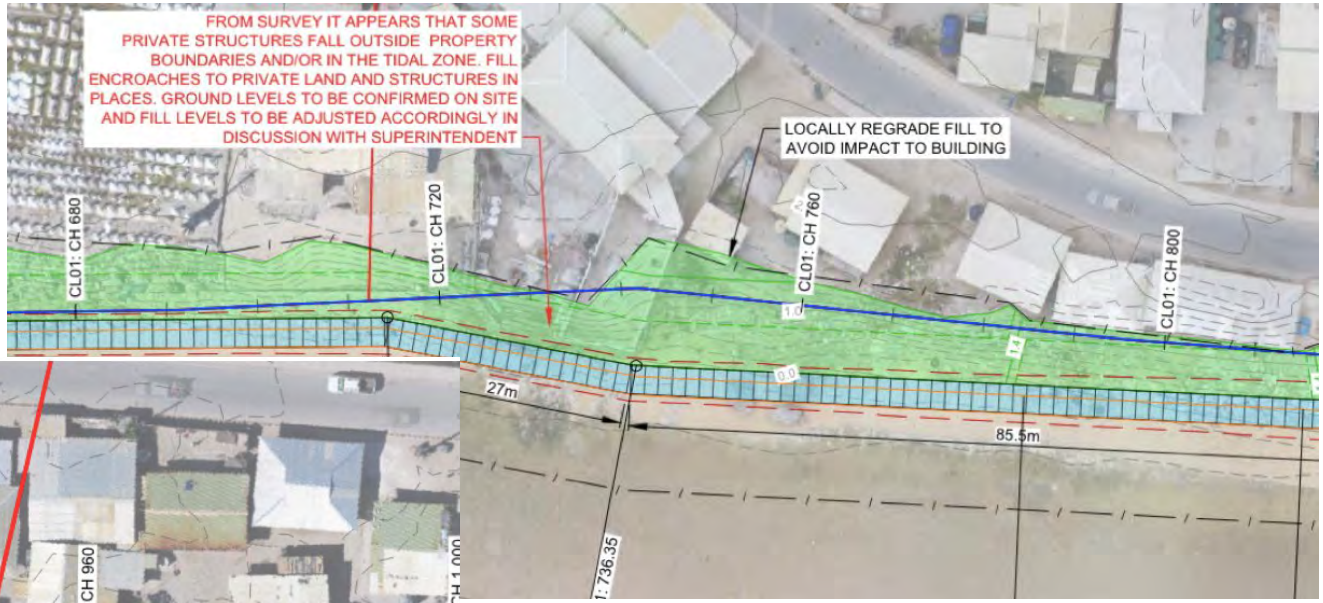

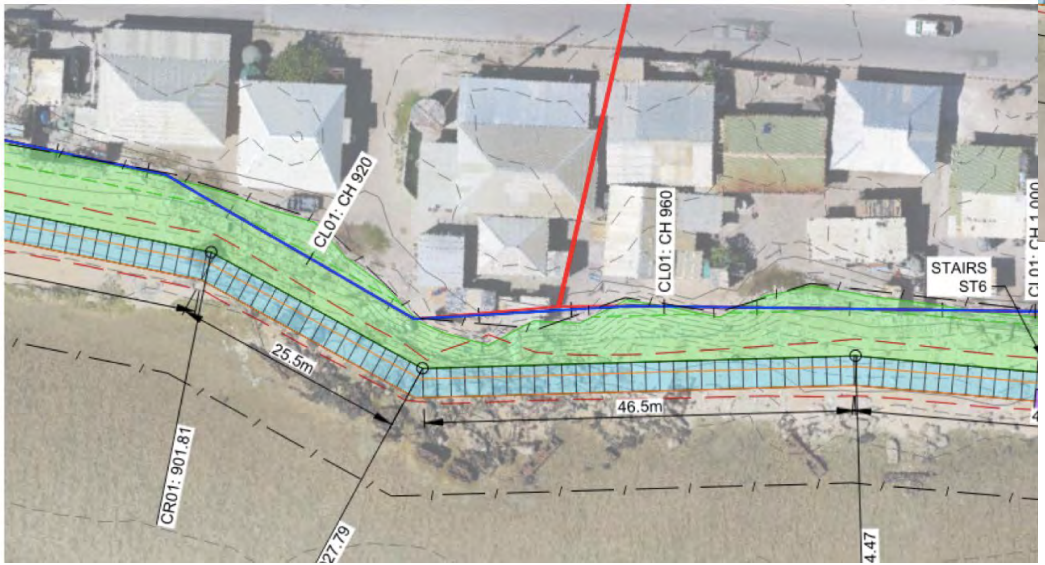

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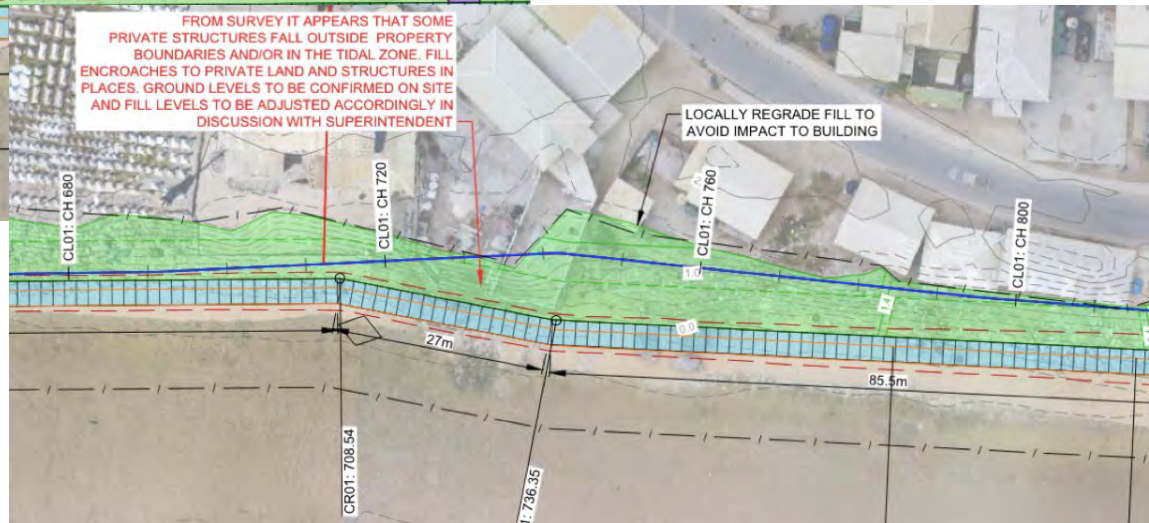

Impact Images Locally Adjusted Fill Areas:

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Attachment C – MICS Summary 4th Round Consultation Report

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Ebeye Seawall Project

Fourth Consultation Report – May 9-12, 2023

1 Executive Summary

The Government of the Republic of the Marshall Islands (GoRMI) commissioned design services for the construction of seawall infrastructure on Ebeye to protect the residents of the island from the impacts of rising sea levels. This initiative is funded by the World Bank through the Marshall Islands PREP II Project.

- ✓ This consultation follows on from the third community consultations held in February to review the seawall designs, construction management and to get feedback on environmental and social issues anticipated before and during construction.
- ✓ This feedback will be used to finalize the design options based on further analysis of coastal conditions, engineering options, environmental and social (E&S) risks related to design and construction, and the available budget.
- ✓ The purpose of this latest round of CIU-led consultations (fourth round of consultations) was to not only confirm to the community that their concerns and recommendations, based on the February consultation, have been addressed or incorporated into the final documents but also to identify any additional E&S risk factors that have not been adequately addressed before the project goes out to tender in June 2023.
- ✓ Community members were presented updated technical information, possible timelines, possibilities of a phased approach to construction depending on the budget, and RMI's approach to funding the remaining amount to finish the project should there be a shortfall. The total cost for the construction is unknown until the tender has gone out and a proposal has been approved.

Representatives from the PREP II Project Implementation Unit (PIU), RMI Centralized Implementation Unit (CIU) Safeguards Team, the Ministry of Works, Infrastructure and Utilities (MWIU) and Royal HaskoningDHV (RHDHV) conducted the consultations on Ebeye, Kwajalein from May 9-12, 2023. The Marshall Islands Conservation Society (MICS) facilitated the community representative focus group sessions, translated materials into Marshallese and prepared this summary report of consultation outcomes. Webmedia was responsible for the preparation of communication materials related to the project design/consultation process.

While this will be the final community consultation on the design of the seawall and input to the Environmental and Social Impact Assessment (ESIA), the design team will continue to liaise and engage with the community on various matters, up until and during construction.

2 Team Briefing – May 9, 2023

Due to flight arrival issues, the briefing with the Ebeye Team on Tuesday May 9th 2023 was not held.

3 Meeting Schedules and Outcomes

The fourth round of community consultations involved representatives from key community groups to ensure broad representation and gather feedback on the final seawall designs focusing on social and environmental

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safeguards. Although it was the team's goal to be able to meet with members of the Marshall Islands Disabled Persons Organization (MIDPO), they were not able to join as their representative was unavailable.

Brief Presentation Overview for each session:

Introductions: Each session started with introductions from the team members and the participants. Yumi Crisostomo as the CIU representative in Kwajalein, led the introductory sessions along with provided lead up questions and responses during the meetings. In line with cultural and community practices, each session started with a prayer to bless the meeting, the participants, and the food.

The team relayed to the community members that their feedback provided in the third round of community consultation have been incorporated into the Environment and Social Impact Assessment (ESIA). This session was aimed at providing community an opportunity to identify any additional E&S risk factors that have not been adequately addressed and discuss the phased approach before the project goes out to tender in June 2023.

Main risks identified: The key E&S risks that have been taken into consideration include:

- Haulage points
    - A large portion of the island's population is made up of children under the age of 10. They are inquisitive and not always aware of their surroundings and the risks that might be present, particularly at a young age. It was considered that any haulage routes that went through the middle of Ebeye would be the riskiest and would lead to the most incidents. As such, routes through the centre of Ebeye should only be utilized when absolutely necessary. Haulage from the north and south was considered to be better and safer, with the north (through the causeway on ramps, by the PII site or possibly by JoeMar Construction site) being the preferable of the two.
- Work Sites and Scheduling
    - There will be a self-sustaining base camp for the foreign workers in order to minimize any impact on the island's utilities, resources and supplies. In the case where a service is needed, then this will be at the discretion of the local service providers.
    - Working at night will be avoided where possible and working hours are to be agreed with community representatives before commencement of works. Any works will need to be coordinated with local businesses, in particular residential waste collection services.
    - Work will be avoided on Sundays and national/local holidays unless absolutely necessary and with the authorization of the committee.
- Sensitive Areas
    - The design team has considered sensitive areas along the coastline (i.e., picnic/beach areas, cemeteries and homes that are right along the coastline).
    - Although the seawall has been designed to naturally drain out excess water, there is no control on the water that will flow onto the road. The island is experiencing drainage issues so there will be times when the water will puddle along with roads and lower land areas. There is funding currently in place to remedy the drainage issue on Ebeye.
- Phased Construction Approach

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- The rock revetment is the most cost-effective option for Ebeye however, it, and the other options are above the budget currently available. Further budget is being sought and we are confident that will be achieved but maybe not at the same time. The sea wall may need to be built in two parts – the first part with the budget available now, and the remainder, later when the additional funding is received.
- Key features of the phased construction approach are as follows:
  - Build from the north, utilizing the northern landing areas
  - Southern landing of material unlikely
  - Procurement of material only when needed
  - No over storage of materials
  - Minimal port deliveries
  - No (as little as possible) major material through Ebeye roads
  - Construction yard to the north
  - Accommodation to the north
- Some risks to consider should the two-phased approach be selected, include:
  - Unprotected sensitivities - Not everywhere along the coastline gets protection and about 800m will need to wait for the sea wall, which includes the power station, one cemetery and a number of both vacant and occupied houses.
  - Construction will go for a longer period, so there may be additional risks such as reduced contractor interest and decreased community buy-in due to delays.

- Traffic Management
  - The Contractor's Traffic Management Plan (TMP) will need to be drafted and then reviewed by key stakeholders, including the Ebeye Leadership Group and the Police. The TMP will need to be approved by these parties and then a supervision framework put into place such that its performance and efficiencies can be reviewed on a regular basis (i.e., weekly or fortnightly). It is essential that the TMP has the local community's support and 'buy-in', and that they have influence its development.

Other activities during this trip:

With two additional days that the design team was on Ebeye, they were able to conduct additional drone surveys to assist with engineering considerations along the coastal areas. Additionally, the design team were able to conduct further ecological evaluation of the reef flat, the borrow pits and the atoll side habitats, particularly considering coral. Martin noted that the reef system on the lagoon side of Jabro Island towards the PII area has some of the healthiest corals he has seen. Lastly, the team was able to conduct further meetings with stakeholders, including Government in Majuro and potential equipment and facilities suppliers. This time around, the project management was able to secure a media team from Webmedia.

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3.1 Ladies Group

Meeting Participants:

Name	Gender	Representation
Rose C. Bobo	F	Mother, Ministry of Health and Human Services
Mylanta Gerald	F	Mother, Early Childhood
Jane Bobo	F	Mother, Public Service Commission
Monica Kemem	F	Community Representative, Youth to Youth in Health
Agnes Jibke	F	Mother, Counselor, RMI Scholarship Office
Ramenty Chong Gum	F	Mother, Vice Principal, Jabro Public School
Juren Jatios	F	Mother, KAJUR

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Stiffney Paul	F	Mother, National Training Council
Evelene Maie	F	Mother, Ebeye - PSS
Abacca Anjain Maddison	F	Mother, Deputy Chief Secretary, Land Owner Rep
Rosaline Anjolok	F	Mother, KAJUR

Comments (C), Questions (Q) and Answers (A):

Q: What are the updates on the final design?

A: There are still two designs being negotiated and most probably just the rock option will be in the tender. The seawall will be built from the Power Plant area all the way to the current revetment or over a mile long.

C: We can't wait to build our shacks once the construction is complete.

A: There must be no structures on the seawall fill area as that will disrupt the drainage system and also the area will be needed for maintenance activities. There will be a "walkway" that can be used by the community.

Q: When will the construction start?

A: The project will go into the bidding process in June and that process should take about 3-4 months. We are targeting around May 2024 for construction to commence (pre-mobilisation). The current plan is to start from the North towards the South end of the island, though this is dependent on the construction methodology of the contractor.

C: Movement of materials.

A: If the landing site is to the north end of the island, then movement of materials will be through the causeway, utilizing a ramp to avoid damages. Movement will usually be done during low tide, but construction work will be done during all tides pending weather conditions. Construction will be completed from the oceanside, facing the island. Trash and metal will be removed from the coastal area prior to construction. Any large rocks or cement blocks will be crushed and reused. Heavy equipment will most likely be removed at the end of construction since they will cause damage to the roads. The smaller equipment can be made available for purchase, but this will be discussed later.

Q: Stairways? How were the sites selected?

A: The plan was to have access stairways from the power plant area, and approximately every 200 feet or so, towards the south end. Stair locations are also based on current access points/areas that have clear access to the oceanside. No stairs are by the gravesites.

Q: Is it possible to change the sites for the stairways?

A: Moving stairs can be done and changes/reduction in the number of stairs will make a difference in the budget. After further review of the sites, the ladies request that the stairs located at the south end of the island by the power plant should be removed as the oceanside/channel can become quite dangerous during high tide.

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Q: Advice on scheduling on Sundays and holidays?

A: Response from Melvin Dacillo, WIU: There will be no work on Sundays. Most of the work will be done during day light hours between Monday-Saturdays up to 6:30-7pm, unless otherwise necessary but will need to consult with the committee prior to any additional activities during anti-social days/hours.

C: Request from Deputy Chief Secretary Abacca Anjain for an additional session to address the placement of the stairs. It is noted that most members of the community use the oceanside for fishing and shelling for food and/or marketing. Also, it would have been better is there was a stairway marking each weto/parcel division, but the design team indicated that no more stairs can be added but they can be moved. So, locations for the stairs should be strategic based on how the people of that particular area utilize the oceanside.

Additional comments:
Additional comments included the importance of ensuring that the police have authoritative power over traffic management, communications must be open and frequent when addressing human trafficking, and lastly, we need to make the information available to the community.

