Environmental Assessment Document

January 2017

REG: Improving Internet Connectivity for Micronesia

Initial Environmental Examination

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Abbreviations

ADB	Asian Development Bank
BNPL	basic needs poverty line
CDL	chart datum level
DRC	Development Review Committee (Kosrae, FSM)
DTCI	Department of Department of Transportation, Communication and Infrastructure (Kosrae, FSM)
ECD	Environment and Conservation Division (Kiribati)
EEZ	exclusive economic zone
EMCSC	East Micronesian Cable Steering Committee (for the project)
ESMP	environmental and social management plan
ESIA	environmental and social impact assessment
FAD	fish aggregation devices
FSM	Federated States of Micronesia
GRM	grievance redress mechanism
ICT	information and communications technology
ICTD	Information and Communications Technology Department (Nauru)
MICTTD	Ministry of Information, Communication, Transport and Tourism Development (Kiribati)
MMA	Micronesian Maritime Authority
MPA	marine protected areas
MSL	mean sea level
NBSAP	National Biodiversity Strategy and Action Plan
PC	project coordinator (in each country)
PCR	physical cultural resources
PIA	project influence area
PMU	project management unit (in each country)
OP	Operational Policy (of the World Bank)
QPR	quarterly progress report
SESMP	site-specific environmental and social management plan (of the contractor)
SPREP	Secretariat for the Pacific Regional Environment Programme
SPS	Safeguard Policy Statement 2009 (of the ADB)
SPV	special project vehicle (in each country)
SR1	Safeguard Requirement 1 (of the ADB SPS)
UNCLOS	United Nations Convention on the Law of the Sea
WB	World Bank

Executive Summary

1. **Project background**. The Government of the Federated States of Micronesia (FSM), Government of Kiribati, and Government of Nauru are seeking assistance from the Asian Development Bank (ADB) and World Bank (WB) for a regional fibre optic cable to link the FSM State of Kosrae and the Micronesian countries of Kiribati, and Nauru, to the existing Hannon-Armstrong-1 cable which currently connects the FSM State of Pohnpei to Guam. The project will also provide internet access to Kiritimati Island in Kiribati to be financed by ADB. The WB will provide grant support to the project to cover the FSM and Kiribati portions of the project cost. The project will complement ongoing and existing cable systems connecting all the major islands in the North Pacific region.

2. **Project cost**. The total cost of the project is estimated to be $65.0 million, of which ADB will provide $30 million for the Nauru component and the Kiritimati Island link (Kiribati). The WB will provide parallel grant financing of $30 million to the project covering the FSM and Tarawa (Kiribati) components.

3. **Institutional arrangements**. The implementing agencies for the participating countries in the project are: FSM Department of Transportation, Communication and Infrastructure (DTCI); the Ministry of Information, Communication, Transport and Tourism Development (MICTTD) in Kiribati; and the Information and Communications Technology Department (ICTD) in Nauru. Each implementing agency is responsible for implementing the ESMP and complying with the safeguards policies of its development partner (WB or ADB) as per its funding agreement.

4. During implementation of the cable supply contract(s), each country's implementing agency may establish a project management unit (PMU) and/or hire a project coordinator (PC) to manage the project as delegated by the implementing agency. Compliance with safeguards requirements will be monitored by a safeguards advisor who will be part of the PMU in each country. Each implementing agency will be responsible for day-to-day project delivery including the supervision of the cable-laying contractor. This responsibility may be delegated by the implementing agency to its government PMU or its PC. Each country's PMU or PC will continue this role until the country establishes a state-owned entity or other special purpose vehicle for owning and operating each country's long term interest in both the undersea and terrestrial components of the project.

5. A firm will be engaged to undertake the detailed surveying (including establishing the marine cable alignment). Information form the surveys will be sued to update the environmental assessment and fill information gaps. A cable-laying contractor will be contracted to supply all undersea components of the project up to the beach manhole at each landing. Each of the parties will be separately responsible for letting the contracts for the associated terrestrial works at the respective landings.

6. **Environmental assessment**. The project is a category B for environment. At the time of preparation of this document, a project concept has been completed. At the outset of the project, it has been agreed by ADB and WB to adopt a common approach to the safeguards due diligence and to prepare a combined environmental and social impact assessment (ESIA) and environmental and social management plan (ESMP) that meets in-country laws as well as ADB and WB respective safeguards policies. This ESIA is equivalent to an initial environmental examination for the purposes of the ADB Safeguard Policy Statement 2009.

7. This ESIA was prepared to identify potential environmental and social impacts that may arise because of implementation of the project and to mitigate any impacts, with a focus on coastal zones and near-shore marine areas which form most the project influence area (PIA). Terrestrial infrastructure is relatively limited in extent and utilises existing facilities (e.g., in ground ducting, telecoms buildings and premises for landing stations, etc.) or is confined to public road reserves on existing easements. This ESIA for the project addresses the potential impacts relating to the installation and operation of the project by each of the three participating project parties. An ESMP is also provided which defines work area boundaries, work restrictions and time limits, to be included in the construction contract specifications which the contractor will need to comply with.

8. **Key components and infrastructure**. The key components of the subsea and terrestrial infrastructure include:

i. Fibre optic cable and repeaters (approximately every 200 km) laid on or beneath the sea floor using a trenching machine;At the shoreward ends of the cable across the intertidal zone, between the subtidal zone and a 'beach manhole (beach manhole) structure', the cable will be covered with lightweight protection consisting of standard articulated piping bolted to the substrate;

ii. A beach manhole landing facility which will likely comprise a small concrete manhole approximately 2m x 2m x 2m;

iii. Use of existing in ground ducting (as is the case in Kiribati), existing fibre optic cable already installed adjacent to the road (Nauru), or corridor within road easement currently used for existing telecommunications infrastructure (as is the case in Kosrae) along the main road to the cable landing station; and

iv. A secure DC power feed facility (including back up diesel generator and battery supply, earth mat, control systems, etc.) at Kiribati to power the cable repeaters to be located as close as possible to the cable landing station to minimise the risk of human contact with the buried or conducted power supply cable.

9. The cable landing stations are proposed to be located as follows: (i) Kosrae - the FSM Telecommunications Corporation earth station premises in Tofol; (ii) Kiribati - either the existing provider ATH Kiribati facility or the new Ocean Links facility to be constructed adjacent to the PBS aerial both in Bairiki (to be confirmed); and (iii) Nauru - Information & Communications Technology (ICT) Department building in Yaren.

10. **Impacts and risks**. The project will require limited land-based infrastructure, will have minimal mainly marine-based impacts which are limited in scale and extent and can be fully mitigated, will require no involuntary land acquisition, and will use existing infrastructure for landing stations and for conveying land based cable or where new infrastructure is required will use existing government easements and leases. The sub-marine cable will affect a corridor no more than 3-4 m wide on the sea floor in the open ocean and nearshore zone.

11. The final design of the cable route will be decided during project implementation. For project preparation, this ESIA has assessed the likely / probable cable routes and terrestrial infrastructure locations. The cable route will be designed to avoid sensitive habitats such as corals and conservation areas with placement guided by divers who will place the cable according to instructions from a marine ecologist.

12. These measures will assist with mitigating potential impacts on the marine environment. Several viable options have been identified for sites to be used for each beach manhole (beach manhole) site and as cable corridors to each cable landing station. Most sites are government owned or leased and none require involuntary land acquisition or resettlement.

13. Given the small-scale impact of the work, and the fact that nearly all the work is on board a vessel at sea, no negative social impacts are expected. Sensitive sites such as sea mounts and vents will be avoided to protect the cable and avoid potential environmental impacts.
The construction of the beach manhole facility on land will require a local sub-contractor. In Kosrae, a key potential impact relates to the disturbance to road users and adjacent land uses from the trenching of the cable within the government owned road reserve; to address this reinstatement of the disturbed areas will be required as specified in the ESMP. In Kiribati and Nauru no impacts are envisaged given the infrastructure is already in place to convey the terrestrial cable.

14. **Environmental and social management plan**. The ESMP defines a full set of working area boundaries, work restrictions and timing limits, which will be included in the construction contract specifications and which the contractor will have to comply with. The PMU/PC and supporting specialists as required will lead the ESMP implementation and will monitor compliance. Given the small-scale impact of the work, and the fact that nearly all of it takes place on board a vessel at sea with a specially trained crew, no negative social impacts are predicted during any stage of the project.

15. Further, the trenching will have to be completed using equipment that creates the smallest possible 'footprint' given that the cable, likely inside a case-hardened conduit, will be less than 6cm in diameter.

16. **Consultation and grievance redress**. Consultations with stakeholders and beneficiaries were undertaken during the preparation of the ESIA. Consultations were conducted in Kosrae between 17th and 20th October 2016, in Kiribati between 24th and 29th October, and in Nauru on 31st October and 1st and 2nd November 2016. At the consultation sessions, the grievance redress procedure was discussed. Participants were also urged to review the ESIA once it was publically disclosed. A consultation plan will be prepared for implementation by the PMU in each country, the consultation plan will detail how, when and what information will be communicated and how project beneficiaries can participate in the project.

17. The ESIA contains a grievance redress mechanism (GRM) defining the procedure for anyone with a complaint about the project. The GRM will be adapted as required by each country. The GRM will be established at the outset of project implementation. The site-specific ESMP to be prepared by the cable laying contractor will integrate the relevant components of the GRM into its SESMP.

18. **Monitoring and reporting**. All reporting and monitoring requirements are specified in the ESMP (and tables). In addition to submitting oceanographic mapping findings and alignment definition data provided by the surveying contractor and cale-laying contractor, the PC will be required to submit compliance monitoring checklists describing the progress achieved with ESMP implementation. The PC, supported by the safeguards advisor, will submit the reports as set out in the monitoring and reporting schedule (Table 8.2). In addition, semi-annual safeguards monitoring reports will be submitted to WB and ADB and these will be disclosed.

19. **Disclosure**. The ESIA, monitoring reports, and other project documentation will be made publically available as per the disclosure requirements of the ADB Public Communication Policy 2011.

20. **Follow-up requirements**. The PC overseen by the executing agency each country will provide full safeguard documentation (e.g., the updated ESIA and ESMP and alignment information) to the communities affected and will, with local authorities, conduct consultations once the draft of the final alignments is ready, inviting the PIA villages to help with final locations, particularly inside the reef boundary.

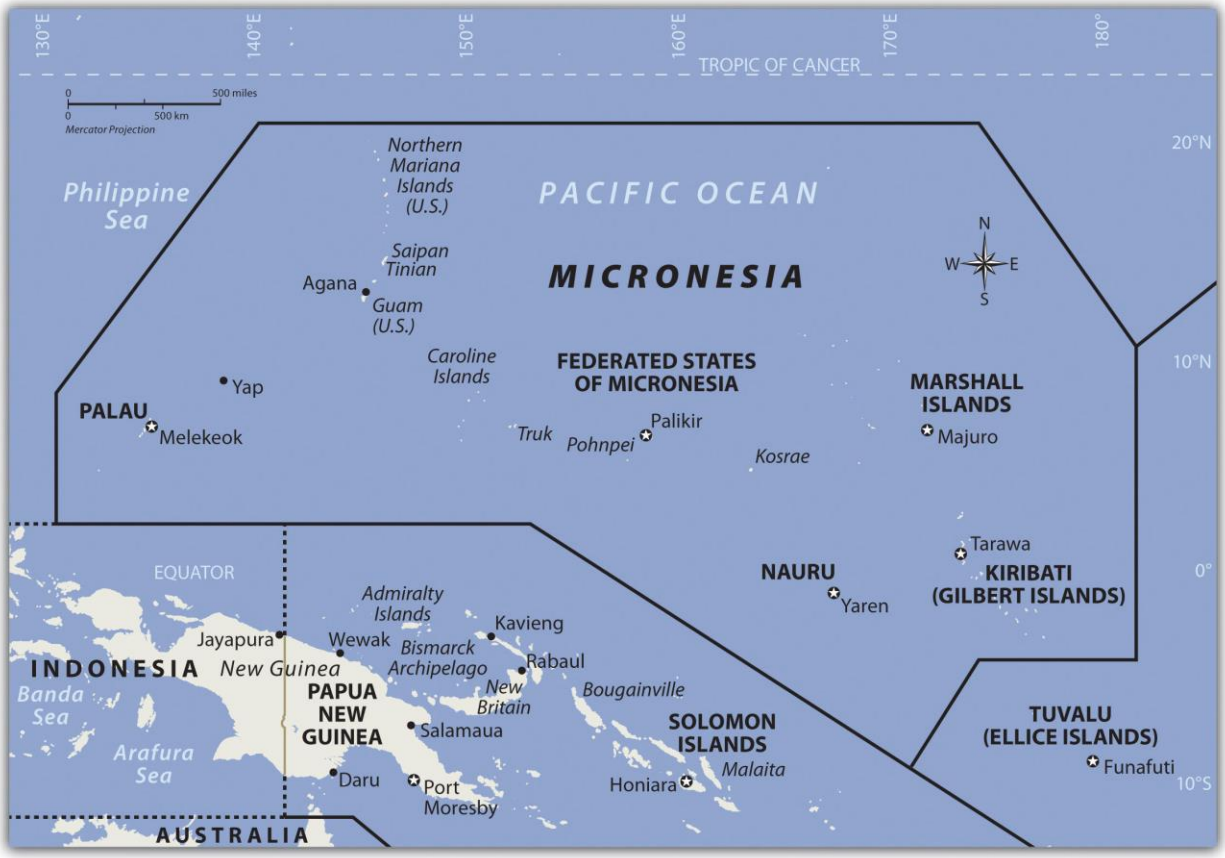
21. The governments recognize that the specific alignment of the cable and its deployment has not been finalized and as such there will be the need to revise and update this ESIA following the surveys, detailed design and cable alignment finalization. When this occurs the PC and safeguards advisor in each country will adjust the ESMP and discuss these changes with the executing agencies, WB and ADB to be sure that protection of the environment is robust.

1. INTRODUCTION

1.1 Background to the Project

1. The Government of the Federated States of Micronesia (FSM), Government of Kiribati, and Government of Nauru are seeking assistance from the Asian Development Bank (ADB) and World Bank (WB) for a regional fibre optic cable to link the FSM State of Kosrae and the Micronesian countries of Kiribati, and Nauru (Figure 1.1), to the existing Hannon-Armstrong-1 cable which currently connects the FSM State of Pohnpei to Guam. The project will also provide internet access to Kiritimati Island in Kiribati to be financed by ADB. The WB will provide grant support to the project to cover the FSM and Kiribati portions of the project cost. The project will complement ongoing and existing cable systems connecting all the major islands in the North Pacific region.[1]

Figure 1.1: Location of Project Countries in Micronesia, North Pacific



2. **Project cost**. The total cost of the project is estimated to be $65.0 million, of which ADB will provide $30 million for the Nauru component and the Kiritimati Island link (Kiribati). The WB will provide parallel grant financing of $30 million to the project covering the FSM and Tarawa (Kiribati) components.

[1] The north Pacific system comprises the ADB financed connection for Palau, the WB financed connections for Yap and Chuuk States of FSM, and the United States of America Government financed connections for the Republic of Marshall Islands and Pohnpei State, FSM.

3. **Institutional arrangements**. The implementing agencies for the participating countries in the project are: FSM Department of Transportation, Communication and Infrastructure (DTCI); the Ministry of Information, Communication, Transport and Tourism Development (MICTTD) in Kiribati; and the Information and Communications Technology (ICTD) Department in Nauru. Each implementing agency is responsible for implementing the ESMP and complying with the safeguards policies of its development partner (WB or ADB) as per its funding agreement.

4. During implementation of the cable supply contract(s), each country's implementing agency may establish a project management unit (PMU) and/or hire a project coordinator (PC) to manage the project as delegated by the implementing agency. Compliance with safeguards requirements will be monitored by a Safeguards Advisor who will be part of the PMU in each country. Each implementing agency will be responsible for day-to-day project delivery including the supervision of the cable-laying contractor. This responsibility may be delegated by the implementing agency to its government PMU or its PC. Each country's PMU or PC will continue this role until the country establishes a state-owned entity or other special purpose vehicle for owning and operating each country's long term interest in both the undersea and terrestrial components of the project.

5. A firm will be engaged to undertake the detailed surveying (including establishing the marine cable alignment). Information form the surveys will be sued to update the environmental assessment and fill information gaps. A cable-laying contractor will be contracted to supply all undersea components of the project up to the beach manhole at each landing. Each of the parties will be separately responsible for letting the contracts for the associated terrestrial works at the respective landings.

1.2 Project Rationale

6. One of the main challenges facing the region is the need to overcome its remoteness and dispersed geography by developing infrastructure to connect people domestically and internationally. The project is intended to provide essential backbone infrastructure to promote and support social and economic development across all sectors in each country and within the region. The long-term viability of the region hinges on domestic and international economic integration.

7. The North Pacific Micronesian countries of Kiribati, Republic of Marshall Islands, FSM, Nauru, and Palau are highly dependent on official development assistance, external funds flows, and rents from a limited set of natural resources such as oceanic fisheries and phosphate (for Nauru). Small and disperse populations and geographic isolation contribute to limited opportunities for productive business activity.

8. The private sector base is narrow and large public sectors dominate economic output and employment. Infrastructure projects tend to be development partner financed, and private investment is difficult to attract. Private sector development will significantly help the growth outlook in these economies, reducing heavy dependency on public expenditure.

9. Information and communications technology (ICT) development presents massive opportunities to stimulate private sector growth in these economies. Harnessing ICT could help facilitate enhanced education and training for the labor force (often the main resource available for exploitation in these small economies), raise overall efficiency in the delivery of basic public services, and open up business opportunities, among others. For example, these economies'

longitudinal position could potentially allow the small island economies of the Micronesian subregion to participate in opportunities opened by the ongoing trend of international business fragmentation, as facilitated by the ICT revolution. Based on a World Bank report, it was found that in low- and middle-income countries every ten-percentage point increase in broadband penetration accelerates economic growth by 1.38 percentage points.[2]

10. Such impacts result from reduced transaction costs for business, government, and households; new business opportunities; and the harnessing of ICT for improved public service delivery.

11. A submarine cable would provide higher capacity and quality broadband internet at much lower cost to Micronesia, making the internet more accessible and affordable to the broader population. This would help Islanders maintain social cohesion with their relatives residing abroad. Regional integration would also be supported by increasing the frequency and quality of communications among the countries in the region, thus increasing trade in services (tourism and back-office functions) and allowing the region to form a sizable market for digital products and services. It would also strengthen the existing regional public goods and encourage new ones by allowing countries to share the limited knowledge and human resources available in the Pacific. Moreover, a regional initiative will help the countries achieve significant savings in comparison with individual country cable investments. The proposed project will establish a cable system connecting the remaining major islands in the region which are currently not connected

12. The proposed project will support investment in a submarine fibre optic cable that would connect Kosrae, Kiribati and Nauru with Pohnpei to Guam and from there to the rest of the world via the global Internet. At present, Kosrae, Kiribati and Nauru rely entirely on satellite for Internet connectivity. The high cost, and the variable and limited availability of international bandwidth are major constraints to their ability to participate in the global Information Age and the concomitant opportunities for economic and social development that arise when cheap and accessible high speed Internet services are made available.

13. The proposed project will contribute to improved public services (including online government services such as health, education and financial services), will support the tourism sector, and will facilitate better trade and communication among north Pacific island economies.

1.3 Project Status and Documentation

14. This environmental and social impact assessment (ESIA) was prepared to identify all potential environmental and social impacts that may arise as a result of implementation of the project and to mitigate any impacts, with a focus on coastal zones and near-shore marine areas which form the majority of the project influence area (PIA). Terrestrial infrastructure is relatively limited in extent and utilises existing facilities (e.g., in ground ducting, telecoms buildings and premises for landing stations, etc.) or is confined to public road reserves on existing easements.

15. At the time of preparation of this document, a project concept has been completed. At the outset of the project, it has been agreed by ADB and WB to adopt a common approach to the safeguards due diligence and to prepare a combined ESIA and environmental and social

[2] The World Bank. 2009. *Information and Communications for Development 2009: Extending Reach and Increasing Impact.* Washington.

management plan (ESMP) that meets in-country laws as well as their respective safeguards policies. This ESIA is equivalent to an initial environmental examination for the purposes of the ADB Safeguard Policy Statement 2009 (SPS).

16. Given that the focus of this assessment is on coastal zones and nearshore marine areas, various marine surveys have been undertaken and are attached as a detailed report in Appendix 1. The outcome of the land due diligence assessment is provided in Appendix 2. Detailed design, including a detailed marine survey and identification of the final cable route and location of infrastructure, and land acquisition will occur during project implementation. These activities will be guided by the ESMP. The ESMP will be updated if any new sites or routes are identified through the detailed design phase.

1.4 ESIA Methodology

17. An initial evaluation of potential cable alignments was undertaken based on in-country consultations with officials from the respective governments. Then, further scoping activity was undertaken to evaluate these locations based primarily on eliminating the requirement for private or custom owned land acquisition and minimizing coastal zone environmental impacts. This initial scoping exercise identified several beach manhole sites and landing stations that facilitated the completion of the evaluation for this ESIA.

18. In addition, the assessment included a review of relevant secondary information sources, site visits, key stakeholder interviews, and public consultations to determine existing environment conditions in the PIA corridor, at beach manhole sites and along landside routes where cables are to be located. This was followed by an analysis of the potential impacts that the installation and operation of the fibre optic cable could have on the corridor's natural and socio-cultural environment. Data collected included the following:

- Potential land acquisition requirements;
- Sensitive environmental receptors within the PIAs, including conservation areas, fish aggregation devices (FADs) and special tourism sites, such as dive sites;
- Marine ecology of the coastal zone and nearshore waters likely affected by the cable project, including benthic and coral reefs conditions along the PIA corridor;
- Poverty and gender conditions in relation to the proposed work;
- Social impacts of faster and more reliable Internet connections; and
- Cultural heritage and archaeological sites within the PIA corridor.

19. The evaluation of the marine and terrestrial ecological resources in the three countries was undertaken in late October and early November 2016. Assessment methodology, specific site locations and detailed findings are presented in Appendix 1. This information was then used to assess potential environmental impacts and identify potential mitigation options during cable deployment and to prepare the ESMP, which forms part of the ESIA.

2. Policy, Legal & Administrative Framework

2.1 Kosrae

2.1.1 Resource Management

20. There are a considerable number of government and semi-government agencies involved with marine resource management at national and state levels in the FSM. Each State operates independently in fisheries matters within State territorial waters.

21. The FSM government's Marine Resources Division of the Department of Resources and Development is responsible for providing the government (national and state) with technical information, advisory services and support for development and management activities in marine resources including fisheries, aquaculture and coastal resource management. It is additionally responsible for non-living marine resources within the 200-mile exclusive economic zone (EEZ). A major function is to liaise with foreign and international agencies concerning marine resources.

22. The Micronesian Maritime Authority (MMA) was established to regulate the use of and to manage and conserve the resources within the 200 mile EEZ. One of the MMA's key functions is to adopt and promulgate regulations for the conservation, management, and exploitation of all living resources in the EEZ.

23. In Kosrae, the Marine Resources Division of the Department of Conservation and Development is the state agency responsible for the management and development of marine resources. The Kosrae Island Management Resources Authority is the state agency responsible for assessments relating to land usage, permitting for developmental programs, identification of conservation areas, enforcement, development of environmental regulations, and development and implementation of environmental management plans. An environmental assessment is required to be prepared (Section 19.104 of the State Code) if a development or activity affects "the environmental quality of fishery waters".

24. The Kosrae Conservation and Safety Organization is a non-governmental organization whose purpose is "*to further projects relating to awareness and protection of the natural environment and to public health and safety; to conduct community programs and related programs applicable to these projects within Kosrae* …"

25. The Kosrae National Biodiversity Strategy and Action Plan (NBSAP) outlines the state of the nation's biological resources and the current biological and human-related threats that affect their continued existence.

2.1.2 Land & Tenure

26. The State Government controls a major part of the land in Kosrae, namely government owned lands, mangrove areas, nearshore areas, and lagoon areas. Primarily, government lands are of the interior, above the 'Japanese line';[3] and foreshore areas.

[3] A line which sets aside the upper elevation of Kosrae Island; land above the line is designated as Government and land below the line is where private-own designations begin.

27. Kosraeans can own land but not outsiders (foreigners). The land is owned in “fee simple” with a certificate of title issued when the registration process is complete for individual landowners. However, if the land is inherited by multiple heirs or if customary family land is held in common, then a ‘tenancy in common’ title is issued.

28. Accessing land through usufruct or access rights (customary practice) was common for hunting or gathering purposes. Nowadays, this is more common in the upland and government owned areas. Accessing land and use rights for productive lands, particularly in settled areas, is done through leasing agreements.

29. As a protectorate measure, foreign ownership of land is through leasing titles only. Kosrae state law allows locals and foreigners alike to lease for up to a 55-year term renewable for an additional 55 years. Although this provides secure access and use for the lease period, issues such as land ownership disputes, lack of certainty, poor surveying capabilities, absence of records, and uncertain parameters for customary usage often hinder foreign investment. As in other Pacific island land tenure systems, land transactions are often made under customary practice, which is frequently undocumented. This makes accurate determination of ownership rights and pricing of land difficult to determine.

30. The Kosrae Constitution is the primary rule of law in the State of Kosrae. In its preamble, it declares Kosraeans are one, as people, in their language, in their traditions, and in their family and communal life. The Preamble acknowledges the bounty and beauty of Kosrae pledging to preserve those natural riches. Thus, the legal foundation for the State’s environmental protection and conservation, both human and physical, is laid.

31. The Kosrae State Code Title 11, Land and Environment, sets out the requirements regarding the acquisition and use of land. Under Titel 11, the Governor can transfer title or interest in public land on behalf of the State but only with the Legislature’s resolution. The Governor also has the authority to designate suitable areas of the public land for homesteading to eligible persons.

32. In managing land and land use, the Kosrae State Code provides for land use planning, surveying practice, homesteading and establishment of the Land Court. The Land Court determines and registers land titles. Further, the deed of trust allows for the transfer of an estate in real property or freehold or leasehold interest in real property to secure an obligation. This practice allows land transactions for monetary or customary obligations.

2.1.3 Legal Framework

33. As described in Section 2.1.1, there is significant legal provision in existing law for managing and conserving the environment of Kosrae. Table 2.1 lists state and national laws relevant to the Kosrae portion of the project.

34. The Development Review Commission (DRC) is a five-member body that reviews development proposals and is mandated to “*protect the environment … balancing development with those of environmental quality … ensuring that economic and social development is environmentally sustainable*”. The DRC has the authority to enter, enforce, and issue injunctions, mandamus, or other remedies requiring compliance through the Attorney General. Further, the DRC has the authority to protect the environment and antiquities.

35. The State can acquire an interest in private land for public purpose. The Constitution and Article XI, Land and Environment, provide for fair compensation should there be a need for land acquisition for resettlement. The process must be done in good faith with reasonable effort to avoid substantial hardship to the interested parties[4].

36. An environmental assessment may be required particularly if any development or activity affects the environmental quality of fishery waters, which is determined following consultation with the Director of the Marine Resources. If an environmental assessment is required, then the Director has the right to submit comments before a decision is made by any State Government Authority such as the DRC

37. Based on the initial consultation regarding the project an application will need to be submitted to determine whether an environmental assessment is required for the installation and use of the cable and associated facilities, for State approval.

Table 2.1: Relevant National and State Legislation for Kosrae

National Legal Framework	
FSM Constitution	The supreme law and it establishes the national, state, and municipal governance.
Federated States of Micronesia Environmental Protection Act 1984	Provides for the protection of the environment, culture, historic and natural aspects of Micronesian heritage.
Marine and Freshwater Quality Standards Regulations 1986	Identifies the uses for which waters of FSM shall be maintained and protected (water quality).
Trust Territory Solid Waste Regulations 1979	Establishes the minimum standards for the design, construction, installation, operation and maintenance of solid storage, collection, and disposal systems.
FSM Earthmoving Regulations 1988	Earthmoving activities permits are issued by the Secretary of Human Resources.
FSM EPA Environmental Impact Assessment Regulations 1989	Requires the National Government and its agencies to submit Environmental Impact Statement (EIS) to the Secretary of Human Resources prior to any “major” action significantly affecting the quality of the human environment.
FSMC, Title 26 Historical Sites, and Antiquities	Policy to protect and preserve the diverse cultural heritage of the people of Micronesia.
State Legislation	
Constitution of the State of Kosrae	Primary rule of law in the State of Kosrae
Kosrae State Code, Title 17, Chapter 4	Establishes the Kosrae EPA
Kosrae Code Section 11.201	Land use and subsidiary regulations
Kosrae Code, Section 14.1302	Foreign fishing agreement
Kosrae Code, Section 11.1601	Endangered species
Kosrae Code, Section 13.514	Water quality
Kosrae Code, 13.523	Unauthorised procuring of marine life
Kosrae Code, Section 13.524	Endangering a species
Kosrae Code, Section 11.1401	Protection of antiquities and traditional culture
Kosrae Code, Section 13.506	Littering

[4] Palik vs Kosrae, 5 FSM Intrm. 147. 152-154 (Kos. C. Ct. Tr. 1991).

2.2 Kiribati

2.2.1 Resource Management

38. Marine resources are very important to the people of Kiribati, as it is their main protein source. Subsistence and small-scale fishing operations are carried out throughout the islands with fishing activities focused both within lagoons for reef fish and shellfish and nearshore for tunas and other pelagic species.

39. The Maritime Zones (Demarcation) Act (1983) establishes Kiribati jurisdiction over an exclusive economic zone including description of areas within these limits relating to international and archipelagic waters and the territorial sea. Kiribati is not however, a party to the United Nations Convention on the Law of the Sea which established the international basis for supporting the claim over 200 miles of exclusive economic zone.

40. The Foreshore and Land Reclamation Ordinance Act 1969, as amended in 2005, proclaims State ownership of the foreshore and sea bed, subject to public rights and navigation. This means that the legislation does not seek to override customary rights in marine areas. The Laws of Kiribati Act 1989 acknowledges customary law in that it may be applied to:

- The ownership by custom of rights in, over, or in connection with any sea or lagoon area, inland waters or foreshore or reef, or in or on the seabed, including rights of navigation and fishing; and

- The ownership by custom of water, or rights in, over or to water.

41. The Ministry of Fisheries and Marine Resources Development is the Kiribati Government Agency responsible for developing and managing the nation's fisheries as well as other marine resources (marine aggregates, deep-sea minerals). The Ministry has two main technical divisions, the Fisheries Division and the Mineral Resources Division. The development and management of the marine resources within Kiribati falls under the jurisdiction of the Fisheries Division. The Fisheries Division is mandated under fisheries-related legislation: The Fisheries Ordinance (CAP 33) and the Fisheries (Pacific Island States' Treaty with the United States of America) Act 1988. The Fisheries Ordinance has been amended by the Fisheries (Amendment) Act 1992; the Fisheries (Amendment) Act 1995 and the Fisheries (Amendment) Act 1997. In addition, the Republic of Kiribati has a National Development Strategy that also addresses marine resources.

42. Kiribati has several statutory provisions that address environmental management issues. The key ones are the Environment Act 1999 and 2007 Amendment; the Draft Environmental (General) Regulation, 2009; the Schedule of Environmentally Significant Activities, i.e. a list of actions/projects that would likely trigger environmental effects needing assessment. The 1999 Act established the Environment and Conservation Division (ECD) within the Ministry of Environment, Land and Agricultural Development (MELAD) as the mandated Division for environmental protection, resource conservation and sustainable development.

43. Kiribati has also established a system of marine protected areas (MPA) that aim to conserve marine biological diversity and serve as ecologically representative networks of protected areas at sea. Currently there are twelve MPA primarily set up for stock enhancement of marine species that have been identified and confirmed to be declining in numbers, yet important for Kiribati's livelihood and economic wellbeing.

44. There is no current legislation in Kiribati to protect national heritage except for vague references in the Mineral Development Licensing Ordinance (1978) (in relation to the reporting of finds by prospectors and the authority of the Minister in respect of the preservation of finds) and the Local Government Act (1984) (the role of Local Councils in the preservation, control and removal of any antique artefacts).

2.2.2 Land & Tenure

45. The Kiribati land tenure system is encapsulated in six legislations, namely the Native Land Ordinance of 1956, the Gilbert and Phoenix Islands Lands Code, the Landowners Taxation Ordinance, the Neglected Lands Ordinance, the Non-Native Land (Restriction on Alienation) Ordinance of 1974, and the Native Land (Amendment No.2) Ordinance. It is important to note that almost all land in Kiribati belongs to the I-Kiribati, except for the Phoenix and Line Islands, small portions of reclaimed land owned by the Government, and lands belonging to the Catholic and Protestant churches. I-Kiribati land rights and interests are inherited and can also be gifted (Gilbert and Phoenix Islands Lands Code 1956). Also, any environmental management and resource conservation effort requires the cooperation of the landowners.

46. Land ownership is fundamental to the I-Kiribati socio-cultural way of life. Land is owned by families, whom the head has the right to distribute land to its members. In effect, land is a source of power and prestige among local people. Land is central to community's socio-political environment, particularly among the older generation. Family members have equal rights to family lands, to use (build) and access (collect produce). Traditionally, land ownership infers ownership of groundwater, provides fishing rights, harvesting rights, and a social security.

47. The Kiribati land tenure system upholds the rights of landowners, as stipulated in the Native Land Act; landowners 'controls the use of his property. Accordingly, the Land Planning Act provides for land use planning in the 'public interest.' It is significant to note that even on Government leaseholds on South Tarawa, the landowner retains the right to veto applications for sublease on his land. The landowner can either consent or refuse to sign on the planning application form.

48. Government, businesses, non-government organisations, and churches lease large areas of family land. In addition, there are substantial areas of South Tarawa occupied by internal migrant settlers from other parts of Kiribati. The government owns some land, namely state land. This is confined to Temwaiku Bight, which is 200ha of reclaimed land. It also leases lands in Betio, Bairiki and Bikenibeu from private landowners. Due to the depleted land supply and the tenure situation, a large segment of the urban population either constructs houses illegally or enters formal or informal agreements with landowners to occupy the land. In Betio, Bairiki, and Bikenibeu, some homes and squatter settlements are found amongst shops and offices. About two thirds of the 5,584 households in South Tarawa live on land that is owned by their families. One in ten household's live on land that is neither owned nor leased. These households are built on informal or other arrangements with the landowners. These types of arrangements have no legal or contract basis. However, many land disputes are due to poor informal agreements.

2.2.3 Legal Framework

49. As described in Section 2.1.1, there is significant legal provision available within the existing legislation for managing and conserving the environment of Kiribati. Table 2.2 presents reference to legislation considered relevant to this project.

50. The Constitution, the Native Land Ordinances of 1977 and the State Acquisition of Lands Ordinance of 1979 provide for compensation arrangements in case of involuntary resettlement. This is only applied if those who are resettled have not breached any law. The large number of people who occupy land as squatters, or with informal arrangement are not covered.

Table 2.2: Relevant Legislation for Kiribati

The Republic of Kiribati Constitution	All natural resources of Kiribati vests in the people and Government of Kiribati. In implementing the Constitution, the customs and traditions will be upheld.
Native Land Ordinance 1956	Native lands cannot be alienated to non-native person. Title to native land registered by the Native Lands Commission.
Neglected Land Ordinance 1959	Provides for the purchase of lands that, in the opinion of the Minister responsible, are neglected.
Land Planning Ordinance 1973	Provides for control of land use and development only in areas designated under the Ordinance.
Environment Act 1999 Environment Amendment Act 2007	Provides for integrated systems for development control, environmental impact assessment and pollution control. Reduce risks to human health and prevent the degradation of the environment. Protect and conserve natural resources.
Local Government Act 1984	Provides for building control and town and village planning is the function of Local Council.
Plants Ordinance 1976	Provides for the protection of plants in Kiribati and for control of plant importation.
Maritime Zones (Demarcation) Act 1983	Establishes Kiribati jurisdiction over an exclusive economic zone. Also, defines international and archipelagic waters and territorial sea.
Foreshore and Land Reclamation Ordinance 1969	Proclaims State ownership over the foreshore and seabed, subject to public rights and navigation.
Laws of Kiribati 1989	Acknowledges customary law that it may be applied to ownership in, over, or in connection with any sea or lagoon area, inland waters or foreshore or reef, or in or on the seabed, including rights of navigation and fishing.
Fisheries Ordinance 1977	Provides for Minister's role in developing the fisheries resources for the full benefit of Kiribati.
Public Utilities Ordinance 1977	Grants exclusive rights over the provision of water in any declared water supply area.
Wildlife Ordinance 1975	This provides for the establishment of wildlife sanctuaries in Kiribati.
Protected Area Ordinance 1957	Provides for the Minister responsible, on the advice of Cabinet, to declare all any island a prohibited area wherein entry is forbidden without permission.
Closed District Act 1990	Provides for the President, acting on Cabinet advice, to declare closed districts over parts of islands.
Mineral Development Licensing Ordinance 1978	Provides for reporting by prospectors. There is no current legislation to protect national heritage.

51. Although not identified as a prescribed requirement (Schedule of Environment Act 1999), in consultation with MELAD it was indicated that an environmental assessment would likely be required before an "environmental licence" can be provided. This would be determined following provision of a development application for review.

2.3 Nauru

2.3.1 Resource Management

52. The key environmental management, environmental health and resource management and conservation legislation in Nauru is detailed in Table 2.3. The Nauru Fisheries and Marine Resources Authority Act establishes the Nauru Fisheries and Marine Resources Authority as the authority responsible for regulating and developing Nauru's fisheries and marine resources. The Authority is responsible for the management of offshore fisheries, coastal fisheries and aquaculture; as well as owning the Nauru Fisheries Corporation that acts as the commercial arm of the Authority. The key fisheries laws are the Nauru Fisheries and Marine Resources Authority Act of 1997, which regulates the fishing industry, both inshore and within the 200-Mile EEZ, and the Fisheries Act of 1997.

53. Although there is currently no specific environmental assessment legislation in Nauru the Department of Commerce Industry & Environment is in the process of developing environment policy with assistance from Secretariat of the Pacific Regional Environment Programme (SPREP) and the Justice Department to develop appropriate legislation to provide a much clearer environmental assessment process.

2.3.2 Land and Tenure

54. Government and corporate entities do not own land in Nauru. They must enter leasing agreements with the rightful land owner. Further, non-Nauruans cannot own land in Nauru. In most Pacific island countries including Nauru, a large majority (80%-100%) of the land is customary land. The customary land is owned collectively or jointly by indigenous families.

> "*(2) Any person who transfers … the freehold of any land in Nauru to any person other than a Nauruan person shall be guilty of an offense; (3) Any person who, without the consent in writing of the President, transfers, sells or leases, or grants any estate or interest in any land in Nauruans…is guilty of an offense*" s3 Lands Act 1976.