Webmedia is on board this time around to collect photos, videos and conduct interviews with relevant stakeholders to develop an informational video on the project which will be accessible through a Q&R Code system. There are no firm plans in place but there will have to be some form of translations through captions or voice overs that will be done for the video.

The CIU reiterated the importance of getting involved with awareness, information sharing and preparing the community for the construction period – especially making the children aware to be careful once construction starts.

Closing remarks were provided by Deputy Chief Secretary Abacca who thanked the team for ensuring that the community is informed through the consultations and the fact that they have been involved since the beginning gives them a sense of ownership.

Next steps: Provide informational flyers/pamphlets on the two designs and other relevant activities in both English and Marshallese to provide to the community especially to the schools.

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3.2 Youth Group

Meeting Participants:

Name	Gender	Representation
Noah Santos	M	Ebeye SDA School
Temy Lande Jr.	M	Ebeye SDA School
Juliet Jatios	F	Ebeye SDA School
Kathmi Kabua	F	Ebeye SDA School
Manny Jorlanin	M	Ebeye SDA School
Willy Lebeau	M	Ebeye SDA School
Jenuk Kabua		KALGov
Doran deBrum	M	Ebeye Jabro Public School

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Kikki Haacke	F	Ebeye Jabro Public School
Dorsina Kibin	F	Ebeye Jabro Public School
Josepot William	F	Ebeye Jabro Public School
Robinta Anitak	F	Ebeye Jabro Public School
Suzann Way	F	Ebeye Jabro Public School
Geny Lanwi	M	Youth Leadership, KALGov
Rynos Mandrik	M	Ebeye Calvary School
Bo Roter	M	Ebeye Calvary School
Jeremiah Laik	M	Ebeye Calvary School
Jope Bainivalu (?)	M	Ebeye Calvary School, Teacher
Julian Nelson	M	KALGov

Comments and Questions:

Q: Is any part of the wall being pre-built?

A: No. All materials will be brought in and constructed on island.

Q: How long will be wall be there?

A: The design was made to withstand continuous wave movement and storm surges for 30-50 years. With good maintenance and keeping the area clean of infrastructure and other materials, it should survive for many years to come. Sea-level rise was taken in consideration with the wall being up to 12 feet high from the reef/base.

Q: Did you consider sensitive areas such as cemeteries, cultural sites, etc.?

A: Yes. We plan to adjust the design to remove the first set of stairs located on the south end of the island, by the power plant, as recommended by the ladies group, because the channel can get dangerous during high tide and should not be easily accessible by children and patrons of the Beach Park area.

Q: Will the wall reduce the flow of wind?

A: If you are directly behind the wall then there will be minimal breeze but it picks up again after a few feet inwards.

Q: How about salt spray?

A: Yes, the rock design will reduce the impact of the waves thus reducing the amount of salt spray coming on land.

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Q: How long will it take before actual construction starts?

A: The estimate is to have about six months for the contractor to come in, set up camp, hire the local work force and so forth.

Q: Is this design the same as the causeway?

A: No. The new seawall will have larger and stronger rocks. It will be a lot bigger and more effective.

Q: How close is the construction/seawall to people's houses?

A: There are some houses that are right along with coastline and they will see placement of rocks and materials close to their houses but once the rocks are place, there will be space for fill material between the homes and the wall. There are areas that will go up to 40ft of space behind their homes once the wall is built.

Q: Will you be tearing down any buildings?

A: No and land boundaries will not be affected. There might be construction of temporary buildings but that is yet to be confirmed. Any infrastructure that will be affected by the construction will have to be repaired by the contractor.

Q: How about standards on air and noise pollution?

A: The World Bank has standards in place to address air and noise pollution so the contractor will have to follow these standards especially during anti-social times.

Q: Construction times?

A: Will be held mostly during the daytime unless there are times when work is required during especially low tides and/or nighttime deliveries. Night movement will be kept to a very minimum.

Q: What is your relationship with the local government?

A: The government, national and local, are integral part of the entire consultation process. The national government will be tasked to seek additional funds should the current budget runs below anticipated costs.

Q: What is the location of the wall?

A: Across GEM on the oceanside (where the current revetment ends) all the way to behind the power plant. Over a mile long.

Q: Any plans to build a wall surrounding all of Ebeye?

A: No. The wall is meant to protect the island from waves, wind and erosion on the oceanside.

Q: How high is the wall?

A: About 3ft high when standing on the island (in most areas) and up to 12ft is you are looking up from the reef.

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C: Comments and discussion were held on the effects of climate change and sea level rise and while the team was not prepared to answer questions on climate change, the design team noted that the wall is prepared for sea level rise projections in the next 50 years based on the 1.5 degree increase in global warming scenario.

Q: Will the wall require much maintenance after storms, compared to the causeway?

A: The rocks will be 6-8 tonnes and gaps will be filled with smaller rocks. Even if there was a strong storm system, the rocks would most likely just shake but will not move.

Q: So you have enough funds to construct the wall?

A: This will depend on the accepted proposals after the tender goes out in June. If accepted bid is higher, then the government will have to seek additional funding to cover the cost and there will be definitely be a phased approach to the construction.

Q: What's the plan for the camp area and haulage routes?

A: The camp will most likely be located on the north end of the island and most haulage will be done around the causeway and on the reef. There will be very minimal movement on the main road other than for special equipment or supplies that need to be delivered from the ports area.

Q: How sustainable is the wall?

A: All materials have to be sourced from sustainable resources, we have a design that will last a long time and Ebeye's coastline will be protected. We will also ensure that coral and reef habitats are safe and unaffected by the construction and ensure that there is no or minimal impact on the community and its marine resources.

Q What happens when there are defects and or other maintenance issues?

A: This will eventually be borne by the Kwajalein Development Authority (KADA) and the local government (KALGov).

Recommendations: Continuous engagements with the authorities, weekly updates, awareness in schools.

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3.3 Private Sector

Name	Gender	Representation
Dota Phillip	F	Lucky Star
Ronnse Saun	F	Triple J
Patrick Maika	M	BOMI
Fani Inok	F	MISSA
Eric Inok	M	DIY

Comments and Questions:

No questions or comments from the group other than the fact that while they appreciate that the camp will be self-sustained and they hope that they will have a chance to provide some services to the contractor, where necessary.

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3.4 Men's Group/Government Representatives

Meeting Participants:

Name	Gender	Representation
Anjojo Kabua	M	KADA
Patrick Bing	M	Ministry of Culture and Internal Affairs
George George	M	KALGov
Evanson Korok	M	Postal Services
Christopher Jacklick	M	Quarantine, Ministry of Natural Resources and Commerce
Alexander Capelle	M	MI Police Department
Rebel John	M	KALGov
Viliame Kuilamu	M	CMI
Julian Reimers	M	KAJUR
Anthony Maie	M	Ministry of Culture and Internal Affairs

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Comments and Questions:

Q: Will the design decrease the amount of salt spray?

A: The rock design provides lesser impact from the waves thus salt spray will be decreased as compared to how it is now.

Q: Rocks will be imported?

A: Yes. All materials will be imported from overseas. The rock that will be used is highly competent and while the seabed rock is hard, it is not as competent as the hard rock that will be used.

Q: Will there be a beach after construction?

A: There is already minimal sand areas in the oceanside being affected by climate change and other weather patterns but eventually, with the movement of the waves and transfer, there will be small pits of sand in certain areas.

Q: Will the wall withstand king tides with storm surges?

A: It may not stop the water from coming over the wall, but it will decrease damage to homes (inundation) and other infrastructure as it is happening now. The site is obviously being used by the community for food/sustenance and for livelihood, so access is important. Stairs have been placed based on current access points in the community (open areas, less homes) so there should be good access to the oceanside.

Q: How thick/expansion in size from the land to the wall?

A: The wall follows the land boundaries and there will be some areas where the land will grow up to 40ft, while for other sections, there will be 5-10ft. While the land level changes throughout, the wall height remains the same.

C: Ensure that there is minimal stress on the community's resources, especially utilities and water.

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3.5 Leadership and Debrief

Name	Gender	Representation
Iroij Kili Kabua	M	Traditional Leadership
Telmong Kabua	M	KALGov
Anjojo Kabua	M	KADA
Capelle Antibas	M	KALGov
(Name not provided)	M	KADA
Bernadette Kabua	F	CCD, CIU

Welcoming remarks – Anjojo Kabua

Remarks – Iroj Kili Kabua, Manit / Traditional Leadership

Remarks – Telmong Kabua, KALGov

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Questions / Answers

Q: Possible to see the costs for the ramp and stairs to secure other fundings to build more ramps and stairs?
A: The weakest points of the seawall are the ramps and the stairs, so it is best to keep them at minimum.

Q: Why are there ramps and stairs?
A: E&S requirement – allows the public (including persons with disabilities) to access the ocean side.

Q: Can we move the stairs somewhere else?
A: Yes, but we are running out of space.

Q: Can we remove the stairs by the royal graves?
A: Yes, we (Anjojo and Kwaj leadership team) will work something out.

Q: When will the rocks be transported from the barge?
A: During high tide.

Q: What time will the construction works operate?
A: During daylight hours.

Q: What would be the impacts on the reef and current?
A: Not so much impact and mitigation measures will be put in place.

Q: Can the PowerPoint slides be shared with the local council to discuss other activities (e.g., streetlights) that KALGov can support?
A: Yes.

Q: When is the last consultation?
A: This is the last consultation.

Other discussions / Notes

- Traffic management plan – needs to be reviewed on a regular basis by the leadership committee.
- Communication is the key to keeping everyone involved.
- Informing all kids to play at the lagoon side during constructions.
- No working during the night and holidays.
- Develop water park at the lagoon side to keep kids from the ocean side during constructions.
- Two phase construction approach P1:1,000m and P2: 800m
- The lights by the walking track or other activities planned outside the scope of work will be the responsibility of the local government – Yumi.

Next Steps/Action Items

- We will take your feedback from this session and integrate into the design.

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- We will update the design to include a new Appendix on a 2-phased approach.
- We will also update the ESIA to allow for this new approach.
- We then prepare bid documents and submit to contractors in July 2023.

Post consultation clarification

- Contractors to visit Ebeye in Q4 2023 and we would hope to award the project in April 2024.
- Start of mobilisation in May 2024.

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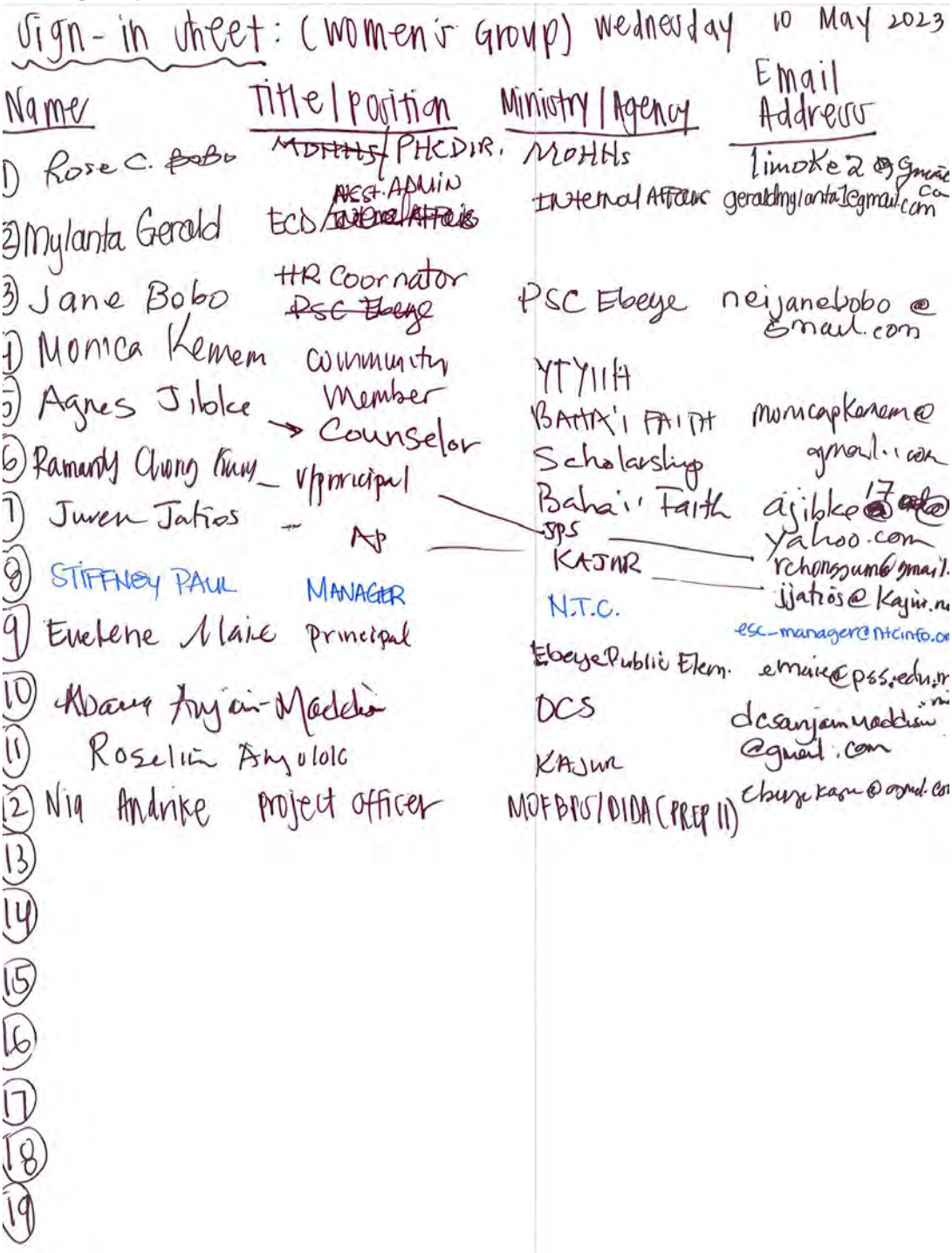
4 Sign-up sheets:



Sign-in sheet: (Women's Group) Wednesday 10 May 2023

	Name	Title/position	Ministry/Agency	Email Address
1	Rose C. ~~Bobo~~	~~MOHHS~~/PHCDIR.	MOHHS	limoke2@gmail.com
2	Mylanta Gerald	ECD/~~Acct. Admin~~	Internal Affair	geraldmylanta1@gmail.com
3	Jane Bobo	HR Coornator ~~PSC Ebeye~~	PSC Ebeye	neijanebobo@gmail.com
4	Monica Kemem	Community Member	YTYIIH	
5	Agnes Jibke	→ Counselor	Baha'i Faith	monicapkemem@gmail.com
6	Ramanty Chong Kum	vp/principal	Scholarship	
7	Juwen Jatios	AP	Baha'i Faith	ajibke17@yahoo.com
8	STIFFNEY PAUL	MANAGER	SPS	rchongsung@gmail.
9	Evelene Alaie	Principal	KAJNR	jjatios@kajur.m
10	Adams Anjain-Maddison		N.T.C.	esc-manager@ntcinfo.or
11	Roselin Anyolole		Ebeye Public Elem.	emaie@pss.edu.m
12	Nia Andrike	Project officer	DCS	dcsanjainmaddison@gmail.com
13			KAJNR	
14			MOFBPS/DIDA (PREP II)	
15				
16				
17				
18				
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Sign-in Sheet: Youth Group Wednesday (10 May 2023)

Name / Gender (M or F)	Agency or School Name:	Grade / Position:	Email Address:
(1) Noah Santos M	Ebeye SDA School	12	njsantos755@gmail.com
(2) Terry Landt Sr			LenokTJ@gmail.com
(3) Juliet Jatios	Ebeye SDA school	11th	Rinajatios08@icloud.com
(4) Katnmi Kabua	Ebeye SDA school	11th	KabuaLenkar@gmail.com
(5) Manny Jorlanin	Ebeye SDA School	11th	MannyJorlanin15@gmail.com
(6) Willy lebeau	Ebeye calvary School	11th	lebeauwilly26@gmail.com
(7) Jenuk M Kabua	KALGOV	Secretary	Jenukk55@gmail.com
(8) Doran Debrum	ebeye JPS school	11th	TuckerDebrum@gmailcom
(9) Kikki Haacke	ebeye JPS school	11th	Keoju
(10) Dorsina Kibin	ebeye JPS School	11th	
(11) Josepot William	Ebeye JPS School	11th	Kunjitoka2020@gmail.com
(12) Robinta Aritak	Ebeye JPS (Teacher)		
(13) Suzann Way	Ebeye JPS		
(14) Geny Lanwi	Youth Leadership/KALGOV		geny-lanwi@yahoo.com
(15) Rynos Maudrik	ebeye Calvary School		
(16) ~~Bert~~ Poter			
(17) JEREMIAH Laik	Ebeye calvary school		
(18) Jope Bainivalu	Calvary Sch.	Teacher	jbainivalujr@gmail
(19) Julian Nelson	KALGOV	Administrator	juliannelson@gmail.com
(20)			
(21)			

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Sign-in Sheet Thursday May 11, 2023

	NAME	Male/Female	INSTITUTION	POSITION	EMAIL
1	Julian Reimers	M	KAJUR	Water/Sanitation Oper. Manager	jreimers@kajur.net.
2	George George	M	KALGOVT	police man	g.george.ra@gmail.2864
3	Viliame Kuilamu	M	CMI	Acting Coordinator	vkuilamu@cmi.edu
4	ANJOOD KABUA	M	KADA	Ex. Dir.	limikekabua@gmail.com
5	REBEL JOHN	M	KMLGOV	DIR. COMMISER	rebel02@gmail.com
6	Patrick Bing	M	MOCA	ASST. SECRETARY	ebemoik@gmail.com
7	Anthony Maie	M	MOCIA	EBM	AM
8	EVANSON. Kook	M	Postal Serice Authority		Kook evanson@cmil.com
9	Alexander Capelle	M	MIPD	Sergeant	alexcapelle33@gmail.com
10	CHRISTopher Jacklick	M	N.R.C	Quarantine INSpection	Chris.jacklick@gmail.com

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(Bussinesses)

Sign-in Sheet

NAME	Male/Female	INSTITUTION	POSITION	EMAIL
Dola Phillip	F	Lucky Star	Whole Sale	Phillupdola@gmail.com
Ronrose Sam	F	TRIPle J	Whole Sale cashier	ronrose Sam1@gmail.com
Patrick Maika	M	Bank of Marshall Isl.	Operation Supervisor	pmaika@bomi.biz
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Emir Inok		Dig		

Attachment D – 4th Round Presentation Document

Royal HaskoningDHV
Enhancing Society Together

Ebeye Seawall

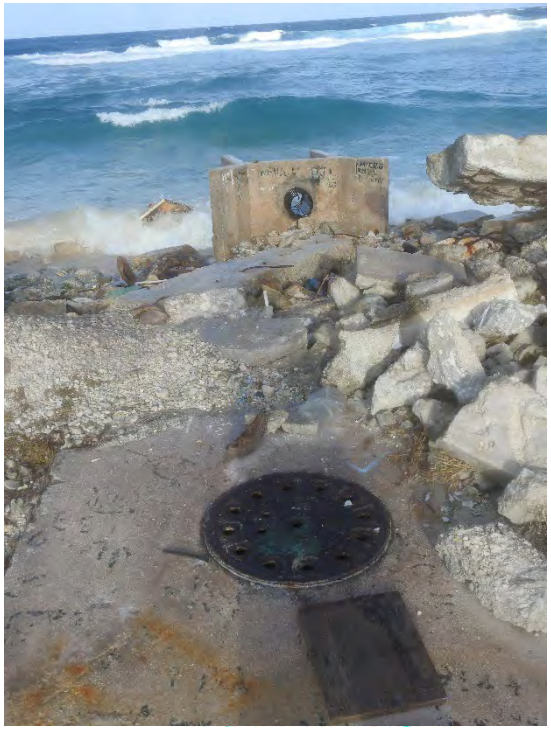
4th Round of Consultation

11th May 2023

Purpose of Consultation

- Update from the Government and Design Teams on progress since February and to go through the following:

1. A quick recap of the project
2. What did we learn from you last round?
3. Potential for 2 phases of construction
4. What's next?



3rd Round of Consultation

- Thank you for your time and input – it was a very valuable session

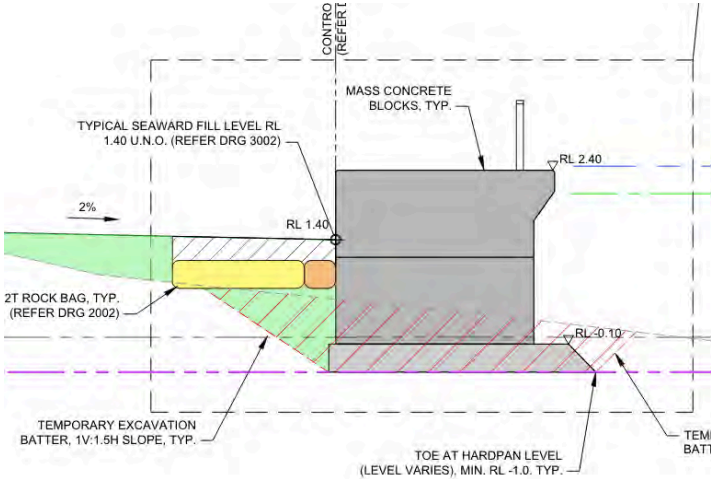
- Last time we were here we met with:

  - Local women's representatives
  - Community leaders and regulators – including the National and Local Police Force, Port and Public Works officials and educators
  - The Chamber of Commerce and local business representatives
  - Youth leaders
  - Local men's representatives

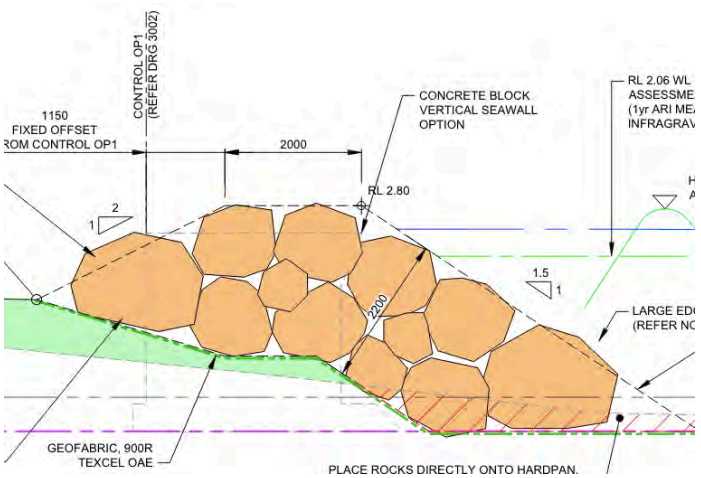
Final two design options were completed for Tender design through the following steps:

- Value Engineering
- Physical Wave Tank Modelling
- Environmental and social risks and impact screening
- Phase 1 now complete barring this consultation

Vertical Block Wall



Rock Revetment



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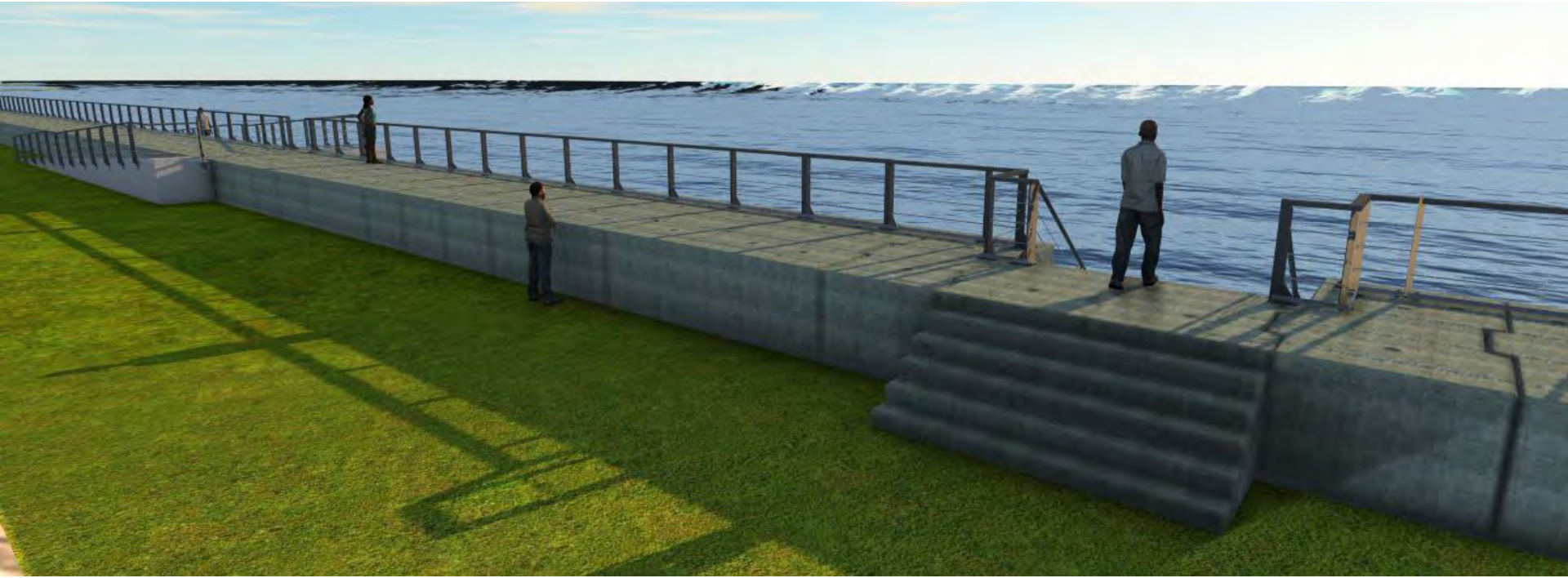
Concrete Block Wall



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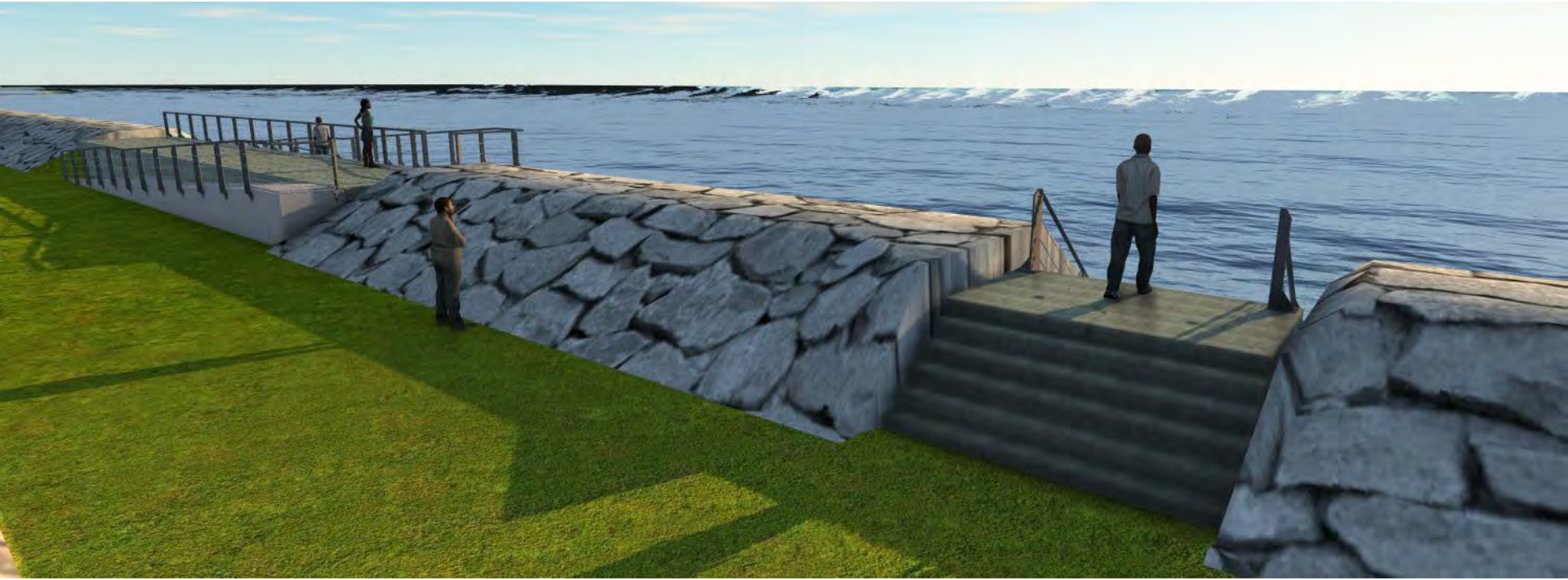
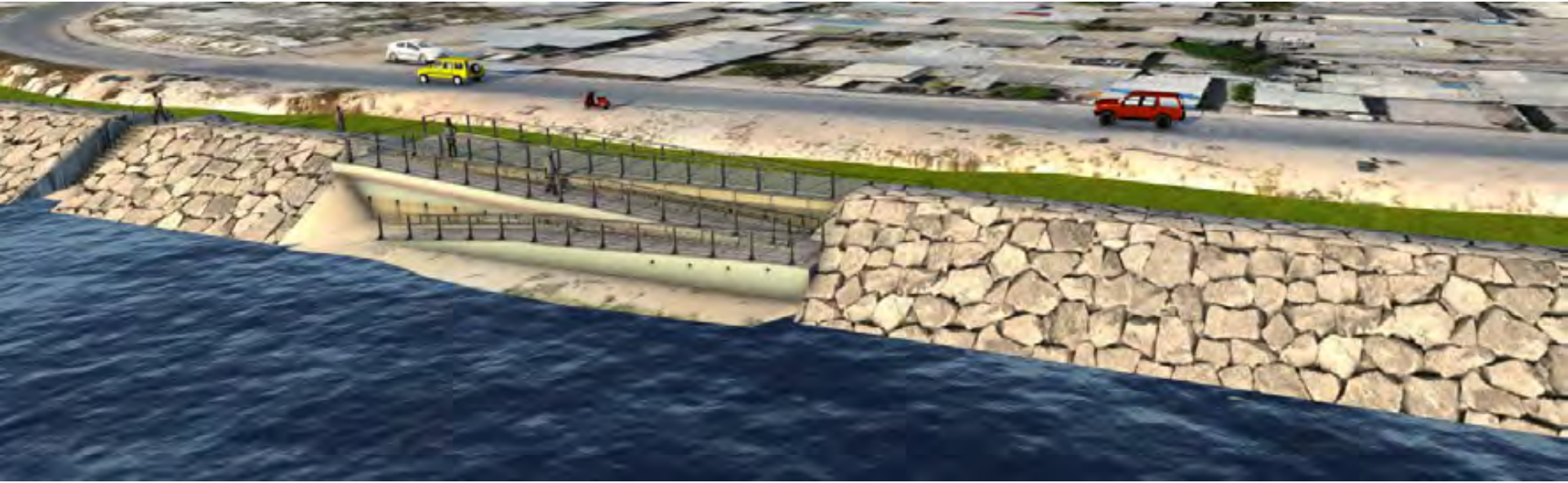
Rock Revetment