55. Most lands held by individuals are unsevered separate shares of portions of land held originally by families or individuals. Ownership of customary land can be both male and female. Nauru is one of the countries that has homogeneity in the customs of indigenous people. Unlike other countries, Nauru has customary land but not customary chiefs. Instead, a Land Committee is appointed by Cabinet.

56. Utilising customary land as a security for a loan is neither authorised nor prohibited by legislation, but the practice has developed. For example, the outright transfer of individually owned land to Nauruan money lenders is practiced. The government can only lease land. Under the Lands Act 1976 compulsory acquisition by the government is possible, but rarely used.

57. All land transfers, sales or leases, or grants of any land estate or interest therein, of any land in Nauru must be consented by the President. The Constitution (s26) and the Lands Act 1976 provides for Nauruans' rights to land. The Lands Act provides for compensation in cases of involuntary resettlement with compensation fees prescribed under the schedules of the Act.

Table 2.3: Relevant Legislation for Nauru

Constitution of Nauru 1968	Provides the basis for Nauru's government and legal authority.
Lands Act 1976	Repealed Lands Ordinance (1921-1968), and made provision for the leasing of land for phosphate industry. For leasing land for other public purposes, it covers the removal of trees, crops, soil, and sand, and payment of compensation respectively.
Land (Declaration of Ownership) Ordinance 1962	Provision for compensation to Nauruans landowners who were not compensated for phosphate mined from the German Wireless Station land area.
Land Committee Act 1956	Established the Nauru Land Committee to determine questions on ownership and rights in respect of land where issues involve Nauruans and Pacific Islanders.
Customs and Adopted Laws Act 1971	Provisions relating to the institutions, customs, and usages of Nauruans, and adopted laws.
Sea Boundaries Act 1997	This demarcates Nauru's sea boundaries and maritime zones and declares the rights of the Republic of Nauru in these zones.
Wild Bird Protection Act 1937	Prohibition on taking of magpies, snipe, quail, Nauru canneries, and noddies.
Agricultural Quarantine Act 1999	Provides for the protection of plants, animals and public health. Also, the protection, development, and utilization of the natural resources and the environment by preventing introduction and spread of diseases and pests.
Fisheries Act 1997	Established the Nauru Fisheries and Marine Resources Authority to manage, develop, conserve and protect the fisheries and marine resources of Nauru.
Nauru Antiquities Ordinance 1935	Provides for the protection of the Nauru antiquities, relics, curios and article of ethnological and anthropological interest and scientific value.
Telecommunication Act 2002	Provides for establishment, maintenance, operation and retaliation of telecommunication services in, to and from Nauru.
Public Health Ordinance 1925-1967 / Health (Eatinghouse) Regulations 1974	Provisions for safety of the public health of Nauru.
Criminal Procedure Act 1972	This is relevant to any criminal prosecutions which may be undertaken in relation to offenses against any environmental law.
Criminal Justice Act 1999	Provisions for appropriate penalties to be applied for persons committing littering and other offenses which affect the environment.
Nauru Rehabilitation Corporation Act 1997	This affords specific provisions for the rehabilitation works in Nauru.
Port Authority Act 2006	Establishes the Port Authority with vested powers that covers the marine environments.
Litter Prohibition Act 1983	Provides for abatement of litter.
Animals Regulation 2000	Extends the provisions of the Animal Act to include most other animals.

58. Although there is currently no environmental assessment legislation in place it is likely that the Nauruan Government will request an environmental assessment to be provided.

2.4 International and Regional Treaties, Conventions and Agreements

59. The three countries are signatories to a range of international conventions and treaties of relevance to this project (see Appendix 3).

2.5 World Bank and ADB Safeguard Policy Framework

60. **Introduction**. The project is located across three different countries where different in-country and development partner policies and laws apply. Each country therefore has its own project appraisal requirements with its own categorisation. However, for simplicity and for cohesion with the overall project requirements, a single environmental assessment document has been prepared.

61. Set out below is an analysis of the WB operational policies and ADB's SPS that have been triggered by the project. A review of relevant policies is provided below and an evaluation of compliance can be found in the tables in Appendix 4.[5]

2.5.1 World Bank

62. The World Bank has 10+1 safeguard policies. The operational polices (OP) that are relevant to the project are discussed below.

63. **Operational policy 4.01 – environmental assessment**. The WB requires an environmental and social assessment (ESA) of category A and B Projects proposed for WB financing to ensure they are environmentally sound and sustainable, thereby improving decision-making. Operational policy (OP) 4.01 requires (i) detailed qualitative and quantitative analysis to determine project impacts, (ii) determination of tangible measures to prevent, minimise, mitigate or compensate for those adverse impacts, (iii) public consultation and disclosure as part of the environmental assessment 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.

64. This policy is triggered by the project. The project is category B, as the impacts are readily mitigatable and reversible. This ESIA satisfies the environmental assessment requirements of OP4.01.

65. **Operational policy 4.04 – natural habitat.** OP 4.04 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. The policy further requires the environmental assessment to identify impacts on biodiversity and species and to determine endemism, endangered species and to determine project impacts on these species and to propose acceptable mitigation and monitoring measures.

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[5] Asian Development Bank. 2009. Safeguard Policy Statement (Manila, Philippines)

66. This OP is triggered as natural habitats may be disturbed temporarily during cable laying in the intertidal zone. No protected areas are located within the PIA for either Kosrae or Kiribati. The ESIA has been informed by ecological surveys of subtidal and intertidal reef and foreshore in Kosrae and Tarawa. Although there are areas of sensitive habitat (i.e., corals and seagrass beds), mitigation measures will be adopted to avoid and minimise disturbance. Significant seabed habitats, such as hydro-thermal vents and seamounts, will be surveyed during the detailed design phase and avoided. There are no natural habitats in the footprint of the terrestrial infrastructure.

67. **Operational policy 4.10 – indigenous peoples.** OP 4.10 requires engagement in a process of free, prior and informed consultation with Indigenous Peoples (IP's), as described by the policy in situations where IP's are present in, or have collective attachment to, the project area and for the preparation of an indigenous peoples plan and /or indigenous peoples planning framework. An assessment completed by the WB into the application of OP4.10 in Pacific Islands countries concluded that the Kosrae and Kiribati projects do not trigger this policy.

68. **Operational policy 4.11 – physical cultural resources.** OP 4.11 seeks to avoid the disturbance and/or destruction of physical cultural resources (PCR) as defined by this policy by the projects activities. PCR includes places of worship, buried artefacts, cemeteries, and archaeological assets, etc. The policy further requires, (i) environmental assessment to undertake an exhaustive desk review and/or site investigation to pre-identify and locate PCR's in the PIA, (ii) environmental assessment and EMP to propose management measures and (iii) to include "chance find" clauses in civil works contracts during construction and maintenance stages.

69. No PCR were identified during the baseline surveys. Due to the small infrastructure footprint, there is a low likelihood of PCR being discovered during construction. A chance find procedure has been included in the ESIA and the policy is triggered as a precautionary measure in case a PCR is discovered.

70. **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 chosen as to avoid these impacts altogether or to minimise them to the extent possible. Where these cannot be avoided, the policy requires the preparation of either or both instruments: (i) resettlement policy framework, (ii) resettlement action plan. The policy also requires meaningful consultations with potentially affected people. The policy prohibits community donations of lands for location-specific infrastructure.

71. All land acquisition will be voluntary at the three landings for this project. The location of the cable is flexible and can be changed to accommodate voluntary land acquisition. The land due diligence study (see Appendix 2) indicates that there are several suitable government-owned or leased sites available for the location of infrastructure, none of which will cause any involuntary resettlement. If private or custom-owned land is required, this will be acquired voluntarily, using lease or easement arrangements. Therefore, this policy is not triggered.

2.5.2 Asian Development Bank

72. The objectives of the SPS are to ensure the environmental soundness and sustainability of projects and to support the integration of environmental considerations into the project decision-making process.

73. The SPS consists of three safeguard requirements (SR): SR1: environment; SR2: involuntary resettlement; and SR3: Indigenous Peoples. The objectives of ADB's safeguards are to: (i) avoid adverse impacts of projects on the environment and affected people, where possible; (ii) minimize, mitigate, and/or compensate for adverse project impacts on the environment and affected people when avoidance is not possible; and (iii) help borrowers/clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks. The SPS sets out the process to be applied from screening, through due diligence and assessment to monitoring and reporting.

74. **Environmental assessment**. The objective of SR1 is to ensure the environment soundness and sustainability of projects and to support the integration of environmental considerations into the project decision-making process. To help achieve the desired outcomes, ADB adopts a set of specific safeguard requirements that need to be achieved during the processing and implementation of projects financed by ADB.

75. Through a process of screening, ADB categorizes projects by their potential risk or level of impact, and the category of a project will determine the level of assessment required. The requirements apply to all ADB-financed and/or ADB-administered sovereign and non-sovereign projects, and their components regardless of the source of financing, including investment projects funded by a loan; and/or a grant; and/or other means, such as equity and/or guarantees (hereafter broadly referred to as projects). In broad terms, environmental safeguards are triggered if a project is likely to have potential environmental risks and impacts, and an environmental assessment commensurate with the impact and risk is required. This evaluation confirms that this ESIA addresses all matters identified in the SR1 set out in the ADB SPS.

76. **Naural and critical habitats.** SR1 includes requirements for assessing the significance of project impacts on modified, natural and/or critical habitat. As described above, ocean natural habitats may be disturbed temporarily during cable-laying in the intertidal zone. No protected areas are located within the PIA for either Kosrae or Kiribati. The ESIA has been informed by ecological surveys of subtidal and intertidal reef and foreshore areas. No marine critical habitats were identified. There are no terrestrial natural or critical habitats affected by the project.

77. **Physical cultural resources**. SR1 also contains provisions for protecting PCR. As noted above, no PCR were identified during the baseline surveys. Due to the small infrastructure footprint, there is a low likelihood of PCR being discovered during construction. A chance find procedure has been included in the ESIA and the policy is triggered as a precautionary measure in case a PCR is discovered

78. **Health and safety**. The project will be required to provide workers with a safe and healthy working environment, considering inherent risks, any hazards in the work areas, including physical, chemical, biological, and radiological hazards. The SPS also requires that the government, through the implementing agency, will take steps to prevent accidents, injury, and disease arising from, associated with, or occurring during work.

79. The project will adhere to international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environmental Health and Safety Guidelines.[6]

80. **Involuntary resettlement**. This ESIA demonstrates that the project will not involve involuntary resettlement and therefore the involuntary resettlement safeguard is not triggered. The land due diligence assessment is in Appendix 2.

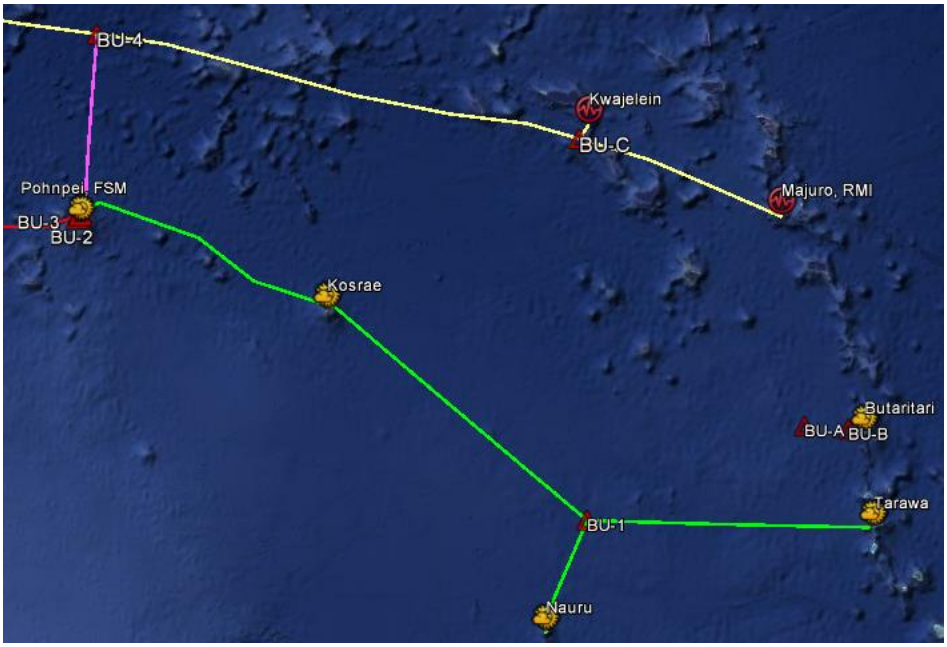
81. **Indigenous people**. As the majority of populations—i.e. the sole or overwhelming majority of project beneficiaries—of each country are indigenous, this policy is not triggered by the project. The elements of an indigenous people's plan are integrated into project design and incorporated into project documents.

3. Project Description

3.1 Project Components

82. The project involves installing a submarine fibre optic cable from Pohnpei to Kosrae (approximately 550 Km) and to Kiribati (approximately 1,250 Km) with either an intermediate landing or a spur to Nauru (approximately 250 Km). The newly constructed portion of the EMC system will total over 2,000 km, much of it in deep ocean water. Subject to final determination after technical review, a possible configuration for the system is pictured in Figure 3.1.

Figure 3.1: Proposed North Pacific Subsea Cable Route



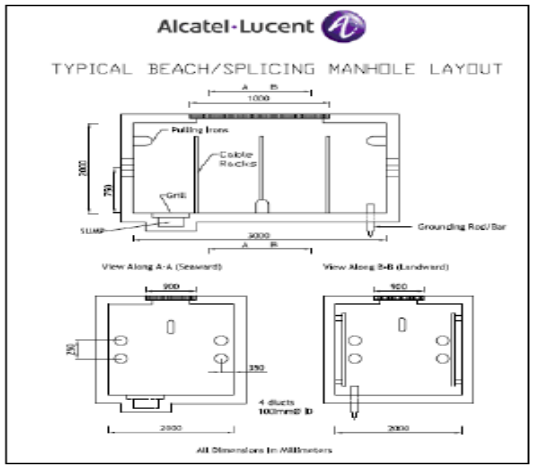
83. The key components of the subsea and terrestrial infrastructure include:

[6] World Bank Group. 2007. *Environmental, Health, and Safety General Guidelines.* Washington, DC.

- Fibre optic cable and repeaters (approximately every 200 km) laid on or beneath the sea floor using a trenching machine.
- At the shoreward ends of the cable across the intertidal zone, between the subtidal zone and a beach manhole structure, the cable will be covered with lightweight protection consisting of standard articulated piping bolted to the substrate.
- A beach manhole landing facility which will likely comprise a small concrete manhole approximately 2m x 2m x 2m (Figure 3.2).
- Use of existing in ground ducting (as is the case in Kiribati), existing fibre optic cable already installed adjacent to the road (Nauru), or corridor within road easement currently used for existing telecommunications infrastructure (as is the case in Kosrae) along the main road to the cable landing station.
- A secure DC power feed facility (including back up diesel generator and battery supply, earth mat, control systems, etc.) at Kiribati to power the cable repeaters to be located as close as possible to the cable landing station to minimise the risk of human contact with the buried or conducted power supply cable.

84. The cable landing stations are proposed to be located as follows: (i) Kosrae - the FSM Telecommunications Corporation earth station premises in Tofol; (ii) Kiribati - either the existing provider ATH Kiribati facility or the new Ocean Links facility to be constructed adjacent to the PBS aerial both in Bairiki (to be confirmed); and (iii) Nauru - Information & Communications Technology (ICT) Department building in Yaren.

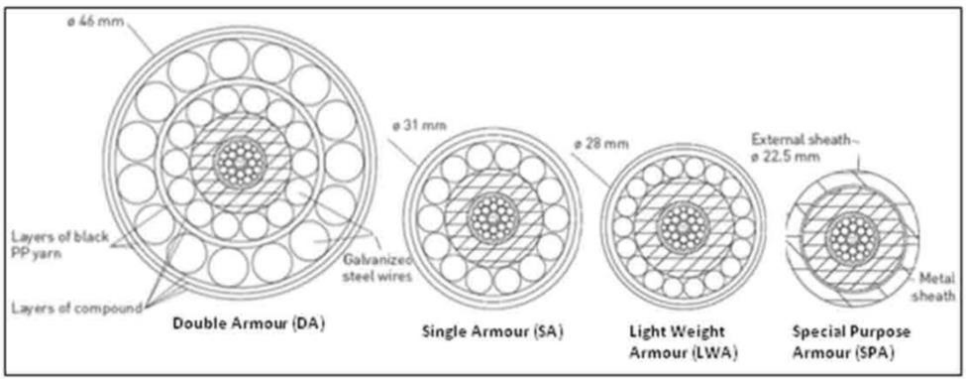
Figure 3.2: Typical layout of a beach manhole landing facility



85. The subsea cable, consisting of double armoured cable to 200 m depth and single armoured cable to 1,000 m depth (Figure 3.3), will range in diameter from 4 - 7.5 cm. The subsea cable will be buried in a trench dug by a towed submarine plough, requiring a corridor no more than 0.75m wide (see Section 5 for further detail). It is also the preferred method for the

cable laying project in north-western Micronesia connecting undersea cable to Palau and the FSM States of Yap and Chuuk.[7]

Figure 3.3: Fibre optic cable options



86. The trench, which will be approximately 25 cm wide by 0.5-0.75m deep, is opened and then closed once the towed plough lays the cable into the trench (Figure 3.4). In the intertidal, the cable will be either trenched using an excavator (approximately 1m wide by 0.5m deep) or the armoured cable will be attached directly to the reef surface. This will be up to the discretion of the appointed contractor but either method is expected to have similar minimal environmental impacts.

Figure 3.4: Example of Submarine Cable Ploughs

87. Where there isn't existing capacity to deliver the land-side fibre cable from the beach manhole to the cable landing station the cable could be installed using several methods including trenching (which may require removal of vegetation where present) using a small excavator or thrusting, whereby cable conduit is pushed underground in advance of pulling the cable (see Figure 3.5). This technique is often used where there is sensitive infrastructure is present at the surface (i.e., road crossings, driveways, buildings, sensitive vegetation, etc.).

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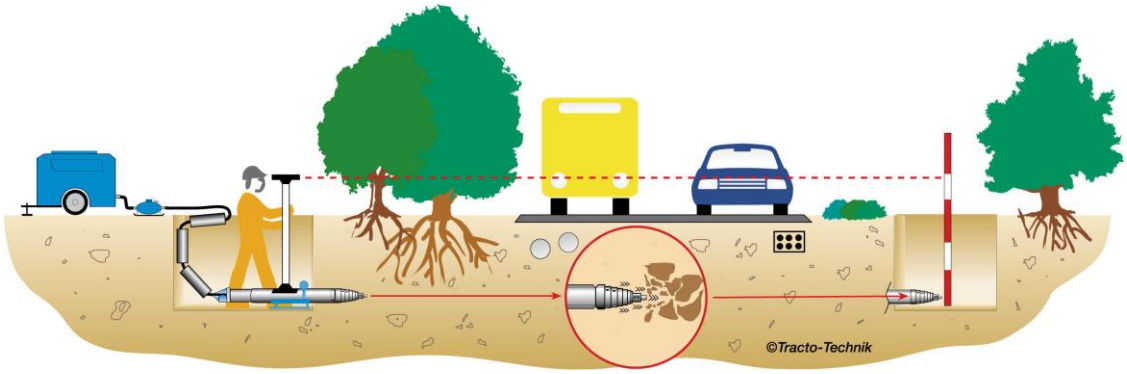
[7] FSM Government. 2016. Environmental & Social Impact Assessment. Palau FSM Connectivity Project - Environmental & Social Safeguards: Yap and Chuuk Cable System Components (Grant No. D004-FM. Project No. P130592, March 2016).

Figure 3.5: Schematic showing typical conduit thrusting approach



88. No hazardous wastes and little or no non-hazardous wastes are expected to be generated. Where non-hazardous wastes are generated these will be disposed of at approved facilities.

3.2 Project Location

3.2.1 Submarine Component

89. Subject to further technical review for the final route and configuration, the submarine component of the project will involve cable placement on the sea floor in the open ocean connecting Pohnpei to Kosrae then Kiribati, with a spur providing a connection to Nauru. Three "shore end" installations will be required; the potential locations are described in detail below. The shore end installations will connect the open ocean segment to the terrestrial infrastructure traversing the fringing reef at each location. The exact location of the cable routes will be determined following a detailed bathymetric marine survey to be conducted during the detailed design phase. Hence, the cable alignments described in the following sections are indicative and are subject to refinement.

90. The marine survey will characterize the proposed cable route and allow avoidance of hazards and/or environmentally significant zones. Surveys include water depth and seabed topography, sediment type and thickness, and potential natural or human-made hazards. A marine route survey for a cable installation commonly assesses a seabed corridor from 1 to 10 km wide with repeat passes where necessary. The marine survey will determine the final cable route which will avoid sensitive submarine features such as sea mounts, hydrothermal vents, coral assemblages, seagrass beds, fishing reserves and other important environments. There is sufficient flexibility in alignment design such that individual coral heads in near shore environments, for example can be avoided.

91. The marine survey will also inform the detailed design of the submerged infrastructure – the cable and repeaters. This will determine the cable types and quantities, and clarify the nature of its deployment on the seafloor – surface laying, or trenching and burial – and the need for supplementary cable protection. The ESIA and ESMP will be updated.

3.2.2 Nearshore and Beach Component

92. Several alternative beach manhole and cable landing station sites were investigated as follows:

- Kosrae - Kosrae Airport at Okat (BMH1); Phoenix Hotel site (BMH2); the 'bench' site (BMH3); the Yacht Club in Lelu Harbour (BMH4); Tofol (BMH5); Sanskrit Elementary School (BMH6); The 7 Day store in Melem (BMH7); and Otwe Harbour (BMH8). The cable landing station is proposed to be located at the Telecom earth station premises in Tofol.
- Kiribati - Bonriki International Airport (BMH1); King George V High School (BMH2); the Public Broadcasting Service (PBS) Radio tower site adjacent to Nanikai Village at the eastern end of the causeway (BMH3); and a site located at the eastern end of Bairiki Village at the western end of the causeway (BMH4). The cable landing station is proposed to be located either at the ATH Kiribati facility or the new Ocean Links facility to be constructed adjacent to the PBS aerial, both located in Bairiki.
- Nauru -– Government Buildings (BMH1) and Gabab Boat Ramp (BMH2). The cable landing station is proposed to be located at the ICT building in Yaren.

93. Figures 3.6 - 3.8 presents the location of potential beach manhole and cable landing station sites. Appendix 5 provides more detailed potential alignments. Further evaluation of the shore-side locations and landing stations options is provided in Section 5.2.

94. Based on the analysis provided in Section 5.2 the following beach manhole sites are preferred: (i) Kosrae - Kosrae Airport at Okat (BMH1); Sanskrit Elementary School (BMH6); (ii) Kiribati - the Public Broadcasting Service (PBS) Radio tower site adjacent to Nanikai Village at the eastern end of the causeway (BMH3); and a site located at the eastern end of Bairiki Village at the western end of the causeway (BMH4); and (iii) Nauru -– Government Building (BMH1) site.

Figure 3.6: Locations of Potential Beach Manhole and Landing Station - Kosrae

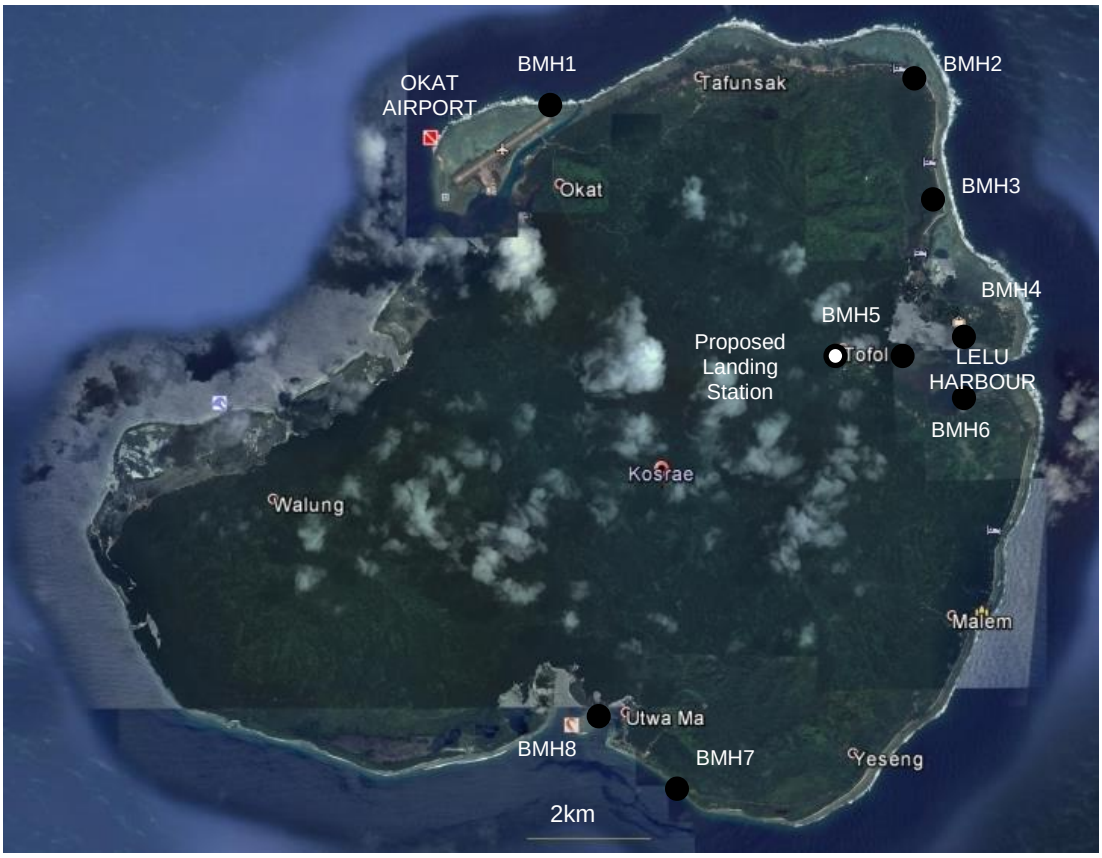


Figure 3.7: Locations of Potential Beach Manhole and Landing Station - Kiribati

Figure 3.8: Locations of Proposed Beach Manhole and Landing Station – Nauru

4. Description of the Environment (Baseline Data)

95. This section presents baseline data describing the physical, biological and socio-economic elements of the environment, which has been used to assess the environmental impacts and which can be used to benchmark future monitoring.

96. The PIA considered for assessment of baseline conditions consists of the cable route as it enters the nearshore coastal environment, the beach manhole (beach manhole) sites and the terrestrial cable route to the cable landing station site. The PIA is defined through consideration of the project footprint including all ancillary project components and potential impacts on environmental, economic and social resources. All data was obtained by desktop study and field surveys conducted in late October / early November 2016.

97. As described in Section 3.2.2, several sites were evaluated; all the data from the evaluation of these sites is included, including that of the preferred sites. Table 4.1 outlines the guidelines that have been followed in determining the PIA for this project which is based on best practices from previous similar studies and by adopting a precautionary approach.

Table 4.1: Project influence areas delineations and conditions

Environment	PIA
Offshore (>3nm from coastline)	The accuracy of the placement of the cable on the sea floor reduces with depth and the increased influence of ocean currents. A 500m corridor either side of the cable has been adopted as a precautionary limit for the PIA.
Inshore and coastal waters (<3nm from coastline)	As the accuracy of cable placement increases, the PIA reduces. Taking a precautionary approach, a 100m corridor either side of the cable (200m total) has been used for the foreshore PIA.
Intertidal zone	10m wide (5m on either side of the cable) area on the shore approach of the cable through the intertidal zone
Beach manhole sites	20m radius from the center point of new terrestrial structure within existing government easements for public works.
Terrestrial cable route	A 20m corridor has been assessed for any terrestrial trenching activities.
Important species habitat	To give specific regard to migratory cetaceans, a 1km belt either side of the cable (2km in total) has been identified in water depth less than 200m.

4.1 Physical Environment

98. This section of the report describes the physical environment in Kosrae, Kiribati and Nauru. The location of the Islands is shown in Figure 4.1.

4.1.1 Location and Geography

99. **Kosrae**. Kosrae is one of the four states that make up the FSM. Kosrae Island is a high island of volcanic origin situated in the Caroline Islands, a little over 5° north of the equator, with a total area of approximately 112 km^2. The steep mountainous interior, which has four peaks ranging in height from 465-620m above mean sea level, is covered with lush tropical rainforest. Around much of the island there are continuous mangrove swamp forests and seaward coastal strands. The island is surrounded by a broad shallow carbonate platform much of which is covered by freshwater swamps, mangrove forests and low coral land and beach strand.[8] A coastal road circles two-thirds of the island, built largely on the coastal strand at the seaward edge of the mangrove forest, from Otwe in the south through to the Airport at Okat in the northwest.

100. **Kiribati.** The Gilbert Island chain of the Republic of Kiribati straddles the equator in the west-central Pacific. This NW-SE trending chain of 11 atolls and five reef islands rises from oceanic floors ~4,000 m deep.

101. South Tarawa comprises a series of islets with a total area of approximately 15.8km2, oriented east-west and connected by causeways, and a recently upgraded road that links Bonkiri Airport in the east to Betio in the West. South Tarawa adjoins North Tarawa which also consists of a series of islets, orientated approximately north-west south-east to form Tarawa atoll. The atoll lies at a latitude 10°20' north and 172°–173° east, approximately 150km north of the equator. The atoll developed from a volcano which appeared between 55 million and 65 million years ago (during the Palaeocene geologic epoch)[9]. Over time, the peak of the volcano sank below sea level as a result of subsidence of the ocean floor.

102. **Nauru.** The Republic of Nauru, one of the world's smallest independent nations, is located approximately 50 km south of the equator at 0°31'south and 166°56'east. Nauru is an independent republic with a land area of only 21 square kilometers and a population in the order of 10,000 (Census 2011). Nauru imports over 95% of its goods by sea transport and is a vital link for the country's current and potential exports (phosphate, dolomite aggregate and fish).

103. The offshore topography of the island of Nauru is unique in the Pacific region and possibly worldwide. From the shoreline of the essentially oval-shaped island, a narrow fringing reef transitions to a seabed which drops away at an abrupt 45-degree slope, down to depths of more than 3.0 km offshore. There is no lagoon or area of sheltered water inside the fringing reef, which could provide sheltered water for a safe anchorage or harbor, as, is typical of other Pacific Island countries. Hence, the island is extremely exposed to Pacific Ocean swells and winds, particularly from the northwest during the monsoon season (October to March), and no natural harbor exists around Nauru's coastline.

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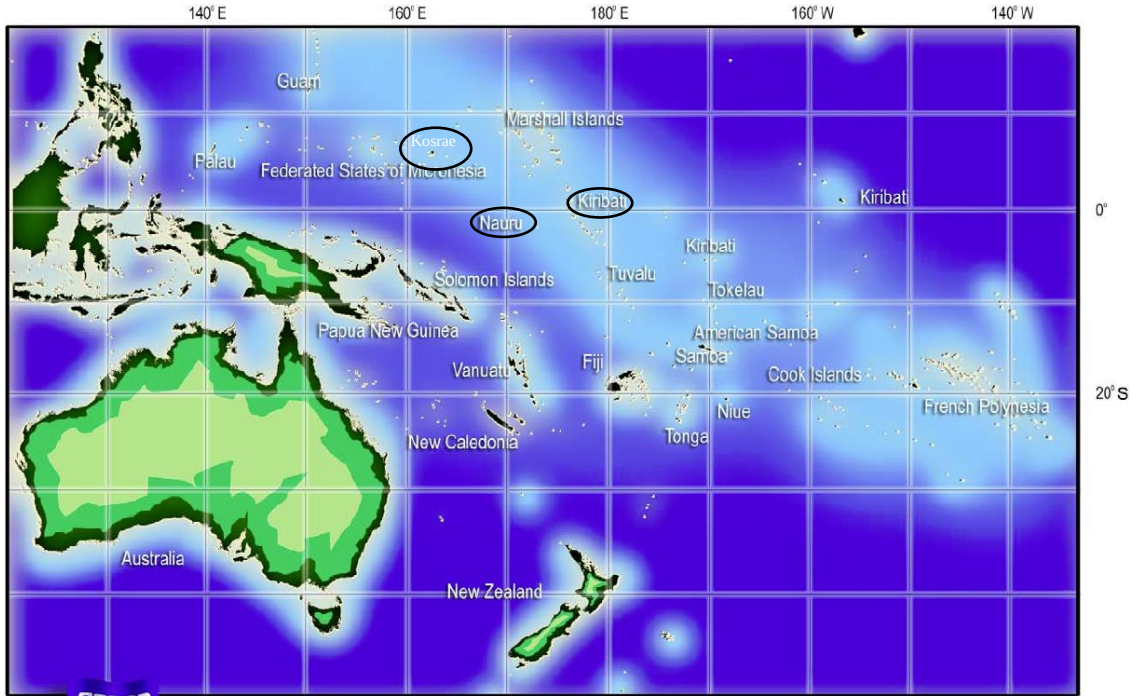
[8] US Army Engineers. 1989. Kosrae Coastal Resource Inventory. Prepared by US Army Engineers, Honolulu.

[9] Richmond, B.M., 1993. Reconnaissance geology of the Gilbert Group, western Kiribati. SOPAC Technical Report 77, 65 p.

Figure 4.1: Approximate location of Kosrae, Kiribati and Nauru in the wider Pacific



4.1.2 Climate

104. **Kosrae**. The climate of Kosrae is tropical marine with daily temperatures ranging from about 24C to 29 C with little average variation throughout the year. Annual rainfall exceeds 1,016 cm in the mountains.[10] Northeast trade winds prevail from about November to May when conditions may be drier on western islands of the FSM. The region is affected by storms and typhoons which are generally more severe in the western islands, and by periods of drought and excessive rainfall associated with the "El Nino" (ENSO) phenomena. In recent times, the droughts of 1982-1983 and 1997-1998 were especially severe.

105. **Kiribati**. Tarawa has a maritime tropical climate. Two seasons occur, characterised mainly by prevailing wind patterns but also by rainfall. Between October and March, easterly trade winds predominate and rainfall is generally higher, while between April and September, more variable winds occur including westerlies, which can be strong and rainfall is generally lower.

106. Temperature generally vary between 28°C and 32°C, averaging 31°C, though monthly averages remain very constant between 26°C (February) and 28°C (September). Rainfall averages 2,027 mm annually; however, this varies widely, between 398mm and 4,333mm. Rainfall patterns are influenced by the convergence patterns of trade winds. El Niño events bring higher rainfall to Tarawa while during La Niña events the reverse happens. The island is subject to intermittent droughts, when the drier season can extend

[10] Wortel *et al.* 2003. Federated States of Micronesia - Fourth National Report 2010. Implementation of Article 6 of the Convention on Biological Diversity.

well beyond the months of April to September. Unlike many other Pacific islands, Tarawa rarely experiences cyclones.

107. Climate change in Kiribati, which is expected to increase the incidence and severity of droughts, is of concern due to increased risk of higher sea surges, greater variation in temperature, loss of land area and constriction of freshwater lenses. South Tarawa could lose between 25% and 54% of its land mass by 2050,[11] and it is predicted that the thickness of the freshwater lenses below South Tarawa may be reduced by 18-19%.[12]

108. **Nauru**. Nauru is in the dry belt of the equatorial oceanic zone, with diurnal temperatures ranging from 26 - 35°C.[13] Annual rainfall is extremely variable, averaging 2,126 mm, with a range of 280 to 4,590 mm. Rains are more frequent between December and April. Prolonged droughts are common and cause severe stress on native ecosystems and species. During the drier months of May to November, the prevailing wind direction is generally easterly at 5 to 10 knots. During the wetter months, the winds are generally from the west at 10 to 18 knots. Nauru does not experience tropical cyclones, although it is occasionally subject to strong winds.

4.1.3 Topography, Geology, Soils and Hydrology

109. **Kosrae**. Kosrae is a volcanic high island with relatively flat and narrow coastal plains extending from the foothills to the shore. Soils are typically brownish red in colour, mostly fine granular clay depending on the bedrock and can be deep in places. The parent rock is mostly Olivine or Benhaline basalt, and in places is porous and slaggy. Carbonates compose most reef environments which include fringing reefs, lagoon floor, barrier reef, and deep passes.

110. **Kiribati**. Kiribati atoll sediments have been formed by successive coral deposits around the old and now submerged volcano. The atolls of North and South Tarawa, and the surrounding reef delineate the edges of the lagoon which occupies the site of the former volcanic core. The atolls and the lagoon cover the peak of the former volcano, which rises sharply from the sea bed. The rock is variable in consistency, reflecting the growth patterns of the coral, which forms the harder rock and large voids which have filled with coral derived fragments forming softer rock.

111. The atolls have soils derived exclusively from coral deposits which are predominantly sandy in texture, with a significant silt component formed from abrasion of the sand deposits. Depth to the groundwater or freshwater lenses varies between 1 and 4 m. Over much of the island, deposition and breakdown of organic matter has led to the formation of a very thin layer of topsoil. The soils are free draining when uncompacted, have poor nutrient status and are generally alkaline.

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[11] World Bank. 2000. Cities, Seas and Storms: Managing Change in Pacific Island Economies. Vol IV: Adapting to Climate Change, World Bank, Washington

[12] South Pacific Sea Level and Climate Monitoring Project. 2009. Pacific Country Report on Sea Level and Climate Change: Their Present State for Kiribati.

[13] SPREP. 2013. Rapid biodiversity assessment of Republic of Nauru.

112. Surface relief is extremely low, attaining a maximum of 3m above sea level. Measurements show that gradual uplift is taking place, as a result of the dynamics of ocean floor movements, in the order of 1mm per year.[14]

113. **Naur**u. Nauru has a total land area of approximately 21 km^2 with a maximum elevation of 71 m. It is considered unique as it consists of a single raised phosphatic island presumed to have been created by hotspot volcanism during the mid-Eocene to Oligocene period. It is estimated that the seamount is capped by about 500m of limestone, with uplift and sub-aerial exposure of the carbonate platform during the Pleistocene.[15]

114. Most the land area (70%) has been utilized for phosphate mining. The remaining 30% is used for domestic, commercial, industrial and government purposes, with the international airport occupying a sizeable area on the south-eastern side of the island. The only significant freshwater resource is a lens of often slightly brackish water hydrostatically 'floating' on high density sea water.

115. **Seismology and earthquakes**. Earthquakes can impact on fibre optic cables when there are significant geological plate movements that stress the cable and or when this movement creates deep sea landslides. Based on data from the website http://earthquaketrack.com the areas around Kosrae, Kiribati and Nauru have not experienced any earthquake activity in recent times with most activity centred around the Marianas Trench some 2,000km to the north west of Kosrae.

4.1.4 Oceanographic characteristics

116. The basic tide parameters in Kosrae are semi-diurnal (2 tides a day) with a strong diurnal inequality and a maximum tidal variation of just over 1.5 m (meso-tidal).[16] Small seasonal and daily tidal fluctuations have been recorded related to sea conditions associated with prevailing weather patterns. Storm systems impact tidal height and can cause increased coastal erosion when coinciding with high water levels.