Rock Revetment



Alignment

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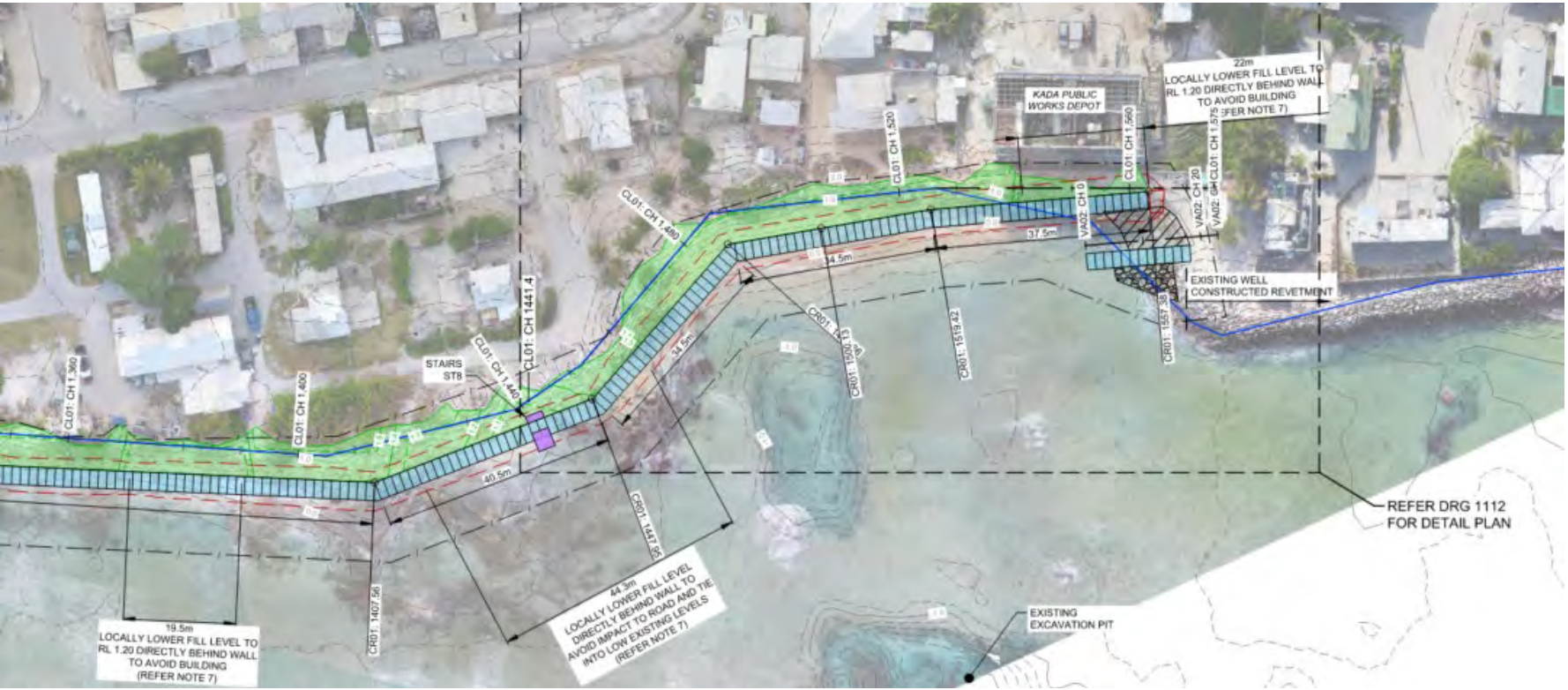

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Environmental and Social Elements of Designs

Consideration	Rock Revetment
Performance in storm conditions	• Overtopping limited to 50L/s/m in 1yr storm at 2050 (29.1L/s/m). • Wall designed to be stable and suffer no material damage in a 100yr typhoon. • Drainage to the reef flat through the revetment caters for 100yr event rain run off with no backwater flooding to private buildings
Safety of Structure	• Very similar risks to existing rock revetment. • Potential injury risk from gaps between rock. Lower risk/safer design option
Loss of Beaches	• Wider footprint than block wall. • All existing beaches will be permanently and fully covered under this design.
Impacts on breeze	• Over half of the breeze will be reduced on average 6.4m behind structure • Less than half of the breeze will be reduced on average 16m behind structure

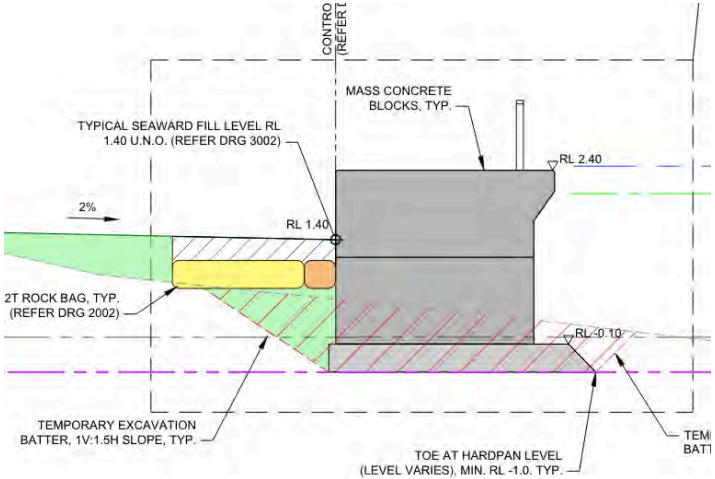
Environmental and Social Elements of Designs

Consideration	Rock Revetment
Changes in outward views	• Crest level will be on average 0.7m (2 feet) high looking out from the land. • Crest level of proposed rock revetment will be RL 2.8m – for comparison existing rock revetment crest level is RL 2.73 – very similar (difference only about 3 inches).
Drainage through wall	• Drainage will be faster through the gaps between the rocks
Construction Effort	• 20-25 workers over a 16-20 month construction duration.
Haulage Requirements	• Up to 5,930 estimated movements of trucks and heavy machinery during construction

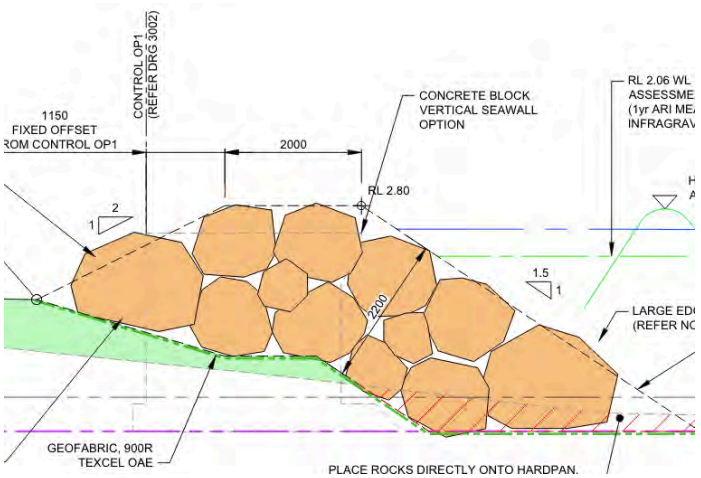
Final two design options were completed for Tender design through the following steps:

- Value Engineering
- Physical Wave Tank Modelling
- Environmental and social risks and impact screening
- Phase 1 now complete barring this consultation

Vertical Block Wall



Rock Revetment



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What did we Learn?

Topic / Issue	Findings and Notes
Ebeye Children, Work Sites and Traffic	A large proportion of the island's population is made up of children under the age of 10. They are inquisitive and not always aware of their surroundings and the risks that might be present, particularly at a young age. The presence of children in such vast numbers quite clearly presents a major risk for any construction works on island, both in terms of haulage and plant movements, and work / storage sites. Any haulage route will need to be carefully planned to avoid built-up areas where possible.
Traffic Management Plan (TMP)	The Contractor's Traffic Management Plan (TMP) will need to be drafted and then reviewed by key stakeholders, including the Ebeye Leadership Group and the Police. The TMP will need to be approved by these parties and then a supervision framework put into place such that its performance and efficiencies can be reviewed on a regular basis (i.e., weekly or fortnightly). It is essential that the TMP has the local community's support and 'buy-in', and that you are able to influence its development.

What did we Learn?

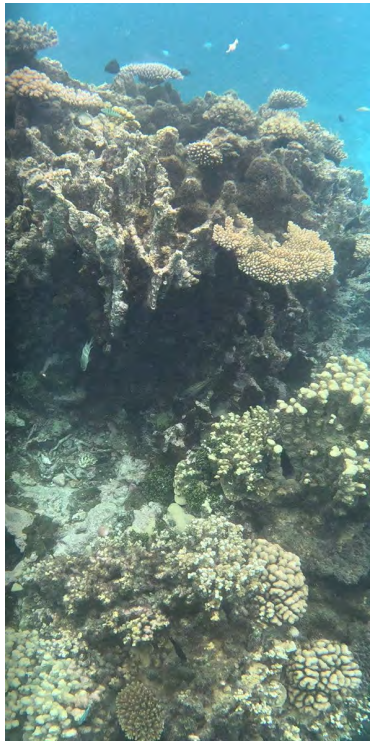
Topic / Issue	Findings and Notes
Haulage routes	It was considered that any haulage routes that went through the middle of Ebeye would be the riskiest and would lead to the most incidents. As such, routes through the centre of Ebeye should only be utilised when absolutely necessary. Haulage from the north and south was considered to be better and safer, with the north being the preferable of the two.

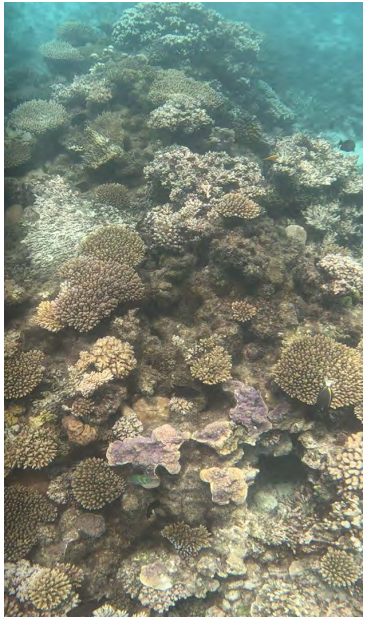
What did we Learn?

Topic / Issue	Findings and Notes
Sensitive Areas	Multiple sensitive areas along the frontage including (to the south) the children's playpark, swimming area and the picnic / barbeque area. There are a number of cemeteries and then, of course, the houses that front the ocean.
Night time and anti-social working	Avoid working at night where possible and working hours to be agreed with community representatives before commencement of works. Any works will need to work with the local businesses, in particular residential waste collection services.
Appearance	Several people identified that they preferred the look and appearance of the rock revetment versus the concrete block seawall.
Holiday Periods	The major holiday dates must be acknowledged and the contractor should avoid working on these days.
Local Workers	We should maximise the amount of local workers on the project and provide skill training and learning where possible.
Road Drainage	All ocean side drains are blocked and broken. Separate project has been commissioned to reinstall these drains.

What else are we doing this time?

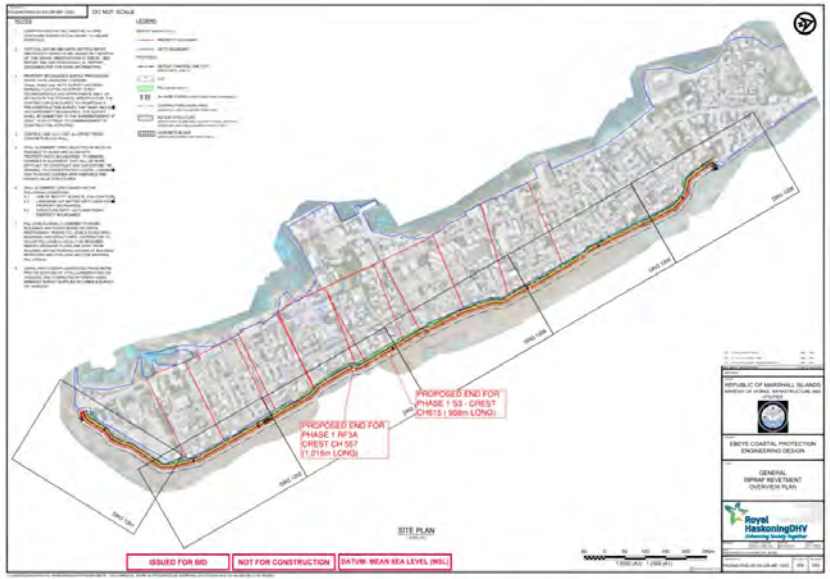
- More drone surveys – looking at particular coastal areas for engineering reasons
- Offshore survey of the potential haulage and landing areas
- Further ecological evaluation of the reef flat, the borrow pits and also the atoll side habitats – in particular coral.
- Further meetings with stakeholders, including Government in Majuro and potential equipment and facilities suppliers





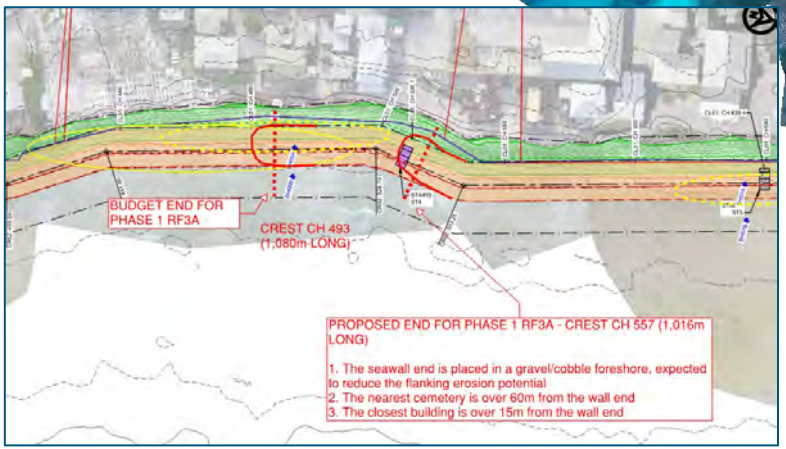
Coral in the SW area of Ebeye

Potential for Two Phases of Development



- Looking at the potential of building the seawall in two phases
- Due to changes in costs, material supply and contractor interest since the pandemic
- The Rock Revetment is the most cost effective option for Ebeye
  - It works well and looks good
  - It is the lowest cost but best performing option
- **So**, we may need to build the sea wall in two parts (Phase 1 – 1000m, Phase 2 – 800m)

Rock Revetment Phase 1 End Point



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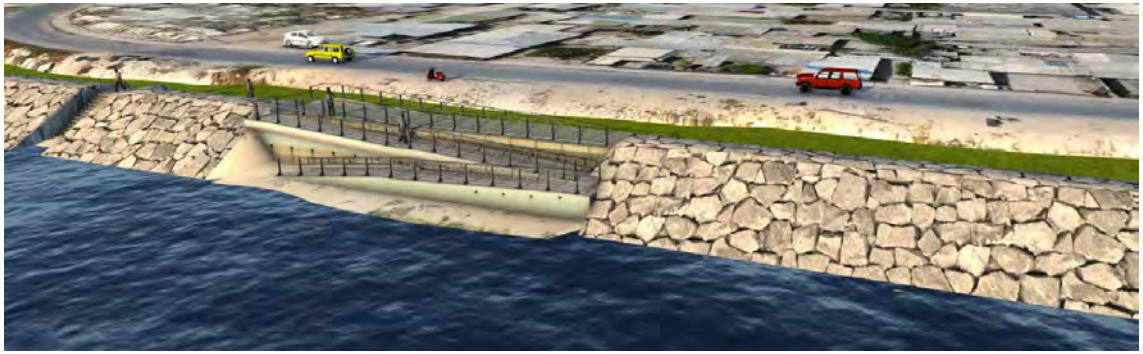
So what is next?

Post Consultation Correction
The slide remains as provided in May but an error needs to be corrected. Contractor visits are likely to be Q4 or later and the award will not be until April/May 2024 with mobilisation then occurring. Construction would likely commence no earlier than November 2024.

- We undertake this consultation and take your feedback and integrate
- We update the design to include a new Appendix on a 2-phased approach
- We also update the ESIA to allow for this new approach
- We then prepare bid documents and submit to contractors in June 2023
- Allowing for contractors to visit Ebeye in August or September, we would hope to award the project in October with a view to

  - **Construction starting in March to June 2024.**



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Appendix B Mitigation Table

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Ebeye Seawall Project: Pre-Construction Phase Mitigation Plan

Category	Mitigation Measures	Cost	Responsibility	Start	End
General: Procurement	• The ESIA/ESMP will be included in the Contractor's contract	Minor, included in tendering costs	PIU	Tender Preparation	Signing of contract
General: Specialists	• Contractor will include safeguards specialist and Community Liaison Officer as per contractual requirements. • Safeguards specialists will be adequately resourced to provide in country support.	Minor, included in tendering costs	Contractor	Tender Preparation	Signing of contract
General: Contractor	• The Contractor shall develop a Contractor's ESMP (C-ESMP) in accordance with the requirements stipulated throughout the ESIA / ESMP. C-ESMP will include Transportation Management Plan, Worker Management Plan and Solid Waste Management Plan (following requirements in ESMP). C-ESMP will be cleared by the Engineer, PIU and World Bank. • The Technical Specification require the Contractor to undertake a Pre-Construction Survey of the Works area, Contractor's compound, stockpile locations, haulage access points, and any part of the site that may be impacted by the Contractor's construction activities. The survey shall extend along the full length of the seawall and extending a minimum of 10 m from the boundary of the Contractor's Work Area and at a minimum capture the following details: o Property boundaries and fence lines; o Beach and dune levels; o Dune fencing and beach accessways; o Existing vegetation including individual trees with trunk diameter >350mm or height > 5m; and o Location of any existing services within the site boundary. • All Project staff will be trained on this plan and attendance will be recorded and monitored. • The Contractor will employ a Community Liaison Officer (CLO) from within the Ebeye community to assist in community consultations, translations	Included in contract (IIC)	Contractor	Award of Contract	Prior to Construction Starting

Category	Mitigation Measures	Cost	Responsibility	Start	End
	during training (i.e., traffic management and COC training) and to provide a contact point for local community. CLO will be recruited in consultation with KADA. • Contractor will maximize use of local labour to minimize need of foreign workers wherever practicable.				
General: Land Requirements	• Secure land for temporary work sites following the process in **Section 8.2.1.** • Any private lands required will be on a voluntary basis only. • Secure permission from landowners for fill material to be placed over Weto boundaries	No additional costs	Contractor/ KADA	During finalisation of design	Prior to commencement of work
General: Land Requirements	• If required, ensure all agreements and permits (EPA) are in place prior to starting works, including agreements to enter sites or buildings, and to install infrastructure and / or modify buildings or sites. • If required for construction, ensure compensation for any removed non-land assets has been paid to the asset owner prior to commencement of works. • If required, ensure consultations on land leases have been transparent and well documented.	Possible Project cost	Engineer and PIU/CIU	Final Design Phase	Prior to establishment of works at site
Community Relations	• Update Stakeholder Engagement Plan (SEP) as required as Project progresses. • Implement SEP. • Develop and promote the Grievance Redress Mechanism (GRM) within the community as noted in **Section 6.3.** Contractor to review the most recent version from the CIU PREP II Safeguards website[144] prior to development. • Ensure a secure and confidential mechanism for reporting of SEA/SH is included therein the GRM.	Included in PMU costs	CIU/PIU	Start of Project	Close of Project

[144] *https://www.ciudidasafeguards.com/prep2*

Category	Mitigation Measures	Cost	Responsibility	Start	End
	• Record outcomes of all consultations and include in PIU periodical monitoring. • Engage with schools to advise children on dangers of construction sites and advise on risk avoidance measures.				
General: Chance Find Procedure	• In accordance with OP4.11 Physical Cultural Resources and the RMI Historic Preservation Act 1991, when a person working on the Project discovers a cultural heritage site or item, the following procedures will be followed: o Stop the activities in the area of the chance find; o Delineate the discovered site or area (e.g. fencing); o Secure the site to prevent any further disturbance, damage or loss. In cases of human remains, arrange for a guard to watch the site until the police, local government and / or National Cultural Commission representative or person with delegated authority take over; o Prohibit the collection of objective by any person; o Notify the local government and RMI Historic Preservation Office within 24 hours (and police if it is human remains); o Any objects that are found must be handed over to the Historic Preservation Office; and o Project works can resume only after instruction is provided from the Historic Preservation Office. • Contractor will resume only after receiving a formal clearance from the Engineer	IIC	Contractor and PIU	Arrival at Project site	Completion of construction
Solid Waste Management	• The Contractor shall develop a Solid Waste Management Plan for clearance by the Engineer. • At all times, the Contractor is responsible for the safe and sound storage and recycling or disposal of all solid waste. • Licenced and controlled landfills are to be used to dispose of project waste. Biodegradable wastes may be managed at the northern dumpsite	Minor, part of standard practices	Contractor	Development of C-ESMP	Prior to Construction Starting

Category	Mitigation Measures	Cost	Responsibility	Start	End
	under the direction of KALGOV only. No other landfills in RMI are to be used. • The SWMP will require the minimize the production of waste: o Avoid over-ordering of imported materials; o Prefabricate parts (such as frames) where relevant / practical; o Train staff to reduce mistakes and wastage of materials; o Find local uses for left over materials; o Select materials that are easily reused or recycled at the end of their life. All workers to use mobile toilets provided for the Project. • Contractor will consult with KADA on export of hazardous substances. • All Project staff will be trained on this plan and attendance will be recorded and monitored.				
Spill Response	• The Contractor will have a spill response plan in place to account for all potential instances. • Spill response plan will be developed to ensure that all fuels and lubricants used during the construction phase in machinery, equipment, generators and also on marine vessels are contained, collected, treated and disposed of. • Under the requirements of the International Finance Corporation EHS Guidelines the spill response plan will: o Identify areas within the Project footprint and nearby vicinity that are sensitive to spills and releases of hazardous materials and locations of any water intakes; o Outline responsibilities for managing spills, releases, and other pollution incidents, including reporting and altering mechanisms to ensure any spillage is reported promptly to the SE; o Include provision of specialized oil spill response equipment (e.g. containment booms, recovery devices, and oil recovery or dispersant application vessels, etc.); and o Include regular training schedules and simulated spill incident and response exercise for response personnel in spill alert and reporting	Minor, part of standard practices	Contractor	Development of C-ESMP	Prior to Construction Starting

Category	Mitigation Measures	Cost	Responsibility	Start	End
	procedures, the deployment of spill control equipment, and the emergency care/treatment of people or wildlife impacted by the spill.				
Transportation Management Planning	• Consultation with community to convey information on routes, risks and Traffic Management measures being proposed • Develop criteria for Contractor's TMP setting the minimum key requirements for traffic planning on Ebeye. • Provide support to Contractor and Contractor's CLO in their discussions with Ebeye stakeholder and police force. • Undertake outreach and education in schools and among community to raise awareness of risks and encourage road safety • Advertise GRM	Cost may be incurred.	PIU and KADA	Development of bid docs and ESIA/ESMP	Prior to commencement of works
Transportation Management Planning	• Contractor to develop a TMP which will set out how the Contractor will meet the traffic and port management requirements including signage and traffic management around detours, physical works, camp sites, and haulage routes. • TMP will be developed in close consultation with and pre-approval from KADA, KAJUR, KALGOV, RMIEPA, Local Police and National Police, with input from stakeholders including RMIPA, Stevedores, NTA, local businesses and the local community. • Traffic through the town and via the port should be minimized as much as possible. • Plant movement to be kept to the works areas and clearly demarked and fenced off. • For each haul route, the TMP will need to include measures to address: Layout plans; Vehicle traffic (including any diversions around river crossings); Pedestrian traffic; Commercial marine traffic; Sensitive receptors (management near and consultation with) such as schools, residential dwellings, markets, churches, etc.); Management of increased heavy load traffic associated with transportation from the offloading site. The TMP will follow the guidelines set in the Safe Traffic Controls for Road	IIC	Contractor	Development of C-ESMP	Prior to mobilization

Category	Mitigation Measures	Cost	Responsibility	Start	End
	Works Field Guide (www.works.gov.pg/files/roads-bridges/IF003_PNGFieldGuide.pdf) and adapted for the Ebeye works. • TMP should ensure that the public, particularly children, cannot access the RORO facility and be at risk from moving plant. • The TMP will address: o Children and other road users are protected, especially for night haulage works (will be limited as nighttime works only in limited circumstances); o Contain a map of sensitive social receptors along the route; o Minimized time of diversions or disruptions; o Contractor will provide pilot vehicles and spotters; o Speed monitoring system that will be used; o Contractor's Community Liaison Officer will be appointed prior to mobilization of machinery to site and commencement of works to provide construction updates and promote safety around construction sites to the community; o Road works must be planned to ensure the least obstruction and inconvenience to vehicular, commercial marine and pedestrian traffic; o For any road closures, a diversion safe for vehicular and pedestrian traffic must be established; o Local authorities and the police must be informed, in writing 7 days in advance, of any haulage works; o Temporary traffic warning signs must be erected and maintained in advance of any place on the road where operations interfere with road traffic, and at all intermediate points where the work crosses or coincides with an existing road; o Temporary traffic warning signs must be adequately illuminated during the hours of darkness; o Barricades must be erected and maintained in front of all obstructions; o Temporary detours must be clearly indicated and delineated by guide markers;				

Category	Mitigation Measures	Cost	Responsibility	Start	End
	o Temporary detours must be maintained in a safe and passable condition; o Reduced speed limits through construction sites must be imposed and signposted; o When traffic is limited to one operational lane or these are workers or machinery operating in the road, traffic control measures must include traffic controllers with “SLOW” and “STOP” signs at both ends of sections of work in progress; o Pedestrian diversion routes must be clearly marked; o Road signs must be clearly visible, unobscured by vegetation and have a surface clean from any excessive dust or dirt; and o Laden trucks must not exceed 20 km/hour in areas close to schools or along the pedestrian access routes usually taken by children on their way to school.				
Mobilization of machinery and equipment from source country	• Ensure all construction machinery and equipment is steam cleaned and free of all organic material in source country prior to deployment. • Ensure all aggregates are subject to biosecurity treatment prior to deployment. • Ensure aggregate is sourced from approved/ permitted quarry sources, are sustainably extracted and are operating in accordance with relevant law. • Provide an approved phytosanitary certificate and any other documentation required under RMI legislation. • Ballast water of cargo vessels to be discharged no closer than 5km from the shoreline. Confirm with ship captain and review of log.	IIC	Contractor	Prior to mobilization	Completion of all importing activities
Construction Materials Offloading and Stockpiling	• Any location ATONs and anchoring of vessels will need to be agreed upon with Ebeye Port Control and the US Navy. • RORO site to be approved by the Engineer, PIU/ CIU and RMIEPA prior to construction of the facility to avoid damage to important marine habitat. Determination of importance of marine habitat will be based on underwater video footage of surrounding reef flat and recorded in C-ESMP .	IIC	Contractor	Development of C-ESMP	Prior to arrival of material

Category	Mitigation Measures	Cost	Responsibility	Start	End
	• Ensure signed approval (by the Engineer and PIU/CIU) for use of reef flat as temporary staging site is included in C-ESMP. • Stockpiling or staging areas will be selected to avoid damage to important marine habitat and will be approved by Engineer and PIU/CIU. Determination of importance of marine habitat will be based on the survey, underwater video footage of surrounding reef flat and recorded in C-ESMP. • No materials which have the potential to generate pollution or increase sedimentation will be stockpiled on the reef flat. i.e. contaminated and/or fine materials. • Reef flat will be completely cleared of all materials (stockpiling and temporary offloading ramps) on demobilization. • Movement of materials and machinery on the reef flat will be strictly controlled by the C-ESMP. • Stockpiling is not permitted in any borrow pit. • Spill response kit will be located at Contractor's offloading ramp and workers trained on its use.				
Stockpile and Laydown sites	• Laydown and Stockpile sites will be proposed Contractor in consultation with KADA and approved by KALGov, Irojlaplap and the Alaps. • Ensure designated sites have capacity for the volume of spoil calculated and for construction staging activities. • Ensure the designated stockpile site is appropriately bunded. • Management and operations of site addressed is C-ESMP prepared by Contractor and cleared by Engineer. • Ensure no significant environmental or social impacts due to the location and operation of laydown and stockpile areas. • Minimize use of island's local water supply and make provisions for alternate supply e.g. portable desalination plants, reverse osmosis plants etc.	IIC	Contractor	Development of C-ESMP	Prior to mobilization

Category	Mitigation Measures	Cost	Responsibility	Start	End
	• Laydown and stockpile sites will be well managed and bunded to prevent run off towards the beach or marine environment • Any lease agreements follow the requirements of the ESIA/ESMP and national legislation.				
Workers and Project Accommodation	• Workers Management Plan to be developed as part of the C-ESMP and will include: o Local and International recruitment strategy; o Worker training program; o Worker Orientation and Induction details; o Cultural protocols and expectations; and o Workers' accommodations standards and procedures • Workers Management Plan will follow the requirements of this ESMP and the International Finance Corporation Workers Accommodation Standards and Guidelines. • Management of workers within camps is expected to include: appropriate clothing, no work on a Sunday, management and restricting of visitors to the camp, visitor curfews, expected behaviour (noise, no alcohol, within community areas, etc), gift giving and receiving, disciplinary actions, etc.) • Voluntary arrangements for temporary access to private land is to be in accordance with the PREP II the Resettlement Policy Framework (RPF). • Contractor is to engage with the community of Loi for their support if the workers camp is proposed to be located there. • Location of workers camps will be approved by KALGov, Irojlaplap and Alaps. • Workers' camp will be fully fenced, and the camp entrance will be staffed with security. • Any new temporary bathrooms must have separate male and female facilities and will have an approved septic tank installed. • All grey water generated at the accommodations will be 100% contained and treated prior to release.	IIC	Contractor	Development of C-ESMP	Prior to mobilization

Category	Mitigation Measures	Cost	Responsibility	Start	End
	• Workers' accommodation will not negatively impact community potable water resources. • Any temporary lease agreements follow the requirements of this ESIA/ESMP and national legislation. • The Contractor will develop an individual Code of Conduct (to be approved by PIU) for all workers (local and overseas) to sign detailing the expected behaviours of Project staff, ESHS requirements, Cultural respect, OHS requirements, Community Health and Safety considerations. • The Codes of Conduct will be written in plain common language and signed by each worker to indicate that they have: o received a copy of the code; o had the code explained to them; o acknowledged that adherence to this Code of Conduct is a condition of employment; and o understood that violations of the Code can result in serious consequences, up to and including dismissal, or referral to legal authorities. • All Contractor staff shall undergo sensitisation in SEA/SH and HIV/AIDS and STIs. • All Contractor workers shall sign an individual COC for prevention of SEA/SH.				
Recruitment of workers	• Contractor is required to maximize the number of Marshallese workers from the Ebeye or wider Kwajalein community used on the Project. • No person under the age of 18 will be employed by the Project. • All imported Project staff will abide by RMI immigration policy and provide all required documentation, including health checks. • Overseas workers will undergo cultural familiarization induction upon arrival and sign a code of conduct applicable for the duration of their contract. • Overseas workers will have the technical skills and experience required for works under this component.	Minor, part of standard practices	Contractor	Upon recruitment	Prior to construction starting

Category	Mitigation Measures	Cost	Responsibility	Start	End
HIV/AIDs & SEA/SH Training	• PIU to enter into an agreement with service providers to provide SEA/SH and HIV training to all Project workers and awareness raising within the community.	Minor, IIC	PIU	Pre-Construction phase	Prior to construction starting
	• All Project workers will undergo training by services providers identified by the PIU on prevention of HIV/AID and SEA/SH as per the requirements of the ESIA/ESMP and contract. Attendance will be recorded and monitored. • Contractor's Workers Management Plan will contain a CoC Implementation Plan (accountability, training, monitoring, enforcement) and will address any additional SEA/SH requirements identified by the CIU/PIU. • All workers to sign SEA/SH Code of Conduct and be trained on its implementation. Copies of all signed CoC will be kept on file for inspection if required.	Minor, IIC	Contractor	Pre-construction phase	Prior to construction starting
Health and Safety	• The Contractor shall: o Prepare OHS Management Plan as part of C-ESMP; o Conduct Induction training for Contractor personnel; o Sign Code of Conduct (if instructed) for Contractor, Managers and other personnel; and o Implement relevant pre-construction measures prescribed in the OHS Plan. • The OHS Management Plan shall comply with all requirements of the ESIA/ESMP, national legislation and with the EHS Guidelines and shall include as a minimum: o Carefully and clearly marked pedestrian-safe access routes around the construction areas;	IIC	Contractor	Development of C-ESMP	Prior to mobilization

Category	Mitigation Measures	Cost	Responsibility	Start	End
	o Conduct safety training for construction workers working at heights and around electricity, and driver safety training for heavy vehicle drivers, prior to commencing work; o Provide personal protective equipment and clothing (gloves, boots, etc.) for construction workers and enforce their use; o Post Material Safety Data Sheets for each chemical present on the worksite and ensure workers understand them; and o Ensure that the removal of asbestos-containing materials or other toxic substances be performed and disposed of by specially trained workers with correct protective equipment. • The Contractor shall provide a report to the Engineer monthly outlining compliance, achievements and training including the number of lost time incidents; the number of near-miss reports; first aid training; completed HIV/AIDS and SEA/SH training; and OHS training courses completed by staff. • OHS Plan will include Covid-19 infection prevention measures as well as procedures for responding to instances of infection within the workforce. These will be in line with the latest guidance from WHO and GoRMI requirements. • Confirm location of emergency hospital services and response times at each site. • Provide an emergency medevac plan with lines of responsibility for action. • Provide an emergency communications plan for contacting PIU and emergency medical services. • In light of the COVID-19 global pandemic, the Project will ensure to protect its workers, and to comply with those regulations that of the national government requirements for COVID-19 protection measures. The Project will prioritize and look after the well-being of the workers and monitor and follow the local and national health authority guidance on Covid-19. All workers are required to undergo the COVID-19 testing, if a worker has				