117. Kiribati tides are semi-diurnal. Spring tidal amplitude can exceed 2 m. Sea level in Tarawa also varies 40 cm with ENSO shifts (higher during El Nino phases), and even seasonally, related to variations in the strength of ocean currents.[17] Higher sea-levels and larger waves during El Nino phases likely have a marked impact on shorelines.

118. Ocean currents are influenced by both the westward northern equatorial current, the eastward equatorial counter current and, particularly at shallower depths, wind patterns.

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[14] Geoscience Australia. 2009. South Pacific Sea Level and Climate Monitoring Project (SPSLCMP) Survey Report February/March 2009: EDM Height Traversing Levelling Survey.

[15] Jacobsen, G., Hill, P.J. and Ghassemi, F. 1997. Geology and hydrogeology of Nauru island. In: Vacher, H.L. and T. Quinn (eds). Geology and hydrogeology of carbonate islands. Developments in Sedimentology 54: 707–742

[16] Wolanski E, Furukawa K. 2007. The Oceanography of Palau. Pp. 59–72 in Kayanne H., Omori M., Fabricus K., Verheij E., Colin P., Golbuu Y., Yukihira H. (eds.), Coral Reefs of Palau. (Palau International Coral Reef Center, Palau, 238 pp.)

[17] Solomon, S. 1997. Assessment of the Vulnerability of Betio (South Tarawa, Kiribati) to Accelerated Sea Level Rise. (SOPAC Technical Report 251, 67 pp.)

119. Nauru tides are semi-diurnal. Mean sea level (MSL) is 1.57 m above chart datum level (CDL). The high neap-tide water level is 0.24 m above MSL, the high spring-tide water level is 0.85 m above MSL, and the highest high water is 1.07 m above MSL.

4.1.5 Deep Ocean features

120. There is a paucity of information describing the deep ocean features surrounding Kosrae, Kiribati and Nauru. However, using google earth imagery it appears that, apart from the potential seamounts located between Pohnpei and Kosrae, the abyssal plain is relatively flat and featureless. This is in stark contrast to the western islands of the FSM where there are significant deep ocean ridges, trenches, seamounts and thermal vents present.

121. Further consideration of hydrothermal vents and seamounts potentially present along the proposed cable route is provided below.

122. **Hydrothermal vents**. There are very few studies and resulting information available detailing hydrothermal vents along the proposed cable alignment corridor. Hydrothermal vents occur when volcanically heated water is discharged from cracks in the earth's crust. Typically, water from these vents exceeds 300°C and is prevented from boiling by the large overlying hydrostatic pressure. Within a few meters of the discharge the water cools to around 2.5°C. The water can also be extremely acidic, thus corrosive, and can leach out minerals from the surrounding rock.

123. Individual vent structures are usually small, measuring only a few tens of metres across, and stand a similar height off the surrounding sea floor. Typically, individual vents exist within fields. These fields, which can measure in the order of a few kilometres across, are sites where hydrothermal activity is closest to the surface. Vents are ephemeral and could occur at any site along the proposed cable alignment at any point in time, replacing sites that become dormant or are destroyed by volcanic activity.

124. Deep sea thermal vents can support unique ecosystems consisting of densely populated organisms occurring within a few hundred square metres of the vent.[18] Deep sea vents generally occur near volcanic activity ranging from 500m depth to the deep ocean.[19]

125. **Seamounts**. Seamounts generally originate as volcanoes and are generally associated with intraplate hotspots, mid ocean ridges or island arcs. They can support unique ecosystems with high biodiversity and act as important aggregations sites for pelagic and demersal fish resources, and invertebrates. They have also been reported to act as important navigational 'waypoints' for oceanic migratory species.[20] Recent studies have shown that the pelagic biodiversity around seamounts is far greater than in open ocean areas, and even in coastal

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[18] Llodra R, Billett D 2006. Deep-sea ecosystems: pristine biodiversity reservoir and technological challenges. In: Duarte CM ed. The exploration of marine biodiversity: scientific and technological challenges. Bilbao, Spain, Fundacion BBVA. Pp 63–92.

[19] See https://php.radford.edu/~swoodwar/biomes/?page_id=1027 for further detail

[20] Rodgers, A., (2012). An Ecosystem Approach to Management of Seamounts in Southern Indian Ocean. Volume 1. Overview of Sea Mount Ecosystems and Biodiversity. IUCN Global Marine and Polar Programme.

reefs. On average, 15% of benthic species found associated with seamounts in the Pacific are endemic either to that specific seamount or to a cluster of seamounts.[21]

126. The main cause of this increased diversity is up-welling currents and oceanographic phenomena that drive primary productivity and create additional ecosystem niches that support more species associated with sea mounts.

127. Benthic areas not associated with hydrothermal vents, sea mounts and active spreading zones, such as the abyssal plains and ridges, also support a diverse albeit less dense populations of invertebrates.[22]

128. Benthic organisms associated with the deep water along the proposed cable route have no current national economic importance and are not harvested commercially. The technology to access deep parts of the ocean floor for large scale collection or any potential commercial use is still not developed. The same limitations restrict the better understanding of the deep-sea area.

4.1.6 Unexploded Ordinance

129. All three countries have significant World War II histories. Although the risk is considered low, due diligence and careful consideration will be needed during near-shore stages of cable deployment to ensure that the presence of unexploded WW II ammunition, that may be present buried in the substrate for both Kosrae, Kiribati and Nauru if present is removed.

130. A detailed assessment of the cable alignment will need to be undertaken during the survey assessment to ensure unexploded munitions are located and removed before the cable is deployed.

4.2 Biological Environment

4.2.1 Marine Fauna

131. The marine environments associated with the deep waters surround the project islands and the associated marine flora and fauna are poorly understood, especially the benthic systems. Information relating to movements of several highly migratory commercially targeted finfish species (e.g., tuna) is available at a large spatial scale however data on movement of large iconic fauna groups such as the cetaceans (e.g. whales, dolphins) is limited.

132. **Cetaceans**. The EEZ of FSM has resident and transient or migratory populations of cetaceans (whales and dolphins). There has been no dedicated scientific survey undertaken to

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[21] Alder, J. & Wood, L., 2004. Managing and protecting seamount ecosystems. In: Morato T, Pauly D eds Seamounts: biodiversity and fisheries. Fisheries Centre Research Report 12(5). Pp. 67– 73.

[22] Llodra R, Billett D 2006. Deep-sea ecosystems: pristine biodiversity reservoir and technological challenges. In: Duarte CM ed. The exploration of marine biodiversity: scientific and technological challenges. Bilbao, Spain, Fundacion BBVA. Pp 63–92.

study to identify establish marine mammal diversity within FSM waters resulting in a paucity of information.[23]

133. There are a total nine confirmed species each for the FSM and Kiribati EEZs, and four from Nauru, the limited records attributed to its relatively small EEZ (see Table 4.1). There are an additional unconfirmed cetaceans species for FSM (three species), Kiribati (eight species) and Nauru (two species). Of the cetacean species records for the three countries, blue whale *Balaenoptera musculus* is considered endangered (i.e., likely to become extinct) and sperm whale *Physeter macrocephalus* is considered Vulnerable (i.e., is likely to become endangered unless the circumstances threatening its survival and reproduction improve) based on the IUCN Red List (version 3.1).

134. For the remaining cetaceans, they are either of 'least concern' or there is insufficient information to make scientific assessments on status.

135. **Marine turtles**. Several key points can be made regarding the distribution of sea turtles in the three project countries:

- The green turtle *Chelonia mydas* and hawksbill turtle *Eretmochelys imbricate* are regularly observed in Kosrae.[24] These species are the most commonly observed in the wider FSM waters, with the olive ridley turtle *Lepidochelys olivacea* and the leatherback turtle *Dermochelys coriacea* being less common.[25]
- Five species of turtles in Kiribati including the green turtle, hawksbill, loggerhead *Caretta carretta* and olive ridley and, rarely, the leatherback turtle. Turtle nesting occurs on a number of islands, including some uninhabited islets in North Tarawa.[26] Turtle nesting occurs year round with two seasonal peaks: April – May and October – February. There are no known nesting sites in South Tarawa.
- There are no well-documented specimen records of turtles on Nauru.[27] Several reports that mention turtles in passing lack substantive detail, but some refer to at least two species, the green turtle and the hawksbill turtle. Anecdotal evidence suggests that both the hawksbill and green turtles … are occasionally present … [and that] some beaches were reportedly once nesting areas although this is no longer the case.[28]

136. An assessment of the conservation status of these species based on the IUCN Red List (version 3.1) indicates:

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[23] Miller, C., 2009. Current State of knowledge of Cetacean Threat, Diversity and Habitats in the Pacific Islands region, 2009 Revision. WDCS International. 77p

[24] US Army Engineers 1989. Kosrae Coastal Resource Inventory. Prepared by US Army Engineers, Honolulu.

[25] Edwards, A., 2002. Marine biodiversity of the FSM.

[26] Preston, G. 2008. Kiribati Ministry of Fisheries and Marine Resources Development: Institutional strengthening scoping study report. Working Paper 3. Coastal fisheries development and management. Attachment 3 to report of mission statement to AusAID. Gillett, Preston and Associates, Noumea, New Caledonia. Anon. 1980. Notes on marine turtles of the Republic of Kiribati. Working Paper No. 7. Joint SPC–NMFS workshop on marine turtles in the tropical islands, Noumea, New Caledonia, 11–14 December 1979. South Pacific Commission, Noumea, New Caledonia. 16p.

[27] Buden, D. W., 2008. The reptiles of Nauru. Pacific Science 62, 4:499–507.

[28] Thaman, R. R., and D. C. Hassall. 1998. Republic of Nauru: National environmental management strategy and national environmental action plan. SPREP, Apia, Samoa.

- Hawksbill turtle is critically endangered (i.e., facing a very high risk of extinction).
- Green turtle is considered endangered; and,
- Olive ridley, leatherback and loggerhead turtles are considered vulnerable.

Table 4.1: Cetacean Species likely passing through the North Pacific waters

Species	Common Name	Status			IUCN Category
		FSM	Kiribati	Nauru	
Balaenoptera musculus	Blue whale	-	U	-	En
Physeter macrocephalus	Sperm whale	C2	C1	C2	Vu
Lagenodlphis hosei	Fraser's dolphin	C1	C1	C2	Lc
Steno bredanensis	Rough-toothed dolphin	-	C2	-	Lc
Hyperoodon planifrons	Southern bottlenose whale	-	C2	-	Lc
Tursiops sp	Bottlenose dolphin	C2	C1	-	Lc
Ziphius cavirostris	Cuviers beaked whale	U	U	U	Lc
Stenella attenuate	Pantropical spotted dolphin	U	C2	-	Lc
Peponcephala electra	Melon-headed whale	C1	U	C2	Dd
Stenella coeruleoalba	Striped dolphin	C1	U	-	Dd
Stenella longirostris	Spinner dolphin	C1	C1	-	Dd
Globicephala electra	Short-finned pilot whale	C1	C2	-	Dd
Mesoplodon gingkodens	Gingko-toothed beaked whale	C1	U	-	Dd
Orcinus orca	Orca	U	C2	U	Dd
Balaenoptera edeni	Bryde's-like whale	C1	-	C2	Dd
Eubalaena australis	Southern right whale	-	U	-	Dd
Mesoplodon densirostris	Blainville's beaked whale	-	U	-	Dd
Pseudorca crassidens	False killer whale	-	U	-	Dd

Key: C = confirmed. U = Unconfirmed. 1 = a relatively recent field (or specimen record) confirmation of the given species within the EEZ of a nation. 2 = a potential Class 1 record that is either dated, or may be marginally outside of a given EEZ. En = Endangered. Vu = Vulnerable. Lc = of least concern. Dd = Data deficient.

137. **Fish**. Fish surveys (along four transects each country) were undertaken at the reef edge in the Kosrae and Kiribati. For Nauru, the surveying completed under BioRap was used. Appendix 1 presents the data from the surveys in Kosrae and Kiribati.

138. For Kosrae, the following key points can be made:

- A total of 28 species are present across the four transects. The convict surgeonfish (*Acanthurus triostegus*) and the thumbprint emperor (*Letherinus harak*) was observed on the most transects (three).
- The most abundant species (11-100 individuals) across all transects are the convict surgeonfish and greensnout parrotfish (*Scarus spinus*). No species are present in abundances greater than 100.
- Many species (22 of the 28 species or 79%) were observed on a single occasion with several species only as a single individual such as *Epinephalus tauvina* and *Rhinecanthus aculeatus*.
- A total of 14 fish families are present with the most common being surgeonfish or tang, parrotfish and goatfish which comprise 58.3% of the total fish species (see Figure 31). Fish species in groups of 2-10 (Category 2) are the most prevalent across all transects comprising 56.4%.
- ST1 (adjacent to proposed BMH1) had the lowest number of fish species (seven) compared with ST4 (adjacent to proposed BMH7) which had the highest number of species (12).

139. For Kiribati, the following key points can be made:

- A total of 36 species are present across five transects. The convict surgeonfish (*Acanthurus triostegus*) and the thumbprint emperor (*Letherinus harak*) was observed on the most transects (three).
- The most abundant species (11-100 individuals) across all transects are the convict surgeonfish and greensnout parrotfish (*Scarus spinus*). No species are present in abundances greater than 100.
- A total of 15 fish families are present with the most common being damselfish, wrasse and surgeonfish which comprise 80% of the total fish species with the remainder comprising snapper, triggerfish, parrotfish, Emperor/bream, grouper and others.
- ST1 had the lowest number of fish species compared with ST3 which had the highest number of species.

140. For Nauru, data to describe the marine fauna present in the PIA has been sourced from the rapid biodiversity assessment (BioRap) undertaken by SPREP in 2013. [29] The locations of the survey sites are shown in Figure 4.2, Sites 3 and 2 are located the closest to the proposed BMH1 and BMH2 locations respectively.

[29] SPREP. 2013. Rapid Biodiversity Assessment of Republic of Nauru (Apia, Samoa)

Figure 4.2: SPREP BioRap Survey Site Locations

141. Several key points can be made regarding the results of the 2013 BioRap fish survey as follows:

- Nauru is considered to have a relatively depauperate reef fish fauna, consisting of at least 407 species of which 231 (or 56%) were observed during the present study. Totals of 52 and 54 fish species are present at Sites 2 and 3 respectively (closest to BMH 2 and 1) compared with the total numbers of species observed at all other sites (ranging from 35 to 88) and is below the average of 74 fish per site.
- Mean fish density is low at 0.6 & 0.3 fish /m^2 at Sites 2 and 3 respectively compared with the range of 0.3 to 1.5 at all other sites and a total mean density of 0.76 fish/m^2.
- The reef fish fauna is dominated by *Labridae* (34 species), *Pomacentridae* (30 species), *Acanthuridae* (21 spp), *Chaetodontidae* (21 spp), *Balistidae* (12 species), *Serranidae* (11 spp) and *Scaridae* (10 spp).
- Mobile invertebrate feeders are the most common functional group found within the reef fish fauna (23.8%), while planktivorous fishes (19.2%), fishes that had a diet comprised of both invertebrates and fishes (12.8%) and piscivores (10.3%) were also relatively diverse.

- Although the abundance of the reef fish fauna within Nauruan reefs is relatively high there were signs of overfishing including a lack of large sized fishes (i.e. large groupers and snappers).
- The lack of early life stages for most reef fishes suggests that the reefs may be distinctly isolated from source habitats (therefore only receiving sporadic new reef fish larvae) which substantially diminish the resilience of the reef fish faunal community to any disturbance events that reduce biodiversity.

4.2.2 Benthic Systems and Inter-tidal Communities

142. **Kosrae**. The benthic substrate along the intertidal transects (IT1 – IT3) undertaken is characterised by the following:

- Upper intertidal - coarse sands (beach) and coral rubble (IT2 and IT3 only)
- Mid intertidal reef flats littered with coral rubble and pools containing: occasional *Halimeda* sp. (a green algal turf) and *Padina* sp. typical of nutrient enriched environments, and sea cucumber (*Holothuria* sp.), and occasional starfish sponge and coral species.
- Lower intertidal reef flats containing larger coral boulder material, a range of brown and green seaweed species, occasional coral and invertebrate species.

143. Plates 4.1 - 4.3 show typical habitats in the transect areas. The benthic cover at the seaward edge of the reef flats on the reef slope adjacent to all sites is dominated by live coral (41.2%) and abiotic elements (i.e., sand/rock (35.9%), refer to Graph 4.1. Algae and dead coral have similar (11.9 and 11.0%) benthic cover proportions.

Graph 4.1: Summary of key benthic types for Kosrae transects

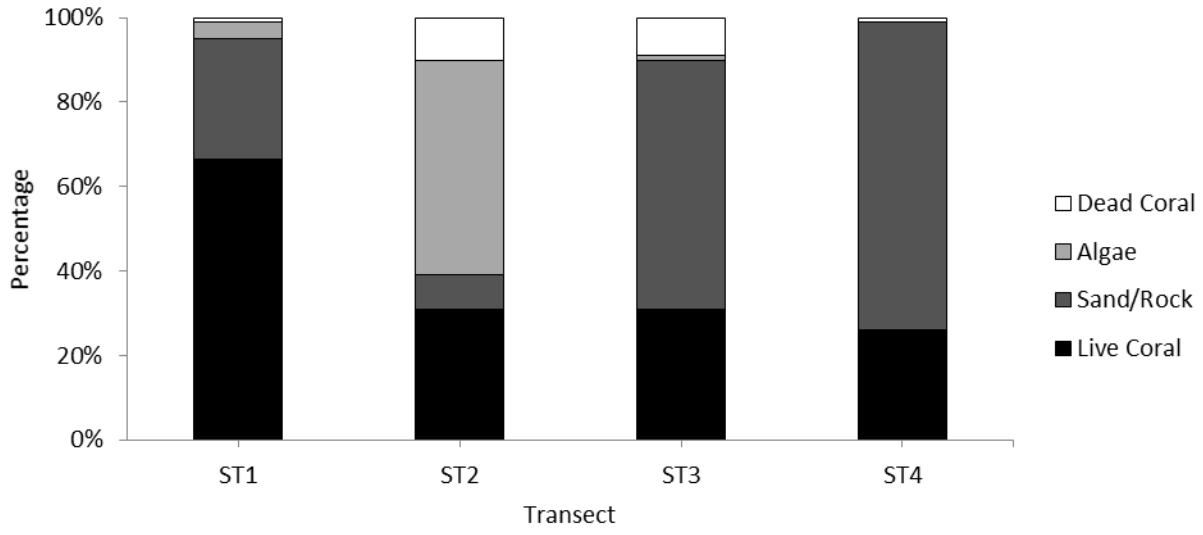


Plate 4.1: Typical habitat along IT1 alignment including the rock wall in upper intertidal beach and reef flat

Plate 4.2: Small corals

Plate 4.3: Seagrass along IT2

144. Nine coral species were observed. The coral community (Plates 4.4 – 4.6) is dominated by Acropora (69.7%) primarily branching (28.4%) and digitate (21.9%) forms. Foliose coral species are also prevalent (21.3%). Branching and mushroom coral types are present in the lowest proportion (1.3 and 0.6% respectively).

145. Overall, several key points can be made regarding the individual subtidal transect (ST) data as follows:

- Live coral is the most dominant benthic type adjacent to the Airport (67%) with abiotic elements being most dominant in ST3 (59%) and ST4 (73%).

- Algae (primarily *Halimeda* sp.) is most prevalent (51%) at Waok Reef in Lelu Harbour and dead coral was found primarily in this area (20%), and located at the entrance to the Harbour.

146. Of the corals, present, branching acropora are the most dominant across all sites, ranging from 16 - 50%. The next most dominant coral cover, foliose coral, ranges from 15 - 35% (ST1/ST4 and ST3 respectively). Massive corals are found primarily on ST2 (55%) and digitate acropora on ST1 (49%). Small numbers of benthic invertebrates were observed with key species consisting of crustaceans such as crabs, sea cucumber and starfish.

Plates 4.4 - 4.6 Typical reef habitat and corals

147. **Kiribati**. The benthic substrate along intertidal transects (IT1 - IT4) is characterised by the following:

- Upper intertidal - coarse sands (beach) or rock platforms (e.g., IT1).
- Mid intertidal back reef flats with large pools containing brown and green algae, *Padina* sp, abundant brittle sea star (*Ophiomastix* sp.), and occasional sea cucumber (*Holothuria* sp.).
- Slightly raised lower intertidal reef flats which typically contain a more diverse range of algal and invertebrate species.

148. Plates 4.7 - 4.9 show typical habitats in the transect areas.

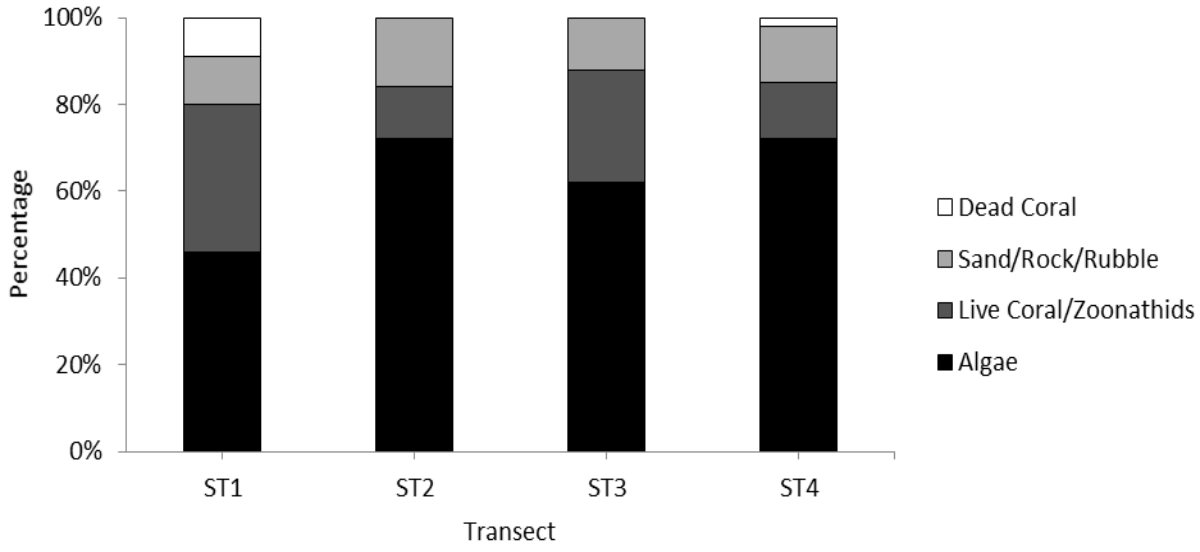
Plate 4.7: Typical habitat along IT1 alignment including upper intertidal hard rock and beach and reef flat

Plate 4.8: Brown algae & *Padina* sp on IT2

Plate 4.9: Sand and coral rubble along IT3

149. The benthic cover at the seaward edge of the reef flats on the reef slope adjacent to all sites is dominated by algae (63.0%) which primarily consist of fine algal material on rock pavement. Live coral is the next most dominant cover with 21.3%. Graph 4.2 presents examples of typical subtidal reef encountered.

Graph 4.2: Summary of key benthic types for Kiribati transects



150. Five coral species were observed. The coral community (Plates 4.10 and 4.11) is dominated by submassive coral species (78.2%). Overall, several key points can be made regarding the individual transect data as follows:

- Algae (primarily fine algal material on rock pavement) is the most dominant benthic type across all sites ranging from 46% (ST1) to 72% (ST2 & ST4).
- Live coral is the next most dominant benthic cover ranging from 12% (ST2) to 34% (ST1).
- Of the corals, present, submassive corals are the most dominant across all sites, ranging from 58 - 100% (at ST1 and ST4 respectively). A small proportion of soft coral (6.5%) was found at ST1.
- Small numbers of benthic invertebrates were observed with key species consisting of crustaceans such as gastropod molluscs, crabs, sea cucumber (*Holothuroidea* sp) and brittle star (*Ophiuroidea* sp.).

Plates 4.10 and 4.11: Typical reef habitat present at ST1 (top) & ST2 (bottom) locations

151. **Nauru**. The benthic substrate along IT1 is characterised by the following:

- Upper intertidal - coarse sands of the beach (Plate 4.12).
- Mid intertidal back reef flats with large pools containing green turfing algal and occasional coral species, sea cucumber (*Holothuria* sp.), black sea urchin (*Diadema* sp) and several species of coral.
- Lower intertidal reef flats which a greater diversity of coral (Plate 4.13), sponge and invertebrate species including occasional Crown of Thorns starfish (*Acanthaster planci*).

152. IT2, adjacent to Gabab Channel is largely devoid of life consisting primarily of a rock platform with abundant sea cucumbers (Plate 4.14). The channel itself consists primarily of sands to the edge of the fringing reef then a deeper reef platform.

Plate 4.12: Typical habitat along IT1 alignment including upper intertidal beach and reef flat

Plate 4.13: Coral species lower intertidal on IT1

Plate 4.14: Sea cucumbers along IT2

153. Data to describe the subtidal ecological resources present adjacent to the potential BMH locations has also been sourced from the BioRap (see footnote 29 and Figure 4.2). The following key points can be made:

- The reefs surrounding Nauru are considered to have a low diversity of hard corals, with a mean of 17.2 species per dive site and a total of 51 species of hard corals at 20 sites.
- Totals of 16 and 11 coral species (Table 4.2) are present at Sites 2 and 3 (closest to BMH 2 and 1 respectively) which is at the lower end of the total numbers of coral species observed at other sites which ranged from 8 to 27.
- Hard coral is the dominant cover at shallow depths (<11m) at Sites 2 & 3 with 54.4 ± 17% and 80.6 ± 1.9% respectively. This is at the upper end of the range of hard coral cover observed at other sites which ranges from 16.9% ± 2.8% to 91.2% ± 3.1% ((Sites 20 – 15 respectively).
- In deeper water (>12m), the dominant cover at Site 3 is also hard coral (76.2%) but at Site 3 hard coral is low (18.7 ± 8.6%) and cover is dominated by calcareous algae (33.1 ± 7.6%). The dominant macroalgae observed at Site 3 only (7.5 & 5.0 ± 1.8% for deep and shallow areas respectively) was *Halimeda* sp. No sponges, soft coral, dead coral, bare substrate and sediment (mud or silt) was recorded at any sites although sponges and soft coral were observed outside of transects.
- Most sites (except one) are heavily dominated by a single species, *Porites rus* (Plate 4.15). No species are considered abundant at Sites 2 and 3, with only *Pocilliopora eydouxi* and *Heliopora coerulea* common.
- Calculated Coral Replenishment Index[30] (used to determine an ability of an area of reef to re-establish following a major disturbance based on diversity abundance and cover) and Coral Rarity Index (used to evaluate reef sites for conservation) indicates Sites 2 and 3 are in at the lower end of the list of potential priority sites.
- *Pocillopora fungiformis*, listed as endangered by the IUCN (International Union for Conservation of Nature) Red List, and as one of the top 50 'EDGE' (evolutionarily distinct and globally endangered) coral species in the world, is present at several sites excluding Sites 2 and 3. *Montipora caliculata* (Plate 4.16), listed as vulnerable by the IUCN Red list and proposed for threatened status under the U.S. Endangered Species Act is present at a single site (but not at Sites 2 and 3). Species listed as vulnerable by IUCN include *Heliopora coerulea* (blue coral), which is present at all sites, and *Pavona venosa*, is present at two sites (but not at Sites 2 and 3).
- Overall, high coral cover, good coral health, good coralline algae cover, and low macroalgal cover all support the view that the reefs are healthy. The low diversity is due to the small size of the island and relatively large distance to areas of high diversity, not a sign of an unhealthy reef.

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[30] DeVantier, L.M., De'ath, G., Done, T.J. and Turak, E. 1998. Ecological Assessment of a Complex Natural Ecosystem: A Case Study from the Great Barrier Reef (Ecol. Appl. 8: 480-496.)

Plate 4.15: ***Porites rus***

Plate 4.16: ***Montipora caliculata***

Table 4.2: Coral species at BioRap sites near potential BMH locations

Family	Genus / Species	Location	
		3 (BMH1)	2 (BMH2)
Acroporidae	*Montipora grisea*	U	U
Agariciidae	*Pavona chriquensis*	-	R
	Pavona duerdeni	R	R
	Pavona gigantea	-	U
	Pavona varians	-	R
	Leptoseris mycetoseroides	R	
Faviidae	*Leptastrea transversa*		R
Fungiidae	*Fungia concina*	R	
	Halomitra pileus		R
Octocorallia	*Heliopora coerulea*	C	C
Pocilliopora	*Pocilliopora eydouxi*	C	C
	Pocilliopora meandrina	-	U
	Pocilliopora verrucosa	R	R
Poritidae	*Porites lutea / evermanni*	U	R
	Porites massive	U	U
	Porites monticulosa		R
	Porites rus	D	D
Stylasteridae	*Distichopora violacea*	U	C
	Count	**11**	**16**

Notes: Relative abundance codes – R = Rare; U = Uncommon; C = Common; A = Abundant; D = Dominant

4.2.3 Nearshore Coastal Marine Resources – Kosrae

154. Kosrae is surrounded by a broad shallow carbonate platform much of which is covered by freshwater swamps, mangrove forest and low coral land and beach strand. The carbonate platform is of recent reef origin and extends 1 – 5 km out from the islands volcanic shoreline boundary. Three lagoons or embayments bisect the reef platform, the largest of which is Lelu Harbour off the east coast. The floor of the harbour is deep, mostly more than 20-30m and is blanketed by fine silts and muds.

155. **Mangrove forests.** Mangroves are a significant coastal habitat and play an important role in coastal biological diversity, erosion control and are a natural barrier of protection for the islands such as Kosrae.[31] They also play an important role in trapping sediment moderating the effects of excessive storm runoff on the surrounding reef system.

156. Mangrove and lowland swamp forest occupy relatively large areas between the basaltic uplands and seaward strand areas of Kosrae. There are 1,562 ha of mangrove forest in Kosrae which represents 14% of the total land area.[32] The mangrove forest is most extensive along the south and northwest coasts, while lowland swamp forest occurs mainly along the southeast coast. Much of the forest occurs behind a protective coastal strand which, in the absence of a barrier reef, is essential for their protection from wave action. The swamp forests have been modified in some areas over time by development for agroforestry, cutting of timber and clearance for house construction.

157. **Seagrass and algae.** Sea grass beds extend over large areas of fringing reef flats primarily along the north and west coasts. Like mangroves, seagrass acts as a trap for terrigenous sediments and provide important habitat for a range of invertebrate and fish species. Four species have been observed; *Cymodea rotundata*, *Enhalus acoroides*, *Thalassia hamprichii* and *Holdule uninervis*.

158. Algae of the genera *Caulerpa*, *Padina* and *Halimeda* are generally common on areas of sand veneered reef pavement not subject to heavy scouring action. These (and other less conspicuous) algae occur within seagrass beds and are common, but irregularly distributed, on patch reefs. The patch and margins and slopes of fringing reefs are typically dominated by live corals, but these areas also support locally abundant coralline algae and patches of *Halimeda* sp. Dense brown algae of the genera *Sargassum* and *Turbinaria* can also be present. The shallower margins of the fringing reef typically have patches of sand producing green algae *Halimeda*.

159. **Reef systems.** The inner reef systems which extend beyond the mangrove fringe and terrigenous sediments are dominated by calcareous sand and rubble deposits which support seagrass beds. The middle to seaward portion is frequently covered by coral rubble, shingle tracts etc. On windward reefs (north and east facing), the outer edge of the reef platform is covered by a solid reef pavement which gives wat to gradually sloping spur-and-groove formation in the surf zone where robust corals and coralline algae are abundant. Steep reef slopes and terraces with very luxuriant coral growth and diversity extend beyond the spur and groove

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[31] Falanruw, M. 2001. Terrestrial Biodiversity of the FSM. FSM Government publication, 35pp.

[32] Cole, T. G., Ewel, K. C., and Devoe, N. N. 1999. Structure of Mangrove Trees and Forests of Micronesia. Forest Ecology and Management 117: 95-109.

formation. On leeward facing reefs this formation is less developed or absent altogether, and a coral-rich reef slope descends abruptly beyond the outer edge of the reef flat.

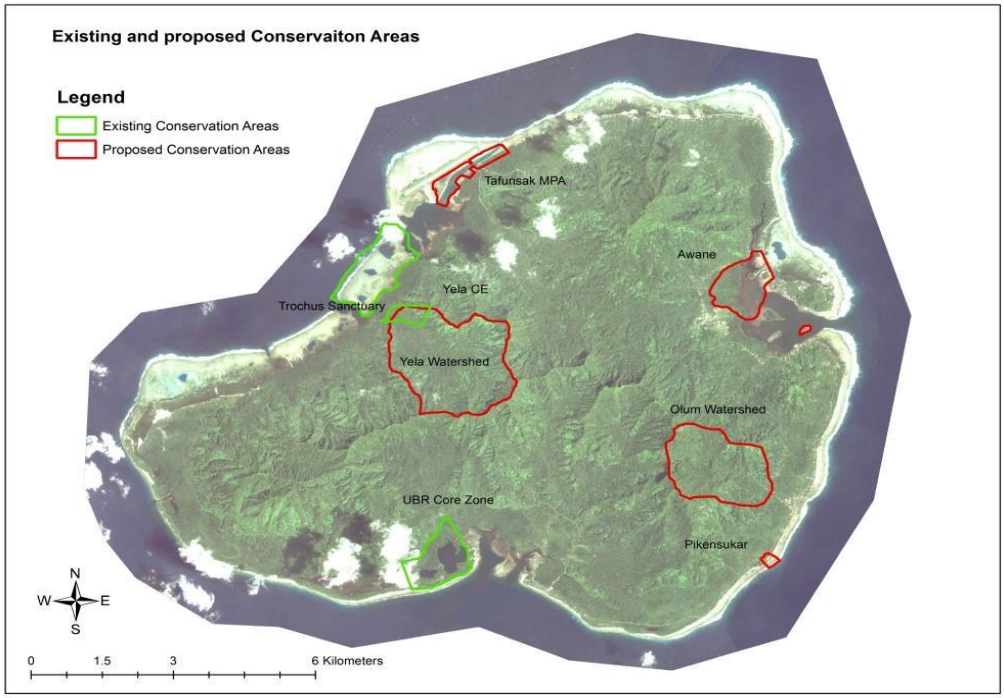
160. **Soft bottom benthic communities.** Rudimentary embayments bisect the reef platform at several places including Lelu Harbour which measures 3km long by 2 km wide. The floor is more than 20-30m deep and covered in fine muds and silts. These softer sediments are likely to be dominated by a range of infaunal and epifaunal invertebrates. The deeper reef slopes of the Harbour are dominated by talus slopes of coral rubble with live coral more conspicuous on the steep mid-level and upper portions of the walls.

161. **Threatened and protected species.** Several species of giant clams may be threatened throughout the FSM due to the high levels of exploitation. One species, Tridacna gigas has been extirpated in the FSM. Fossils of T. gigas are now seen in piles of dredged spoil but the animal is no longer seen alive on the reefs; efforts to reseed the reefs with these animals are ongoing. Other species, such as the Hypoppus are also being depleted and like the T. gigas, they are being cultured to be used for restocking on the reef flats.

162. As described in Section 4.2.1, the green turtle *Chelonia mydas* and the hawksbill turtle *Eretmochelys imbricata*, are threatened and critically endangered respectively. However, these species are known to be harvested throughout the FSM.

163. **Conservation areas and marine management areas.** Kosrae has two existing and six proposed conservation areas (see Figure 4.3). Several these have marine-based components as part of their areas.

Figure 4.3: Existing and proposed conservation areas



4.2.4 Nearshore Coastal Marine Resources – Kiribati

164. **Mangrove forests**. Mangrove ecosystems have special ecological significance. On Tarawa, mangroves occur on reef mud flats at the lagoon margins at certain areas, and provide a coastal protection function as well as an important habitat for marine organisms. Mangroves have been subject to depletion, but mangrove forest areas are being rehabilitated by the government under the World Bank funded Kiribati Adaptation Project Phase II (KAP II).

165. **Seagrass**. Seagrass beds, which provide an important habitat for shellfish and other organisms, occur extensively within the lagoon particularly toward the southeast. Recent measurements suggest that seagrass beds are expanding.[33]

166. **Conservation areas**. Kiribati has several conservation areas, the closest of which is in North Tarawa, and covers the islets, lagoons, and reefs of North Tarawa Atoll. In South Tarawa one proposed marine protected area (MPA) for a site located to the east of Nanikai which would extend into both the lagoon and open coastal reef area on both sides of the atoll. Discussions with the local community are still ongoing about the establishment of the MPA and there are no boundaries yet put in place.

4.2.5 Nearshore Coastal Marine Resources – Nauru

167. **Coral reef and fisheries.** The coral reef surrounding Nauru is the key marine habitat type present. The hermatypic zone of the reef slope descends to between 15 m and 30 m, beyond which there is a transition zone with coral outcrops that descends to about 60 m. Overall, coral diversity is impoverished. The dominant coral species covering around 80% of growth belong to the genera Pocillopora, Monitipora and Acropora.

168. High coral cover, good coral health, good coralline algae cover, and low macroalgal cover all support the view that the reefs are healthy. The low diversity is due to the small size of the island and relatively large distance to areas of high diversity and is not considered to be a sign of an unhealthy reef.

169. **Endemic, rare or endangered species.** The small size of the coastal area means that resources are susceptible to over-exploitation, especially intertidal benthic organisms such as turban shells and octopi, which are easily gleaned at low tide. Anecdotal information suggests that certain reef fish species are becoming scarce.[34] Furthermore, the average size of fish caught is decreasing. Finfish species are becoming rare include mullets (Mugilidae), Topsail Drummer (*Kyphosus cinerascens*), Coral Cod (*Cephalopholis miniata*) and the Humpheaded Maori Wrasse (*Cheilinus undulatus*). Spiny lobster (Palinuridae) is rare, while giant clams (Tridacnidae) are most probably extirpated from Nauru. There are no known verified endemic species from Nauru.