Category	Mitigation Measures	Cost	Responsibility	Start	End
	been tested positive or in contact with a positive COVID-19 case, the worker will be required to undergo any nationally required quarantine or isolation.				
Cumulative Impacts	• Undertake a full dilapidation survey of roads, services and buildings in the construction area to be able to assess repairs that might be required. This should extend to the causeway. • Liaise with Ebeye Port to understand how the two projects might work together for efficiency purposes (i.e. accommodation, plant and materials storage, use of similar skills and services). • If and when cumulative project impacts are identified, the contractor and / or supervising team should re-examine the following (as examples) to determine if more measures are required: o TMP; o Construction sequencing; o Materials delivery and storage; o Workers' accommodation plan; o SEA/SH for all projects; and o Contractor cooperation meetings and way forward.	Cost may be incurred	PIU/ KADA/ Engineer/ Contractor	Pre-mobilization	Prior to construction starting

Royal HaskoningDHV

Ebeye Seawall Project: Construction Phase Mitigation Plan

Category	Mitigation Measures	Cost	Responsibility	Start	End
Offload, transport and operation of construction machinery	• All machinery to be in sound condition and free from any leaks of lubricants and fuel. • Maintain construction equipment. • Any machinery generating visible smoke is not permitted for construction activities. • Select landing area and methodology prior to arrival of equipment. Same location to be used for all offloading and demobilization. Reflect offloading site and transport route in Traffic Management Plan. • Define and clearly mark conservative working areas on the reef flat for all heavy plant and machinery. • No trees or vegetation to be removed or damaged unless already approved in the C-ESMP. • Traffic Management Plan will be implemented and ongoing consultations between Contractor (CLO) and community regarding traffic movements. • The contractor will be required to have an approved speed management system for all vehicles to ensure that they comply with the agreed speed limits, hours of operation, and follow the nominated routes (e.g. www.gps-server.net). Vehicles will also be equipped with appropriate high-visibility or reflective elements on the vehicles, as well as orange revolving lights or strobe lights as additional warning signs. • Spill kits to be placed at all fuelling locations and on construction equipment. • Refuelling only to occur in designated area within laydown site on hardstand area or over drip trays. • Immediately repair any damage caused to community or private facilities. • Pay appropriate construction damage compensation to affected parties as determined by the approved Government compensation schedule.	IIC	Contractor	Pre-mobilization	Demobilization
RORO facility	• Ensure SEP is implemented.	IIC	Contractor	Pre-mobilization	Demobilization

Category	Mitigation Measures	Cost	Responsibility	Start	End
	• Contractor CLO regularly engages with community to seek input and inform. • BBQ area to remain publicly accessible for the duration of the works. • Use of the area adjacent to the BBQ hut will be limited to the area required to turn one articulated dump truck and for two articulated dump trucks to pass one another. • Temporary fencing and spotters required. • TMP and safety management plan to ensure that the public, particularly children, cannot access the area and be at risk from moving plant. • Area to be reinstated after completion unless requested by the client.				
Traffic Management Planning	• Support Contractor and Contractor's CLO to advertise haulage operations to community. • Liaise with key stakeholders, community and police force on an ongoing basis throughout haulage to identify any issues or improvements that could be made to TMP. • Provide support to Contractor and Contractor's CLO in their discussions with Ebeye stakeholder and police force. • Ensure GRM is well advertised.	No additional costs	KADA/PIU	At start of works	Demobilization
Traffic Management	• Implement the TMP to ensure smooth traffic flow and safety for workers, marine traffic, passing vehicles and pedestrian traffic. • Contractor's CLO will maintain regular contact with community for duration of haulage works. • Contractor will maintain regular contact with KADA, KALGOV, police chiefs and other stakeholders for duration of haulage works. • Where appropriate, employ flag operators on the road to prevent traffic accidents. The workers shall have relevant safety equipment and training. • No ad hoc access at the Project site between the beach and the land will be permitted, only routes identified in the C-ESMP will be used. • The TMP will prohibit the use of engine breaking close to and through communities and inhabited areas, it will also regulate the working hours for the haul trucks.	IIC	Contractor	Prior to works	Demobilization

Category	Mitigation Measures	Cost	Responsibility	Start	End
	• The TMP will particularly focus on the movement of heavy plant and the haulage of materials. • The Contractor will be responsible for repairing any damage caused to the roads due to the haulage of materials to the same or better condition surveyed in the pre-construction assessments. • Only roads designated and approved in the TMP shall be used for haulage and transportation. • Consideration of means by which the children could be attracted to the atoll side during low water work on the ocean side could be considered further by the contractor and local stakeholders. This could include creation of events and provision of play areas.				
Sedimentation and Erosion control	• Disturb as little ground area as possible and trap sediment onsite using brush fences or silt fences. • Minimize erosion and design erosion protection measures according to international good practice standards, including incorporation of effective climate resilient drainage systems (soakage pits) and consideration of surface flow paths. • Divert water around construction sites or disturbed areas with ditches. • Contingency planning in the C-ESMP must detail soil erosion prevention measures in event of storm or heavy rain event.	IIC	Contractor	Start of construction	Completion of works
Earthworks	• All earthworks areas and finished surfaces shall be graded to prevent ponding of water. • Excavation shall be undertaken in a careful manner, with a minimum disturbance and with every possible precaution taken to prevent damage to property and injury to personnel. • Contractor shall ensure that all existing structures and structure foundations to be retained are protected from undermining and damage during construction. • Contractor's method statement shall identify excavated materials to be reused on the site.	IIC	Contractor	Start of construction	Completion of works

Category	Mitigation Measures	Cost	Responsibility	Start	End
	• The Engineer shall approve excavated materials for reuse, including but not limited to backfill behind the revetment and reinstatement of beach profile. • Excavations shall not occur within 5m of a marked gravesite unless approved by the Engineer / KADA.				
Demolition	• Demolition shall only be undertaken to the extent required to allow construction of works. • The extent of demolition shall include that determined from drawings and the Contractor's Pre-Condition Survey. • Demolition shall be undertaken in a careful manner, with a minimum disturbance and prevention of damage to property and the environment or injury to personnel. • Contractor's Method Statement shall identify demolished and excavated materials to be reused in the works. • Contractor's Waste Management Plan shall identify how unused materials will be stored and ultimately disposed of. • Moving temporary fence required to keep public away from harm.	IIC	Contractor	Start of construction	Completion of works
Construction of Structures	• Machinery only to be used within the marked working area • All construction activities on any reef flat area to take place on the mid-low-mid tide cycle. • Pedestrian access to work site to be strictly prohibited • Spill kit available during all work with machinery on the reef flat. • No reef flat construction works to take place during period of bad weather.	IIC	Contractor	Start of construction	Completion of works
Aggregate	• No sand or aggregates will be sourced from any quarry, borrow pit or beach in RMI. • Internationally sourced aggregates will be from licensed permitted source, sustainable extracting materials and operating in compliance with its permit conditions.	IIC	Contractor	Pre-mobilization	Offload of aggregates

Category	Mitigation Measures	Cost	Responsibility	Start	End
	• Provide an approved phytosanitary certificate and any other documentation required under RMI legislation prior to dispatch from country of origin. • Present biosecurity and quarantine approvals along with any import permits to Engineer for clearance before offloading any materials.				
Clearance of vegetation (laydown site, building location, stockpile area, workers camp)	• Clearance work will be limited to areas defined in approved C-ESMP. • Agreement from the owner shall be given, and any compensation agreed to, prior to trees being trimmed or removed. • Whenever possible, landowners and occupiers will be allowed to benefit from cut vegetation for firewood and other uses. • Clearly identity any areas of cultural and spiritual significance prior to clearing work (e.g. graves). Any significant sites will be avoided and a 10m buffer placed around them. • All personnel to be aware of the location and the limits of clearance before work commences on site. This is to be delivered through induction training. • Avoid or minimize removal of coconut or other large and/or crop trees. • No disposal of spoil, vegetation or organic matter into any water body or lagoon environment. • Surface water controls where required.	IIC	Contractor	Start of works	Completion of works
Solid Waste Management	• Solid Waste Management Plan, approved by the Engineer and PIU/CIU, will be fully implemented. • All construction workers will be trained on the correct and expected management measures for solid waste as part of the induction process. • Remove all inorganic, non-reusable and solid waste from the island generated as a result of the Project. • Implement waste management in the order of avoid, reduce, reuse, recycle. • No solid waste to be dumped in sea or lagoon waters. • Burning of solid waste is not permitted.	IIC	Contractor	Prior to commencement of works	Demobilization

Category	Mitigation Measures	Cost	Responsibility	Start	End
	• Compost all green and organic waste to assist soil improvement for the production of communal food crops or use as pig food. • Export of all hazardous waste will be subject to the measures in this ESIA/ESMP and in coordination with the relevant authority. • Excess excavated material will be made available to KADA for community use.				
Grey water and sewage	• All construction camps and temporary worker sites will have septic waste management systems for collection and treatment of all grey and septic waste. • Facilities to be removed at the completion of the construction work.	IIC	Contractor	Prior to commencement of works	Demobilization
Hazardous Substance and Materials	• Fuel will be stored in dedicated areas at the laydown site or workers camp in sealed tanks placed within a concrete bund that has 100% of the capacity of the drums or storage. • The storage area will be at least 50m away from the marine environment and at least 20m from water storage and will be fully secured, locked when not in use and shaded from direct sunlight. • MSDS will be provided for all hazardous substances. • Smaller volumes of hazardous substances will be contained within a metal storage shed locker within the storage shed. • Lined pits to separate oil and water will be required near any workshop or maintenance shed to prevent leaching of hydrocarbons into the water table.	IIC	Contractor	Prior to commencement of works	Demobilization
UXO	• In the event of locating UXO all work activities in the area will cease immediately and the UXO isolated. The PIU shall be immediately notified of the situation and work shall not recommence until the area is determined safe and released back to the Contractor by the PIU. • The Contractor shall provide training to staff for identification of UXO. • Before undertaking construction, the Contractor is required to:	Unknown	Contractor and KADA	Prior to commencement of works	End of project works

Category	Mitigation Measures	Cost	Responsibility	Start	End
	o conduct an historical review to determine the potential, if any, for remnant UXO or explosive ordnance (EO) within the Contractor's Work Area; o retain a suitably qualified subcontractor to undertake a marine magnetometer survey to assist in the determination of possible UXO locations within the Contractor's Work Area; o report outcomes of the review and surveys to the Engineer and make appropriate recommendations.				
Spill Management and Response	• Spill Response Plan to be included in the C-ESMP and implemented during construction. • Site induction prepared by the Contractor will be required for all personnel involved with the Project, with specific attention made to community health and safety in the case of a spill. • All personnel involved in the handling of dangerous goods will be trained and inducted in the handling, emergency procedures and storage requirements for different types of substances. • Vehicles and machinery will be refuelled by authorized and trained personnel only in designated areas to reduce the likelihood of spillage in a sensitive environment. • Drip trays will be used during refuelling or servicing to prevent spillages onto the ground. • No refuelling of machines or vehicles will be permitted in the marine environment. • Development of procedures for cleaning up and reporting of accidental spills as part of the Spill Response Plan.	IIC	Contractor	Prior to commencement of works	Demobilization
Influx of labour	• The Contractor is encouraged to employ staff and labour (including subcontractors) with appropriate qualifications and experience from sources within the country. • Recruit CLO from the Ebeye community and in consultation with the PIU.	IIC	Contractor	Prior to arrival of workers	Demobilization

Category	Mitigation Measures	Cost	Responsibility	Start	End
	• Site induction conducted for all construction personnel at start of construction with input from KADA. • All workers to have undertaken approved HIV/AIDS and SEA/SH prevention training on RMI and to have signed individual code of conducts as included in the contract. • All foreign workers must have valid visas. • Recreational facilities to be provided to workers. • Implement Workers Management Plan. • Regular inspection and monitoring of workers accommodation. • Workers to respect Weto and landowner boundaries, observe codes of conduct and avoid damage to properties and resources. • The Contractor is to ensure enough food is delivered to the island for the duration of works so as to not interfere with food supplies to the community Schedule supplementary deliveries well in advance as needed. • No alcohol will be consumed by the workers nor provided by the employer on Ebeye.				
Workers Accommodation	• Provide training to workers on the Pacific Invasive Ant Toolkit (www.piat.org.nz) to ensure practices designed to minimize ant invasions are understood by all workers. • Provide the opportunity for local women groups to cook food for the workers using the imported foods. • Provide the opportunity for local women to undertake housekeeping services around the workers camp. • Employ local workers where practicable. • Use of wood as fuel is not permitted. • No dumping of solid waste in or near water bodies. • Separation and secure storage of solid waste and food waste (for pig feed if appropriate). • Provide fully stocked first aid kit with site workers trained in in emergency First Aid.	IIC	Contractor	Prior to arrival of workers	Demobilization

Category	Mitigation Measures	Cost	Responsibility	Start	End
	• Sufficient quantities of potable water must be provided for the workers. • No community water tanks will be used for workers camp potable water. • Manage water use during dry periods. • Do not use potable water for dust suppression. • Camp must be kept clean from food scraps and waste to minimize pests • The Contractor will be required to restore all temporary work site after completion of works to the satisfaction of the landowners. The restoration plan will be detailed in the C-ESMP and agreed with by the landowners through consultations.				
Dust Generation	• Apply water to unsealed roads to reduce visible dust levels due to construction activities. • Cover loads of any fine aggregate during haulage. • Any processing plants will be located within laydown site and screened. • Cover or wet down stockpiles containing fine material (e.g. sand and topsoil) when not actively being used. Wetting of stockpiles is allowed but due to freshwater constraints will be kept to a minimum, or sea water will be used where feasible. • All surfaces will be constructed to their final design solution as quickly as practicable. • Keep work areas clean with regular sweeping. • Dust masks and personnel protective equipment must be available for workers during dust generating activities. • Manage speed of transportation trucks.	IIC	Contractor	Start of construction works	End of construction works
Noise and Vibration Disturbance	• Unless otherwise agreed with PIU/ CIU and other stakeholders, working hours should be between 6am and 6pm Mondays to Saturdays. No work is to take place on Sundays or public holidays. • Minimize nuisance from noise, especially closer to residential areas and sensitive receptors, through establishment and communication to affected parties of working hours, including night works and avoid increase of noise and number of work equipment at outside of advertised hours. Advertise working hours at the site entrance.	IIC	Contractor	Start of construction works	End of construction works

Category	Mitigation Measures	Cost	Responsibility	Start	End
	• Use noise barriers / screens or mounds to shield sensitive receptors from any processing or batching plant activity. • Workers in the vicinity of sources of high noise shall wear necessary protection gear rated for the situation they are being used. • Signage to outline complaints procedure (GRM) and contact details of recipient of complaints. • The World Bank/ International Finance Corporation EHS Guidelines[145] Section 1.7 – Noise Management shall be applied. Noise impacts will not exceed the levels at the closest residential or other sensitive social receptors for one-hour LAeq of 55 dBA between the hours of 0700-2200 or 45 dBA outside of these hours for night works or result in a maximum increase in background noise levels of 3dB at the nearest receptor location off site. The nearest sensitive receptors are the closest residences to the active works and to the laydown site. • Where possible limit construction activities to daytime hour unless permission is obtained from Engineer. • Acceptable working hours need to be established through consultation with the local stakeholders, in particular the Police and Local Government authorities. In general, no work should take place between 6pm and 6am, on Sundays or on public holidays. Any working hours that are considered to be anti-social will be avoided at all costs. • Workers Management Plan will set guidelines for workers behaviour to minimize disturbance to community.				
Stockpile and Laydown sites	• Laydown areas will be sited on land nominated and approved by KADA for the Project. • Voluntary arrangements for temporary access to private land is to be in accordance with the PREP II the Resettlement Policy Framework (RPF). • Areas will be securely fenced. • Bunded and covered areas will be installed for the storage and handling of hazardous materials and/or substances, the wash down of machinery, the preparation of concrete and the prefabrication of solar arrays.	IIC	Contractor	Prior to commencement of works	Demobilization