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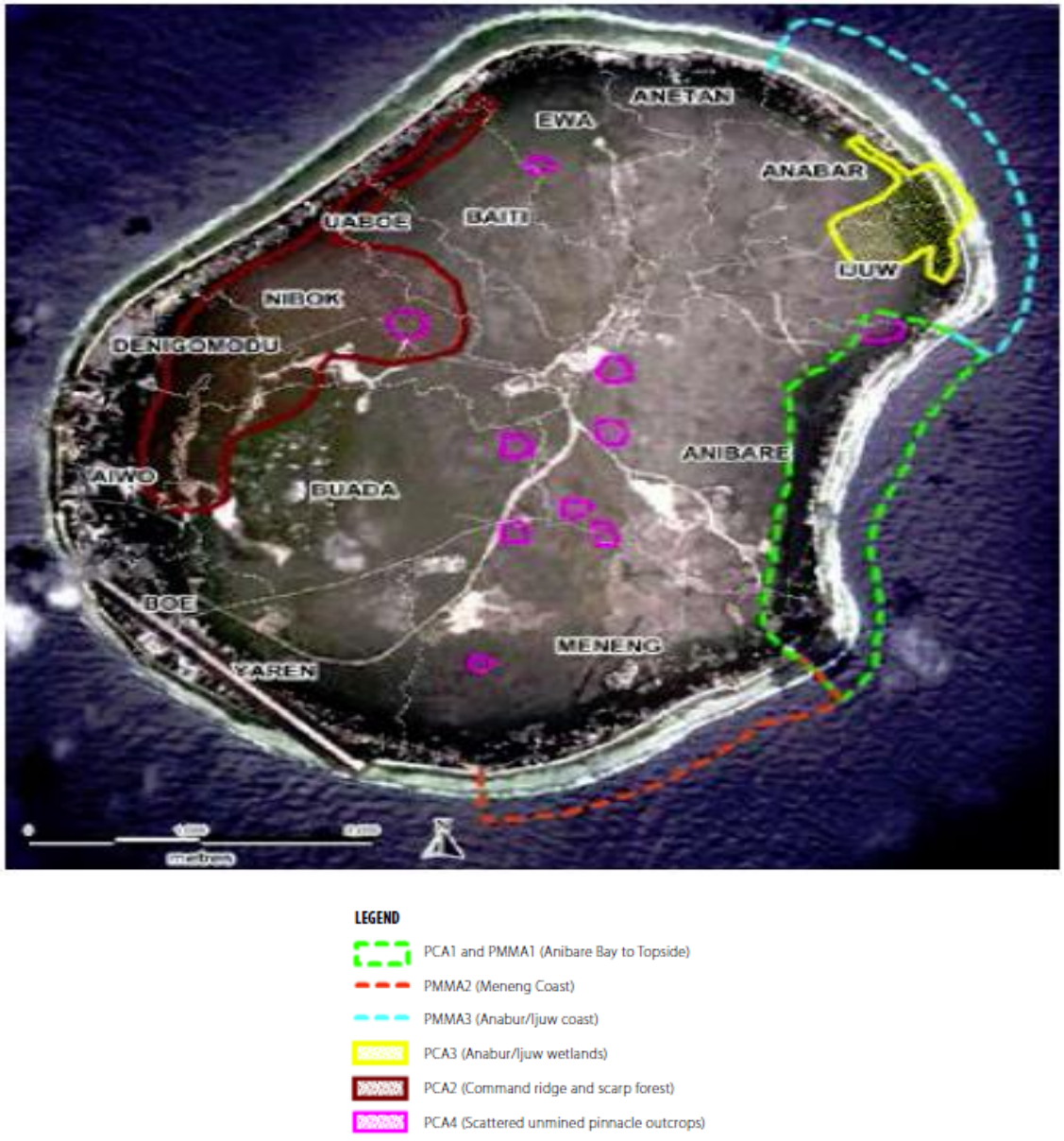
[33] Paulay, G. 2000. Benthic Ecology and Biota of Tarawa Atoll Lagoon: Influence of Equatorial Upwelling, Circulation, and Human Harvest. Atoll Rersearch Bulletin No. 487. National History Museum, Smithsonian Institution, Washington.

[34] Johannes, B. *et al.* 2000. Coral reefs of the pacific: status and monitoring, resources and management. Conference paper. Conference: International Coral Reef Initiative Pacific Islands Regional Symposium on Coral Reefs in the Pacific, At Noumea, New Caledonioa, Volume: Report of the UCRI Pacific Islands Regional Symposium.

170. Four coral species may be locally critically endangered, another seven may be locally endangered, and all others are locally vulnerable. One coral species present is listed by the IUCN Red List as endangered (*Pocillopora fungiformis*), and three species (*Montipora caliculata*, *Heliopora coerulea* & *Pavona venosa*) are considered vulnerable.

171. **Conservation areas/marine management areas.** In Nauru, a total of eight conservation areas have been proposed. The key proposed marine management areas are shown in Figure 4.4 and are as follows: (i) Anibare Bay (PMMA1); (ii) Meneng reef and ocean Front (PMMA2); and (iii) Ijuw, Anabar reef flats and ocean front (PMMA3). None of these areas are near the proposed BMH sites.

Figure 4.4: Proposed conservation areas in Nauru



4.2.6 Conditions at Beach Manhole Locations

172. **Kosrae**. For the northern sites, the marine ecological habitat directly adjacent to the potential Kosrae Airport site (BMH1) consists of a coastal seawall protecting the edge of the runway across the upper intertidal and a short section of intertidal reef flats (approximately 100 m); and sub-tidally, the reef slope and muddy sands of the deeper sea floor located considerable distances offshore. Both the Phoenix Hotel site (BMH2) and the 'bench' site (BMH3) have short sandy beaches located towards the upper intertidal zone and relatively long stretches of intertidal reef flats (approximately 230 m & 170 m respectively). There is evidence of ongoing coastal erosion activity at the 'bench' site (BMH3) while the Phoenix Hotel site (BMH2) appears to be aggrading.

173. The eastern sites are located around the relatively deep water of Lelu harbour which anecdotal evidence suggests extends to 80 feet in the central channel. The BMH4 and BMH5 sites located on the northern side of Lelu harbour at the operational wharf at Lelu and the southern side at Sanskrit Elementary School respectively have no intertidal areas and are situated directly adjacent to areas of deeper water. The BMH5 site, located close to Tofol the likely cable landing station site, has an area of mangroves across the intertidal which would likely require partial removal for cable installation.

174. The southern sites, like the Lelu Harbour sites, BMH7 and BMH8 sites have no intertidal habitat located directly adjacent although there is subtidal reek present. The BMH7 site has deep water near and the BMH8 site is located adjacent to the channel that accesses this working fishing harbour.

175. **Kiribati**. The marine ecological habitat directly adjacent to all BMH sites consists primarily of intertidal reef flats (approximately 275 m (BMH1), 150 m (BMH2), 460 m (BMH3) and 500 m (BMH4)); and sub-tidally, the reef slope and muddy sands of the deeper sea floor located considerable distances offshore. The upper intertidal at BMH2 and BMH4 sites consists of a sandy beach (with potential erosion issues) and the BMH1 and BMH3 sites have coastal seawall protection adjacent to the end of the runway and Public Broadcasting Radio tower support.

176. **Nauru**. The marine ecological habitat directly adjacent to BMH1 consists primarily of intertidal reef flats (approximately 130 m); and sub-tidally, the reef slope and muddy sands of the deeper sea floor. The BMH2 site lies adjacent to the Gabab boat ramp and channel which extends through the intertidal reef (approximately 100 m); and consists primarily of a sandy channel.

4.2.7 Terrestrial Flora

177. **Kosra**e. The vegetation of Kosrae[35] is dominated by the following (Table 4.2):

- Cloud forest which is considered unique given the number of endemic species present.
- Native upland forest characterised by *Campnosperma* species.

[35] Falanruw. 2001. Terrestrial Biodiversity of the Federated States of Micronesia (FSM National Biodiversity Strategy and Action Plan Project)

- Palm trees, a component of forests which occur in dense stands especially in areas where the primary forest has been disturbed.
- Freshwater marsh and riverine systems, filled with grasses, sedges and herbs growing in standing water most of the year and generally located in areas slightly above sea level and are often just inland of mangroves.
- Swamp forests occur where soils are inundated with fresh or slightly saline water. They are most commonly found just inland of mangroves, above tidal influence but lower in elevation than the surrounding terrain.
- Mangrove forests which are the most distinctive forest type.

178. There are over 322 plant species in Kosrae of which 250 species are native, many of which are endemic to one or more islands in the FSM.

Table 4.2: Types of plant communities in Kosrae

Community Type	Area (ha)
Mangrove Forest	1,562
Swamp Forest	345
Upland Forest	5,090
Agroforest *	2,538
Secondary vegetation	1,272
Other non-forest	263
Total Area	**11,186**

Notes: * includes coconut plantations.

179. **Kiribati.** In South Tarawa, present day vegetation cover is heavily influenced by human habitation and is dominated by coconut palm (*Cocos nucifera*), flame tree (*Delonixregia* sp), breadfruit (*Artocarpus altilis*) and papaya (*Carica papaya*).

180. **Nauru.** The vegetation on Nauru can be described based on vegetation type divided between primary vegetation (coastal strand, mangroves or coastal marshes, inland forest and limestone escarpment vegetation) and secondary vegetation (coconut palm plantations, gardens, ruderal vegetation and disclimax vegetation). The flora of Nauru to comprise about 56 native species and 125 naturalized species. The native species are all indigenous, with none of them endemic. Many of the native species are extirpated or on the verge of extirpation from the island.

4.2.8 Terrestrial Fauna

181. **Kosrae.** Historically, birds were hunted and habitat destroyed, resulting in extinctions on some of the FSM islands. The Kosrae rail and Kosrae Mountain Starling are now extinct. In 1990, Kosrae had 42 species of bird comprised of: ten native land and wetland residents, five resident and nine non-resident seabirds, shorebirds, migrants and vagrants (16) and two introduced species. FSM has 27 species of lizards and one terrestrial snake, and several sea snakes. Mammals include one endemic fruit bat and several invasive rodent species (mostly mice and rats).

182. **Kiribati.** Kiribati has a few land mammals, none being indigenous or endemic. They include the Polynesian rat (*Rattus exulans*), dogs and pigs. A total of 75 bird species have been recorded in Kiribati, with only the Line Islands Reeds Warbler (*Acrocephalus aequinoctialis*) being endemic to Kiritimati.

183. **Nauru.** A total of 34 species of birds have been recorded previously on Nauru. Six of these are rare vagrants; three other species have been introduced to the island. Eighteen of the 25 indigenous species are non-breeding visitors and are mainly migrating seabirds and shorebirds. The seven-confirmed resident breeding bird species include only two land birds, the Micronesian pigeon (*Ducula oceanica*) and the endemic Nauru reed warbler (*Acrocephalus rehsei*). The reed warbler is the only endemic and is currently listed as vulnerable by the IUCN red data list.

4.2.9 Site-specific Conditions at Landward Sites

184. **Kosrae.** Vegetation of any significance at the key sites: BMH 1, 6 and 7 and the cable landing station at Tofol is very limited (see Plates 4.17 – 4.19). However, much of the road corridor, containing existing telecom infrastructure, leading from these BMH sites to Tofol is covered with vegetation which will be required to be cleared but this is generally limited to introduced species of limited conservation significance.

Plate 4.17: Vegetation at BMH1

Plate 4.18: Vegetation at BMH7

Plate 4.19: Typical Vegetation Along the Road Corridor

185. **Kiribati.** There is no vegetation at the BMH1-4 and the potential cable landing station site at Betio. In addition, there is no vegetation along road corridor containing existing ducting from these BMH sites to Betio.

186. **Nauru.** There is no vegetation at the beach BMH 1 and 2, and the potential cable landing station at Yaren.

4.3 Socio-economic Environment

4.3.1 Demographics

187. **Kosrae.** The FSM population of about 102,843 people is disproportionately spread across its four states. Almost half live in Chuk; about one-third live in Pohnpei; about 11% in Yap; and Kosrae is the least populated of the states with about 6%. In 2010 the population of Kosrae was 6,616 - 3,352 men and 3,264 women. The population consists almost entirely of Micronesians; there are a few Americans, Polynesians, and Asians, and expatriates. There are about 1,143 households with an average household size of 5.7 people.

188. The population of Kosrae grew from 3,266 (1973) to 6,616 (2010). However, between 2000 and 2010 the annual growth rate was -1.50%. Emigration to other states and especially overseas is the primary reason for this trend. If this trend continues, Kosrae's population will be about 5,611 in a couple of decades (assuming a moderate decline in fertility, moderate increase in life expectancy, and net migration continues to be negative).

189. **Kiribati.** The native people of Kiribati are called I-Kiribati, and are ethnically Micronesians. The language is an Oceanic language known as Gilbertese. English is an official language, but this is often the case outside of Tarawa. South Tarawa is a stretch of islets connected by causeways commencing on Betio to Buota. This strip of lands is where the capital

and centre of both commercial and government administration of the Republic of Kiribati is located. The islets are less than 3m above sea level, and only 450m average width. The main settlements are Betio, Bairiki, and Bikenibeu. Betio village is where the main port is located, and the airport is located near Bonriki village. Bikenibeu holds the higher education institutions, and the main religious centres are located at Teaorareke, Antebuka, and Eita villages.

190. The South Tarawa population was 56,388 people living in 7,877 households according to the 2015 Census (Figure 38). The population of South Tarawa grew by almost 20,000 people between 2000 and 2015. The national growth rate is 2.2%. The rapidly growing population of 56,388 people is spread over a land area of 15.76 km^2; a population density of 3,578 people per km^2. This represents an increase in density from 3,184 people per km^2 back in 2010. In general, South Tarawa, particularly Betio, is overcrowded. Coupled with natural growth, internal migration to South Tarawa from other parts of Kiribati is occurring. This is due to better opportunities for education, health and employment.

191. **Nauru**. Like other Pacific island nations, pre-phosphate era Nauruans lived a lifestyle that was well suited to the island environment. However, European contact changed that lifestyle; the monetisation of the island economy with a coconut monoculture, later the impacts of war, and the degradation from the phosphate mining period. Consequently, Nauruans faced challenges to their socio-economic wellbeing and a serious physical environmental breakdown.[36]

192. In 2011 the population of Nauru was 10,084 (5,105 males and 4,979 females) (http://nauru.prism.spc.int/) with an average annual growth rate of 1.8. Between 2010 and 2015 the average Nauru fertility rate was 2.9. The adolescent birth rate in 2011 was 105.5, which is relatively high. The age dependency ratio is 66, reflecting a young population. The life expectancies for Nauruan males and females are 57.5 and 63.2 years respectively. The primary factor for this is the lifestyle diseases resulting in poor health.

193. Literacy levels for both genders are high with just under 92% of all Nauruan older than 15 years old getting a secondary education. Net enrolment in primary school is 88.1.

Economy

194. **Kosrae.** FSM cash economy primarily depends on the flow of funds from the United States of America. FSM has been receiving approximately $130 million a year from the United States in Compact of Free Association funds and supplementary grants. About 60% of this supports the Government's administrative costs with the rest infrastructure projects and economic development. Consequently, the public sector drives the cash economy and supports the service oriented private sector.

195. Kosrae's economy still depends on financial support from the United States, provided by the Compact Agreement with FSM. Consequentially, public sector dominates the economy; the primary employer is the State through its ten departments. Public sector expenditure in 1994 was USD$12.5 million, or 81% of the total state budget. The estimated wage level in 1993 for the private sector was USD$2,736 compared to USD$ 6150 in the public sector.

[36] Viviani, N. 1970. Nauru: Phosphate and Political Progress (Australian National University Press, p173)

196. Kosrae's GDP in 2015 was estimated at USD$14.6 million (or USD$1,963 per person). Major economic sectors in the State of Kosrae are marine resources, tourism, agriculture and small scale businesses. The combined output from these sectors contributed an estimated USD$1.6 million, or 10% of the state product. The State Government owns and operates all infrastructure facilities, health facilities, and most education services, small enterprises, and an extensive commercial activity in the fishery.

197. The private sector provides employment through retail outlets, restaurants, resorts, farming and some service businesses. The employee earnings per institution in 2015 was US$1.822 million for the private sector and US$17.051 million from the State Government.

198. The subsistence economy is based on small-scale horticulture and fishing. These two activities are not mutually exclusive as most farmers are also fishermen. Some have livestock for food production. This traditional subsistence economy is still vital for the Kosraeans. Remittances from family overseas also supplement the household income especially those with subsistence production and or no employment.

199. The Kosraean State Government continues to seek and promote foreign investments to improve the States trade balance and dependency on foreign funding. In fact, the Kosrae State 2014-2023 Strategic Development Plan adopted a sector approach with a goal "To achieve economic advancement and budgetary self-reliance."

200. **Kiribati.** The economic growth in Kiribati is expected to be moderate to 1.8% in 2016, and 1.5% in 2017.[37] The GDP per capita in 2014 was $1,838 which is one of the lowest in the Pacific countries.

201. South Tarawa, as the center for commercial and government activities, is central for the economic welfare of Kiribati. Major projects namely the Kiribati Road Rehabilitation Project, Kiribati Aviation Investment Project, and South Tarawa Sanitation Improvement Sector Project - all have positive impact on the GDP and economy of South Tarawa.

202. **Nauru.** The growth in the Nauruan economy for the 2015/16 financial year is expected to be 2.5%. In 2011 the Gross Domestic product (GPD) was US$72 million with a GDP per capita of US$6,954 and GDP growth for 2010-2011 was 14%. The GDP for the main sectors of the economy in 2009 includes 33% Industry (mining), 6.1% for Agriculture and 60.8% for services with combined exports earning in 2012 $55.7 million and imports of $29 million.

4.3.2 Employment

203. **Kosrae.** Kosrae's labour force (4,202 people) has a 53.3% participation rate; and an unemployment rate of 23%. Almost two thirds of the employed people work for the State agencies and services with 465 people employed in the private sector. Many people working in the private sector are employed in the wholesale/retail, construction, and transport, storage, and communication.

204. **Kiribati.** The government, at both regional and national levels, has endeavoured to stimulate economic growth and employment opportunities in the cash economy. The labour

[37] www.adb.org/countries/kiribati/economy

force was estimated at 38,078 people over the age of 15. Unemployment in South Tarawa is about 60% with almost half of the unemployed population actively looking for work.

205. The benefits of economic investments have begun to show in terms of jobs and cash income, such as the Kiribati Fish Limited. However, any growth in employment is still outstripped by population growth, particularly in South Tarawa. The ratio is about 1:4, for every job there are four potential workers (school leavers, drop outs, returning scholars) per year.

206. **Nauru.** During the crisis period in 2011 Nauru had a relatively high unemployment (21% and 26% for males and females respectively) and growing economic inactivity. However, the continuing growth of the working age population, coupled with low emigration, maintains pressure to generate employment.[38] The fact that only 25 people identified themselves as employers reflects the limited development in the private sector.

207. The most recent statistics estimate 23% of the adult population is unemployed. This issue is more apparent with the 15-19 years old (70% unemployed), and the 20-24 years old (36% unemployed). Unlike most Pacific Island countries, Nauru almost receives no remittances reflecting low emigration rates.

4.3.3 Poverty and Vulnerability

208. **Poverty**. Poverty does not mean hunger or destitution in the traditional sense, but rather the struggle to meet daily or weekly expenses, especially those requiring cash payments. In the Pacific, people express their condition as 'being in hardship' rather than in poverty. Causes identified for their hardship include: low income; limited access to basic social services such as sanitation facilities; and limited access to opportunities for gainful income.

209. In the FSM, a 2005 survey identified that approximately 22.4% of households or 29.9% of the population are living below the minimum cost of living or the basic needs poverty line (BNPL).[39] Compared to a similar analysis done in 1998, the proportion of households falling below the BNPL has increased, suggesting a slight worsening of overall poverty in the FSM.

210. In Kiribati, a 2014 survey found that 22% of Kiribati people were living in basic needs poverty.[40] Kiribati is ranked a lowly 121 out of 187 on the human development index.

211. In Nauru, a 2008 survey estimated that 25.1% of households will have cash shortages to meet their basic needs whilst 16.0% of these households are struggling to meet the cost of food to maintain the standard calorie intake.[41]

212. **Vulnerable households**. The poor households in the FSM are those headed by persons of low educational attainment, with no wage or salary from the private and public sectors. Poverty has a gender bias. While female-headed households constituted 20% of the household population in FSM, they constituted 39% of the total number of households in

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[38] International Labor Organization. 2014:9

[39] FSM Division of Statistics - Office of Statistics and SPC 2005. FSM Household Income and Expenditure Survey (Budget and Economic Management, Overseas Development Assistance and Compact Management)

[40] DFAT. 2014. Kiribati Programme Poverty Assessment (Department of Foreign Affairs and Trade)

[41] Detenamo, R. 2008. Poverty incidence in Nauru: An Assessment of Poverty (Statistical Training Institute, Republic of Korea)

the lower three expenditure deciles. Poor households as those who are: unemployed and landless; uneducated youth who did not finish school; teenage couples with children; women (widows and single mothers) and men (widowers and elderly); people without assets and who were without education or skills; and large families and families without support from their extended families.[42]

213. In South Tarawa, Kiribati, a typical household in South Tarawa will: be larger than a typical household on the outer islands (seven people as compared to five); have one to two members earning a salary (71% of household income coming from wages) but in the context of a general shortage of job opportunities, especially for youth; receive more remittances from seafaring than those on outer islands; supplement this with activities like fishing (26% of household income); more likely to have health issues from poor water, sanitation and overcrowding; and have limited access to land.

214. In Nauru, a significant proportion of the population falls in the lower expenditure deciles (about 40%), which implies that a significant proportion of the population is poor and the expenditure per capita is small. Some 73% of households are headed by men compared to 27% by women indicating that the traditional concept of "men as the primary bread winner and women devoted for caring of the family and home" is still common.

215. The proportion of poor male headed households was 41% of total households while the proportion of poor female headed households was 16% of total households. The poor male headed households were on average 10% below the BNPL whilst the poverty gap for the poor female-headed households were far less with an average of 5% below the BNPL.

4.3.4 Gender Aspects

216. **Health.** In the FSM, while maternal deaths are declining they are also known to be widely under-reported, and skilled birth attendants are in short supply.[43] Authorities recognize maternal mortality is a problem in FSM. There is low contraceptive use because of poor service delivery due to geography, lack of supplies and cultural/religious beliefs against contraception. There is a relatively high fertility rate for women over 35 years. Data on antenatal care are poor, but it is widely recognized as a major challenge. Professional advice on family planning is also weak. Better, cheaper and more reliable telecommunication services should help improve these conditions.

217. Fertility in Kiribati peaked around 1968 when the total fertility rate reached 7.4 and is now approximately 3.8. The contraceptive prevalence rate is one of the lowest in the Pacific at 18% for currently married women using modern methods and is even lower than some countries that have higher levels of fertility. The unmet need for family planning was 28%, suggesting that there is considerable scope for better quality family planning and reproductive health services. Teenage pregnancy is high (10% of women ages 15–19 years reported they were pregnant or already had a child at the time of the 2009 survey). Annual maternal deaths are low.

218. In Nauru, the 2011 fertility rate was 3.70. The contraceptive prevalence rate in 2007 was 23% for females aged 15-49 years using modern methods. The unmet need for family planning was 24% in 2007. Nauru's teenage pregnancy rate was 93 per thousand women in the period

[42] ADB. 2004. Priorities of the people. Hardship in the FSM. September 2004.
[43] United Nations Development Programme. 2013. Millennium Development Goals Report.

1997-2002, and in 2002 almost one in every six girls aged 15-19 had already born a child. In the period 2007-11 Nauru had a reported maternal mortality ratio of 300 deaths per 100,000 live births.

219. **Education.** In the FSM, the 2013 study concluded that gender parity in education this had been achieved at all levels. However, there is the issue of low economic participation of women. Better access to education does not translated into increased participation by women in the formal sector. This is likely due to deeply entrenched beliefs in the traditional role of women, where their role is at home.

220. In Kiribati, gender parity in education has been achieved with more girls attending high school. In terms of employment, the gender gap is narrowest in government employment (53% male, 47% female) whereas in the private sector it is 60% male, 40% female).

221. The 2011 Census in Nauru indicated that there are insignificant differences between male and female enrolment rates for students aged 5-12. From the age of 13, school enrolment rates for females were noticeably higher than males.

4.3.5 Land Use

222. Maps showing landownership arrangements adjacent to proposed sites are provided in the Land Due Diligence Report (Appendix 2).

223. **Kosrae.** The key points to note include: (i) BMH1 is located on the reclamation that forms Kosrae International Airport which is State owned land. Locating the BMH outside the Airport operational area would likely not require permission from the U.S. Federal Aviation Authority; (ii) BMH6 is located on state land at the Elementary School; and (iii) BMH7 is on private land, the owner is willing to enter into lease agreement.

224. **Kiribati.** The key points to note include: (i) BMH1 is located on government leased land, just outside the Bonriki Airport security fence, and an unused area. Accessing the existing road easement is also possible; (ii) BMH2 is located well within the government leased land area. It is a vacant spot with easy access to the road easement. The adjacent schools will be temporarily impacted during the construction phase; (iii) BMH3 is located on a sublease from government, which is on Nanikai. There is a radio aerial on the site, there is no requirement to move the structure to install the fibre optic submarine cable landing. Residential buildings are well away from this site; and (iv) BMH 4 is located on the causeway (reclaimed land) in east Bairiki. It does not encroach on the existing subleases or government lease.

225. **Nauru**. The key points to note include: (i) BMH1 is located is on government lease land, and is a secure location down a drive away off the main road, and is easily accessible; (ii) BMH2 is located is on government lease land, and is open land commonly deemed a public area.

4.3.6 Sites of Archaeological and Historical Value

226. In Nauru and Kiribati there were no known sites of archaeological or historical value identified within the PIA. In Kosrae, there are several historic sites (associated with ship wrecks) identified in Lelu Harbour (see Figure 4.5). A chance finds procedure is included in the ESMP.

Figure 4.5: Locations of ship wrecks in Lelu Harbour

5. Analysis of Alternatives

5.1 Alternative Technologies

227. Both fibre optic cable and satellite connections were considered during the pre-approval period in feasibility studies. Satellite connections are currently used in all three countries and have provided a partial solution but do not provide a long-term solution to connectivity needs due to limitations in available bandwidth, maintenance and deployment issues, and ongoing cost.

228. Fibre optic cable connectivity will provide much broader bandwidth and sustainable, long term service. If feasible, satellite contracts can be redeployed for backup redundancy but should not remain the sole or primary connection to international bandwidth. Alternative cable configurations were also considered with other potential landing and transit parties. After comparative options were reviewed, a proposed route and configuration with landings in Kosrae, Kiribati and Nauru was deemed optimal by each of the three project parties. It was therefore agreed by the project parties that the project would be pursued.

5.2 Cable Alignment and Landing Station Options

229. **Ranking of options**. The alignment options for each country are described in Section 3.2. The options were screened according to the following criteria in order of importance, as shown in Table 5.1.

Table 5.1: Screening Critieria and Ranking of Importance

Screening criteria	Ranking (importance/priority)
Least amount of encroachment on private or customary land	1
Least amount of interference with marine protected areas	2
Least effect on sensitive coastal and nearshore marine features	3
Lowest risk of impacts on beach manhole site due to coastal erosion processes	4
Proximity of the beach manhole site to the proposed/likely landing site	5
Deep water access close to potential beach manhole site	6
Least effect on tourism/fishing/boating/shipping activities	7

230. A comparative analysis has been undertaken rating each alternative against these criteria using a scale of 1 to 5 being least to most desirable. Table 5.2 presents the outcome of this analysis in matrix format.

231. **Kosrae**. The evaluation of the eight options indicates the most favourable locations for beach manhole sites are Kosrae Airport at Okat and Sanskrit Elementary School on the southern side of Lelu Harbour (Score 28). As described in Table 5.2, the key points regarding these locations are as follows:

- Kosrae Airport is located on State land, has a short intertidal reef section adjacent to the potential beach manhole site which is located outside the operational runway area, and has existing coastal erosion protection. The only negatives are that the site is located at considerable distance from the potential cable landing station at Tofol. Cable trenching activities would be required from the likely cable landing station in Tofol back to the Airport facility. In addition, there are plans to extend the runway to the north east. The cable however, could be installed in such a way as it is not disturbed by construction activities.
- Sanskrit Elementary School is located on State land adjacent to the deep water in Lelu harbour potentially allowing the cable laying vessel closer access to the beach manhole site, and it is in close proximity to Tofol. The only negative aspects are the potential interference with existing shipping (although Lelu Harbour is not heavily utilised), and the potential cable alignment would be in relatively close proximity to a proposed conservation area.

232. Given the uncertainty around of the subsea cable route from Pohnpei, these two options (i.e., Kosrae Airport in the north-east, Lelu Harbour in the east) allow flexibility for the cable laying contractor to make a final decision regarding the most favourable beach manhole site based on other installation considerations.

233. The preference is that cable landing station be located at the existing Telecommunications Building earth station premises in Tofol as it is the current centre of telecommunications operations in Kosrae.

234. **Kiribati**. The evaluation of the four options indicates the most favourable location for a beach manhole site is the Public Broadcasting Radio tower site adjacent to Nanikai Village at the eastern end of the causeway (Score 32).

235. As described in Table 5.2, the site is located on government leased land, it has existing coastal erosion protection in place, and is in closer proximity (approximately 1.1 km) to the potential cable landing station at ATH Kiribati in Bairiki than the Bonriki International Airport site for example. However, if Ocean Links confirm they are to construct their facility on land adjacent to the PBS aerial, BMH3 may be preferable with a cable landing station located in their facility (assuming Ocean Links were agreeable) due to the fact that there is only a short distance to the beach manhole for the required power supply.

236. **Nauru**. The evaluation of the four options indicates the most favourable location for a beach manhole site is the Government Building site (Score 32). As described in Table 5.2, the Gabab site had a similar score but is considered less favourable due to the fact that; the land is not government leased; the narrow access channel is used regularly by local vessels; and there is a view (identified through community consultation) that the channel is dangerous under certain sea conditions.

237. The proposed cable landing station is the existing ICT Building in Yaren as it is the current centre of telecommunications operations in Nauru.

5.3 Alternative Installation Methodologies

238. **Subsea and intertidal cable installation**. Cable placement can be undertaken in one of the following three ways: (i) placement on the seafloor; (ii) burial of the cable; or (iii) a combination of the two.

239. Burial is done using a trenching machine (Figure 3.4) which is either via a mechanical plough or a high-pressure water jet. For either method, the cable is laid into the trench and covered in one movement as the device is pulled along.

240. A second method used in the deep open ocean is to simply set the cable on the seafloor, sometimes with additional weights. In shallow sensitive areas, the cable is often floated into place and sunk with divers assisting with specific placement.

241. These options were assessed in relation to the sensitive habitats potentially affected, most importantly coral formations. Hydro-jet trenching in the nearshore zone has been ruled out as it can create considerable sediment plumes. The combination of plough-trenching and cable placement using divers was selected for this project as it creates minimal bottom disturbance minimising sediment plumes.

242. However, the final decision will be made by the cable contractor and will be informed by the ESMP. Any deviation from the recommended method and from the ESMP will require environmental evaluation to establish possible additional impacts and necessary mitigation actions.

243. **Terrestrial cable installation**. In Kosrae, consideration was given for the terrestrial cable to be suspended on the existing power poles adjacent to the road or buried adjacent to the road alongside the existing telecommunications infrastructure. It was the clear preference from Government officials that the cable is buried.

244. In Kiribati, apart from the short section from the beach manhole site to the roadside, no cable trenching or thrusting is required to connect the beach manhole to the cable landing station as there is conduit in the existing road for cable installation.

245. In Nauru, apart from a short section of trench required to get to the roadside, no additional trenching of the terrestrial cable is required as the cable has already been installed.

Table 5.2: Screening of Alternative Fibre Optic Cable alignments

Country	Location	Screening Criteria (ref. Table 5.1)							Total	Key Notes
		1.	2.	3.	4.	5.	6.	7.		
Kosrae	Kosrae Airport at Okat	5	4	4	5	2	4	4	**28**	State land, short intertidal reef, coastal erosion protection, considerable distance to cable landing station
	Phoenix Hotel site	1	5	3	2	3	4	4	22	Private land, longer intertidal reef, potential coastal erosion issues
	'Bench' site	1	5	3	1	3	4	4	21	Private land, longer intertidal reef, potential coastal erosion issues
	Yacht Club in Lelu Harbour	3	3	5	4	3	3	3	24	State land, moderate distance to cable landing station.
	Tofol	5	1	1	2	5	3	3	20	State land, sensitive mangroves, proposed CA
	Sanskrit Elementary School	5	3	5	5	4	3	3	**28**	State land, close to proposed CA, deep water harbour, potential shipping issues
	7-Day store in Melem	1	5	5	4	2	4	3	24	Private land, potential coastal erosion issue, proximity to reputed dive sites
	Otwe Harbour	5	5	3	4	1	3	4	25	State land, considerable distance to landing station, coastal erosion protection.
Kiribati	Bonriki International Airport	5	5	5	5	1	5	4	29	Government land, coastal erosion protection, considerable distance to cable landing station.
	King George V High School	5	5	4	2	2	5	4	27	Government land, possible coastal erosion issue
	Public Broadcasting Radio tower	5	4	4	5	4	5	5	**32**	Government land, coastal erosion protection, closer to potential cable landing station
	Western end of the causeway	5	5	3	3	5	5	5	31	Government land, possible coastal erosion issues, closer to potential cable landing station
Nauru	Government Buildings	5	5	3	5	5	5	4	**32**	Government land, coastal erosion protection
	Gabab Boat Ramp	1	5	5	5	4	5	2	27	Private land, coastal erosion protection, heavily used access channel through reef.

6. Anticipated Impacts & Mitigation Measures

246. **Introduction**. The project has the potential to create a variety of impacts which can be either positive, negative or negligible or neutral depending on the receptors involved. The impact of the project on the physical, ecological and social environment has been assessed using methodology described in this chapter.

247. The impact assessment process initially involves identification of the project's activities and potential environmental and social impacts resulting from each activity during project phases. Project activities include preconstruction activities, cable installation and operation, and ongoing maintenance.

248. Within this ESIA, an impact is defined as "any change to the physical, biological or social environment, whether adverse or beneficial, wholly or partially resulting from an organisation's activities, products or services".

6.1 Deep Ocean Waters

249. The environmental issues associated with submarine cable deployment and maintenance have been identified in relevant literature.[44] Disturbances and impacts caused by cable laying and maintenance should be viewed in the context of the frequency and extent of these activities. The one-off disturbance associated with cable placement is restricted mainly to a strip of seabed less than 5–8 m wide and unless a cable fault develops, the seabed will not be disturbed again within the system's design life (approximately 25 years).

250. By comparison, commercial bottom trawl and dredge fishing operations are repetitive and more extensive and a single bottom trawl can be tens of metres wide, sweep substantial areas of seabed in a single operation and is likely to be repeated at the same site within a year. A single impact, such as a cable placement or burial, is preferred to continuous, multiple or recurring impacts.

251. The United Nations Convention on the Law of the Sea (UNCLOS) advocates the freedom to lay, maintain and repair cables outside territorial seas, but these are not necessarily inconsistent with the need to protect deep-ocean habitats and ecosystems, described as follows:

- Cable deployment in the deep ocean, i.e. laying of a 17–20 mm diameter tube on the surface of the ocean floor, has a minor if not negligible one-off impact; and
- Cable repairs can result in substrate disturbance. However, cable failures in deep water are relatively rare and are mainly caused by major natural events.

252. In addition, the submarine cable industry, together with environmental regulators, attempt to reduce or avoid any impact on vulnerable deep-water ecosystems by:

- Utilizing modern seabed mapping and navigation systems that allow identification of benthic habitats in unprecedented detail and accuracy. Together with modern

[44] Carter, L., Burnett, D., Drew, S., Marle, G., Hagadom, L., Bartlett-McNeil, D., and N. Irvine., 2009. Submarine cables and the oceans – Connecting the World. UNEP-WCMW Biodiversity Series No. 31 – ICPC/UNEP-WCMC.

cable-laying techniques, it is now possible to deploy cables to avoid ecologically and biologically sensitive areas; and

- Avoiding the deployment of cables on or through habitats such as seamounts, submarine canyons and hydrothermal vents, which are also unsuitable as cable routes due to the risk of natural hazards. For example, canyons are often swept by powerful currents that may abrade or break cables; and seamounts can be volcanically active and subject to landslides and hydrothermal venting.

253. Modern deep-water fibre-optic cables are composed of several pairs of hair-like glass fibres, a copper power conductor and steel wire strength member, which are all sheathed in high-density polyethylene. Where extra protection is required (as for areas of rocky seabed or strong wave and current action) additional steel wire armour is included. Of these materials, cable-grade polyethylene is essentially inert in the ocean. Processes such as oxidation, hydrolysis (chemical breakdown in water) and mineralization are extremely slow; the total conversion of polyethylene to carbon dioxide and water would take centuries.

254. The effects of ultraviolet light (UV-B) (the main cause of degradation in most plastics) are minimized using light-stabilized materials, burial into the seabed and the natural reduction in light penetration through the upper ocean, where the photic zone rarely extends beyond 150 m depth. Any mechanical breakdown of a cable's plastic sheathing to fine-grained particles on the energetic continental shelf, a potential hazard for marine life, is minimized by armouring and burial.

255. In addition, the diesel-powered vessels used to survey the seabed and lay cable (as described in Section 3.1) will emit greenhouse gases. As the relative contribution of these ocean-going vessels to overall greenhouse gas emission is so small it is considered minimal.

256. Offshore anchoring for fishing in each of the three countries is also limited due to significant water depths.

257. Hence, the overall potential environmental impacts arising from the project in the deep ocean are limited. The key environmental interactions are in the near shore areas where cable requires burial to avoid potential entanglement with fishing activities and other human activities.

6.2 Intertidal Coastal Areas

258. A range of potential impacts could arise at all the beach manhole sites in each of the three countries. The key potential impacts to both the intertidal reef and soft bottom communities include:

- Direct loss of habitat along the cable route.
- Physical effects of sedimentation on benthic communities thus suspension of fine materials and off-site deposition.
- Reduction in water clarity due to increases in water-borne suspended solids concentrations and potential impacts on fish communities.
- Temporary restrictions to local villagers to fishing areas during the installation period only.

259. Overall the potential impacts are not expected to be significant due to:

- The area disturbed represents a very small proportion of the total intertidal habitat present.
- Ability of the marine benthic community to recolonise over time.
- The short duration of installation activities.

6.3 Terrestrial Areas

260. **Kosrae**. The proposed cable landing station at the national Telecommunications Corporation premises is located in the township of Tofol, and is located approximately 13.7 km and 3.2 km from Kosrae Airport and Sanskrit Elementary School respectively.

261. The terrestrial cable route for both locations is along the road corridor in the easement where the existing telecommunications infrastructure (copper cable) is installed. Evaluation of the potential route indicates it is comprised of a combination of vegetation that encroaches on the road corridor, intersecting roads, drive way crossings, etc. There appear to be no activities of a sensitive nature (e.g., hospital access road) along the route access to which would be unnecessarily impeded.

262. Overall, the potential impacts of cable installation are not expected to be significant due to the fact:

- The vegetation present is typically comprised of a range of common species and there is nothing of conservation concern present.
- The installation period is of short duration so disruption to traffic etc. will be temporary.
- The use of methods (i.e., cable thrusting under sensitive areas) will mitigate any potential impacts.

263. The proposed cable landing station itself has no ecological resources of any description on or immediately adjacent to the site that would be impacted.