[145] *International Finance Corporation, Environmental Health and Safety Guidelines, General Guidelines: Noise Management*

Category	Mitigation Measures	Cost	Responsibility	Start	End
	• Run off from these bunded areas will be collected, treated and tested before being either reused for construction purposes or allowed to discharge into the ground, away from the marine environment. Discharge will be at a rate to allow absorption without causing surface flooding • Segregated storage for solid waste will be provided. This area will be clearly marked and designed to ensure that as waste is secure. • Worker inductions will include a tour of the laydown area and required practices from workers. • Spill response kits will be available, and workers trained in their use. • The Contractor will be required to restore all temporary work site after completion of works to the satisfaction of the landowners. The restoration plan will be detailed in the C-ESMP and agreed with by KADA and other key stakeholders through consultations.				
Demobilization	• All residual material to be removed from the island unless specifically requested by KADA. • Site rehabilitation works of laydown site, stockpile site and laydown area to include scarifying soil and spreading vegetative material to assist with natural regeneration processes unless the area is required for community use. • All vegetated areas disturbed by the works shall be restored with appropriate native plant species. • Following acceptance of the constructed rock revetment, the pre-condition beach profile shall be reinstated with excavated beach sand from the site. All excavated beach sand shall be screened prior to reinstatement. • Upon completion of works, the Contractor shall clear the site of all surplus material, plant, fencing, site sheds/buildings, workers accommodations, notice boards, etc.	IIC	Contractor	End of construction works	Demobilization
Health and Safety	• Will not commence works until the Contractor's OHS Management Plan has been approved by the Engineer. • Implement all provisions within the approved OHS Management Plan	IIC	Contractor	Prior to commencement of works	Demobilization

Category	Mitigation Measures	Cost	Responsibility	Start	End
	• Provide fully stocked first aid stations at each construction site with workers trained in emergency First Aid. • Provide appropriate Personal Protection Equipment (PPE) for all construction workers and ensure they are used • Maintain daily contractor's diary and record any OHS accidents or incidents. • Include any OHS accidents or incidents in monthly report. • Report any serious accident or incident to Engineer. • Prohibit usage of drugs and alcohol on construction sites and undertake regular alcohol testing. • Install lights and cautionary signs in hazardous areas. • Workers are required to undergo the COVID-19 screening before the mobilization if requested. • If a worker has been tested positive or have been in contact with a positive COVID-19 case, the worker will be required to undergo any nationally required quarantine or isolation and testing.				
Community Health and Safety	• General public is to be excluded from high-risk areas and where heavy machinery is in operation. • Ensure reversing signals are installed on construction vehicles or provide flagmen as required to ensure safe operations. • Mark dangerous areas with reflective tape or other hazardous areas during the hours of darkness. • Provide safe access around work sites to keep public away from harm. Use safety barriers and fences as required (including during demolition works). • Liaise with Ebeye police force to ensure site security.	IIC	Contractor	Start of construction works	Demobilization
Physical Cultural Resources	• Ensure all identified graveyards and private grave sites are well fenced and protected from construction activities. • Cultural sensitivity and appropriate behaviours when working adjacent to the graveyards will be included in induction trainings.	IIC	Contractor	Start of construction works	Demobilization

Category	Mitigation Measures	Cost	Responsibility	Start	End
	• Chance find procedure will be implemented for any PCR discovered during the course of works.				
Environmental Emergency Procedures	• In the event that accidental leakage or spillage of diesel/chemicals takes place, the following response procedures shall be followed: o The person who has identified the leakage/spillage shall immediately check if anyone is injured and shall then inform the Supervising Engineer or in his/her absence, the Site Operations Manager; o In such cases, all personnel shall take immediate action to stop and contain the spillage / leakage; o The Contractor shall arrange maintenance staff with appropriate protective clothing to clean up the chemicals/chemical waste. This may be achieved through soaking with sawdust (if the quantity of spillage/leakage is small), or sandbags (if the quantity is large); and/or using a shovel to remove the sand / topsoil (if the spillage/leakage occurs on bare ground); and o Contaminated sand and materials must be handled as hazardous waste. • The Contractor shall prepare a report on the incident detailing the accident, clean-up actions taken, any pollution problems and suggested measures to prevent similar accidents from happening again in future. The incident report shall then be submitted to MWIU for review and submit to the appropriate RMI authority.	IIC	Contractor	Start of construction works	Demobilization
Community Relations	• Implement the SEP. • Maintain a grievance redress procedure as described in the ESIA/ESMP. • Ensure that public consultation and disclosure communication is completed at regular intervals to ensure that the public are fully aware of the Project program of activities, work schedules, the potential risks and harm from construction sites and the GRM process. • Signage will be used in public areas around the Project sites advising the complaints procedure and contact details of key Project individuals responsible for responding to issues raised.	IIC	PIU and Contractor	Prior to commencement of works	Demobilization

Category	Mitigation Measures	Cost	Responsibility	Start	End
	• Inform local community as early as possible and repeat at least one day in advance of any interruption to traffic, electricity or water supply etc. Advise through postings at the Project site, at public meeting places, and in affected homes/businesses. • The contractor needs to be made aware of all holiday periods on the island. The contractor will expect to not work on these dates.				

Royal HaskoningDHV

Ebeye Seawall Project: Operation Phase Mitigation Plan

Category	Mitigation Measures	Cost	Responsibility	Start	End

Maintenance and repair of structure	• Inspections of the coastal protection structure are required to be carried out by a degree qualified Civil / Structural Engineer with experience in coastal structures. Two levels of maintenance inspection and investigation are required, governed by duration and recurrence interval storm event.
	  • Level 1 – 2-year interval and 2 year ARI storm: The coastal protection structure would be inspected for damage or defects at two (2) yearly intervals and also following storm events that equal or exceed two (2) year ARI. The two-yearly routine inspection cycle would recommence following a post-2-year storm inspection.
	  • Level 2 – 6-year interval and 10 year ARI storm: Level 2 inspections include Level 1 as well as land and/or drone survey monitoring covering the seawall and nearby foreshore areas. Level 2 would take place at six (6) yearly intervals (every third routine monitoring round), and also immediately following storm events that equal or exceed 10-year ARI. Level 2 inspection cycles would recommence following a post 10-year storm inspection.
		Costs to be incurred	KADA	Demobilization	End-of-life

	Rock revetment:
	• The design surface level of the maintenance corridor must be maintained to its design lines and levels.
	• Check for damage of the rock revetment after storms. Record the size, number and location of rocks:
	  • larger than 0.3m diameter that were moved away from the footprint of the revetment, and
	  • larger than 0.5m diameter that were moved by more than their own diameter within the footprint of the revetment.
	• Check particularly that rocks at the seaward and landward toes are not being mobilized away from the structure. If any small rocks are mobilized these will be replaced into the structure behind the larger sized toe rocks ensuring good interlock with adjacent rocks. Once replaced smaller sized rocks will not protrude above the general surface of the revetment.
		Costs to be incurred	KADA	Demobilization	End-of-life

Category	Mitigation Measures	Cost	Responsibility	Start	End
	• Ongoing cleaning of litter from the rock revetment to prevent the voids being filled with rubbish which will be unsightly and potentially unhealthy. Large tree branches and metal (i.e. pipes) could get stuck in the voids and could act as a lever in wave conditions. Such an event would be infrequent but possible and, again, it is highly recommended that the revetment is patrolled regularly to remove these types of offending objects.				
	Concrete block stairs: • General condition of all structures (blocks and handrails) to be noted. • The design surface level of the ground behind the coastal structure must be maintained to ensure that the geotextile covering the rock bags is suitably covered and not exposed to direct sunlight or traffic (vehicle or pedestrian). Within a maximum of 30 days, replace specified sandy gravel to cover exposed geotextile to design lines and levels. • Drainage slots must always remain unblocked. • All litter must be cleared. • Ensure that no fine soil materials are leaking out between or under blocks, or out from the drainage slots. Seek geotechnical engineering advice if the leaking appears to be of a material quantity, indicated by a general lowering of the corridor surface by more than 50mm immediately behind the wall, or discoloration in the water at higher tides in front of the wall due to loss of fine sands through the structure, or scour holes occurring behind the wall. • Check for any movement of the block wall, particularly after storms. Check the wall is in true alignment and record with land photos and survey. Seek geotechnical and structural engineering advice if the block wall is found to have any movement that is measurable (such as 5mm) from its as-constructed position. • During operation of the wall, any cracking (beyond hairline width) of the structure needs to be mapped and assessed by a degree qualified Structural Engineer (and noting any cracks that extend through the blocks). • Check nuts securing handrail posts to fixing plates are tight.	Costs to be incurred	KADA	Demobilization	End-of-life

Category	Mitigation Measures	Cost	Responsibility	Start	End
Upkeep of Maintenance Corridor	• Ensure maintenance corridor is clear of obstructions and encroachment by neighboring properties. • Engagement with landowners and property owners.	Costs to be incurred	KADA	Demobilization	End-of-life
Community Relations	• Continue close liaison with by KADA, KAJUR, KALGOV, RMIEPA, Local Police and National Police and Ebeye Leadership. • Grievance procedures will be in place from the beginning of the social and environmental assessment process and exist throughout construction and operations through to the end of Project life. • Continued maintenance of accessways (staircases and all-access ramp) to allow for continued community access to reef flat.	Costs to be incurred	KADA	Demobilization	End-of-life
Community Health and Safety	• To reduce chance of accidental falls and risk of injury, the handrail will be inspected and maintained as discussed above.	Costs to be incurred	KADA	Demobilization	End-of-life

Appendix C Monitoring Plan

Ebeye Seawall: Pre-Construction Checklist

Impact Area	Management Measures	Frequency	Monitoring Responsibility	Cost
General	• Development consents and environmental permits are in place • Any lease agreements for private lands have been signed and sighted prior to commencement of works • Any requirements of the PREP II RPF have been finalized and approved by the World Bank • In line with the permit and ESMP requirements baseline water quality, and any other required, data has been established by Contractor with PIU support and incorporated into C-ESMP	Once - Prior to commencement of civil works	PIU/CIU	No additional cost
	• C-ESMP has been developed and approved • C-ESMP includes Solid Waste Management Plan, Spill Response Plan, Traffic Management Plan and Worker Management Plan • C-ESMP include a comprehensive environmental inspection checklist for all required measures in the ESMP • Contractor's Community Liaison Officer has been recruited and trained		Engineer	
Solid and hazardous waste	• Approved Solid Waste Management Plan in place • Waste collection at workers camp and laydown area is established and well signed • Waste collection storage arrangements in place and compliant with approved SWMP • Agreements in place for offshore disposal of solid waste	Once- Prior to commencement of civil works	Engineer	No additional cost

Impact Area	Management Measures	Frequency	Monitoring Responsibility	Cost
Community health and safety	• HIV/SEA/SH/Code of Conduct training and acknowledgements have been completed as per contractual requirements • C-ESMP reflects any Contractor's requirements stipulated in the ESMP • Medical clearance certificates provided for all foreign workers • GRM process available for public inspection • CLO on site • Worker Management Plan contains all required elements, has been approved by PIU	Once - Prior to commencement of civil works	Engineer	No additional cost
Protection of habitats	• Clear demarcation of machine operating zone on reef flat, site access, along alignment property boundary and fence line, near graveyards and around borrow pits are clearly mapped in C-ESMP and demarcated on approved final design drawings • Stockpile and/or storage areas on the reef flat have been surveyed to avoid significant impacts on live coral cover and approved for use by PIU	Once - Prior to commencement of civil works	Engineer	No additional cost
Soil and water pollution	• Contractor's EMP contains all soil erosion and sediment prevention measures stipulated in the ESMP and GoRMI permit • Sediment containment measures listed in the ESMP are in correct places (as described in Contractor EMP) and well-constructed • Appropriate spill response plan in place • Staff are trained on spill response plan • Overland drainage diverts water flow away from exposed areas. • Sediment laden runoff from excavations or stockpiles directed to a settling area	Once- Prior to commencement of civil works	Engineer	No additional cost

Impact Area	Management Measures	Frequency	Monitoring Responsibility	Cost
	• Discharges of treated wash water are to occur to land			
Occupational Health and Safety	• Ensure OHS Management Plan established for Project as per requirements of this ESMP and EHS Guidelines • All workers have undergone appropriate OHS training	Once - Prior to commencement of civil works	Engineer	No additional cost
Materials Supply	• All imported materials with appropriate biosecurity clearances • Imported materials from appropriate approved source	Once - Prior to commencement of civil works	Engineer and PIU	No additional cost
Laydown and Stockpile Area	• Laydown areas established on pre-approved sites as per C-ESMP • Water run off management systems in place to approved standard as per ESMP • Washdown areas have collection and treatments systems • Sanitation treatment system is in place • No runoff from laydown or stockpile sites are directed to private properties or coastline • Bunded secure storage area for hazardous substance is established	Once - Prior to commencement of civil works	Engineer	No additional cost
Workers Accommodation	• Accommodation established on pre-approved sites as per C-ESMP and PREP II RPF. Pre-approval has been obtained from PIU and KADA • Waste management system in in place • Adheres to International Finance Corporation Workers Accommodation Standards • Worker Management Plan in approved and in place	Once - Prior to commencement of civil works	Engineer	No additional cost

Impact Area	Management Measures	Frequency	Monitoring Responsibility	Cost
	• Potable water for workers is provided for • Food supplies for workers is secured			

Ebeye Seawall: Construction Phase Monitoring Plan

Impact Area	Management Measures	Frequency	Monitoring Responsibility	Cost
General	• Contractor is undertaking weekly monitoring and reporting using monitoring form approved in C-ESMP • Contractor CLO is on site and undertaking weekly engagements with the communities affected by works • Engineer is undertaking daily monitoring • GRM is in use and any complaints being progressed to resolution • Non-compliances are being addressed to Engineer satisfaction in timely manner	Weekly throughout construction	Engineer and PIU	No additional cost
Solid and hazardous waste	• Waste collection at laydown area is secure, well signed and clean • Hazardous waste is stored according to SWMP • Good housekeeping around Project sites and workers accommodation	Daily throughout construction	Engineer	No additional cost
	• Approved Solid Waste Management Plan effectively implemented • All waste is disposed of offshore • Contaminants of Concern documentation in place and reviewed	Weekly through construction		
Community infrastructure, health, and safety	• Approved Traffic Management Plan is under effective implementation • Signs and fences restrict or direct pedestrians and public where appropriate • Dust suppression is effective	Daily throughout construction	Engineer	No additional cost

Impact Area	Management Measures	Frequency	Monitoring Responsibility	Cost
	• No damage to public or community infrastructure • Noise is within permitted limits • Public signage of complaints procedure • Required signage is in place	Weekly throughout construction		
Community Health and Safety	• HIV/SEA/SH/Codes of Conduct training being implemented and reported as per contractual requirements • GRM and community engagement measures being implemented • Worker Management elements being implemented	Monthly throughout construction	Engineer	No additional costs
Protection of terrestrial environment	• No unauthorized removal of vegetation • No damage to vegetation outside areas permitted in C-ESMP • Construction machinery barriers are in place • No evidence of construction machinery working outside marked area	Daily through construction	Engineer	No additional cost
Protection of marine habitat	• No evidence of stockpiling outside reef flat areas approved in C-ESMP • Work areas are clearly demarcated • No evidence of construction machinery working outside marked area • Machinery working around waterways is well serviced and in good working order. • If applicable, only approved offloading beach sites are being used.	Daily through construction	Engineer	No additional cost
Soil and water pollution	• All required sediment control measures are in place and well maintained as approved in C-ESMP • No visible spills on soil or uncovered ground	Daily throughout construction	Engineer	No additional cost

Impact Area	Management Measures	Frequency	Monitoring Responsibility	Cost
	• All drainage, water treatment and soakage systems clear and fit for purpose • Division bunding around large areas of vegetation clearance is in place and well maintained • Vehicles are working in defined areas • Worker's sanitation facilities in good order and maintained as per design requirements.			
	• Weekly water testing is undertaken by Contractor and reported as per any permit requirements. • Appropriate spill response plan/kit in place for waste area	Weekly throughout construction		
Hazardous substances storage	• Substances stored within bund on impermeable surface • Spill kit complete and accessible • Spill training completed • No evidence of spills on the ground • MSDS available at storage locations	Weekly through construction	Engineer	No additional cost
Occupational Health and Safety	• Workers have access to, and are using appropriate, PPE for the task • All workers have undergone appropriate OHS training • Proper briefing of staff before undertaking work activities • Contractor is undertaking weekly OHS monitoring and reporting as described in the approved Contractor Safety Plan in the C-ESMP • Contractor is reporting serious accidents as per the requirements of the safety management plans	Weekly through construction	Engineer	No additional cost

Impact Area	Management Measures	Frequency	Monitoring Responsibility	Cost
Laydown and Stockpiles Site	• Laydown areas established on pre-approved sites • Laydown areas dust levels managed efficiently • Traffic management plan correctly implemented at laydown site • Water run off management systems operating correctly • Dust management effectively implemented • PPE present and correctly used • Refuelling occurring over drip trays in dedicated areas • No stockpiling outside approved sites • Bunding is functional at stockpile site	Daily through construction	Engineer	No additional cost
Workers Accommodation	• Camp is clean and tidy • Waste management is as per Solid Waste Management Plan • Food supplies are sufficient • No community potable water is being used • Workers Management Plan is being effectively implemented • First Aid kit is fully stocked • No grievances received from community regarding workers	Weekly through construction	Engineer	No additional cost

Appendix D Minimum C-ESMP Contents

Contractor's Environmental and Social Management Plan (C-ESMP)
Principles

- The C-ESMP is informed and based upon GoRMI law, the ESIA/ESMP and International Finance Corporation EHS Guidelines.
- All commitments must be specific and auditable with measurable outcomes and clear timeframes.
- To ensure readability, write clearly and avoid long sentences with complex clauses.
- Always use the terms 'will' and 'must', rather than 'should' or 'may' when committing to carry out management actions.
- Avoid use of ambiguous terminology such as 'where possible', 'as required', 'to the greatest extent possible'. If it is necessary to include ambiguous terminology, it should be explained and examples given.
- Clearly explain any technical terms or acronyms used, and/or define them in a glossary.
- Commitments or statements within the management plan must be consistent with other relevant management plans or conditions of approval.

C-ESMP Content

1. **Declaration and Document Version Control**
    - Person accepting responsibility for the C-ESMP – signed declaration.
    - The document version control should be a simple system that ensures that details of all key changes to the document over time are properly recorded.
2. **Table of Contents**
3. **Executive Summary**
    - The executive summary will note the key elements of the work, the purpose of the document, the main potential impacts and the primary strategies planned to address these impacts.
4. **Project Description**

The C-ESMP will provide a summary of the works, description of construction methodologies and identification of offsite areas such as selected quarries, identified haul routes, landfill or waste disposal sites as this provides context for the plan particularly where the information was not included in the ESMP. The location of all works actions as relates to this contract will be described with a clear definition of the works area of influence, with a map showing the various locations provided. Summary information on the environment at these locations will also be included as this helps provide the environmental context to which the C-ESMP applies. A schedule of intended commencement and completion dates will be provided. Projects undertaken in stages will identify each stage in the schedule.

5. **Objectives**

The environmental outcomes of the plan will be defined. These will be tailored to the environmental issues outlined in the plan.

6. **Environmental Management Roles and Responsibilities**

The plan will define the roles and responsibilities of personnel in charge of the environmental management of the works. The roles and responsibilities of each relevant position will be documented, including the responsibilities of any subcontractors. The names of the responsible personnel do not need

to be included. Identification of the position titles, roles and responsibilities is sufficient. If the roles and responsibilities are expected to change over time the long-term variations will also be documented.

7. Reporting

The description of reporting requirements will include:

- a list of required reports including where appropriate monitoring, environmental incidents, non-compliance, corrective action and auditing;
- a description of the standard report content;
- the schedule or triggers for preparing a report;
- who the report is provided to; and
- document control procedures.

8. Environmental Training

All people involved with the works will receive relevant environmental training to ensure they understand their responsibilities when implementing the C-ESMP. People to be trained include those at the site/s of all Project activities and operations, including contractors, subcontractors and visitors. The training will be tailored to the role of the individual in the Project.
The C-ESMP will describe the training to be implemented and could include:

- site inductions;
- identification of key points of environmental value and any relevant matters of national environmental significance;
- understanding the requirements of the C-ESMP and the individual's role;
- environmental incident emergency response procedures;
- site environmental controls; and
- an outline of the potential consequences of not meeting their environmental responsibilities.

Records of all training conducted will be maintained and include:

- the person receiving the training;
- the date the training was received;
- the name of the person conducting the training; and
- a summary of the training.

9. Emergency Contacts and Procedures

The C-ESMP will identify the key emergency contacts responsible for managing environmental emergencies associated with the Project and their contact details. These personnel will have the power to stop and direct works so that they can manage emergencies effectively. In addition, the plan will establish procedures for managing environmental emergencies and ensure that those procedures are implemented and maintained.
The C-ESMP will also detail the Contractor's contingency plan for extreme weather events, medical emergencies and other rapid response situations.

10. Mitigation Measures

The C-ESMP will clearly state how the potential impacts of the proposal will be implemented and managed based on the stipulations in the ESIA/ESMP and this information usually forms the bulk of the

content of the plan. For each potential impact the plan will address specific measures that will be taken including:

- Summary of mitigation measures as related to the works and the ESMP;
- Additional subsequently identified mitigation measures to be implemented specifically in relation to identified offsite locations, including restoration of Project sites to the standard required in the ESMP;
- monitoring programs with trigger values for corrective actions;
- corrective actions and non-compliance reporting; and
- environmental schedules.

Sub-plans: The C-ESMP will also include all required sub-plans as an annex to the C-ESMP:

- Solid Waste Management Plan;
- Worker Management Plan;
- Traffic Management Plan;
- Spill Prevention and Emergency Response Plan; and
- Occupational Health and Safety Plan.

11. Audit and updates

Environmental auditing

The C-ESMP will include the schedule or triggers for auditing the implementation and effectiveness of the plan. It will address both internal and external audit requirements including who is responsible for undertaking the audits and reporting the results.

C-ESMP update

The environmental management plan will specify the schedule or triggers for updates of the plan. An update is required whenever there is a change to the scope of the works or construction methodology that changes the Projects area of impact or brings about a change that would be of public interest to know. The plan will also identify who will be responsible for undertaking the update.

Appendix E Solid Waste Management Plan Guidelines

The key objectives of this Solid Waste Management Plan (SWMP) guideline is to assist the Contractor to develop a SWMP that:

i. Maximize the amount of material which is sent for reuse, recycling or reprocessing;
ii. Minimize the amount of material sent to the landfill;
iii. Satisfies the national waste management legislations; and
iv. Satisfies the EHS requirements of the World Bank.

The SWMP requirements set that at a minimum:

i. No Ebeye landfills are to be used for any waste. All waste is to be recycled or disposed of offshore at a permitted facility;
ii. No dumping of any waste in RMI;
iii. Compliance with Waigani Convention and any other relevant international conventions for export of hazardous and non-hazardous waste;
iv. Identify and utilize suitable local recycling and reuse options;
v. Hazardous wastes such as old oil and fuel shall be collected and stored in self-bunded containers. Containers shall be stored in a bunded covered area approved by the relevant waste authority prior to collection for overseas disposal; and
vi. Difficult waste shall be stored in a secure fenced and covered area.

In addition to this, it is a requirement that best practices are implemented through the SWMP. These include:

i. Segregation of waste;
ii. Secure storage for waste;
iii. Adopting waste hierarchy: (i) avoid, (ii) reduce, (iii) reuse, (iv) recycle; and
iv. Collaborating with other sectors, waste generators and government department for cumulative benefit;

SWMP Content Requirements

1. Waste streams: identify which waste streams are likely to be generated and estimate the approximate amounts of materials. Solid waste streams include:
    - General waste (i.e. office type waste, household waste (from any workers camps), lightweight packaging materials);
    - Recyclable waste (i.e. certain plastics, metals, rubber etc. that can be recycled);
    - Organic biodegradable waste (i.e. waste that will decay / break down in a reasonable amount of time, such as green waste, food waste);
    - Inorganic non-recyclable waste (i.e. waste that cannot decompose / break down and which cannot be recycled);
    - Hazardous waste (i.e. asbestos, waste oil etc.); and
    - Disused material (e.g. dredge spoil).
2. Undertake inventory of materials that can be reused, recycled or recovered from the construction site:
    - Specific types of materials: a template assessment table below;
    - Amount of material expected; and
    - Possible contamination by hazardous materials like asbestos or lead: these materials will limit reuse/recycling options and require special disposal.

Waste and/or Recyclable Materials		Destination		
		Reuse and recycling		Disposal
Possible Materials Generated	Estimated Volume (m3) or Area (m2) or weight (t)	On-site (How will materials be reused and/or recycled on site)	Off-site (Specify the proposed destination and/or recycling facility)	Specify the disposal site and permit if required.

3. Disposal Services: identify an appropriately equipped waste management contractor who will provide compliant services for disposal of the waste streams generated.

   The following disposal methods will be used:
   - Organic biodegradable waste may be deposited at local composting facilities or separated (food waste) for pig feed in consultation with stakeholders;
   - Food waste and stores will be stored securely on site to avoid pests;
   - Recyclable waste may be supplied to Department of Waste Management in Funafuti to process such waste;
   - All scrap metals or metal waste will be provided to the Department of Waste Management to assist with their metal recycling program;
   - All other waste is to be disposed of OFFSHORE in permitted or licensed facilities;
   - It is the Contractor's responsibility to work with the Department of Waste Management to obtain all necessary permissions for transport and safe disposal of hazardous waste from the Project site in a legally designated hazardous waste management site within the country or in another country, and to ensure compliance with all relevant laws. Evidence will need to be supplied to the Engineer of proper disposal of waste at the final location;
   - All unclaimed surplus material from excavations shall be removed from the site area and safely disposed of in compliance with any local requirements at the Employer's nominated disposal site(s), before the start of the defects liability period; and
   - Unless otherwise instructed by the Engineer, other surplus materials not needed during the defects liability period shall be removed from the site and the country.

4. On-site: understand how the waste management system (sorting and storage) will work on-site, including bin placement and access.

   - Determine storage requirements (separate bins or co-mingled), things to consider include:
     - Ease of use: ensure that containers are easily accessible by workers and that storage areas are clearly sign posted;

- Safety: ensure that the containers and storage can be managed safely, including limiting public access to the site and protecting against spillage;
- Hazardous waste materials storage;
- Aesthetics: ensure that the site appears orderly and will not raise concern from local residents or businesses – for example screening for dust and litter containment and daily collection of windblown material; and

- Establish a collection/delivery plan in collaboration with waste contractors for waste and recyclable materials generated on-site.

5. Clearly assign and communicate responsibilities: ensure those involved in the Project are aware of their responsibilities in relation to the construction waste management plan.

6. Training: be clear about how the various elements of the WMP will be implemented.

7. Monitor: to ensure the plan is being implemented, monitor on-site as per the ESMP monitoring plan.

Appendix F Worker Management Plan Guidelines

GENERAL
The Worker Management Plan will be compliant with the specific prescriptions of the ESIA/ ESMP.

OBJECTIVES
To provide guidelines on the recruitment of workers and the selection, development, management, maintenance and restoration of workers accommodation camp sites in order to avoid or mitigate against significant adverse environmental and social effects, both transient and permanent.

WORKER RECRUITMENT
The Contractor is required to minimize the number of skilled workers that are recruited from overseas. No unskilled labour will be sourced from overseas. The Contractor will maximize the number of skilled and unskilled workers that are recruited from the Ebeye community.

The Contractor will be required to provide justification for any unskilled workers that the wish to recruit from overseas and explain why this position cannot be filled locally.

It is anticipated that there will be 20-25 employment opportunities available during the construction period. The Contractor must identify opportunities to provide appropriate roles for women (i.e., catering, cleaning, office roles, and security).

WORKERS CAMP FACILITIES
All facilities in the Workers Camp must be complaint with the stipulations of the ESIA/ESMP and the International Finance Corporation Workers Accommodations and Standards. The camp shall be provided with the following minimum facilities:

- Canteen, dining hall and dormitories as required shall be constructed of suitable materials to provide a safe healthy environment for the workforce and which facilitate regular cleaning and the provision of ventilation and illumination;
- Ablution block with a minimum of one water closet toilet, one urinal and one shower per 10 personnel engaged either permanently or temporarily on the Project. Separate toilet and wash facilities shall be provided for male and female employees;
- A sick bay and first aid station;
- Sewage collection facilities to allow for the treatment of black and grey wastewater discharge from toilets, washrooms, showers, kitchens, laundry and the like. The management of all camp wastewater water shall be as prescribed in the ESIA/ESMP;
- All camp facilities shall be maintained in a safe clean and or appropriate condition throughout the construction period;
- The Contractor shall provide, equip, and maintain adequate first aid stations and erect conspicuous notice boards directing where these are situated and provide all required transport. The Contractor shall comply with the government medical or labour requirements at all times and provide, equip and maintain dressing stations where directed and at all times have experienced first aid personnel available throughout the works for attending injuries; and

- Throughout the period of the contract the Employer, the Engineer, or their representatives shall have uninterrupted access to and from the camp for the purpose of carrying out routine inspections of all buildings, facilities or installations of whatever nature to ensure compliance with this specification.

WORKERS CAMP OPERATIONS

- The Contractor will be required to provide calculations of the amount of freshwater needed for the number of workers accommodated at the camp and is to demonstrate how they will provide this water. The use of existing freshwater resources on Ebeye will be kept to a minimum.
- The Contractor will be required to provide adequate provisions for the workers for the duration of the project so as not to deplete the available food sources of the community.
- All wastewater, solid waste, freshwater usage, noise levels, handling and storage of hazardous materials shall be as prescribed in the ESIA/ESMP.

MANAGEMENT OF OFF DUTY WORKERS

- The Contractor will prepare a specific Code of Conduct to describe the expected behaviours of their project worker in relation to the local communities and their social sensitivities.
- The Contractor is to ensure that all overseas project staff undergo a cultural familiarization session as part of their induction training. The purpose of this induction will be to introduce the Project staff to the cultural sensitivities of the local communities and the expected behaviours of the staff in their interactions with these communities. The PREPII PIU shall provide to the Contractor a list of approved service providers which shall include recognized NGOs and others for conducting this training.
- The Contractor is to stipulate the conditions under which visitors may attend the workers camp. Strict visiting hours will be enforced and all visitors will be required to sign in and out of the workers camp.
- The Contractor shall ensure that basic social/collective rest spaces are provided equipped with seating within the Workers Camp to help minimize the impact that the workers would have on the leisure and recreational facilities of the nearby communities. Provisions will also be made to provide the workers with an active recreation space within the camp.

SEXUAL EXPLOITATION AND ABUSE AND SEXUAL HARASSMENT AND WORKERS

- Awareness raising/sensitisation training will be provided and a Code of Conduct will be signed by all workers (including Project management) to demonstrate commitment to not perpetrate SEA/SH and the prevention of the spread of STDs such as HIV/AIDs.
- Worker Management Plan (WMP) will capture required SEA/SH risk mitigation and response measures as may be identified in the ESIA/ESMP.
- On mobilization, all Project staff (Contractor's and Engineer's) will undergo approved mandatory training by approved service providers on the prevention of SEA/SH and HIV/AIDS prior to deployment to Ebeye and/or commencement of works.
- Contractor will accept responsibility for implementing actions to reduce instances of HIV/AIDS and SEA/SH.

WORKERS CAMP MANAGEMENT PLAN

A Workers Camp Management Plan shall be submitted as an annex to the C-ESMP. The Workers Camp Management Plan shall describe how this document, the ESIA/ESMP and the International Finance Corporation Guidelines shall be implemented in the following:

- Recruitment strategy;
- Accommodation;
- Canteen and dining areas;
- Ablutions;
- Water supply;
- Wastewater management system;
- Proposed power supply;
- Full Code of Conduct for Workers;
- SEA/SH preventative measures;
- Recreational/leisure facilities for workers;
- Visitors to the Workers Camp; and
- Interactions with the local communities.