264. **Kiribati and Nauru.** No impacts are anticipated for either Kiribati or Nauru. In Kiribati, only a short section of trenching or cable trusting is required to reach the roadside conduit. In Nauru, existing cable is available minimising any potential impacts of terrestrial cable installation. Any impacts to traffic etc. will be temporary.

265. As described in Section 3.1, there is a requirement for a diesel-powered generator in Kiribati to power cable repeaters. As this requirement is small scale any issue associated with greenhouse gas emission is minimal. In addition, measures will be taken so that alien or pest species are not introduced particularly in relation to hull fouling organisms (hull cleaned before works commence), ballast waters (discharged at sea) or machinery that needs to be imported for use on land (cleaned prior to transport).

6.4 Land Acquisition and Resettlement

266. The due diligence report addressing the issue of involuntary resettlement for Kosrae, Kiribati and Nauru is provided in Appendix 2. The report concludes that as all the beach manhole and cable landing station sites will be located on government owned or leased land, and as there will be no need for private or custom owned land to be used or accessed, no involuntary land acquisition will be required. In addition, cable routes are expected to follow public road reserves.

267. Most location options will enable shore side beach manhole installations to connect the open ocean segment to the terrestrial infrastructure traversing the fringing reef. An option in Kosrae is to bring the cable through Lelu Harbour and into the State-owned school. The exact location of the cable routes will be determined following a detailed marine bathymetric survey during the design stage. Similarly, the locations of land-based infrastructure (other than utilisation of existing facilities) will be subject to detailed design.

268. The proposed cable landing station's (which will house the necessary equipment to enable the high-speed connection) will likely be sited within existing government owned facilities.

269. In conclusion, as all the beach manhole and cable landing station sites will be located in government owned or leased land, and as there will be no need for private or custom owned land to be used or accessed, thus there will be no involuntary land acquisition and therefore resettlement plans are not required.

6.5 Poverty and Gender Impact

270. Section 4.3 describes the relevant poverty, vulnerable population and gender issues in each of the three countries. In terms of potential impact overall, the project will ensure lower cost Internet access for consumers, including low income households. Thus, the project will contribute to improved social welfare, provide expanded access to information and services, and increase income-earning opportunities.

271. In addition, the project is expected to have a positive impact on women's access to affordable Internet services in all three countries, particularly Kiribati. This is important because access to affordable, high-speed Internet in employment particularly in the education and health sectors is known to be associated with economic and social empowerment. Improved Internet access can facilitate new livelihood opportunities for women who tend to stay on-island whereas many young men travel overseas (e.g. to work on merchant ships).

272. An added benefit is in disaster risk management such as: (a) facilitating the deployment of disaster risk monitoring tools and applications that require large volumes of data transmission (including access to regional databases) by improving the quality and reducing the cost of Internet; (b) providing additional options/media for early warning systems and post-disaster communications.

6.6 Risk Assessment & Impact Identification Methodology

273. Risk assessment is routinely undertaken as part of the ESIA process. In assessing a project's environmental risk, impacts are rated to determine the appropriate response or

management actions that should be implemented to minimise potential impacts. The risk assessment methodology for the project is described in this section.

274. The commonly adopted Australasian Standard for Risk Management has been used to assess the level of risk posed by the activities associated with the Project and is based on the following: the likelihood or probability of an event; and the consequences of the impacts of that event occurring (see Table 6.1).

Table 6.1: Qualitative Risk Analysis Matrix

	Consequence				
	1	2	3	4	5
Likelihood	Catastrophic	Major	Moderate	Minor	Insignificant
A - Almost certain	E	E	E	H	H
B - Likely	E	E	H	H	M
C - Possible	E	E	H	M	L
D - Unlikely	E	H	M	L	L
E - Rare	H	H	M	L	L

Risk Map Color Code
E = Extreme
H = High
M = Moderate
L = Low

275. This is a conventional risk management framework and is considered applicable in the context of this assessment which has a focus on high level identification of biodiversity and ecosystem services risks. It is envisaged that the subsequent ESIA process will provide detail on these risk areas as appropriate.

276. There are four main levels of risk after combining the 'likelihood' and 'consequences' factors (see Tables 6.2 and 6.3). Each level has a response or management control action. The four 'Risk Levels' are:

- Extreme (E) risk - those impacts that require immediate action at the highest level of management;
- High (H) risk - those impacts requiring action at senior management level;
- Moderate (M) risk - those that require policies in place to address impacts and monitoring programs; and
- Low (L) risk - those impacts that do not require any specific management actions but may be part of routine management and monitoring plans.

Table 6.2: Qualitative Measures of Consequence

Level	Descriptor	Env/Social Impacts	Legal	Public/Media Attention	Financial
1	Catastrophic	Significant extensive detrimental long term impacts on the environment, community or public health. Catastrophic and /or extensive chronic discharge or persistent hazardous pollutant. Damage to an extensive portion of aquatic ecosystem. Long term impact on water resource.	License to operate likely to be revoked or not granted	Probable public or media outcry with natonal/internati onal coverage. Significant green NGO campaign.	> $1 million
2	Major	Off-site release contained with outside assistance. Short to medium term detrimental environmental and social impact off-site or long term environmental damage on-site.	May involve significant litigation and fines. Specific focus from regulator.	May attract attention of local and state media and local community groups.	$500,000-$1,000,000
3	Moderate	Onsite release contained with outside assistance. Significant discharge of pollutant, possible source of community annoyance. Non persistent, but possible widespread damage to land. Damage that can be remediated without long term loss or very localised long persistence damage.	Probably serious breach of regulation. Possible prosecution and/or fine. Significant difficulties or delays experienced in gaining future approvals.	May attract attention of local media, heightened by local community.	$50,000-$500,000
4	Minor	On site release immediately contained without outside assistance. Ongoing or repeat exceedances of odour, dust or noise/vibration limits.	Minor on the spot fines or formal written correspondence from regulator.	Local community attention or repeated complaints.	$5,000-$50,000
5	Insignificant	Negligible environmental impact. Minor transient release of pollutant including odour, dust and noise/vibration. Minor social impact.	No serious breach of regulation. Minor license non-compliance.	Local landholder verbal discussion/compl aint.	< $5,000.

Table 6.3: Qualitative Measures of Likelihood

Level	Descriptor	Example	Frequency
A	Almost certain: Environmental issue will occur, is currently a problem or is expected to occur in most circumstances.	Is expected to occur in most circumstances	> once per year
B	Likely: Environmental issue has been a common problem in the past and there is a high probability it will occur in most circumstances.	Will probably occur in most circumstances	Once per year
C	Possible: Environmental Issue may have arisen in the past and there is a high probability that it should occur at some time.	Could occur	Once every 5 years
D	Unlikely: Environmental issue may have occurred in the past and there is a moderate probability that it could occur at some time.	Could occur but not expected	May happen within Project Life
E	Rare: Environmental issue has not occurred in the past and there is a low probability that it may occur in exceptional circumstances.	Occurs in only exceptional circumstances	Not likely to happen with Project Life

277. **Outcome of risk assessment and impact identification**. Tables 6.4 and 6.5 present the results of the risks associated with the construction and operation and maintenance activities of the project. Risks identified 'extreme' and 'high' risk project activities have been determined as low risk following implementation of mitigation measures.

278. In summary, the submarine cable industry, together with environmental regulators, attempts to reduce or avoid any impact on vulnerable deep-water ecosystems by: (i) utilizing modern seabed mapping and navigation systems that allow identification of deep benthic habitats in unprecedented detail and accuracy. Together with modern cable-laying techniques, it is now possible to deploy cables to avoid ecologically and biologically sensitive areas; and (ii) avoiding the deployment of cables on or through habitats such as seamounts, submarine canyons and hydrothermal vents, which are also unsuitable as cable routes due to the risk of natural hazards. For example, canyons are often swept by powerful currents that may abrade or break cables; and seamounts can be volcanically active and subject to landslides and hydrothermal venting.

279. Modern submarine fibre-optic cables are composed of several pairs of glass fibres, a copper power conductor and a steel wire strengthening member, which are all sheathed in high-density polyethylene. Where extra protection is required - as for areas of rocky seabed or strong wave and current action - additional steel wire armour is added. Of these materials, cable-grade polyethylene is essentially inert in the ocean (Carter et al. 2009).

280. Processes such as oxidation, hydrolysis (chemical breakdown in water) and mineralization are extremely slow; the total conversion of polyethylene to carbon dioxide and water will take centuries.

281. The effects of ultraviolet light (UV-B) - the main cause of degradation in most plastics - are minimized using light-stabilized materials, burial into the seabed and the natural reduction in light penetration through the upper ocean, where the photic zone rarely extends beyond 150 m depth. Any mechanical breakdown of a cable's plastic sheathing to fine-grained particles on the energetic continental shelf – a potential hazard for marine life – is minimized by armouring and burial (Carter *et al.* 2009) and placing the cable in a conduit.

282. Hence, the overall potential environmental impacts arising from the project are limited. The key environmental interactions are in the near shore areas where cable requires burial to avoid potential entanglement with fishing activities and other human activities.

6.7 Other Potential Impacts and Benefits

283. **Cumulative impacts**. No cumulative impacts are anticipated given cable installation involves the placement of a small diameter solid cable (containing no liquids, and not needing transmission of electricity) in a narrow trench on the seabed and will be careful placed (via divers and/or a cable floated into place if required) in coastal waters over a relatively short period. There are no other known activities occurring at the same time that the cable is to be placed on the seafloor. There may be other construction activities on land, but since the cable landing station's will only require the construction of a single room, which may be a simple addition to an existing structure, no cumulative impacts are anticipated.

284. In addition, there are no expected cumulative social impacts due to the small project footprint, and the fact that it is not expected to cause permanent loss of communal fishing grounds and local people's livelihoods.

285. **Irreversible and irretrievable impacts**. Given the very small disturbance to the environment from the cable installation and landside building (30-50 m^2) construction, there will be no irreversible or irretrievable impacts from the Project. Implementation of measures outlined in the ESMP will serve to mitigate any potential impacts.

286. **Transboundary impacts**. Transboundary impacts are likely to be limited to:

- Potential emission of greenhouse gases from the survey and cable laying vessels; and
- Impacts on endangered species and habitats.

287. Overall, the impacts of greenhouse gas emissions are expected to be no more than minor given the relative contribution of the vessels compared to other emitters, and no endangered species and habitats were identified that could be potentially adversely affected following implementation of mitigation measures.

288. **Environmental and social enhancements/benefits**. The project will not only improve people's access to income and social services but may also enhance social networks and contact with family members living abroad. Faster Internet is expected to facilitate regular and

affordable connections among local and overseas-based groups, particularly women's organizations who rely on Internet for communication.

289. A fibre optic system was installed on Pohnpei, FSM, in 2010 and improvements in health care and education services have been reported. Better Internet connections should also help with remote medical services and distance education.

Table 6.4: Issues & risk assessment – Construction Activities (cable installation, manhole construction etc.)

Activity	Source of Risk	Description of Potential Impact	Assessment of Risk			Mitigation / General Comments	Post-Mitigation Residual Impact
			C	L	Rating		
1. Employment, Health and Safety							
Cable trenching, Manhole construction, cable installation	Earthworks, vegetation clearance, etc.	Employment opportunities	3	B	H	Positive overall benefit, no mitigation required	H
	OHS risk due to earthworks, vegetation clearance, etc	Potential human hazards due to large machinery, noise, dust	1	C	E	ESMP includes suitable provisions covering workers and communities; Appropriate OHS policy implemented and OHS training offered	L
2. Terrestrial Ecology							
Cable installation	Minor vegetation removal and earthworks during cable trenching	Direct loss of terrestrial habitat	5	C	L	Little or no significant vegetation present, no mitigation required	L
		Terrestrial habitat fragmentation, general disturbance, pathway for invasive species	5	C	L	Little or no significant vegetation present, no mitigation required	L
		Impact on ecotourism operations due to loss of business as a result of construction activities	4	D	L	Construction period of short duration, no mitigation required	L
	Earthworks machinery	Noise and vibration creating bird (and other species) disturbance	5	C	L	No species of conservation significance identified, Construction period of short duration, no mitigation required	L
	Soil disturbance, spoil disposal	Sediment runoff into downstream watercourse, visual effects	4	D	L	Minor earthworks required, no spoil disposal required, mitigation consists of immediate trench re-instatement	L
3. Marine Ecology							
Cable installation	Sub-tidal cable laying using cable trencher	Disturbance to soft bottom benthic communities	5	A	H	Minor construction footprint, sediments already prone to disturbance, no mitigation required	L
	Vessel movements associated with sub-tidal cable laying	Disturbance to pelagic species such as whales, dolphins, turtles	4	C	M	Limited occurrence with species in nearshore coastal environment, vessel movement slow, a trained independent observer to be present on board	L
	Cable installation along subtidal coral reef	Disturbance to coral reef communities due to presence of cable, colonization of cable	5	C	L	Very minor cable footprint, no specific mitigation required apart from microscale avoidance of significant coral outcrops (in Nauru)	L
	Intertidal earthworks during cable trenching	Disturbance of intertidal reef communities / seagrass beds / birds	5	A	H	Minor earthworks required, small construction footprint, short duration activity, mitigation consists of immediate trench re-instatement	L
	Subtidal and intertidal works affecting informal	Direct and indirect impacts on fish and benthic communities within the adjacent	4	D	L	Significant separation between Project site and fish reserve	L

Activity	Source of Risk	Description of Potential Impact	Assessment of Risk			Mitigation / General Comments	Post-Mitigation Residual Impact
			C	L	Rating		
	fishing reserve	fish reserve (Kiribati).					
4. Recreational and Heritage							
Trenching, manhole construction, cable installation	Earthworks activities	Loss of or disturbance to potential recreational & heritage resources	2	H	H	There are no known heritage resources or areas used for recreational purposes at the proposed beach manhole and landing sites apart from in Lelu Harbour (Kosrae).	L
5. Traffic							
Cable installation, manhole construction, etc	Additional land traffic movements, lane closures	Issues due to additional traffic movements, congestion, increased risk of accidents, etc	2	H	H	Existing roads will be used to deliver and remove construction materials, and equipment to and from the proposed BMHs and CLSs. Additional vehicle movements expected to be minimal. No mitigation required.	L
	Vessel activity in nearshore coastal environment	Potential impact on existing recreational and commercial vessel activity	4	C	M	Ports Authority & local villagers will be notified in advance	L
6. Solid Waste							
Manhole construction, etc	Residual materials following construction	Impacts on waste handling facilities	4	D	L	No mitigation required	L
7. Noise and Vibration							
All construction activities	Construction machinery and related traffic	Impacts on adjacent sensitive receptors from excessive noise	4	C	M	Construction activity of short duration, limited sensitive receptors near. Apart from appropriate noise attenuators on machinery, no additional mitigation required.	L
8. Air Quality							
All construction activities	Construction machinery and related traffic	Impacts on adjacent sensitive receptors from excessive dust	4	D	L	Construction activity of short duration, limited sensitive receptors near, apart from dust suppression using a water cart (if required), no additional mitigation required.	L
9. Subsistence and Livelihoods							
Cable installation	Cable trenching activities in subtidal areas	Impacts on fish harvested for subsistence as a result of vessel movements	4	D	L	Nearshore cable installation of short duration, mitigation to include notice to locals of upcoming activities	L
	Cable trenching activities across intertidal reef	Impacts on both subsistence commercially targeted benthic fauna (e.g., sea cucumbers, octopus, clams, seaweeds, etc) in immediate areas of cable trenching	4	D	L	Construction footprint small and installation activity of short duration, subtidal reef already impacted, mitigation to include notice to locals of upcoming activities	L

Table 6.5: Issues & risk assessment – Operation and Maintenance Activities

Activity	Source of Risk	Description of Potential Impact	Assessment of Risk			Mitigation / General Comments	Post-Mitigation Residual Impact
			C	L	Rating		
1. Employment and Livelihoods							
Use of Cable to access internet	Access to cable for internet use	Improved telecommunications access to businesses and residents leading to additional employment opportunities	2	B	E[1]	Positive overall benefit, no mitigation required	E[1]
2. Health and Safety							
Installed power cable	Powered cable (Kiribati only)	Potential for the public to come in to contact with powered cable and associated electrocution risk	1	C	E	Ensure cable landing station is near beach manhole, deep burial of powered cable and signage allowing cable route advising of risk of excavation	L
3. Sea Vessel Traffic							
Installed subsea cable	Vessel activity in nearshore coastal environment	Entanglement of anchor on cable	4	D	L	Due to burial and trenching of cable there is low risk of this occurring.	L

Notes: [1]The 'extreme' rating refers to a positive impact.

7. Consultation and Information Disclosure

290. Appendix 6 presents lists of meeting attendees. The consultation undertaken with stakeholders is detailed in Appendix 7. Set out below is a summary of the results of the consultations undertaken.

7.1 Kosrae

291. Stakeholder meetings and public consultations were held during the site visit to Kosrae by the safeguards team from 17th to 20th October, 2016.

292. Overall, stakeholder feedback during meetings and public consultation was very encouraging and positive. Primarily, people just wanted information on the nature and timeframe for the project. In fact, the limited connectivity in Kosrae prompted a lot of people to demand quicker implementation of the Project. The desire to obtain better Internet and communication services at an affordable rate was high.

293. Government and non-government organisations indicated the aspiration to offer more products and better services particularly private businesses and financial institutions (banks). In addition, there is a high rate of emigration from Kosrae in search of better economic opportunities. Better communication will be welcomed by Kosraean families with loved ones living abroad who wish to keep close contract with family members at home.

294. A key issue raised related to land access and ownership. However, it was mentioned that the priority was locating the beach manhole and cable landing station sites on government land. Further, it was highly likely that the existing utility corridor (telephone and electricity lines) would be used for the fibre cable networking on land. The purpose provision in the government easement lease, which clearly identifies the 60 feet wide easement, will accommodate the duct route of the fibre cable from the beach manhole to the cable landing station. However, an issue was raised that landowners may potentially claim that land on the seaward side of the road, which has been eroded in recent times, belongs to them when in fact it is within the road easement. To avoid the issue of ownership and to ensure long term viability of the cable in these areas, it is proposed that the cable be installed on the inland side of the road.

295. The issue of accessing inappropriate information specifically by children was raised by women. The response was described as an issue of managing the risk. Education will need to be provided on how to manage access to Internet content at home.

7.2 Kiribati

296. Stakeholder meetings and a public consultation exercise was held during the site visit conducted between 24th and 29th October 2016.

297. Due to the current land tenure, and WWII history, the proposed sites were generally accepted as potential locations for the beach manhole sites.

298. The sense of public need for the project, seen as a potential improvement of the existing Internet and communication services, was overwhelming. Strong support from both the Government and non-government entities was evident.

299. Kiribati has a large contingent of its population overseas, and communication is an important part of their daily lives. There was a perception that the fibre cable will bring with it an accessible and affordable service.

300. The concerns were generally around the impact on fisheries (because of bringing the cable ashore), potential costs, and social impacts. The importance of fishing to the people of Tarawa was evident, as some raised concerns of potential impacts of the fibre cable on fish. However, an explanation of the project and potential impacts alleviated these concerns.

301. It was explained that costs will likely depend on the Kiribati Government and the selected operator for the cable and that in theory it should be cheaper compared to the current satellite services, which was generally accepted.

302. The concerns with respect to the social impact of this project were a subject matter of discussions which differed between different age groups and gender. Women and children, were the most vulnerable people to the negative impact of the new cable. Overall, the need for a public awareness and information assistance, from government for example, was apparent.

303. The government, particularly confirming the structure of Telco's access rights to use of the cable and confirming the cable landing station, was needed to be progressed in advance of Project delivery.

7.3 Nauru

304. Stakeholder meetings and a public consultation exercise was held during the field trip to Nauru (31st October, 1st and 2nd November 2016). Stakeholders included both government and non-government including environment, conservation, legal, gender, youth, women, and NGOs.

305. The technological gap between the younger generation and their parents was evident. Public awareness and education was raised as a prerequisite prior to the implementation phase. This will be a necessary component of managing the risk of opening Nauru to global Internet.

306. The project has great potential for Nauru. However, the legal framework and local infrastructure must be developed leading up to the fiber optic submarine cable landing date. Thus, allowing the people and government of Nauru to fully utilised the cable. Freedom of speech is embedded in the Constitution. However, Internet freedom is still an area that requires further development. In fact, that Cyber Crime Act passed in May 2016, which certainly will assist with monitoring and managing Internet usage.

307. The potential negative impact both on the environment and people's lives were perceived to be nil. On the other hand, the positive impacts were overwhelmingly expressed. Overall, the perceived positive impacts appear to far outweigh any negative impact.

7.4 Ongoing Consultation and Participation

308. During project implementation, the implementing agencies in each country will be responsible for keeping the public and stakeholders informed of progress. Further consultation will be undertaken before the detailed marine survey, during any land access negotiations and before and during installation. Each implementing agency will develop a consultation plan for their project and will be supported by the in-country PMU or PC to implement the plan.

7.5 Disclosure

309. This ESIA will be publicly disclosed by the governments of each country (through the websites of implementing agencies in FSM, Kiribati and Nauru), and will be available in hard copy at government offices in each country. A public notice will let stakeholders know that the documents are available to view.

310. The World Bank and ADB will also disclose this document, and other relevant project information during implementation, on their websites.

311. The updated ESIA and ESMP, monitoring reports and other project documents will also be made available and publically disclosed as per the ADB Public Communications Policy 2011.

8. Environmental and Social Management Plan

8.1 Introduction

312. The ESMP is organised into two cross-referenced tables, namely the environmental mitigation table (Table 8.1) and monitoring table (Table 8.2). These tables detail the mitigation measures and monitoring actions that the Implementing Agency has committed to implement, from the planning through to the operating period of the project. The ESMP mitigation table is consistent with the monitoring table so that reference can be made in bid documentation or during any other monitoring activity and the correct mitigation and monitoring measure can be found. This approach makes for an ESMP that is practical and can be easily used. The ESMP will inform the cable contractor's site-specific ESMP (SESMP) which will be prepared following marine surveys and detailed design.

313. During the pre-construction stage (pre-installation) of the project the ESIA and ESMP will be updated based on detailed information from the surveys to be undertaken, now the existing information gaps in the baseline will be filled. The responsibility for oversight of these activities is with the PCs supported by the PMUs. As soon as the detailed marine and hydrographic surveys have been completed, the PC with the contractor, will review the alignment plans and decided if new surveys and revisions to the ESMP are needed. The PC will then make any necessary changes to the ESMP and prepare to brief the contractor. The updated ESIA and ESMPs will be submitted to WB and ADB for review and approval.

8.2 Performance Indicators

314. Given that nearly all the potential negative impacts could arise during cable installation, and that robust environmental contract clauses will be included in the contracts to avoid all impacts, key performance indicators will be as follows:

i) key baseline conditions for monitoring as per section 4 and Tables 8.1 and 8.2;

ii) confirmation that the ESMP tasks are defined as specific individual or grouped environmental and social clauses in the contract bid documents for cable laying;

iii) confirmation that environmental management criteria are included as part of the cable-laying contractor selection process, including their experience preparing and implementing ESMPs, working in sensitive tropical locations such coral reefs, recognizing fish aggregation/spawning areas, seagrass meadows and seamounts;

iv) a safeguards advisor with marine ecology expertise located and retained as an advisor by each country's implementing agency providing assistance with ESMP implementation, contractor briefing on marine habitat protection, contractor ESMP supervision (including observations during cable laying within the reef), and participation in community consultation;

v) a written record of the briefing on safeguards and inspection of vessels, according to the tasks as they are defined in the ESMP and contract specification, completed with the survey and cable placement contractors, as soon as the contractors have been selected.

vi) compliance monitoring checklists prepared and being used by the contractor and safeguards consultant and due diligence notes, completed as defined in the ESMP, and making the notes available in an easily accessible file for the contractor, PC, PMU, and others to use.

vii) a written mitigation and monitoring completion report, listing all mitigation and monitoring measures defined in the ESMP, their implementation timing, monitoring and any follow up actions; and,

viii) a written record of interviews with local fishers, examining any cable placement issues, vis-à-vis fishing gear damage.

315. The safeguards advisor for each project party will be responsible for preparing a performance indicator report on behalf of that party's PMU, by listing the seven items above and providing a short text to indicate how these items were implemented and their success as of the start of the operating period of the project. The safeguards advisor will also be responsible for supporting the PMU prepare the semi-annual safgeuards monitoring reports.

8.3 Implementation Arrangements

316. **Overview**. The project involves three countries--FSM, Kiribati and Nauru--each with their own project funding supported by either the WB or ADB.

317. The development and implementation of joint components of the project will be administered through the East Micronesia Cable Steering Committee (EMCSC), which will be comprised of two members from each of the participating countries. A joint technical project manager reporting to the EMCSC will be responsible for finalizing the system specifications and conducting the tender for the undersea components of the project.

318. During implementation, each country's implementing agency will establish a PMU and/or hire a PC to manage the project as delegated by the implementing agency. Each implementing agency is responsible for implementing the ESMP and complying with the safeguards policies of its development partner (WB or ADB) as per its financing agreement (see next section).

319. A cable-laying contractor will be contracted to supply all undersea components of the project up to the beach manhole at each landing. Each of the parties will be sperately responsible for letting the contracts for the associated terrestrial works at the respective landings.

320. Each implementing agency will be responsible for day-to-day project delivery including the supervision of the cable-laying contractor. This responsibility may be delegated by the implementing agency to its government PMU or its PC. Each country's PMU or PC will continue this role until the country establishes a state-owned entity or other special purpose vehicle (SPV) for owning and operating each country's long term interest in both the undersea and terrestrial components of the project.

321. Each implementing agency's PMU/PC will be responsible for identifying the final location of land-based infrastructure (beach manhole, cable landing station and cabling), securing land access (lease or easement), procuring contractors and supervising the land-based works, public and stakeholder consultations and managing complaints and grievances in their respective country.

322. **ESMP implementation arrangements**. ESMP activities relating to cable laying will be coordinated and managed by the implementing agency or the implementing agency's PMU or PC which may delegate responsibility to a Safeguards Advisor, part-time, as needed for the duration of the implementation period. ESMP activities during undersea cable laying include:

- Ensure safeguards clauses in the cable laying bid documents
- Review and comment on detailed design, detailed marine surveys and other technical outputs Updates to the ESIA and ESMP, af required, following the marine surveys and detailed design
- Review and clearance of the cable laying contractor's SESMP
- Remote and site-based supervision of the cable laying contractor, particularly when the cable is being laid in the nearshore / foreshore environments.
- Reporting safeguards activities and progress to the implementing agency on a quarterly basis

- Training, oversight, support and capacity building to the implementing agency as required, but particularly for consultation, voluntary land acquisition, management of non-compliances and incidents, and obtaining local permits and approvals.

323. To implement the above, a safeguards advisor will be hired by each implementing agency to support the implementing agency's project team in ensuring compliance with the ESMP for associated terrestrial works and stakeholder engagements, including:

- Ensuring land acquisition and resettlement is voluntary and is carried out in accordance with WB or ADB safeguards policies.
- Ensuring land access documentation is obtained before construction starts.
- Managing consultation, disclosure of information, keeping records of consultations and providing feedback to the implementing agency.
- Receiving and recording grievances and complaints and managing their resolution.
- Remote and site-based supervision of local contractors for compliance with the ESMP, including managing any non-compliances and incidents.
- Obtaining local permits or environmental approvals, including preparing any documentation and communications with environment agency staff.
- Providing training and capacity building to implementing and regulatory agency staff as required.
- Reporting safeguards activities and progress to the implementing agency on a regular basis and supporting PMU prepare and submit the semi-annual safeguard monitoring reports.

324. The safeguards advisor serves as additional support to each party's local environmental protection agency, and will have specific experience with WB and / or ADB safeguards policies to ensure compliance with both government and donor safeguards requirements. If they are based overseas, they will be required to travel to the project location at key milestones.

8.4 Institutional Capacity Assessment

325. **Institutional capacity assessment**. Kosrae, Kiribati and Nauru appear to have competent staff that work in the various environmental consenting agencies which have some, if limited, experience with processing environmental assessments.[45] Given that the impacts of this project are expected to be minor in nature and extent, the capacity within the implementing and environmental regulatory agencies should be adequate with the additional support from the PMU and safgeuards advisors. The safgeuards advisors can provide training and/or capacity development during their inputs.

326. The respective implementing agencies have indicated that they have capacity to take on the responsibilities required to implement the project subject to provision of technical assistance

[45] Even Nauru, which has no national environmental assessment requirements, has experience with several category B projects implemented by development partners which have required implementation of safeguards provisions and EMPs.

offered by the WB and ADB. The safeguards advisors recruited for the project will be required to have experience in the implementation of WB or ADB safeguards. The implementing agencies and their respective project implementation teams will coordinate with their safeguards advisors to ensure that the supplier complies with ESMP requirements, which will be incorporated into the surveying and cable installation contract(s). Each implementing agency's project team will fill existing safeguards capacity gaps and ensure that there is adequate expertise and resources to implement the ESMP for that country.

327. In addition, the cable supplier, installation contractor and building contractors will be required to have sufficient ESMP implementation skills and resources within their team for the duration of their contract. This may include recruiting sufficiently experienced and qualified specialists if they lack in-house experience.

328. The WB and ADB will support the implementing agencies to prepare terms of reference for the safeguards advisors, as needed, and will provide ongoing safeguards support for the duration of the project.

8.5 Mitigation and Monitoring Costs

329. **Environment**. The ESMP identifies mitigation and monitoring actions. Monitoring will be required during cable installation field (likely to be 1-2 days), when the cable placement is ongoing nearshore. For the deep ocean work the oceanographic survey is expected to be completed several weeks ahead of the cable placement operation.

330. If each safeguards advisor will be an individual who is sourced from outside these countries, safeguards monitoring costs are estimated as follows:

- Requirements for safeguards advisors for Kosrae, Kiribati and Nauru are estimated to be 55 days per year (US$46,000, plus $30,000 travel and disbursements budget).
- For Kiribati and Nauru, US$25,000 each for an UXO survey.

331. **Social development and social safeguards**. Social mitigation and monitoring will involve at least five tasks (Table 8.1 and Table 8.2). Cost of community awareness activities such as community meetings/public consultations and information materials prior to construction, during and after construction is expected to be approximately $30,000.00, or about $10,000 for each country, for the complete development period. As access on government or state land will be negotiated, there is no land acquisition required for the project and therefore no budget allocated.

332. **Total costs**. Combining both the environmental and social mitigation and monitoring costs the estimated collective costs for all three project parties are expected to be approximately US$76,000 for the entire project, or about $25,333 each (excluding the UXO surveys for Kiribati and Nauru). These cost estimates assume efficiencies to be gained from either a joint or coordinated procurement of the safeguards advisors. Additional costs especially for travel will need to be considered if the safeguards advisors are procured/coordinated individually.

333. **Monitoring and reporting requirements**. All reporting requirements are specified in the ESMP (Table 8.2). In summary, quarterly progress reports from each country's safeguards

advisors to its respective implementing agency (as delegated to a PC or PMU) is required as part of the quarterly progress reports (QPR) to ADB/WB (or as specified in the funding agreement), and semi-annual safeguards monitoring reporting from the implementing agency/PMU to the executing agency, WB and ADB.

334. At the end of the pre-construction period each country's safeguards advisor will prepare mitigation and monitoring completion reports for their respective implementing agencies to submit to the WB and ADB as required. The contractor will be required to submit progress reports to the implementing agencies, in addition to the oceanographic survey findings and monthly reporting on SESMP implementation and compliance. Each PMU or PC or safeguards advisor through its respective implementing agency will prepare and submit a semi-annual compliance monitoring report which will summarize contractors and PMU activities, as well as the construction period mitigation and monitoring completion reports, once the facilities are fully installed. Monitoring requirements are specified in the ESMP Table 8.2.

Table 8.1: ESMP – Mitigation Table

Parameters	Potential Impact	Mitigation Measures	Location	Timing/ Duration	Implementation	Supervision
1.0 Pre-Construction Period (planning and design actions to prevent impacts)						
1.1 Physical Environment						
Land access	Unable to secure access to sites identified in ESIA	Acquire land owner approvals before works begin. Transfer of any entitlements, and keep documentation. Identify other sites on other Government land	Beach manhole, cable landing station sites identified in the ESIA	Prior to start of installation	PMUs/PCs and Safeguards Advisors	Safeguards Advisors
Air quality	Greenhouse gas emissions from vessels	Require vessel emission certification (PM, SO_2 and NOx) included in contract specs to meet USEPA emission standards http://www.epa.gov/otaq/marine.htm.; Smoke density test will be performed by the technical monitor using Canadian Department of Transport Smoke Chart (schedule of regulations) https://www.dieselnet.com/standards/ca/marine.php	Entire cable route	Prior to start of installation	PMUs/PCs	Safeguards Advisors
Substrate	Use of foreign materials for filling cable trench, causing unknown pollution.	Contractor's specification to include; 1. All backfill to be previously excavated material. 2. Only inert/stable materials will be used in cable laying and anchoring. 3. To be aware of unexploded WWII munitions.	Inshore coastal areas	Low tide in intertidal areas.	PMUs/PCs	Safeguards Advisors
UXO	Failure to complete an unexploded ordinance sweep of cable route leading to detonation and loss of life	Conduct a UXO survey of the cable alignment as it passes the barrier reef cut and all the way to the landing site, prior to any cable placement activity.	Inshore coastal areas	Prior to start of any cable laying activity.	IAs/ SPVs	PMUs/PCs
Hydrothermal vents	Physical damage to vents by cable or cable laying equipment. Turbidity and smothering	In construction contract specifications require survey team to identify a cable route that maintains a minimum clearance of 200 m from active hydrothermal vents (if known) and identify route in the cable-laying spec.	Deep sea areas	During preparation of contract specs	PMUs/PCs	Safeguards Advisors
Sea mounts	Physical damage to habitat and possible fishery usage.	During preparation of contract specifications, Project Coordinator to include a minimum clearance of 2 Km from the base of seamounts, for any cable alignment for both oceanographic survey and cable-laying operators	Oceanic deep-sea areas	During preparation of contract specifications	IAs	PMUs/PCs
1.2 Ecological Environment						
Coastal and deep ocean habitats	Accidental discharge of pollutants from vessel and from vessel grounding.	Require bidders to provide specifications of fuel and lubricant management equipment and storage on vessels used during the survey and cable laying operations; Require bidders to certify the installations follow national regulations and-or MARPOL specifications for fuel management; Maintain a contingency plan to address spills	Offshore and inshore coastal areas	Preparing bid construction contract documentation	IAs	PMUs/PCs

Parameters	Potential Impact	Mitigation Measures	Location	Timing/ Duration	Implementation	Supervision
Sensitive nearshore ecological resources (i.e., coral reef, sea grass)	Disturbance of marine and terrestrial organisms and habitats	Prepare routing report based on detailed design demonstrating avoidance of significant habitat areas; Define in contract specifications that the cable`s placement must be confined narrow a path as possible; In contract specifications instruct cable survey team to survey cable alignment for coral outcrops, and design alignment to avoid; Coral assemblages to be marked on design drawings.	Subtidal, Intertidal and terrestrial cable route	Prior to start of installation	IAs/SPVs	PMUs/PCs
Conservation areas (CA)	Disturbance of marine organisms and habitats in 'no take 'areas	Cable alignment to avoid conservation areas; Define in contract specifications, via GPS and survey markers, a cable route that provides ≥ 75m distance from CA boundaries, and requires all survey and cable laying vessels to maintain this distance always.	Subtidal and intertidal cable route	Prior to start of installation	IAs/SPVs	PMUs/PCs
Species potentially at risk (whales, dolphins, turtles)	Ocean sonar survey affecting cetaceans. Entanglement in cable by deep diving cetaceans	Contract specifications to include best practice for operating vessels in proximity to marine mammals as included in the Code of Environmental Practice (COEP)	Subtidal and Intertidal cable route	For bid & contract documentation	IAs	PMUs/PCs
1.3 Socio-Economic Environment						
Coastal resource users – subsistence and artisanal fisheries	Damage to ecosystem integrity and fishery productivity through loss or damage to local fishing grounds.	Specify in contract specs trenching/cable laying activities to be limited to a narrow corridor (0.4m wide by 0.75m deep) and trenching to be followed by immediate burial.	Subtidal and Intertidal cable route	For bid & contract documentation	IAs	PMUs/PCs
Safeguards advisors	Inexperienced technician leading to delayed or failed implementation of ESMP items	Hiring of safeguards advisors to help implement and record delivery of ESMP for each country	FSM, Kiribati, Nauru	At start of project for the duration of the project	IAs	PMUs/PCs/ World Bank and ADB task teams
Community information	Misconceptions raising people's fears regarding project footprint and potential damages to marine food supply.	At least one community consultation prior to commencement of civil works, during construction and after project completion to reduce concerns about construction impacts.	Kosrae, Kiribati, Nauru	Before civil work begins	IAs	Safeguards Advisors/ PMUs/PCs
Community grievances	Minor concerns/issues developing community resentment due to unaddressed project related concerns	Establish GRM, for use throughout the life of project, prior to commencement of civil works and making this known to villages during follow up meetings before the work begins.	Local villages	Before civil works begin	IAs	Safeguards Advisors/ PMUs/PCs
Access during landside trenching and cable installation works	Failure of contractors to do trenching work with minimal damage and access restrictions to property	Contract specs to require full rehabilitation immediately after completion of trenching works; Develop notification protocol to provide notice of access restrictions, comprising the following steps: (i) notification of the residents by letter providing details of the project, potential access restrictions and likely timing of activities; (ii) follow-up telephone contact to	Residents with access affected by trenching and cable installation works	Before civil works begin	IAs	Safeguards Advisors/ PMUs/PCs

Parameters	Potential Impact	Mitigation Measures	Location	Timing/ Duration	Implementation	Supervision
		confirm letter receipt and offer further consultation; (iii) on-site meetings with affected residents (if requested); and (iv) “door-knock” notifications of residents 48 hours prior to trenching to provide details of work program, duration of access restriction and contact details in case of grievance; Develop a specific procedure, in consultation with hospital management, to ensure emergency access is maintained to local hospital at all times.				
Contractor awareness raising	A contractor with little understanding of EMPs or safeguard matters initiates the work and causes damage, impacts and complaints	Conduct contractor ESMP implementation briefing reviewing the mitigative, monitoring and reporting requirements, support contractor in preparation of SESMP	Implementing agency/PMUs office	1 day	IAs/SPVs	PMUs/PCs
2.0 Construction Period (impacts associated with installation work)						
2.1 Physical Environment						
Air quality	Emissions from survey and cable placement vessels	Zero tolerance and immediate repair required — specified in Contract specifications; namely stack emissions and stack smoke tests. Vessel fined and shut down within 5 days of notice	At all work sites	From the time the vessel begins work on this project	Contractor(s)	Safeguards Advisors/ PMUs/PCs
Substrate	Introduction of foreign substances reacting with environment or introduced medium for introduced organisms.	Contractor’s specification to include; 1. All backfill to consist of previously excavated material. 2. Only inert/stable materials are to be used in cable laying and anchoring. 3. To be aware of unexploded WWII munitions.	Inshore coastal areas	For all seafloor trenching operations	Contractor(s)	Safeguards Advisors/ PMUs/PCs
Hydrothermal Vents	Physical damage to vents or cable.	As per contract specifications, lay cable along surveyed alignment which has identified any hydrothermal vents and maintains a minimum clearance of 200 m from active hydrothermal vents to protect the site(s).	Oceanic deep-sea areas	When work is under taken.	Contractor	Safeguards Advisors/ PMUs/PCs
Sea mounts	Physical damage to habitat and possible fishery usage.	As defined in the contract specifications, lay cable along designated survey route, which maintains a minimum clearance of 2 Km from the base of seamounts	Oceanic deep-sea areas	When work is under taken.	Contractor	Safeguards Advisors/ PMUs/PCs
2.2 Ecological Environment						
Coastal and deep ocean habitats	Accidental discharge of pollutants from vessel and from vessel grounding.	Adhere to contract specifications and national laws; Safe storage and clear labelling of fuel and chemicals; Containing all fuel, lubricants and transmission fluids in double walled tanks on vessels and if in drums, store below deck, as specified in contract specifications. Maintain a contingency plan to address spills and storm events.	Offshore and inshore coastal areas	When work is undertaken	Contractor	Safeguards Advisors/ PMUs/PCs

Parameters	Potential Impact	Mitigation Measures	Location	Timing/ Duration	Implementation	Supervision
Species potentially at risk (whales, dolphins, turtles)	Ocean sonar survey affecting cetaceans. Entanglement in cable by deep diving cetaceans	Contractor to be provided with COEP which contains detailed guidelines on minimally intrusive oceanographic survey method.	Oceanic deep-sea areas	When work is undertaken	Contractor	Safeguards Advisors/ PMUs/PCs
Sensitive nearshore ecological Resources (i.e., coral reef, sea grass)	Disturbance of marine and terrestrial organisms and habitats	Contractor(s) to adhere to ≥75m avoidance rule and lay cable along surveyed route, as per cable- laying specification, thus avoiding coral reefs and outcrops. Restrict cable footprint to as narrow a path as possible when burying across a seagrass meadow, and fill trench immediately.	Subtidal, intertidal and terrestrial cable route	When work is undertaken	Contractor In-country ICT / SPV	Safeguards Advisors/ PMUs/PCs
2.3 Socio-Economic Environment						
Coastal resource users – subsistence and artisanal fisheries	Damage to local nearshore fishing grounds or introduce greater chances of gear entanglement	As per contract specifications, contractor to confine trenching activities narrow a corridor (0.4m width—width if small backhoe bucket) and restore site when finished. Trenching/laying activities confined to a short period. Request Fisheries authorities to advise local fishers of activities, dates, and avoidance measures. Place markers along cable alignment in shallow waters.	Offshore, Inshore Coastal areas.	When work is under taken.	Contractor	Safeguards Advisors/ PMUs/PCs
Coastal resource users – game fishers	Displacement of activities during cable laying. Entanglement of fishing gear. Damage to ecosystem integrity and fishery productivity.	PC to ensure shipping notice is issued warning of cable laying, dates, and safe clearance for other activities. Request port authorities and marine resources authority to advise local operators of cable laying activities, location (planned corridor survey) and avoidance measures; Confine laying activities to a short period preferably outside any fishing seasons defined during consultation.	Offshore areas	When work is under taken.	Contractor/IAs/SPVs	Safeguards Advisors/ PMUs/PCs
Coastal shipping – commercial shipping and ports	Damage to ships through cable entanglement. Disruption to shipping during cable laying.	Ensure shipping notice is issued, warning of cable-laying, dates, and safe clearance for other activities; Request port authorities to advise local shipping of laying activities and avoidance measures.	Offshore and inshore areas	When work is under taken.	Contractor/IAs/SPVs	Safeguards Advisors/ PMUs/PCs
Land use	Detour from agreed cable alignment Community perception of cable encroachment to marine protected areas	Conduct a series of consultations with government, private sector and non-government organizations including women and youth on progress of work and cable alignment.	At locations where this occurs	When work is under taken.	Contractor /IAs	PMU/PC
Access	Temporary loss of local community's access to fishing grounds during cable laying	Provision of electronic and print notices to local communities/ fishers of construction schedule and contact person in case of inquiries.	During cable laying	When work is under taken.	Contractor	PMU/PC
Inadequate information disclosure	Failure to include villages in final alignment planning and decision making	Prior to start of work, present draft plan to villages and seek input and agreement on final alignment plan, etc.	At key locations	At start of construction	Contractor/IAs/SPVs	Safeguards Advisors/ PMUs/PCs
Environmental completion reporting	Contractor fails to prepare summary report defining mitigation and monitoring actions completed and what	Prepare a completion report and deliver to the Engineer.	N/A	Complete within the last 4 months of installation	Contractor/IAs/SPVs	Safeguards Advisors/ PMUs/PCs

Parameters	Potential Impact	Mitigation Measures	Location	Timing/ Duration	Implementation	Supervision
	needs to be continued during operating period.			period		
Health and safety	Injury or death to contractors during contracted works	Contractors to prepare health and safety plan (covering (i) workers; and (ii) community) as part of SESMP	All	Submission prior to works being undertaken	Contractor	PMUs/PCs
3.0 Operating Period						
3.1 Physical and Ecological Environment						
Mitigation measures completion report	No report and no record of actions implemented	PC will not approve final payment to contractor until a completion report identifying all relevant items in the ESMP and the actions taken by the contractor has been submitted.	N/A	At start of operating period before final payment	Contractor	PMUs/PCs
Oceanic habitat – hydrothermal vents	Physical impact on cable of vent water.	New vents can appear in proximity to the cable and re-routing of cable may be required to maintain safe clearance	Offshore deep water environment	As part of periodic maintenance checks	SPVs	SPVs
Perceived marine pollution	Local communities fear of potential damage to marine life and other impacts.	Grievance redress committee (or successor within each SPV) to address community concerns taking immediate action to address perceived concerns.	PIA	As concerns arise	SPVs	SPVs
3.2 Socio-Economic Environment						
Impact associated with improved Internet — better access to harmful sites	Failure to adopt measures and continue mitigation actions defined in the construction environmental completion report.	Make population aware of 'Internet site blocking features available to every subscriber; possibly via a village advisory group.	When in use	At all times	SPVs and appointed NGOs or women's groups	SPVs
Fishing	Fishing gear snagging	Clearly advertise location of undersea cable and alert local fishers and dangers of gear snagging (which will be minor as it will be buried 3 feet below the seafloor.	Inshore coastal areas	After cable is in place	SPVs	SPVs

Table 8.2: ESMP - Monitoring Table

Parameters	Potential Impact	Mitigation Measures	Monitoring Action Details	Timing/ Duration	Output	Implementation	Supervision
1.0 Pre-Construction Period (Planning and design actions to prevent future impacts)							
1.1 Physical Environment							
Air quality	Greenhouse gas emissions from vessels	Require vessels emission certification (PM, SO_2 and NOx) to be submitted in contract specs. Results will need to meet USEPA emission standards http://www.epa.gov/otaq/marine.htm CFR-40; Smoke density test will be performed by the technical monitor using Canadian Department of Transport Smoke Chart (schedule of the regulations) https://www.dieselnet.com/standards/ca/marine.php	Confirm contract specification and compliance certification	During pre-installation period	Written and signed DD inspection note-to file	IAs/SPVs	PMUs/PCs/ Safeguards Advisors
Substrate	Use of foreign materials for filling cable trench, causing unknown pollution.	Contractor's specification to include; 1. All backfill will be only locally sourced or seabed material. 2. Only inert/stable materials are to be used in cable laying and anchoring. 3. To be aware of unexploded WWII munitions.	Confirm contract specification and compliance certification	During pre-installation period	Written and signed DD inspection note-to file	IAs/SPVs	PMUs/PCs/ Safeguards Advisors
UXO	Failure to complete an unexploded ordinance sweep of the cable route in coastal waters could lead to loss of life	Conduct a UXO survey of the cable alignment as it passes the barrier reef cut and all the way to the landing site, prior to any cable placement activity.	Obtain record of UXU sweep completed	During pre-installation period	Written and signed DD inspection note-to file	IAs/SPVs	PMUs/PCs
Hydrothermal vents	Physical damage to vents by cable or cable laying equipment. Smothering by disturbing area	Contract specifications (prepared by technical advisor/PC) require survey team to identify a cable route that maintains a minimum clearance of 200 m from active hydrothermal vents (if known) and id this route in the cable-laying specification.	Confirm that appropriate specifications contained in bid documentation	During pre-installation period	Written and signed DD inspection note-to file	IAs/SPVs	PMUs/PCs/ Technical advisor/PC
Sea mounts	Physical damage to habitat and possible fishery usage.	During preparation of contract specifications, technical advisor/PC to include a minimum clearance of 2 km from the base of seamounts for cable alignment (for oceanographic survey and cable-laying operators)	Confirm adequate presentation in bid documentation	When bid, documents are being prepared	DD note-to file	IAs	PMUs/PCs/ Technical advisor/PC
1.2 Ecological Environment							
Coastal and deep ocean habitats	Accidental discharge of pollutants from vessel and from vessel grounding.	Bidders to provide specifications of the fuel and lubricant management equipment and storage on vessels used during the survey and cable laying operations, and certify that the installations follows national regulations and-or MARPOL specifications for fuel management; Maintain a contingency plan to address spills	Confirm appropriate specification contained in bid documentation	During pre-installation period	Written and signed DD inspection note-to file	IAs/SPVs	PMUs/PCs/ Technical advisor/PC

Parameters	Potential Impact	Mitigation Measures	Monitoring Action Details	Timing/ Duration	Output	Implementation	Supervision
Sensitive nearshore ecological resources (i.e., coral reef, sea grass)	Disturbance of marine and terrestrial organisms and habitats	Prepare routing report based on detailed design demonstrating avoidance of significant habitats; Define in contract specifications that the cable placement must be confined narrow a path as possible; Contract to instruct cable survey team to survey cable alignment for coral outcrops, and design alignment to avoid. Coral assemblages to be marked on design drawings.	Confirm appropriate specification contained in bid documentation	During pre-installation period	Written and signed DD inspection note-to file	IAs/SPVs	PMUs/PCs/ Technical advisor/PC
Conservation areas	Disturbance of marine organisms and habitats in 'no take 'areas	Define in contract specifications, via GPS and survey markers, a cable route that provides ≥ 75m distance from CA boundaries, and requires all survey and cable laying vessels to maintain this distance always.	Confirm contract specification in place as indicated in ESMP	During pre-installation period	Written & signed DD inspection note-to file	IAs/SPVs	PMUs/PCs/ Technical advisor/PC
Species potentially at risk (whales, dolphins, turtles)	Ocean sonar survey affecting cetaceans. Entanglement in cable by deep diving cetaceans	Contract specifications to include best practice for operating vessels in proximity to marine mammals as included in the Code of Environmental Practice (COEP).	Confirm inclusion in contract specifications	When specifications are, being written	Record to file	IAs	PMUs/PCs/ Technical advisor/PC
1.3 Socio-Economic Environment							
Coastal resource users - subsistence and artisanal fisheries	Damage to ecosystem integrity and fishery productivity through loss or damage to local fishing grounds.	Define in contract specs trenching/cable laying activities to be limited to a narrow corridor and trenching to be followed by immediate burial.	Confirm inclusion in contract specifications	When specifications are, being written	Record to file	IAs	PMUs/PCs/ Technical advisor/PC
Safeguards advisors	Inexperienced technician leading to delayed or failed implementation of ESMP items	Appointment of Safeguards Advisor to help implement and record delivery of ESMP training for each country	Confirm technician is on staff at start of project	At start of project for duration	Note to file	IAs	PMUs/PCs/ World Bank and ADB task teams
Community information	Misconceptions raising people's fears regarding project footprint and potential damages to marine food supply.	Conduct community consultation prior to commencement of civil works, during construction and after project completion to reduce concerns about construction impacts.	As required	As required	Note to file	IAs/SPVs	Safeguards Advisors PMUs/PCs
Community grievances	Minor concerns/issues developing community resentment due to unaddressed project related concerns.	Establishment of grievance redress mechanisms (GRM) prior to commencement of civil works and making this known to villages during follow up meetings before the work begins.	Confirm that a grievance redress mechanism requirements is in Contract specs.	At start of detailed design stage	Note to file	IAs/SPVs	Safeguards Advisors PMUs/PCs

Parameters	Potential Impact	Mitigation Measures	Monitoring Action Details	Timing/ Duration	Output	Implementation	Supervision
Access during landside trenching and cable installation works	Failure of contractors to do trenching work with minimal damage and access restrictions to property	Contract specs to include instruction re: full rehabilitation immediately after completion of trenching works. Develop notification protocol to provide notice of access restrictions. Develop a specific procedure, in consultation with hospital management, to ensure emergency access is maintained to local Hospital always.	As required	As required	Note to file	IAs/SPVs	Safeguards Advisors PMUs/PCs
2.0 Construction Period (installation activities)							
2.1 Physical Environment							
Air quality	Emissions from survey and cable placement vessels	Zero tolerance and immediate repair required — as specified in Contract specifications; namely stack emissions and stack smoke tests as defined in IEE and at web sited defined in IEE. Vessel fined and shut down within 5 days of notice	Contractor to provide emission test results	Prior to start of work	Record to file	Contractor(s)	Safeguards Advisors PMUs/PCs
Substrate	Introduction of foreign substances reacting with environment or introduced medium for introduced organisms.	Contractor's specification to include; 1. All backfill will be previously excavated material. 2. Only inert/stable materials are to be used in cable laying and anchoring. 3. To be aware of unexploded WWII munitions.	Site inspection	During installation	DD note to file	Contractor(s)	Safeguards Advisors PMUs/PCs
Hydrothermal vents	Physical damage to vents or cable.	As per contract specifications, lay cable along surveyed alignment which has identified any hydrothermal vents and maintains a minimum clearance of 200 m from active hydrothermal vents to protect the site(s).	Hydrothermal vents detected during initial ocean survey, periodically check cable location to ensure it complies with limits.	When detailed design is complete and cable placement is to take place	Compliance Checklist signed	Contractor	Safeguards Advisors PMUs/PCs
Sea mounts	Physical damage to habitat and possible fishery usage.	As defined in the contract specifications, lay cable along designated survey route, which maintains a minimum clearance of 2 Km from the base of seamounts	If seamounts are identified during detailed design the monitor will check on cable location, ensure it complies with limits defined.	When detailed design is completed and the cable placement is to take place	Compliance Checklist signed	Contractor	Safeguards Advisors PMUs/PCs
2.2 Ecological Environment							
Species potentially at risk (whales, dolphins, turtles)	Entanglement in cable by deep diving cetaceans	Control cable tension so that laid cable conforms to undulations of seabed as per cable laying spec	Ensure cable layer understands cetacean sensitivities	At start of survey and start of cable placement	DD note to file	Contractor	Safeguards Advisors PMUs/PCs

Parameters	Potential Impact	Mitigation Measures	Monitoring Action Details	Timing/ Duration	Output	Implementation	Supervision
Coastal and deep ocean habitats	Accidental discharge of pollutants from vessel and from vessel grounding.	Adhere to contract specifications and national laws, containing all fuel, lubricants and transmission fluids in double walled tanks on vessels and if in drums, store below deck, as specified in contract specifications. Maintain a contingency plan to address spills and storm events.	Inspect both survey and cable laying vessel and confirm compliance	At start of work for all vessels used	Written compliance checklist	Contractor	Safeguards Advisors PMUs/PCs
Sensitive nearshore Ecological Resources (i.e., coral reef, sea grass)	Disturbance of marine and terrestrial organisms and habitats	Contractor(s) to adhere to ≥75m avoidance rule and lay cable along surveyed route, as per cable-laying specification, thus avoiding coral reefs and outcrops. Restrict cable footprint to as narrow a path as possible (0.4m wide by 0.75m deep), when burying across a seagrass meadow, and fill trench immediately. Contractor to received map from Government Marine Resources agency, showing sensitive areas on route from passage to landing.	Inspect cable laying operations in vicinity of coral formations and confirm compliance	When work is near sensitive areas	Compliance report with photos	Contractor/IAs/ SPVs	Safeguards Advisors PMUs/PCs
Conservation areas	Disturbance of marine organisms and habitats in 'no take 'areas	Cable alignment to avoid conservation areas. Define in contract specifications, via GPS and survey markers, a cable route that provides ≥ 75m distance from CA boundaries, and requires all survey and cable laying vessels to maintain this distance always.	Inspect cable laying operation in coastal waters to confirm minimum distance from CAs is maintained	As soon as work takes place near shore waters	Record of inspection and findings—written and photos	Contractor/IAs/ SPVs	Safeguards Advisors PMUs/PCs
2.3 Socio-Economic Environment							
Coastal resource users – subsistence and artisanal fisheries	Damage to local nearshore fishing grounds or introduce greater chances of gear entanglement	As per the contract specifications, contractor is to confine trenching activities to as narrow a corridor as possible (0.4m width—width if small backhoe bucket) and restore site when finished and confine trenching/laying activities to as short a period as possible. Request Fisheries authorities to advise local fishers of cable laying activities, dates, and avoidance measures. Consider placing markers along cable route in shallow (<10 m) waters.	Examine trenching activity and establish compliance with work area limits defined in ESMP. Interview fishers to determine if contractor advised re cable laying activity Locate with cable markers	Trenching in nearshore waters	DD note to file	Contractor/IAs/ SPVs	Safeguards Advisors PMUs/PCs
Coastal resource users – game fishers	Displacement of activities during cable laying. Entanglement of fishing gear. Damage to ecosystem integrity and fishery productivity.	Project Coordinator to ensure a shipping notice is issued warning of cable laying, dates, and safe clearance for other activities Request port authorities and marine resources Authority to advise local operators of cable laying activities, location (planned corridor survey) and avoidance measures. Confine laying activities to as short a period as possible, preferably outside any fishing seasons defined during the consultation with marine	Shipping notice	When work is under taken.	Shipping notice to file	Contractor/IAs/ SPVs	Safeguards Advisors PMUs/PCs

Parameters	Potential Impact	Mitigation Measures	Monitoring Action Details	Timing/ Duration	Output	Implementation	Supervision
		resources authorities.					
Coastal shipping – commercial shipping and ports	Damage to ships through cable entanglement. Disruption to shipping during cable laying.	Ensure shipping notice is issued, warning of cable-laying, dates, and safe clearance for other activities. Request Port Authorities to advise local shipping of laying activities and avoidance measures. Contractors to provide written statement to PC that marine navigation lights and other national maritime measures are closely followed by contractors' vessels always.	Shipping (local and international) notice(s) issued. Appropriate markers and signage employed	When work is under taken.	Shipping notice to file	Contractor/IAs/ SPVs	Safeguards Advisors PMUs/PCs
Land use	Detour from agreed cable alignment Community perception of cable encroachment to 'no-go' marine protected areas	Consult with government, private sector and non-government organizations including women and youth on progress of work and cable alignment. These consultations have the objective of informing all interested people on the work and general alignment location and methods to used.	Obtain review and file record/notes/ minutes of consultations completed	Within 5 days of land use issue consultation taking place	Copy of record of completed meeting	Contractor/IAs/ SPVs	Safeguards Advisors PMUs/PCs
Access	Temporary loss of local communities' access to fishing grounds during cable laying	Provision of electronic and print notices to local communities/ fishermen of construction schedule and contact person in case of inquiries.	Inspect material and confirm timely distribution	At start of installation when issues could arise	Copy of material	Contractor/IAs/ SPVs	Safeguards Advisors PMUs/PCs
Inadequate information disclosure	Failure to include villages in final alignment planning and decision making; Inadequate or untimely delivery of project information	Prior to start of work, present draft plan to villages and seek input and agreement on final alignment plan, etc.	As required	At start of installation	Note to file	Contractor/IAs/ SPVs	Safeguards Advisors PMUs/PCs
Environmental completion reporting	Contractor fails to prepare report detailing mitigation and monitoring actions completed	Regular reporting as specified in monitoring plan; Prepare a completion report and deliver to the Engineer.	Review completion report and file compliance checklist	Following submission by contractor	Compliance checklist	Contractor/IAs/ SPVs	Safeguards Advisors PMUs/PCs
Contractor awareness raising	Contractor with little understanding of EMPs or safeguards initiates the work and causes damage, impacts and complaints	Conduct a 1 day contractor ESMP implementation briefing reviewing mitigation, monitoring and reporting requirements; GRM implemented Reporting as per requirements; Corrective actions implemented and documented	Review briefing material and attendance list; Review reports	Monthly – contractor; PMU – quarterly progress reports & semi-annual reports	Reports (as per previous column)	Contractor/IAs/ SPVs	Safeguards Advisors PMUs/PCs
3.0 Operating Period							
3.1 Physical and Ecological Environment							
Mitigation measures	No report and no record	Prepare completion report	Confirm report	At end of	DD note	Contractor/IAs	Safeguards

Parameters	Potential Impact	Mitigation Measures	Monitoring Action Details	Timing/ Duration	Output	Implementation	Supervision
completion Report	of actions implemented		available and provided by contractor	installation, 1 month into operating period			Advisors PMUs/PCs
Oceanic habitat – Hydrothermal vents	Physical impact on cable of vent water.	New vents can appear in proximity to the cable and re-routing of cable may be required to maintain safe clearance	Undertake periodic check in vicinity of vent areas	After volcanic activity detected	DD note	SPVs	SPVs
Perceived marine pollution	Fear of potential damages to marine life and impact to food supplies by communities	Use the grievance redress committee to address community concerns which needs to be established by the Implementing Agency, taking immediate action to address mostly perceived concerns, before they become negative rumours.	Review and record operation of the grievance redress committee, prepare inspection report	As concerns arise	Inspection report	SPVs	SPVs
3.2 Socio-Economic Environment							
Impact associated with improved Internet — better access to harmful sites	Failure to adopt measures and continue mitigation actions defined in the construction period environmental completion report.	Make population aware of 'Internet site blocking features available to every subscriber; possibly via a village advisory group.	Examine and record steps taken to inform public. Measure effectiveness of consultation.	Once the service becomes operational	DD note Ongoing record of incidents.	SPVs	SPVs
Fishing	Fishing gear snagging	Clearly advertise location of undersea cable and alert local fishers and dangers of gear snagging (which will be minor as it will be buried 3 feet below the seafloor.	Confirm with fishers that steps necessary were taken	After cable is in place.	DD note	SPVs	SPVs

9. Grievance Redress Mechanism

9.1 Introduction

335. Although at this stage there are no identified environmental and involuntary resettlement complaints associated with the proposed project, a grievance redress mechanism (GRM) is presented, to be applied by each Country if at any time during project implementation a grievance or complaint is received and requires action. The GRM lasts for the duration of the project but each of the three countries can continue this beyond the project if they wish, under their own system. For example, there could be a grievance filed because of fishing gear becoming snagged on the cable, presumed to be due to due to faulty cable placement.

336. The GRM is scaled to the risks and adverse impacts of the project. If promptly addressed, concerns and complaints of potentially affected people using a clear and transparent process that is gender responsive, culturally appropriate, and at no costs and without retribution, can be resolved. The mechanism will not impede access to national or state judicial or administrative procedures. The PMU will inform affected people (AP) about this GRM before commencement of any civil works, as part of the consultation process.

337. A grievance redress committee will be established in each country to: (i) record, categorize and prioritize the grievances; (ii) assist the PMU to settle the grievances in consultation with complainant(s) and other stakeholders; (iii) inform the aggrieved parties about the solutions; and (iv) forward the unresolved cases to higher authorities. The committee will be comprised of one member of each implementing agency PMU, the PC and other members (as required), with a chair being appointed.

9.2 Proposed GRM

338. The following seven-step mechanism (Table 9.1) is proposed for grievance redress of social and environmental matters. Each country will need to adapt the GRM to ensure it is culturally appropriate and fits with any requirements set out in laws or regulations.

339. During implementation, the PMU Manager and safgeuards advisor will be responsible for managing the GRM. The PMU Manager will be the grievance focal point, and receive and address project related concerns. The safeguards advisor will maintain the database and support the PMU Manager as required. Concerns will be resolved first by the PMU. Affected people will be made fully aware of their rights regarding land ownership and environmental degradation. During the installation / construction period the contractors will be a key participant in the grievance redress process, and the PC and the PMU will need to confirm that each contractor has assigned a GRM coordinator and has a GRM system that is consistent with the project GRM.

340. Any complaint will be recorded and investigated by PMUs and the contractor (as appropriate). A complaints register will be maintained by each PMU, and will show the details and nature of the complaint, the complainant's name, the date and actions taken because of the investigation. It will also cross-reference any non-compliance report and/or corrective action report or other relevant documentation filed under that complaint. The GRM system will be subject to monitoring.

341. When construction starts, a sign will be erected at all sites to provide the public with updated project information and summarizing key GRM contact person details at the PMU. All corrective actions, complaints and responses carried out on site will be reported in the six-monthly safeguards reports prepared by the PMU safeguards advisor.

342. Throughout this process, the respective country courts and regulatory agencies will be available to hear public complaints and provide advice, as per country laws, or if the complainant feels that the PMU's responses are unsatisfactory.

343. On receipt of a complaint in any form (in person, telephone, written) the PMU manager will log the details in a complaint register. The PMU manager or safeguards advisor (at the manager's request) will respond within one week with advice on the corrective actions taken or to be taken. The PMU safeguards advisor will review and find solution to the problem in consultation with village/island/state or affected party and relevant local agencies.

344. If the complainant is dissatisfied with the outcome, or has not received advice in the allotted time, he or she can take grievance to the national/state level. The relevant authorities will review the case and report back to the PMU manager who will discuss the outcome the complainant.

345. If unresolved, or if at any time the complainant is not satisfied, the matter can be taken through the courts. Both successfully addressed complaints and unresolved issues will be reported to the WB and ADB by the PMU.

Table 9.1: Grievance Redress Process

Step	Process	Duration
1	Affected person (AP) / village elected or traditional chief takes grievance to PMU or contractor	Any time
2	PMU manager and safeguards advisor reviews issue, and in consultation with island/state or relevant agencies and contractor (if appropriate), agrees to a solution and records the results.	2 weeks
3	PMU manager reports back to island/state/AP and gets clearance the complaint has been resolved.	1 week
If unresolved		
4	Island/state/AP take grievance to Committee for resolution	Decision within 2 weeks
5.	Committee refers matter to relevant national agency	2 weeks
6.	Committee can deliberate for up to four weeks	4 weeks
7.	Committee reports back to AP	1 week
If unresolved or if at any stage and AP is not satisfied with progress		
AP can take the matter to appropriate state or national court		

10. Conclusions & Recommendations

346. Overall, the proposed project will require very limited land-based infrastructure, will have minimal mainly marine-based impacts which are limited in scale and extent and can be fully

mitigated, will require no involuntary land acquisition, and will prioritise the use of existing building and infrastructure for landing stations and conveying land-based cable.

347. The project will impact a corridor of no more than 3-4 m wide (including the footprint of the submarine water-jet trenching machine on the sea floor and to a depth of 0.75 m beneath the sediment). The cable, about 4 cm in diameter in the nearshore zone, will be buried. Burial of the cable will be done to reduce interference with coastal fishing gear and reduce the risk injury to corals and people during storm events.

348. The cable route will be surveyed to avoid sensitive habitats such as corals and conservation areas with placement guided by experienced divers who will place the cable according to instructions from a marine ecologist. These measures will serve to mitigate any potential negative impacts on the marine environment.

349. All priority land options to be traversed by the cable and associated infrastructure are either government owned or leased, including the seafloor. Given the small-scale impact of the work, and the fact that nearly all the work takes place on board a vessel at sea with specially trained crew, no negative social impacts are anticipated during any stage of the project.

350. The construction of the beach manhole facility on land will require a local sub-contractor. In Kosrae, a key potential impact relates to the trenching of the cable adjacent to the road; to address this, reinstatement of the disturbed areas will be required as specified in the ESMP. In Kiribati and Nauru no impacts are envisaged given the infrastructure is already in place to convey the terrestrial cable.

351. The ESMP defines a full set of working area boundaries, work restrictions and timing limits, which will be included in the construction contract specifications and which the contractor must comply with. Compliance will be monitored by safeguards advisors in each country PMU. The ESIA and ESMP will be updated following the marine surveys, information gaps will be filled and the finalized cable alignment will be reflected.

Appendix 1: Baseline Fish Data Kosrae and Kiribati

Table A1.1: Fish species identified in the current survey along transects - Kosrae

Family	Scientific name	Common Name	Transect			
			T1	T2	T3	T4
Acanthuridae	*Acanthurus blotchii*	Ringtail surgeonfish	3			
	Acanthurus guttatus	Whitespotted surgeonfish			3	
	Acanthurus triostegus	Convict surgeonfish	2	2	3	
	Naso lituratus	Orangespine unicornfish				2
Mulidae	*Mulloidichthys flavolineatus*	Yellowstripe goatfish	2			2
	Mulloidichthys mimicus	Mimic goatfish			3	
	Parupeneus indicus	Indian goatfish		3		
Balistidae	*Rhinecanthus aculeatus*	White-banded triggerfish			1	
Chaetodontidae	*Chaetodon auriga*	Threadfin butterflyfish				3
	Chaetodon melannotus	Blackback butterflyfish			2	
	Heniochus acuminatus	Pennant coralfish		2		
Holocentridae	*Myripristis adusta*	Shadowfin soldierfish			2	
	Myripristis berndti	Blotcheye soldierfish	2			
	Myripristis kuntee	Shoulderbar soldierfish				3
Kyphosidae	*Kyphosus vaigiensis*	Brassy chub				3
Labridae	*Epinephalus merra*	Honeycomb grouper				2
	Epinephalus tauvina	Greasy grouper		1		
	Halichoeres nigrescens	Bubblefin wrasse		2		
	Halichoeres podostigma	Axil spot wrasse	3			
Lethrinidae	*Lethrinus harak*	Thumbprint emperor		1	2	3
	Scolopsis lineatus	Striped monocle bream		2		
Lutjanidae	*Lutjanus fulvus*	Blacktail snapper			3	2
Monacanthidae	*Amanses scopas*	Broom filefish				2
Pomacentridae	*Chromis albomaculata*	White-spotted chromis				2
Scaridae	Hipposcarus harid	Candelamoa parrotfish		2	3	
	Scarus spinus	Greensnout parrotfish	2			3
Serranidae	Epinephelus merra	Honeycomb grouper	2			
Siganidae	Siganus argenteus	Streamlined spinefoot				2

Notes: Numbers of fish presented as abundance codes: 1 - Single (one individual). 2 - Few (2 – 10), 3 – Many (11- 100), 4 – Abundant (more than 100).

Table A1.2: Fish species identified in the current survey along transects - Kiribati

Family	Scientific name	Common Name	Transect			
			T1	T2	T3	T4
Acanthuridae	*Acanthurus lineatus*	Lined surgeonfish	3	3	3	3
	Acanthurus nigricans	Whitecheek surgeonfish		1	2	
	Acanthurus grammoptilus	Finelined surgeonfish	3		3	
	Ctenochaetus striatus	Striated surgeonfish	3	2	3	
	Naso lituratus	Orangespine unicornfish	3	2		2
	Naso unicornis	Bluespine unicornfish	1			
Balistidae	*Balistapus undulatus*	Orange-lined triggerfish	3	1	2	
	Melicthys niger	Black triggerfish	2	2		2
	Odonus niger	Red-toothed triggerfish	2			
	Pseudobalistes flavimarginatus	Yellow-margin triggerfish	3			
	Rhinecanthus aculeatus	White-banded triggerfish		2	1	
Cirrhitidae	*Paracirrhites arcatus*	Arc-eye hawkfish			1	2
	Paracirrhites forsteri	Blackside Hawkfish		2		
Chaetodontidae	*Chaetodon bennetti*	Bluelashed butterflyfish			1	
	Chaetodon ornatissimus	Ornate butterflyfish			2	
	Chaetodon vagabundus	Vagabond butterflyfish	2			
	Chelinus undulatus	Humphead wrasse		2		
	Forcipiger longirostris	Longnose butterflyfish			1	
Holocentridae	*Cetoscarus ocellatus*	Spotted parrotfish	1			
	Chlorurus sordidus	Daisy parrotfish	3		2	
	Scarus tricolor	Tricolor parrotfish		1		
Labridae	*Anampses melanurus*	White-spotted wrasse	2			
	Bodianus mesothorax	Splitlevel Hogfish	2			
	Chelinus trilobatus	Tripletail wrasse				2
	Epinephalus merra	Honeycomb grouper				2
	Gomphosus varius	Bird wrasse	2	2	2	2
	Halichoeres hortulanus	Checkerboard wrasse	2	3	3	2
	Halichoeres melanurus	Tail-spot wrasse				1
	Labroides dimidiatus	Bluestreak cleaner wrasse		3	2	

Family	Scientific name	Common Name	Transect			
			T1	T2	T3	T4
	Labroides rubrolabiatus	Redlip cleaner wrasse		2	2	
	Pseudocheilinus tetrataenia	Four-lined wrasse	1			
	Thalassoma amblycephalum	Bluntheaded wrasse	3	3	3	3
	Thalassoma purpureum	Surge wrasse		2	2	
Lethrinidae	*Gnathodentex aureolineatus*	Striped large-eye bream				3
	Lethrinus harak	Thumbprint emperor	2		1	
	Lethrinus olivaceus	Long face emperor	1			
Lutjanidae	*Lutjanus bohar*	Two-spot red snapper	3			
	Lutjanus fulvus	Blacktail snapper				2
	Lutjanus gibbus	Humpback red snapper	3			2
	Lutjanus monostigma	One spot snapper	2			
	Lutjanus semicinctus	Black-banded snapper	2			
	Macolor niger	Black and white snapper	2			
Pomacentridae	*Abudefduf septemfasciatus*	Banded sergeant		3		3
	Chromis margaritifer	Bicolor chromis	3	3	3	3
	Chromis ternatensis	Ternate chromis				3
	Chromis xanthura	Paletail chromis		3		2
Pomacentridae	*Plectroglyphidodon dickii*	Blackbar devil	2	3	2	
	Plectroglyphidodon lacrymatus	Whitespotted devil		3		3
	Pomacentrus coelestis	Neon damselfish			3	
	Stegastes nigricans	Dusky farmerfish	3	3	3	2
Pomacanthidae	*Centropyge flavissima*	Lemonpeel angelfish		2		
Serranidae	*Cephalopholis argus*	Peacock hind	2	2	2	2
	Cephalopholis urodeta	Darkfin hind	2	2	2	
Sparidae	*Monotaxis grandoculis*	Humpnose big-eye bream	2			2
	Ptereleotris evides	Blackfin dartfish				2
Zanclidae	*Zanclus cornutus*	Moorish Idol			2	2

Notes: Numbers of fish presented as abundance codes: 1 - Single (one individual). 2 - Few (2 – 10), 3 – Many (11- 100), 4 – Abundant (more than 100).

Appendix 2: Land Due Diligence Report

I. Introduction

1. **Purpose of report**. This due diligence report on involuntary resettlement describes: (i) a brief background of the project and its component activities; (ii) current land ownership status or use; (iii) identification of land requirements for the components and potential issues; and concluding remarks.

2. **Project background**. In 2014 the World Bank (WB) approved the Palau – Federated States of Micronesia (FSM) Connectivity Project (P130592) aimed to reduce the cost and increase the availability of information and communication technology (ICT) services needed to support social and economic development within the respective recipient countries. Another project in the north Pacific will be the regional cable to link Kiribati, Nauru and Kosrae (FSM) to the existing Hannon-Armstrong-1 cable which already connects Pohnpei (FSM) to Guam. Under the new project, the World Bank (WB) is to finance the Kosrae portion and Asian Development Bank (ADB) will finance the Kiribati and Nauru comnponents.

3. The proposed Kosrae-Kiribati-Nauru cable is approximately 2,100 km in length, with the landing sites in each country yet to be confimed, options have been identified and assessed.

4. **Component activities**. The development process is summarised as follows:

- Cable route concept design and feasibility;
- Country and development partner safeguards instruments prepared based on concept and initial feasibility;
- Recruitment of surveying and cable installation contractor(s), who will undertake: (i) detailed marine survey; (ii) final design (in agreement with the implementing agency and other stakeholders); (iii) order the manufacture of the cable and equipment; and (iv) sub-marine cable laying using a dedicated vessel;
- Update of country and development partner safeguards instruments based on detailed information from the surveys (this will include filling of information gaps);
- Construction of terrestrial infrastructure; and
- Connection of the cable to the island telecommunications network.

II. Legal Framework and Land Status

5. **Introduction**. Land, being a traditional source of food, social and political relationships, and identity, is an integral part of life for people of Kosrae, Kiribati and Nauru. In effect, access and use of land are closely tied to the respective communities and countries. In difference to many western societies, land has a much broader meaning to the indigenous people of these countries, more than just value as an economic commodity. For this project, acknowledging the customary land tenure is paramount. That will assist the project to access and use land areas as required, but also minimise potential risks of any land dispute. Ultimately, assisting the final decision for project site selection on these three countries.

A. Legal Framework

6. **Kosrae**. There are significant legal provisions available for managing land and land use within FSM and Kosrae, the following table presents the elements of the legal framework that are relevant to the project.

Table A2.1: Kosrae Legal Framework for Land

National Legal Framework	
FSM Constitution	The supreme law and it establishes the national, state, and municipal governance.
Trust Territory Solid Waste Regulations 1979	Establishes the minimum standards for the design, construction, installation, operation and maintenance of solid storage, collection, and disposal systems.
Federated States of Micronesia Environmental Protection Act 1984	Provides for the protection of the environment, culture, historic and natural aspects of Micronesian heritage.
FSM Earthmoving Regulations 1988	Earthmoving activities permits are issued by the Secretary of Human Resources.
FSM EPA Environmental Impact Assessment Regulations 1989	Requires the national government and its agencies to submit environmental impact statement (EIS) to the Secretary of Human Resources prior to any “major” action significantly affecting the quality of the human environment.
FSMC, Title 26 Historical Sites, and Antiquities	Policy to protect and preserve the diverse cultural heritage of the people of Micronesia.
State Legal Framework	
Constitution of the State of Kosrae	Primary rule of law in the State of Kosrae
Kosrae State Code, Title 17, Chapter 4	Establishes the Kosrae EPA
Kosrae Code Section 11.201	Land use and subsidiary regulations
Kosrae Code, Section 14.1302	Foreign fishing agreement
Kosrae Code, Section 11.1401	Protection of antiquities and traditional culture
Kosrae Code, Section 13.506	Littering

7. Most of the land in Kosrae is privately owned. However, the State can acquire an interest in private land for public purpose without consent of the landowners. Further, payment of fair compensation and showing that the lands and the interest are ‘highly suited’ to the intended use.

8. The Constitution and the Article XI Land and Environment provide for fair compensation should there be a need for land acquisition for resettlement. Further, the process must be done in good faith and made reasonable effort to avoid substantial hardship to the interested parties[46]. The Constitution is the primary rule of law in Kosrae. In the preamble, it declares Kosraeans are one, as people, in their language, in their traditions, and in their family and communal life. It goes on to pledge to preserve those natural riches. Thus, the basis for environmental protection and conservation, both human and physical, has been laid. The Kosrae State Code Title 11 Land and Environment set out the requirements regarding the acquisition and use of land.

9. **Kiribati**. The laws of Kiribati acknowledge that customary law may be applied to ownership in, over, or about any sea or lagoon area, inland waters or foreshore or reef, or in or on the seabed, including rights of navigation and fishing. The following table presents the land legislation that is relevant to the project.

Table A2.2: Kiribati Legal Framework for Land

The Republic of Kiribati Constitution	All natural resources of Kiribati vests in the people and Government of Kiribati. In implementing the Constitution, the customs and traditions will be upheld.
Native Land Ordinance 1956	Native lands cannot be alienated to non-native person. Title to native land registered by the Native Lands Commission.
Protected Area Ordinance 1957	Provides for the Minister responsible, on the advice of Cabinet, to declare all any island a prohibited area wherein entry is forbidden without permission.
Neglected Land Ordinance 1959	Provides for the purchase of lands that, in the opinion of the Minister responsible, are neglected.
Foreshore and Land Reclamation Ordinance 1969	Proclaims State ownership over the foreshore and seabed, subject to public rights and navigation.
Land Planning Ordinance 1973	Provides for control of land use and development only in areas designated under the Ordinance.
Fisheries Ordinance 1977	Provides for Minister's role in developing the fisheries resources for the full benefit of Kiribati.
Public Utilities Ordinance 1977	Grants exclusive rights over the provision of water in any declared water supply area.
Mineral Development Licensing Ordinance 1978	Provides for reporting by prospectors. There is no current legislation to protect national heritage.
Maritime Zones (Demarcation) Act 1983	Establishes Kiribati jurisdiction over an exclusive economic zone. Also, defines international and archipelagic waters and territorial sea.
Local Government Act 1984	Provides for building control and town and village planning is the function of Local Council.
Closed District Act 1990	Provides for the President, acting on Cabinet advice, to declare 'closed districts' over parts of islands.
Environment Act 1999	Provides for and establish integrated systems for development control, environmental impact assessment and pollution control.

10. The Constitution, the Native Land Ordinances 1977, and the State Acquisition of Lands Ordinance 1979 provided for compensation arrangements in case of land acquisition by the state for public purposes. However, this applies only if those being resettled have not breached any law. The large number of people who occupy land without proper arrangement, and/or informal arrangements is not covered. An amendment act (2000) allows landowners to subdivide a plot of land (subject to the court's satisfaction) and better aligns the subdivision law with the land sale or lease or sublease provisions.

11. State acquisition of land(s) is provided for by the State Acquisition of Lands Act 1986, under which the government has the power to acquire land for public purposes by purchasing the freehold title or obtaining a lease. The state also has the power of compelling the surrender of a lease or sublease with fair consideration or compensation being paid to the owner.

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[46] Palik vs Kosrae, 5 FSM Intrm. 147. 152-154 (Kos. C. Ct. Tr. 1991.

12. **Nauru**. Nauru's phosphate mining history has left 70% of the island inhabitable. This is primarily in the interior of the island, commonly known as the "Top Side." Consequently, the population is concentrated along the coastline areas, with a population density of 1,500/km^2 (Nauru Bureau of Statistics, 2013). The pressure on both land and water resource management not only for today but for the future is increasingly critical.

13. The long-term management of the islands remaining terrestrial resources is paramount for Nauru's future. The need to rehabilitate the degraded interior land and sustainable use of its coastal resources are critical for sustaining and improving Nauruan's quality of life.

14. There is a significant number of legal provisions available within the existing legislations to apply to managing and conserving the environment of Nauru. The following table contains what deemed to be relevant for this project.

Table A2.2: Nauru Legal Framework for Land

Nauru Antiquities Ordinance 1935	Provides for the protection of the Nauru antiquities, relics, curios and article of ethnological and anthropological interest and scientific value.
Land Committee Act 1956	Established the Nauru Land Committee to determine questions on ownership and rights in respect of land where issues involve Nauruans and Pacific Islanders.
Constitution of Nauru 1968	Provides the basis for Nauru's government and legal authority.
Land (Declaration of Ownership) Ordinance 1962	Provision for compensation to Nauruans landowners who were not compensated for phosphate mined from the German Wireless Station land area.
Lands Ordinance 1968	This act ensures proper leasing arrangements and specifically requires rehabilitation of extracted or mined areas.
Customs and Adopted Laws Act 1971	Provisions relating to the institutions, customs, and usages of Nauruans, and adopted laws.
Lands Act 1976	Repealed Lands Ordinance (1921-1968), and made provision for the leasing of land for phosphate industry. For other public purposes, removal of trees, crops, soil, and sand, and payment of compensation respectively.
Litter Prohibition Act 1983	Provides for abatement of litter.
Sea Boundaries Act 1997	This demarcates Nauru's sea boundaries and maritime zones and declares the rights of the Republic of Nauru in these zones.
Nauru Rehabilitation Corporation Act 1997	This affords specific provisions for the rehabilitation works in Nauru.
Telecommunication Act 2002	Provides for establishment, maintenance, operation and retaliation of telecommunication services in, to and from Nauru.
Port Authority Act 2006	Establishes the Port Authority with vested powers that covers the marine environments.

15. The Constitution (s26) and the Lands Act 1976 provides for Nauruans rights to land. Most of the land is under customary ownership, the government can only lease lands. Nauru is the only Pacific country that has no legislation that allows government to force a landowner, including customary owners, to force acquisition or transfer ownership to the government for public purposes. Landowner consent is paramount and government has to prove 'just terms'.

16. Negotiating new leases for public purposes can be lengthy and tedious. Further, all land transfers, sales or leases, or grants any estate or interests in, any land in Nauru must be

consented to by the President. The Lands Act provides for compensation in case of involuntary resettlement, because of successful negotiations acquiring land through leasehold. Also, the fees for compensation are prescribed under the schedules of the Act.

B. Land Ownership and Tenure

17. **FSM and Kosrae**. Kosrae has an estimated land area of 110 km^2. It has a fringing reef that provides for three sheltered lagoon areas on the east, the north, and the west sides of the island. The lagoons cover an area of about 16 km^2. The most prominent part of the island is the interior uplands, which accounts for two-thirds of the landmass. The settlement areas are spread along the coastal plain and include Tafunsak (42 km^2), Lelu (21 km^2), Malem (16 km^2), and Utwa (30 km^2). However, only 20% of the total land area is flat and used for residential and commercial purposes.

18. The state government controls the major portion of land in Kosrae (government owned lands, mangrove areas, nearshore areas, and lagoon areas). Primarily, government lands are of the interior, above the 'Japanese line'; and the foreshore areas. Kosraeans can own land but not outsiders (foreigners and non-Kosraean). The land is owned fee simple with a certificate of title issued when the registration process is complete for individual landowners. However, if the land is inherited by multiple heirs or customary family land is held in common, then a tenancy in common title is issued.

19. In previous times, accessing land through usufruct or access rights (customary practice) were common for hunting or gathering purposes. Nowadays, this is only common in the upland and government owned areas. Accessing land and use rights for productive lands, particularly the settlement areas, is through leasing agreements. The leasing title is the only method for foreigners to obtain land use rights for a defined period.

20. Leasing land is permissible, but the lease terms are controlled exclusively by the state government. Kosrae laws allow for a 55-year lease renewable for an additional 55 years. Although this provides a secure access and uses for the lease period, issues such as land ownership disputes, lack of certainty, poor surveying capabilities, the absence of records, customary usage often hinder foreign investment. As in other Pacific island tenure systems, restrictions on land sales or access means that land transactions are often made through customary practice, making accurate pricing of land difficult. Lack of records of these practices is a challenge.

21. The Governor can transfer title transfer or interest on public land on behalf of the State but only with a resolution from the Legislature. The Governor has authority to designate suitable areas of the public land for 'homesteading' to an eligible person.

22. In managing land and land use, the State Land Code provides for land use planning, surveying practice, homesteading rules, and establishing the Land Court. The latter determines and registers land titles. Further, a deed of trust allows for the transfer of an estate in real property or freehold or leasehold interest in real property to secure an obligation. This practice allows land transactions for monetary or customary obligations.

23. **Kiribati**. The Kiribati land tenure system is encapsulated in six laws: Native Land Ordinance 1956; Gilbert and Phoenix Islands Lands Code; Landowners Taxation Ordinance; Neglected Lands Ordinance; Non-Native Land (Restriction on Alienation) Ordinance 1974; and Native Land (Amendment No.2) Ordinance.

24. All land in Kiribati belongs to the i-Kiribati, except for the Phoenix and Line Islands, small portions of reclaimed land owned by the government, and lands belonging to the churches. The government owns land in Kiritimati (Christmas) Island.

25. Kiribati land tenure upholds the rights of landowners, as stipulated in the Native Land Act; landowners 'controls the use of his/her property. The i-Kiribati land rights and interests are inherited and can be gifted. Land ownership is fundamental to the i-Kiribati socio-cultural way of life. Land is owned by families, with the head having the right to distribute land to its members. Anyway, family members have equal rights to family lands, to use (build) and access (collect produce). Traditionally, land ownership infers ownership of groundwater, provides fishing rights, harvesting rights, and a social security.

26. On South Tarawa (part of the Gilbert Islands chain) the government leases a large area of various families land in Betio, Bairiki and Bikenibeu. The government owns some land, but this is confined to Temwaiku Bight (200ha of reclaimed land).

27. The Land Planning Act provides for land use planning in the public interest. Even on government leaseholds on South Tarawa, the landowner retains the right to veto applications for sublease on his land. The landowner can either consent or refuse to sign on the planning application form.

28. Due to the restricted land supply on South Tarawa, a large proportion of the urban population either construct their houses illegally or enter an agreement (formal or informal) with the landowners to occupy the land. In Betio, Bairiki, and Bikenibeu, homes and squatter settlements are found amongst shops and offices. About two-thirds of the 5,584 households in South Tarawa live on land that is owned by their families. One in ten households live on land that is neither owned nor leased; these households are built on land through informal arrangements with the landowners or are squatting on the land (no arrangements).

29. **Nauru**. Nauru is surrounded by a fringing coral reef ranging from 120m to 300m wide, which drops away sharply on the seaward edge to a depth of approximately 4,000m. The raised central plateau (referred to as Topside) generally lies between 20-45 meters above sea level with occasional elevations of up to 50-70m. The central plateau is approximately 1600 ha. The long history of phosphate mining near Topside, about 70% of the island is deemed uninhabitable and unsuitable for any kind of livelihood. Consequently, most Nauru's population is concentrated along the coast with numerous small settlements along the coastline resulting in a population density of over 1,500 persons per km^2 (Nauru Bureau of Statistics, 2013).

30. Nauru has an estimated land area of 21 km^2. The government has acquired small parcels of land for its own but in general all government infrastructures are located on leased land. Most land is held by individuals as unsevered separate shares of portions of land held originally by families or individuals.

31. Unlike other countries, Nauru has customary land but not customary chiefs. Instead, there is a Land Committee is appointed by Cabinet. Part of this Committee's purpose is to apply the principle of "just terms" as provided by the law on land acquisition for public purpose. The Land Committee is the adjudicating authority on land ownership and disputes in Nauru.

32. According to the Lands Act 1976 (section 3), the land is in customary ownership owned by Nauruan individuals and/or families and can be leased, but not sold, to non-Nauruan's:

"(2) Any person who transfers … the freehold of any land in Nauru to any person other than a Nauruan person shall be guilty of an offense; (3) Any person who, without the consent in writing of the President, transfers, sells or leases, or grants any estate or interest in any land in Nauruans…is guilty of an offense" s3 Lands Act 1976.

III. Project Requirements

A. KOSRAE

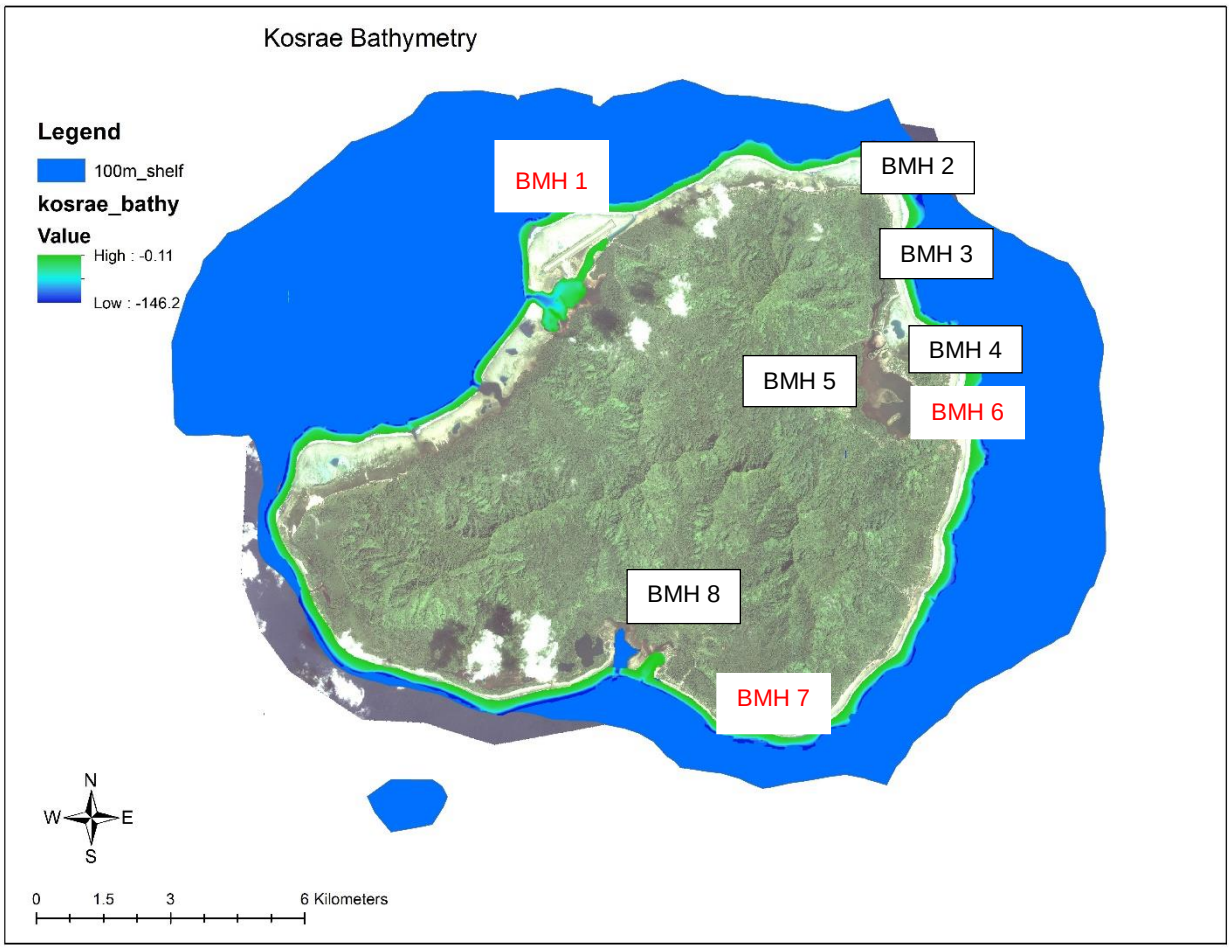
33. **Landing station**. The landing station preferred is to be located within the State Government Administration Building. The alternative is the FSM Telecommunication building at Tofol. These properties front the main road that links the settlements and the proposed sites as well.

34. **Beach manhole sites**. A beach manhole (BMH) landing facility which will likely comprise a small concrete manhole approximately 2m x 2m x 2m. The beach manhole sites were identified with input from the national government ministries. Considering both potential environmental and social impacts of the project, three sites are recommended. Noting that preference will be for a site on government owned or leased land area. It is noted that the supplier/contractor will finalise the landing site from their perspective and expertise on ocean cable laying.

35. Several sites were identified namely (refer Figure A2.1); Kosrae Airport at Okat (BMH1); Phoenix Hotel site (BMH2); the 'bench' site (BMH3); the Yacht Club in Lelu Harbour (BMH4); Tofol (BMH5); Sansrik Elementary School (BMH6); The 7-Day store in Malem (BMH7); and Otwe Harbour (BMH8). However, only three sites (BH1, BMH 6, and BMH 7) are proposed based on the land tenure (ownership), physical characteristics (accessibility; exposure to both marine environment and terrestrial environment). All three sites have open access to the marine area. For BMH 1 (Tafunsak) and BMH 7 (Malem), the fibre cable will pass straight onto the beach, across the intertidal reef flat. However, for BMH 6 Lelu, it will pass through the harbour entrance (shipping lane) and southward to the site (school).

36. The three BMH sites are as follow; BMH 1 Tafunsak, government owned; BMH 6 Lelu is government leased land; and BMH 7 Malem, is a privately-owned land.

Figure A2.1: Location of Beach Manhole Sites - Kosrae



37. **BMH 1: Kosrae International Airport**. This site is on the airport reclaimed land, but outside the existing security fenced runway area. It is an advantage that the reclaimed land is government owned, and used by Kosrae Ports Authority (KPA). The KPA has an existing plan to extend the runway soon. However, the Airport management is willing to work with State Government to accommodate the cable landing site. It is about 14km from the proposed cable landing station site in the State Government Administrative Centre.

38. **BMH 6: 056K01-06, Sansrik Elementary School, Tofol**. This site on a school ground adjacent Lelu Harbour. It is a Government leasehold area, and 3km from the landing station at the Government department. Land access will be an internal matter for the State Government's TCI and Education to finalise, but there are no foreseeable issues. The school site is about 3km from the State Government administrative centre.

39. **BMH 7: Augustus Tara (Inpuspusa) - 034M03 & 04**. This is on private land at Malem. During site visit consultations, the landowner agreed in principle for his land to be considered. There are potential issues with this location. Land negotiations may take some time and create project delays. Secondly, there are evidence that this is a relatively high energy beach for

example, rocky beach and steep seawall. This site is about 14km from the State Government Administrative Centre.

40. **Existing land use**. All three sites have no crops or subsistence farming at all. On the sea side, the common practice of reef fishing will only be affected temporarily (construction phase). There will be no harvesting of organisms in any aspects of this project.

41. **Right of way**. The project will utilise the existing government right of way to bring the fibre cable to the landing station. This is an existing easement that provides for the roads and state government utility needs. This area is 30 feet to each side of the road centre line. This area currently has both electric and telephone copper lines, in addition to the transport carriage way.

B. Kiribati

42. **Landing station**. South Tarawa has a unique physical layout, as the islets are interconnected by causeways. This allows one main road easement to traverse through the spine of the islets, from Bonriki to Betio. The PMU and the cable supplier will have the final decision on the location of the cable landing station. Essentially, regardless of the landing station location, the terrestrial cabling will be laid in an existing conduit in this easement to connect the beach manhole to the landing station. The preferred landing station site is located at the ICTD building and area in Bonriki. The alternatives are the government facility or the ATH Kiribati facility at Bairiki.

43. Four sites were identified as potential beach manhole locations with input from government ministries.

44. **BMH 1: Bonriki Airport**. The green area is the existing government leased land. This is just outside the airport security fence and is a vacant area (Figure A2.2). Further, connecting to the existing road is possible without land acquisition. BMH 1 is approximately 27.5 km to the MCTTD at Betio.

45. **BMH 2: King George V School**. BMH 2 is within the government leased land area. It is a vacant spot with easy access to the road (Figure A2.3). There will be no displacement or involuntary land acquisition necessary. The surrounding school activities will only be temporarily impacted upon during the construction phase. BMH 2 is approximately 21km to the MCTTD.

46. **BMH 3: Broadcasting and Publication Aerial Nanekai**. BMH 3 is on a Broadcasting and Publication Authority (BPA) sublease from government, which is on Nanekai (Figure A2.4). There is a radio aerial on the site, but there is no plan to displace such structure to make way for the fiber optic submarine cable landing. No tree vegetation on site except for some grass cover. Residential buildings are well away from this site. This site is approximately 6.5 km from the MCTTD.

47. **BMH 4: Bairiki Causeway**. BMH 4 is on the causeway reclaimed land area at east Bairiki. An accretion area is government owned (Figure A2.5). It does not encroach on the existing subleases or government lease. It is about 5.9 km from the MCTTD.

Figure A2.2: Location of BMH 1 Site Bonriki Airport

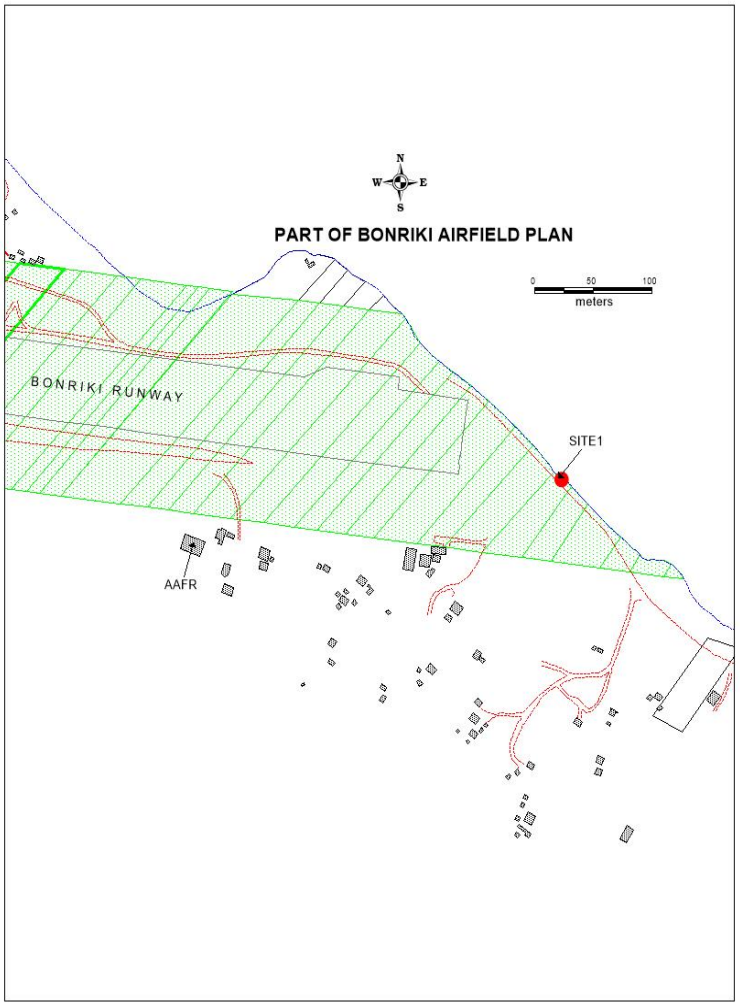


Figure A2.3: Location of BMH 2 Site King George V School

Figure A2.4: Location of BMH 2 Site Nanekai

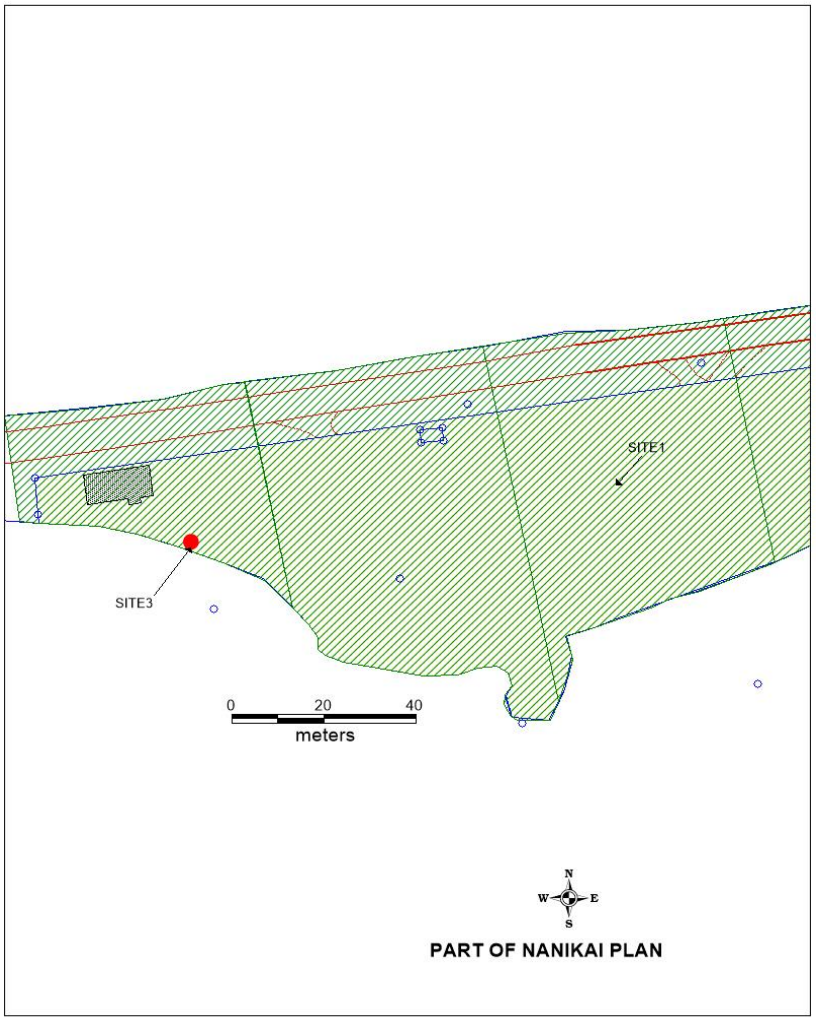
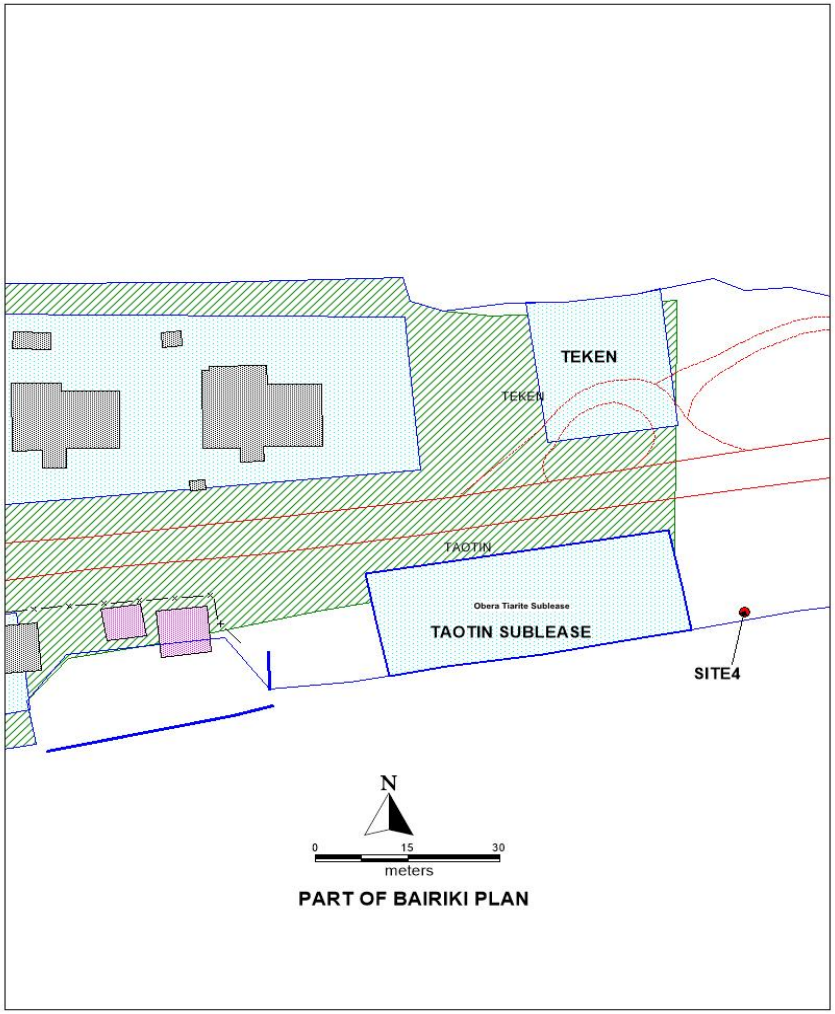


Figure A2.5: Location of BMH 4 Site Bairiki Causeway



48. **Land ownership at the sites**. Government owned land is preferable to avoid potential delays to land access agreements. Three sites—Bonriki Airport, King George V School and Bairiki causeway—are located on government leased land areas. The Nanekai site is on a BPA (a government entity that manages and operates Kiribati Radio) sublease from government. No issues have been expressed to date about a sublease for a landing site.

49. Given government ownership of the potential sites, there will be no displacement of people or land acquisition. Site 1 has the disadvantage of absence of a proper lease agreement. Thus, leaving sites 2, 3 and 4, as the preferred locations for the beach manhole. The selected sites will be subleased to MCTTD to allow access and ownership of the site.

50. **Right of way**. The existing road easement and road network upgrade almost completed, with an inbuilt conduit readily available, is a major advantage for this project. There are no land access issues foreseen.

51. **Existing land use**. All four sites have no crops or are not suitable for subsistence farming at all. On the sea-side, the common practice of reef fishing will only be affected temporarily (construction phase). There will be no harvesting of organisms in any aspects of this project.

C. Nauru

52. **Landing station**. The cable landing station will be at the ICT Building at Yarren, which is on the Government compound, under an existing government lease.

53. **Beach manhole sites**. There were two sites identified with the assistance and input from the relevant ministries, led by the ICTD. The two sites were put forward primarily due to their status as government leased or owned. Both sites are vacant (no building structure or crops or vegetation that require removal).

54. **BMH 1: Government compound, LOT 58, Yarren**. This is an existing government leased area, and currently occupied by government, and commonly known as the government compound (Figure A2.6). Accessibility and security are deemed vital, as this is a national asset. BMH 1, present the better option, as it is on government lease, secured, and easily accessible.

55. **BMH 2: Public Boat Ramp, Gabab**. This site has a boat ramp with an open parking area. This is a vacant area between land allotment 33 and land allotment 137, according to the map provided. There is a risk of the site being claimed either by an individual or family under the customary provision. Further, locals vouched that it is not uncommon occurrence for unpredictable high wave to cause damages during heavy weather. Any impact on the local fishing and boating activities will be limited to the implementation phase where there will be restrictions around the cable.

Figure A2.6: Location of BMH 1 at Government Compound

56. The project will use existing government right of way to land and bring the fiber optic cable to the landing station. There is an existing fibre optic cable that connects the government administrative offices on Yarren. These cables are partly secured to the electric posts, and partly buried, along the road easements. There is already a plan to extend this cabling to cover the whole island. In effect, the existing road easements can be utilised for terrestrial cabling purposes.

57. Given the fact that the landing station will be at the ICT Building, which is on the Government compound, it is sensible for the beach manhole to be located on BMH 2.

58. **Existing land use**. The two sites have no crops or are not suitable for subsistence farming at all. On the sea side, the common practice of reef fishing will only be affected temporarily (construction phase).

IV. Public Consultations

59. Summaries of consultations are provided in Appendix 2 Annexes 1-3.

60. **Kosrae**. The dialogues during the stakeholder meetings and public consultation were very encouraging and positive. Primarily, people just needed to know about the nature and timeframe for this project. In fact, their existing issues with ICT prompted a lot of people to demand quicker implementation of this project. The aspiration to provide better internet and communication services at an affordable rate was high.

61. Government and non-government organisations will offer more products and better services. Particularly the private businesses and the financial institutions (banks). In addition, better communication will be welcomed by Kosraeans in Kosrae and overseas.

62. The potential issues raised were around the land access and ownership. However, these were countered with the option of locating the landing site on government land, as proposed. Further, the existing utility corridor (telephone and electricity lines) will be used for the fibre cable networking on land. The purpose provision in the government easement leasehold can accommodate for the fibre cable also. The 60 feet wide easement is clearly marked. However, there were issues with some people potentially claiming land on the seaward side. Their land had been eroded, and these claims are on the existing government easement areas. Again, the cable will be safer to be laid between the electric posts and the carriage-way, on the land side of the road easement.

63. Using and accessing the inter-tidal area for fishing was briefly discussed, but it was ascertained that the impact will be limited to the construction phase. However, care should be taken around the marine cable area.

64. The issue of internet access, specifically accessing inappropriate information by children, was rightfully raised by the women. This is a risk management issue that the women also accepted. Admittedly, they will need assistance and information on how to manage their home internet.

65. **Kiribati**. Due to the current land tenure, and WWII history, the proposed sites were generally accepted as potential location for the landing site.

66. The public needs for the project, as potential improvement of the existing internet and communication services, was overwhelming. Strong support from both the government and Non-government entities were evident.

67. Kiribati has a large contingent of its population overseas, and communication is an important part of their daily lives. Therefore, the perception of an accessible and affordable service, such as the fibre cable, is accepted with minimal resistance.

68. The concerns were generally around the impact on the fisheries, potential costs, and social impacts. The importance of fishing to the people of Tarawa was evident, as some raised concerns of potential impacts of the fibre cable on fish. However, explanations and evidences quickly dowsed down these concerns.

69. Using and accessing the inter-tidal area for fishing was briefly discussed, but it was ascertained that the impact will be limited to the construction phase. However, care should be taken around the marine cable area.

70. The potential costs to the people of this fibre cable service was justly raised as a concern. However, people accepted the fact that it will depend on the government and the selected operator for the cable. This was beyond the scope of the team anyways.

71. The concerns with respect to the social impact of this project were a subject matter of discussions. The disproportionate in terms of knowledge and information between different age groups, and gender, was highlighted. Women and children, were the most vulnerable people to

the negative impact of the fast internet. Overall, the need for a public awareness and information assistance, from government for example, was apparent.

72. Government, with regards to ICT capacity and infrastructure development, must progress well ahead of the landing date.

73. **Nauru**. Stakeholder meetings and public consultation was held during the field trip to Nauru (30th October – 2nd November 2016). Stakeholders include both government and non-government, and covers environment, conservation, legal, gender, youth, women, and NGOs. The views and perceptions reflected the multi-facet of this project within the Nauruan society.

74. The technological gap between the young generations and their parents were evident. Rightfully asserted, public awareness and education were raised as a natural prerequisite to the implementation phase. This will be a necessary component of managing the risk of opening Nauru to the global network.

75. The proposed project has great potential for Nauru. However, the legal framework and local infrastructure must be developed leading up to the fiber optic submarine cable landing date. Thus, allowing the people and government of Nauru to fully utilized the cable. Freedom of speech is embedded in the Constitution. However, internet freedom is still an area that requires further development. In fact, that Cyber Crime Act passed in May 2016, which certainly will help monitoring and managing the internet.

76. The potential negative impact both on the environment and the people's lives were perceived to be nil. On the other hand, the positive impacts were overwhelmingly expressed. Either way, these views are considered vital component of this assessment. Evidently, the perceived positive impact far outweighed any negative impact.

V. Summary and Next Steps

77. **Kosrae**. Given due consideration to the above-mentioned factors, particularly land ownership, the order of preference would be BMH 6 (Sansrik Elementary School Lease, *056K01-06 Tofol,* Lelu Harbour), and BMH 1 (International Airport Site, Tafunsak). The distance between the two sites and the land station (Government Administration hub) and associated costs, elevates BMH 6 as the desired option. Granting access and usage of these leaseholds for the beach manhole, and terrestrial cabling along the easements will be the State Government prerogative. Consultation with the land owner of beach manhole BMH 7 indicates that private land may also be an option, where a suitable easement or lease can be voluntarily negotiated. Therefore, because of the options available for the land based infrastructure, involuntary resettlement and land acquisition can be avoided.

78. **Kiribati**. Given due consideration to the above-mentioned factors, particularly land ownership, the order of preference would be BMH 4 (Accretion Area, Government owned), and BMH 3 (Nanikai), BMH 2 (near King George V), and BMH 1 (end if runway, Airport). Given that the road, and associated easement, traverse the whole atoll (Bonriki to Betio), there is ample areas for connecting the beach manhole and the landing station. Granting access and usage of these leaseholds for the beach manhole, and terrestrial cabling along the easements will be the State Government prerogative. The limited area for developing a landing station at Betio may

promote Bairiki as the landing station location. In which case, BMH 4 and BMH 3 may be the better option.

79. **Nauru**. Given due consideration to the above-mentioned factors, particularly land ownership, the order of preference would be BMH 1 (government leasehold, Yarren) over BMH 2 (Boat Ramp, Boe). Given that the road, and associated easement, is currently being utilised for terrestrial cabling, there is no limitation on siting the beach manhole as suppose to the location of the landing station.

80. Granting access and usage of BMH 1 will be the government's prerogative. Overall, involuntary resettlement and land acquisition will not be necessary for BMH 1 (Yarren).

81. **Conclusion**. There are no involuntary resettlement impacts in any of the three countries, neither the WB or ADB safeguard policy is triggered. The beach manhole sites have been identified on land either owned or leased by the respective governments, or on private land where voluntary land access may be possible. The landing locations are flexible and therefore compulsory acquisition of beach manhole sites can be avoided. The right of ways for all terrestrial cables are within existing government right of ways. Cable landing stations likewise will be located on government owned or leased land. Government land is prioritised because the access arrangements are more simply to arrange as supposed to private or customary land.

82. The cable supplier will have the concluding input into the final selection of beach manhole location in each country. Based on the assessment, the following are the preferred sites:

Country and site	Comments
Kosrae: BMH1 and BMH6	These sites are existing government leaseholds and infrastructure can be laid without disturbing current land uses, thus involuntary resettlement and land acquisition are not necessary. Terrestrial cabling from the beach manhole from either site to the landing station can be installed along the existing road easement. The lease agreement on BMH2 will require review, as the lease purpose will include communication as supposed to education. This may require the landowner's consent. Considering this, BMH 1 (Airport, Tafunsak) may be the best option.
Kiribati: BMH1, BMH2, BMH3, BMH4	All sites are government leaseholds; thus, resettlement and land acquisition are not necessary. All sites can be connected to the landing station, either Betio or Bairiki, via the existing duct along the road easements. The lessee (government) or sub-lessee (state owned enterprise) can either transfer the lease or sub-lease, or sub-lease the lease, with the approval of the Minister. Further, the Minister's power can be delegated to the Chief Lands Officer, when the land allotment is under 10 acres. In the case of native leases, it shall be approved by the Land Court. Any of such lease transfer or sublease must be registered in the Leases Register or Sub-Leases Register respectively.
Nauru: BMH1	Nauru is BMH 1 (government compound), which is a government leased area. There is no need for resettlement and land acquisition. Existing road easement can be used for terrestrial cabling. The leasing of land for public purposes is under the authority of the Minister. Since this is an existing government leasehold, it is advisable to inform the Minister in writing seeking Cabinet approval. The lessee (government) can consent to implement the project (beach manhole and landing station) on its property.

Kosrae Consultations

October 18 2016		
Bank of Guam	Gwendolyn E Nicolas Assistant Vice President Branch Manager	• Bank operation hindered by limited and slow internet • At times staff had to stay on until late at night, to complete transactions & transmitting to Main Branch (Guam) • Services available are also limited due to slow internet • Products offered can be expand and delivered with a better internet • We are happy to express our support for this project
FSM Bank	Lynn Langu Assistant Branch Manager	• Had to work long hours some days to complete work needed because of the slow internet • Relaying information to and from Pohnpei can be frustrating • Mobile banking is a real possibility, if the fibre optic cable provides us with fast internet • There is real need for this project in Kosrae
FSM ACE	Smith Sigrah Kosrae Manager	• Businesses like ours do need this for our website and dealing with customers • Doing business on the internet can be slow and impacts on our business operation. • It can be difficult to relay finance information with our head branch in Pohnpei • We need a better and faster internet
Lelu Municipal Government	Ben Jesse Mayor	• Appreciate this, for including our office in your consultation. • To me, our work in this municipality will benefit from this project. • We need to inform and raise public awareness in a timely manner. This is difficult with the existing internet. • May be a chance for our people to do courses online in Hawaii or the States. • We support whatever happens. If this cable lands on our municipality, that is great. If not, we still support it.
19 October 2016		
Utwe Resident	Simon Lak Former Mayor	• This is a good chance for our people • Contacting our family members overseas is important for us
Utwe Resident	Aluk Levi Former Mayor	• We need better internet to contact our family members overseas • About time to see this new technology implemented in Kosrae • No issues with landing the cable here
Utwe Municipal Government	Truman Waguk Mayor	• Hoping that the cable lands here in Utwe • We need better communication/internet for our local people • Support this and will talk to local people about the project • Utwe seemed to be always the last to get these types of developments. Anyway, it is good because we get the best projects result, because we get it with lesson learned from other municipalities, like the water system. • See no real issue with our local fishing activities • The sooner the better
Malem Resident	Malon Talley Church Pastor & Youth Leader	• Built a Gym for the youth; to give them something to occupy their time with, otherwise they will drift into drinking etc. The local school is also using this gym as well. • We have a vision and program that includes a Youth Centre, as an extension of our gym. This requires a better internet; kids can do research or distant learning. • This project is what we need.

		• Also, need better communication with our families overseas; this is important to us locals.
Ahmadiyya Muslims Community	Imam E.M. Kauser Religious Minister	• It is now difficult to communicate with our head quarter in London. • Sometimes we need to pay our orders from ACE but cannot, as such service (eftpos) is not available. We had to carry large cash to do that, and that is not advisable for anyone to carry large cash around. • Predecessor used to go to either Treelodge or Nautilus and stay there the practically the whole day, so he can access the internet. • We cannot access the Muslim television now, but that is an important part of our operation. • We pay the maximum package, but the access we received is not consistent. • We note the negative impacts of such internet capability but these are insignificant comparing to the benefits we will have. • We support this project; and we will arrange for the Kiribati counterpart to meet you.
Kosraean Women Association	Salorne Mast (President) Masy Livae Merbina Nena Brnisda Nakumura Jenny Seymour Hetty J Palik Tamoe E Ylaguk Priscilla Labonete Rose K Sigrah	• President welcomes the opportunity to be involved and to hear about the project. • Concerns with the exposure of youths to the negative impact of the internet. • Some mothers/women are rather better prepared than most to receive this new technology and exposure. In fact, most do not fully comprehend this exposure, and kids are better versed with the internet. So hard for mothers to monitor kids' activities over the internet, especially with the kind of exposure this technology will bring. • As mothers, this will be another role for us, making sure that the new internet is used properly. However, support will be needed to inform/educate or prepare us for this technology. • Interests raised about who will be managing or in charge of this cable. • We can see the capacity and speed of this technology, but there is a need to guarantee that the rates will be affordable.
20 October 2016		
Community Consultation	Senators Members of public Business	• Need to know who fund this project • Concerns with maintenance of this cable ('Warranty') • Impact on fish and sea creatures • Telecom need to negotiate their role with regards to this cable • Highlight the role of Municipal stakeholders
Chamber of Commerce	Business owners	• Keen to see this project completed • Liberalization of communication is welcomed • Noted that the road at Utwe will move inland due to continuous erosion of the existing road • Keen to see more than one operator (competition) • Expected the rates to be much cheaper

Kiribati Consultations

25 October 2016		
Amalgamated Telecommunication Holding Kiribati	Kamleshwar Sharma CEO	• ATH supports the concept • ATH wants to contribute to the process • Happy to provide any technical information, but need a written request
	Arobati Teamako A/Manager Earth Station	• This is a new technology to us
Ocean Link		• Difficult to access and compete with ATHK • Need to have the cable accessible to private operators • Difficulty in interconnection between two operators • Keen to see who is going to manage the cable • Operator of the cable must be independent of the current operators (fair competition)
Women Development	Bairee. Beniamina. Officer in Charge	• Communication is vital for women; especially with families within Tarawa, and with those overseas. • Issue now is the “bad image” being downloaded and shared by kids. • Children’s’ time being spent on phones, laptops, tablets are an issue with their school work. Imagine if the fibre cable will allow faster internet. • We are aware that teachers have found pornographic materials in student’s phones. • Some students pretend to do school work but they spend school time on their phones or internet. • Better communication will allow us to share information with communities, especially community development information. • We need to manage this new technology through program for the public.
NGOs	Uriam. Robati. Senior NGO Officer	• We have almost 300 NGOs registered with us; and there is more being set up and seeking help on how to incorporate their NGO. • Main concern is that we need more public information on this type of new technology. • Our people should be aware and have some understanding. • There have been some issues with the current project being implemented by McDowell: some people vandalise it because there were no consultation, awareness, and information for the local people (community). • Appreciate that you start by informing us. I hope that the public awareness and information will continue so that local people, especially those who are less fortunate, to know and understand this new project.
Social Welfare	Tabotabo.Auatabu. Principal Social Welfare Officer	• We are aware that internet has some negative influence on people. • The most vulnerable in this type of development is our children. They access to a fast technology, with little guidance. Be mindful, that some parents have less knowledge of this internet technology. That make it difficult for them and the kids. • There is a need for more consultation, so that people are fully aware of this new technology. They will need help to

		manage the risks that this will bring to their homes. We will liaise with the Ministry of Communication on this important issue. • There is a need to have protection for our kids. Either, educating the parents or have some program, like parent lock, so that parents can manage the internet usage in their homes. • Adults, also need some protection with this new internet technology.
26 October 2016		
MOEL	Uataake Terite Technical Office Barnabas Iotiabata IT Technician	• Internet only service • Concerns with cable management and operator (independent) • Good timing for us to review our satellite contract • Will build in the cable into our next business plan • We would like to be involved in the planning with Government
28 October 2016		
KANGO	Tereeao Teingiia President	
29 October 2016		
Ahmadiyya Muslim Community Tarawa	Imam Khawaja Fahad Ahmad	• Long overdue for Kiribati to have a reliable internet • Current internet is expensive • Communicating with our headquarter is vital • We provide basic education service for local people, and we need good internet • Better internet will allow us to expand our community education service

Nauru Consultations

31st October – 2nd November 2016		
Lands & Survey	Penisasi Nakautoga	• Land survey has been done for most claims • Support by providing the necessary information
Youth Affairs	Lavinia Akken	• Youth are very well familiar with the internet • Youth are fast learner in using the internet • Issues with accessing and distributing inappropriate images • Work hindered by unreliable internet service
Culture Affairs	Riverina Scotty	• We feel like we are isolated • Need to expose our cultural products to a wider market • We need more visitors and tourists
Child Protection	Krystelle McKenzie	• Children are vulnerable especially with this coming technology (exposure)
Justice & Border Control	Filipo Masaurua Stella Dubriya Daron Adeang	• Rights: Peoples rights to have equal access to this service at an affordable cost • The project should be gender sensitive, especially the women and children (rights and protection) • Issues as of date will worsen of there are no appropriate measures to protect and manage the potential risks of this technology
Department of Commerce, Industry, and Environment		• Presentation and Briefing on the project • Potential location discussed with no issues raised
Eco Nauru	Tyronne Deiye	• Established but currently applying for funds, such as the GEF Small Grant • Our team is well equipped (experience and knowledge) to do conservation and environmental work
Public Meeting		• Interests on the cable project was evident • Keen to access a more reliable and affordable internet service • Open and fair competition will benefit people • Government need to alert land owners of their utilising the leasehold for the cable. There should be not issue, a matter of courtesy. • Interested to know who funds the project. Glad to know it is not paid by the Government.

Appendix 3: International Conventions and Treaties

Table A3.1: List of conventions and treaties associated with marine sector - FSM

Ratified	Convention and/or Treaty
1991	To ratify the United Nations convention on the Law of the Sea ("UNCLOS").
1993	Kyoto Protocol to the United Nations Framework Convention on Climate Change.
1993	Agreement for the Implementation of the Provisions of the UN Convention on the Law of the Sea of 10 Dec 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks
1994	To ratify the amendments to the Federated States of Micronesia Arrangement for Regional Fisheries Access (The FSM Arrangements).
1994	To accede to the "Convention on Biological Diversity," the objectives of which are to conserve biological diversity, to promote the sustainable use of biological components, and to provide for the fair and equitable sharing of the benefits of genetic resources and technology, including biotechnology.
1995	Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal
1995	Ratifying the convention for the prohibition of fishing with the long driftnets in the South Pacific, otherwise more popularly known as "The Wellington Convention"
Date unknown	To ratify the amendment to the treaty on fisheries between the Governments of certain Pacific Island States and the Government of the United States of America, the Aim of said amendments is to allow U.S. long line vessels access to high seas within the treaty area.
1999	To provide for the acceptance, approval and ratification by the Republic of Palau of UNESCO's Convention for the safeguarding of the Intangible Cultural Heritage.
1999	To ratify the Articles of Agreement establishing the Arrangement for the Management of the Western Pacific Purse Seine Fishery, otherwise known as "The Palau Arrangement".
1992	Ratifying the Niue Treaty on Cooperation in Fisheries Surveillance and Law Enforcement in the South Pacific Region and 2012 amendment.
2002	Convention concerning the Protection of the World Cultural and Natural Heritage
2005	Convention on the Conservation and Management of Highly Migratory Fish
	Stocks in the Western and Central Pacific Ocean
2005	To ratify the accession of the Republic of Palau to the Convention for the Conservation of Migratory Species of Wild Animals.
2009	To ratify the Agreement on Regional Cooperation in Matters Affecting International Commercial Shipping in Micronesia.
2010	To ratify several agreed upon amendments to the Palau Arrangement for the Management of the Western Pacific Purse Seine Fishery.
2010	To ratify the Third Arrangement Implementing the Nauru Agreement Setting Forth Additional Terms and Conditions of Access to the Fisheries Zones of the Pacific.
2011	International Convention for the Prevention of Marine Pollution from Ships, 1973 (MARPOL) adopted in London on 2 Nov 1973 and its Protocol of 1978, adopted in London on 2 Nov 1973 and its Protocols of 1978, adopted in London on 17 Feb 1978(MARPL 73/78), including following subsidiaries:

Table A3.2: List of marine conventions, treaties & agreements - Kiribati

Year Ratified	Convention and/or Treaty
1972	Convention for the Prevention of Marine Pollution by Dumping of Wastes and Other Matter [London Dumping Convention]
1973, 1978	International Convention for the Prevention of Pollution from Ships and its Protocol
1979	South Pacific Forum Fisheries Agency Convention
1982	United Nations Convention on the Law of the Sea
1985	Convention for the Protection of the Ozone Layer
1985	South Pacific Nuclear Free Zone Treaty
1986	Convention for the Protection of the Natural Resources and Environment of the South Pacific Region and related Protocols [SPREP Convention]
1989	Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific
1992	Convention on Climate Change
1992	Convention on Biological Diversity
1993	The Niue Treaty between Tonga and Tuvalu on Co-operation in Fisheries Surveillance and Law Enforcement

Table A3.3: List of marine conventions, treaties & agreements - Nauru

Year Ratified	Treaty, Convention or International Agreement
1951	International Plant Protection Convention
1970	Treaty on the Non-Proliferation of Nuclear Weapons
1972	Convention on the Prevention of Marine Pollution by the Dumping of Wastes and Other Matter (London Dumping Convention)
	United Nations Convention to Combat Desertification and Drought (CCDD)
1979	South Pacific Forum Fisheries Agency Convention
1982	United Nations Convention on the Law of the Sea
1982	Agreement for the Implementation of the Provisions of the UN Law of the Sea of December
1985	Convention for the Protection of the Ozone Layer
1985	South Pacific Nuclear Free Zone Treaty
1986	Convention for the Protection of the Natural Resources and the Environment in the South Pacific Region and Related Protocols, including the Protocol for the Prevention of Pollution of the South Pacific Region by Dumping (Apia Convention)
1989	Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific
1992	United Nations Framework Convention on Climate Change
1992	Convention on the Conservation of Biological Diversity
1992	Treaty on Cooperation in Fisheries Surveillance and Law Enforcement in the South Pacific Region (the Niue Treaty)
1993	Multilateral Treaty on Fisheries Between the Governments of Certain Pacific Island States and the Government of the United States of America
1994	South Pacific Regional Environment Programme (SPREP Convention)
1995	Basic Agreement between Nauru and the World Health Organisation
1995	Convention to Ban the Importation into Forum Island Countries of Hazardous and Radioactive Waters and to Control the Transboundary Movement and Management of Hazardous Wastes within the South Pacific Region
1996	United Nations Educational, Scientific and Cultural Organisation (UNESCO)
1997	Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks
Yet to be ratified	Convention on Hazardous and Toxic Wastes (Waigani Convention)

Appendix 4: Evaluation of Compliance with WB and ADB Safeguard Policy - Environmental Requirements

Table 4A: Evaluation of ESIA against WB Safeguard Policies that have been triggered for the Kosrae and Kiribati projects

WB Operational Policy	Application to Project	Potential Impacts	Mitigation Measures
OP4.01 Environmental Assessment	This OP is triggered as there will be minor environmental and social impacts to be managed.	As outlined in Section 6.2	Implementation of the ESMP (Section 7)
OP4.04 Natural Habitats	This OP is triggered as there may be some disturbances to marine ecosystems.	Cable laying activities in near shore areas could cause damage to live coral resulting in unstable positioning of the cable. The laying of the cable in the marine environment will result in the loss of a small area of habitat specifically, seagrasses which provide habitat for juvenile fish species and benthic invertebrates.	Use diver and/or marker buoy guided cable placement and post lay surveys to ensure that the cable comes to rest on the sea floor in the wide channels identified through field surveys. No mitigation possible, loss of some seagrass areas is likely, however, the cable will either be buried during construction or the cable will bury itself in soft sediments over time. Seagrass areas will regenerate over time.
OP 4.11 Physical and Cultural Resources	This OP is triggered as a precaution. There are no known physical or cultural resources within the project impact area but chance find mitigations are recommended.	Disturbance of physical & cultural resources	Any physical or cultural resources, as defined in WB OP4.11 that are discovered by chance during the project development will be covered by the chance find procedures.

Table 4B: Evaluation of ESIA elements against ADB Safeguard Requirements – Environment (Appendix 1 – SPS 2009)

ADB SPS Safeguard Requirement 1: Environment	Reference to this ESIA
1. Environmental Assessment	
The borrower/client will identify potential direct, indirect, cumulative and induced environmental impacts on and risks to physical, biological, socioeconomic, and physical cultural resources and determine their significance and scope, in consultation with stakeholders (incl. affected people and CSOs). If potentially adverse environmental impacts and risks are identified, the borrower/client will undertake an environmental assessment as early as possible in the project cycle. For projects with potentially significant adverse impacts that are diverse, irreversible, or unprecedented, the borrower/client will examine alternatives to the project's location, design, technology, and components that would avoid, and, if avoidance is not possible, minimize adverse environmental impacts and risks. Rationale for selecting the project location, design, technology, and components will be properly documented, including, cost-benefit analysis, taking environmental costs and benefits of the various alternatives considered into account. The "no project" alternative will be also considered.	Addressed throughout this ESIA
The assessment will be based on current information, including an accurate project description, and appropriate environmental baseline data; …will consider all potential impacts and risks of the project on physical, biological, socioeconomic (occupational health and safety, community health and safety, vulnerable groups and gender issues, and impacts on livelihoods) and physical cultural resources in an integrated way. The project's potential environmental impacts and risks will be reviewed against the requirements presented in this document and applicable laws and regulations of the jurisdictions in which the project operates that pertain to environmental matters, including host country obligations under international law.	Addressed throughout this ESIA
Impacts and risks will be analysed in the context of the project's area of influence. This area of influence encompasses (i) the primary project site(s) and related facilities that the borrower/client (including its contractors) develops or controls, such as power transmission corridors, pipelines, canals, tunnels, access roads, borrow pits and disposal areas, and construction camps; (ii) associated facilities that are not funded as part of the project (funding may be provided separately by the borrower/client or by third parties), and whose viability and existence depend exclusively on the project and whose goods or services are essential for successful operation of the project; (iii) areas and communities potentially affected by cumulative impacts from further planned development of the project; and (iv) areas and communities potentially affected by impacts from unplanned but predictable developments caused by the project that may occur later or at a different location. The PIA does not include potential impacts that might occur without the project or independently of the project. Environmental impacts and risks will also be analyzed for all relevant stages of the project cycle, including preconstruction, construction, operations, decommissioning, and post closure activities.	The area of project influence is described in Section 4 and Appendix 1 - Baseline Data Report
The assessment will identify potential transboundary effects, such as air pollution, increased use or contamination of international waterways, as well as global impacts, such as emission of greenhouse gases and impacts on endangered species and habitats.	Refer Section 6
The environmental assessment will examine whether individuals and groups may be differentially or disproportionately affected by the project's potential adverse environmental impacts because of their disadvantaged or vulnerable status the poor, women and children, and Indigenous Peoples. Where such individuals or groups are	Refer Sections 6.3 and 6.4

ADB SPS Safeguard Requirement 1: Environment	Reference to this ESIA
identified, the environmental assessment will recommend targeted and differentiated measures so that adverse environmental impacts do not fall disproportionately on them.	
Depending on the significance of project impacts and risks, the assessment may comprise a full-scale environmental impact assessment (environmental assessment) for category A projects, an initial environmental examination or equivalent process for category B projects, or a desk review. An environmental assessment report includes the following major elements: (i) executive summary, (ii) description of the project, (iii) description of the environment (with comprehensive baseline data), (iv) anticipated environmental impacts and mitigation measures, (v) analysis of alternatives, (vi) environmental management plan(s), (vii) consultation and information disclosure, and (viii) conclusion and recommendations. The annex to this appendix provides further details. An IEE, with its narrower scope, may be conducted for projects with limited impacts that are few, generally site-specific, largely reversible, and readily addressed through mitigation measures.	This ESIA complies with the requirements for an assessment commensurate with the level or impact and risk. This ESIA is equivalent to an initial environmental examination as required for category B projects.
When the project involves existing activities or facilities, specialists will perform environmental audits to determine the existence of any areas where the project may cause or is causing environmental risks or impacts. If the project does not foresee any new major expansion, the audit constitutes the environmental assessment. The audit includes the following major elements: (i) executive summary; (ii) facilities description, including both past and current activities; (iii) summary of national, local, and any other applicable environmental laws, regulations, and standards; (iv) audit and site investigation procedure; (v) findings and areas of concern; and (vi) corrective action plan that provides the appropriate corrective actions for each area of concern, including costs and schedule.	Not relevant
When the project involves the development of or changes to policies, plans, or programs that are likely to have significant environmental impacts that are regional or sectoral, strategic environmental assessment will be required. A strategic environmental assessment report will include (i) an analysis of the scenario, (ii) an assessment of long-term and indirect impacts, (iii) a description of the consultation process, and (iv) an explanation of option selection.	Not relevant
2. Environmental Planning and Management	
The borrower/client will prepare an environmental management plan (EMP) that addresses the potential impacts and risks identified by the environmental assessment. The EMP will include proposed mitigation measures, monitoring and reporting requirements, emergency response procedures, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators. Where impacts and risks cannot be avoided or prevented, mitigation measures and actions will be identified so that the project is designed, constructed, and operated in compliance with applicable laws and regulations and meets the requirements specified in this document. The level of detail and complexity of the environmental planning documents and the priority of the identified measures and actions will be commensurate with the project's impacts and risks. Key considerations include mitigation of potential adverse impacts to the level of "no significant harm to third parties", the polluter pays principle, the precautionary approach, and adaptive management.	Section 8 ESMP
If some residual impacts are likely to remain significant after mitigation, the EMP will also include appropriate compensatory measures (offset) that aim to ensure that the project does not cause significant net degradation to the environment. Such measures may relate, for instance, to conservation of habitat and biodiversity, preservation of ambient conditions, and greenhouse gas emissions. Monetary compensation in lieu of offset is acceptable in exceptional circumstances, if the compensation is used to provide environmental benefits of the same nature and is commensurate with the project's residual impact.	Not relevant
The EMP will define expected outcomes as measurable events to the extent possible and will include performance	Section 8 ESMP, Table 8.1 and Table 8.2

ADB SPS Safeguard Requirement 1: Environment	Reference to this ESIA
indicators or targets that can be tracked over defined periods. It will be responsive to changes in project design, such as a major change in project location or route, or in technology, unforeseen events, and monitoring results.	
At times, a third party's involvement will influence implementation of the EMP. A third party may be, inter alia, a government agency, a contractor, or an operator of an associated facility. When the third-party risk is high and the borrower/client has control or influence over the actions and behaviour of the third party, the borrower/client will collaborate with the third party to achieve the outcome consistent with the requirements for the borrower/client. Specific actions will be determined on a case-by-case basis.	Not relevant
The borrower/client will use qualified and experienced experts to prepare the environmental assessment and the EMP. For highly complex and sensitive projects, independent advisory panels of experts not affiliated with the project will be used during project preparation and implementation.	ESIA meets this criterion.
3. Information Disclosure	
The borrower/client will submit to ADB the following documents for disclosure on ADB's website: a draft full environmental assessment (including the draft EMP) at least 120 days prior to ADB Board consideration, and/or environmental assessment and review frameworks before project appraisal, where applicable; the final environmental assessment/IEE; a new or updated environmental assessment/IEE and corrective action plan prepared during project implementation, if any; and the environmental monitoring reports.	Will be complied with. Refer to reporting processes in Section 8.6.
The borrower/client will provide relevant environmental information, including information from the documents in para. 17 in a timely manner, in an accessible place and in a form and language(s) understandable to affected people and other stakeholders. For illiterate people, other suitable communication methods will be used.	ESIA will be publicly disclosed.
4. Consultation and Participation	
The borrower/client will carry out meaningful consultation with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation. Consultation will be carried out in a manner commensurate with the impacts on affected communities. The consultation process and its results are to be documented and reflected in the environmental assessment report.	Section 7 of ESIA
5. Grievance Redress Mechanism	
The borrower/client will establish a mechanism to receive and facilitate resolution of affected peoples' concerns, complaints, and grievances about the project's environmental performance. The grievance mechanism should be scaled to the risks and adverse impacts of the project. It should address affected people's concerns and complaints promptly, using an understandable and transparent process that is gender responsive, culturally appropriate, and	Section 9 of ESIA
6. Monitoring and Reporting	
The borrower/client will monitor and measure the progress of implementation of the EMP. The extent of monitoring activities will be commensurate with the project's risks and impacts. In addition to recording information to track performance, the borrower/client will undertake inspections to verify compliance with the EMP and progress toward the expected outcomes. For projects, likely to have significant adverse environmental impacts, the borrower/client will retain qualified and experienced external experts or qualified NGOs to verify its monitoring information. The borrower/client will document monitoring results, identify the necessary corrective actions, and reflect them in a corrective action plan. The borrower/client will implement these corrective actions and follow up on these actions to	Section 8.5 of ESIA

ADB SPS Safeguard Requirement 1: Environment	Reference to this ESIA
ensure their effectiveness.	
The borrower/client will prepare periodic monitoring reports that describe progress with implementation of the EMP and compliance issues and corrective actions, if any. The borrower/client will submit at least semi-annual monitoring reports during construction for projects likely to have significant adverse environmental impacts, and quarterly monitoring reports for highly complex and sensitive projects. For projects, likely to have significant adverse environmental impacts during operation, reporting will continue at the minimum on an annual basis. Such periodic reports will be posted in a location accessible to the public. Project budgets will reflect the costs of monitoring and reporting requirements.	Section 8 - ESMP, Table 8.1 and Table 8.2
7. Unanticipated Environmental Impacts	
Where unanticipated environmental impacts become apparent during project implementation, the borrower/client will update the environmental assessment and EMP or prepare a new environmental assessment and EMP to assess the potential impacts, evaluate the alternatives, and outline mitigation measures and resources to address those impacts.	Section 8 - ESMP, Table 8.1 and Table 8.2
8. Biodiversity Conservation and Sustainable Natural Resource Management	
The borrower/client will assess the significance of project impacts and risks on biodiversity and natural resources as an integral part of the environmental assessment process specified in paras. 4–10. The assessment will focus on the major threats to biodiversity, which include destruction of habitat and introduction of invasive alien species, and on the use of natural resources in an unsustainable manner. The borrower/client will need to identify measures to avoid, minimize, or mitigate potentially adverse impacts and risks and, as a last resort, propose compensatory measures, such as biodiversity offsets, to achieve no net loss or a net gain of the affected biodiversity.	Section 6.2 General Environment
Modified Habitats	
In areas of modified habitat, where the natural habitat has apparently been altered, often through the introduction of alien species of plants and animals, such as in agricultural areas, the borrower/client will exercise care to minimize any further conversion or degradation of such habitat, and will, depending on the nature and scale of the project, identify opportunities to enhance habitat and protect and conserve biodiversity as part of project operations.	Not relevant – not modified habitats – impacts are no more than minor.
Natural Habitats	
Mitigation measures will be designed to achieve at least no net loss of biodiversity. They may include a combination of actions, such as post project restoration of habitats, offset of losses through the creation or effective conservation of ecologically comparable areas that are managed for biodiversity while respecting the ongoing use of such biodiversity by Indigenous Peoples or traditional communities, and compensation to direct users of biodiversity.	Not considered to apply – impacts are no more than minor.
Critical Habitats	
No project activity will be implemented in areas of critical habitat unless the following requirements are met When the project involves activities in a critical habitat, the borrower/client will retain qualified and experienced external experts to assist in conducting the assessment.…:	No critical habitats in PIA - impacts are no more than minor.
Legally Protected Areas	
In circumstances where some project activities are located within a legally protected area, in addition to the	Project will not impact any legally protected

ADB SPS Safeguard Requirement 1: Environment	Reference to this ESIA
requirement specified in para. 28, the borrower/client will meet the following requirements …:	areas - impacts are no more than minor.
Invasive Alien Species	
The borrower/client will not intentionally introduce any new alien species …	Section 6.2 General Environment in Section 6 Anticipated Impacts
Management and Use of Renewable Natural Resources	
Renewable natural resources will be managed in a sustainable manner….	Not relevant
9. Pollution Prevention and Abatement	
During the design, construction, and operation of the project the borrower/client will apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards….	Section 8 - ESMP, Table 8.1 and Table 8.2
Pollution Prevention, Resource Conservation, and Energy Efficiency	
The borrower/client will avoid, or where avoidance is impossible, will minimize or control the intensity or load of pollutant emission and discharge. In addition, the borrower/client will examine and incorporate in its operations resource conservation and energy efficiency measures consistent with the principles of cleaner production…	Section 8 - ESMP, Table 8.1 and Table 8.2
Wastes	
The borrower/client will avoid, or where avoidance is not possible, will minimize or control the generation of hazardous and non-hazardous wastes and the release of hazardous materials resulting from project activities. … When waste disposal is conducted by third parties, the borrower/client will use contractors that are reputable and legitimate enterprises licensed by the relevant regulatory agencies.	Section 3.1 Project Components
Hazardous Materials	
The borrower/client will avoid the manufacture, trade, and use of hazardous substances and materials subject to international bans or phase outs because of their high toxicity to living organisms, environmental persistence, potential for bioaccumulation, or potential for depletion of the ozone layer and will consider the use of less hazardous substitutes for such chemicals and materials.	Section 3.1 Project Components
Pesticide Use and Management	
The environmental assessment will ascertain that any pest and/or vector management activities related to the project are based on integrated pest management approaches and aim to reduce reliance on synthetic chemical pesticides in agricultural and public health projects.	Section 6.2 General Environment in Section 6 Anticipated Impacts
The borrower/client will not use products that fall in World Health Organization Recommended Classification of Pesticides by Hazard Classes Ia (extremely hazardous) and Ib (highly hazardous) or Class II (moderately hazardous), if the project host country lacks restrictions on distribution and use of these chemicals, or if they are likely to be accessible to personnel without proper training, equipment, and facilities to handle, store, apply and dispose of these products properly. The borrower/client will handle, store, apply and dispose of pesticides in accordance with international good practice such as the Food and Agricultural Organization's International Code of	

ADB SPS Safeguard Requirement 1: Environment	Reference to this ESIA
Conduct on the Distribution and Use of Pesticides	
Greenhouse Gas Emissions	
The borrower/client will promote the reduction of project-related anthropogenic greenhouse gas emissions in a manner appropriate to the nature and scale of project operations and impacts. ….	Section 6.2 General Environment in Section 6 Anticipated Impacts
10. Health and Safety	
Occupational Health and Safety	
The borrower/client will provide workers with a safe and healthy working environment, considering risks inherent to the sector and specific classes of hazards in the borrower's/client's work areas, including physical, chemical, biological, and radiological hazards. The borrower/client will take steps to prevent accidents, injury, and disease arising from, associated with, or occurring during the course of work by (i) identifying and minimizing, so far as reasonably practicable, the causes of potential hazards to workers; (ii) providing preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances; (iii) providing appropriate equipment to minimize risks and requiring and enforcing its use; (iv) training workers and providing them with appropriate incentives to use and comply with health and safety procedures and protective equipment; (v) documenting and reporting occupational accidents, diseases, and incidents; and (vi) having emergency prevention, preparedness, and response arrangements in place.	Section 8 - ESMP, Table 8.1 and Table 8.2
The borrower/client will apply preventive and protective measures consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environment, Health and Safety Guidelines.	
Community Health and Safety	
The borrower/client will identify and assess the risks to, and potential impacts on, the safety of affected communities during the design, construction, operation, and decommissioning of the project, and will establish preventive measures and plans to address them in a manner commensurate with the identified risks and impacts. These measures will favor the prevention or avoidance of risks and impacts over their minimization and reduction. …	Section 6.3 and 6.4 of ESIA.
The borrower/client will inform affected communities of significant potential hazards in a culturally appropriate manner. The borrower/client will be prepared to respond to accidental and emergency situations. This preparation will include response planning document(s) that addresses the training, resources, responsibilities, communications, procedures, and other aspects required to respond effectively to emergencies associated with project hazards. Appropriate information about emergency preparedness and response activities, resources, and responsibilities will be disclosed to affected communities.	Section 8 - ESMP, Table 8.1 and Table 8.2
When structural elements or components, such as dams, tailings dams, or ash ponds, are situated in high-risk locations and their failure or malfunction may threaten the safety of communities, the borrower/client will engage qualified and experienced experts, separate from those responsible for project design and construction, to conduct a review as early as possible in project development and throughout project design, construction, and commissioning.	Not relevant – project does not involve such elements
11. Physical Cultural Resources	Not relevant – Project does not affect PCRs – see Section 6.4 of ESIA

Table 4C: Evaluation of ESIA against ADB Safeguard Requirements – Involuntary Resettlement - Appendix 2 of SPS

Safeguard Requirement 2: Involuntary Resettlement	Reference to this ESIA
Introduction	
ADB …seeks to avoid involuntary resettlement wherever possible; minimize involuntary resettlement by exploring project and design alternatives; enhance, or at least restore, the livelihoods of all displaced persons in real terms relative to pre-project levels; and improve the standards of living of the affected poor and other vulnerable groups. Note: In the context of involuntary resettlement, displaced persons are those who are physically displaced (relocation, loss of residential land, or loss of shelter) and/or economically displaced (loss of land, assets, access to assets, income sources, or means of livelihoods) because of (i) involuntary acquisition of land, or (ii) involuntary restrictions on land use or on access to legally designated parks and protected areas.	As noted in Section 2.5.3 of this ESIA, all land acquisition associated with the project will be voluntary. The location of the cable can be changed to accommodate voluntary land acquisition. The land due diligence study (see Appendix 3) indicates that there are several suitable Government owned or leased sites available for the location of infrastructure, none of which will cause any involuntary resettlement. If private or custom-owned land is required, this will be acquired voluntarily, using lease or easement arrangements. It therefore appears that this safeguard policy requirement is not triggered. For the avoidance of doubt, each relevant requirement of these involuntary resettlement safeguard requirements is reviewed against the ESIA below.
Scope of Application	
The requirements apply to all ADB-financed and/or ADB-administered sovereign and non-sovereign projects, and their components regardless of the source of financing, including investment projects funded by a loan; and/or a grant; and/or other means, such as equity and/or guarantees (hereafter broadly referred to as projects). The requirements also cover involuntary resettlement actions conducted by the borrower/client in anticipation of ADB support.	Applies to Nauru elements of Project

Safeguard Requirement 2: Involuntary Resettlement	Reference to this ESIA
The involuntary resettlement requirements apply to full or partial, permanent or temporary physical displacement (relocation, loss of residential land, or loss of shelter) and economic displacement (loss of land, assets, access to assets, income sources, or means of livelihoods) resulting from (i) involuntary acquisition of land, or (ii) involuntary restrictions on land use or on access to legally designated parks and protected areas. Resettlement is considered involuntary when displaced individuals or communities do not have the right to refuse land acquisition that results in displacement. This occurs in cases where (i) lands are acquired through expropriation based on eminent domain; and (ii) lands are acquired through negotiated settlements, if expropriation process would have resulted upon the failure of negotiation. Note: In the context of involuntary resettlement, displaced persons are those who are physically displaced (relocation, loss of residential land, or loss of shelter) and/or economically displaced (loss of land, assets, access to assets, income sources, or means of livelihoods) because of (i) involuntary acquisition of land, or (ii) involuntary restrictions on land use or on access to legally designated parks and protected areas.	There is no: (i) involuntary acquisition of land, nor are there (ii) involuntary restrictions on land use or on access to legally designated parks and protected areas. Therefore, the ADB involuntary resettlement safeguard requirements are not triggered.
If potential adverse economic, social, or environmental impacts from project activities other than land acquisition (including involuntary restrictions on land use, or on access to legally designated parks and protected areas) are identified, such as loss of access to assets or resources or restrictions on land use, they will be avoided, or at least minimized, mitigated, or compensated for, through the environmental assessment process. If these impacts are found to be significantly adverse at any stage of the project, the borrower/client will be required to develop and implement a management plan to restore the livelihood of affected persons to at least pre-project level or better.	No significant adverse impacts on land access in areas other than legally designated parks and protected areas are identified. Section 6.2.2 of the ESIA identifies that there will be temporary restrictions on costal use (fishing) during the very brief duration of installation. Otherwise, interference with marine and coastal environmental will be less than minor.
1. Compensation, Assistance and Benefits for Displaced Persons	
Displaced persons in a project area could be of three types: (i) persons with formal legal rights to land lost in its entirety or in part; (ii) persons who lost the land they occupy in its entirety or in part who have no formal legal rights to such land, but who have claims to such lands that are recognized or recognizable under national laws; and (iii) persons who lost the land they occupy in its entirety or in part who have neither formal legal rights nor recognized or recognizable claims to such land. The involuntary resettlement requirements apply to all three types of displaced persons.	The Project does not involve any displaced persons as defined.
The borrower/client will provide adequate and appropriate replacement land and structures or cash compensation for parties described in paras. 7(i) and 7(ii) and 7(iii) ….	Not relevant see 7 above
Preference will be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based…	Not relevant see 7 above
The rate of compensation for acquired housing, land and other assets will be calculated at full replacement costs….	Not relevant see 7 above
In the case of physically displaced persons, the borrower/client will provide (i) relocation assistance, secured tenure to relocation land, better housing at resettlement sites with comparable access to employment and production opportunities, and civic infrastructure and community services as required; (ii) transitional support and development assistance, such as land development, credit facilities, training, or employment opportunities; and (iii) opportunities to derive appropriate development benefits from the project.	No physical displacement – see 7 above
In the case of economically displaced persons, regardless of whether they are physically displaced, the borrower/client	No economic displacement – see 7 above

Safeguard Requirement 2: Involuntary Resettlement	Reference to this ESIA
will ……	
Involuntary resettlement should be conceived of and executed as part of a development project or program.	Not relevant see 7 above
The borrower/client will ensure that no physical displacement or economic displacement will occur until [various specific requirements are met].	Not relevant see 7 above
2. Social Impact Assessment	
As part of the social impact assessment, the borrower/client will identify individuals and groups who may be differentially or disproportionately affected by the project because of their disadvantaged or vulnerable status. Where such individuals and groups are identified, the borrower/client will propose and implement targeted measures so that adverse impacts do not fall disproportionately on them and they are not disadvantaged in relation to sharing the benefits and opportunities resulting from development.	See consultation records in Appendix 7.
The borrower/client will conduct socioeconomic survey(s) and a census, with appropriate socioeconomic baseline data to identify all persons who will be displaced by the project and to assess the project's socioeconomic impacts on them. For this purpose, normally a cut-off date will be established by the host government procedures. In the absence of such procedures, the borrower/client will establish a cut-off date for eligibility. Information regarding the cut-off date will be documented and disseminated throughout the project area. The social impact assessment (SIA) report will include (i) identified past, present and future potential social impacts, (ii) an inventory of displaced persons and their assets, (iii) an assessment of their income and livelihoods, and (iv) gender-disaggregated information pertaining to the economic and sociocultural conditions of displaced persons. The project's potential social impacts and risks will be assessed against the requirements presented in this document and applicable laws and regulations of the jurisdictions in which the project operates that pertain to involuntary resettlement matters, including host country obligations under international law.	The procedure adopted in this ESIA is described in Section 7 and Appendix 5 of the ESIA. The chosen methodology was a targeted survey approach involving direct consultation with the limited number of potentially impacted parties, and recognition that impacts would be no more than minor and then only during the short duration of cable installation (see Section 6.2.2 of ESIA). A census was not undertaken as part of this programme because it was recognised very early on that the Project did not involve involuntary displacement as defined in the SPS Requirement.
3. Resettlement Planning	
The borrower/client will prepare a resettlement plan, if the proposed project will have involuntary resettlement impacts.	No resettlement plan needed – the project does not involve IR impacts. DDR has been prepared confirming potential land requirements and status.
A resettlement plan will be based on the social impact assessment and through meaningful consultation with the affected persons.	Not relevant see 16 above
The borrower/client will analyze and summarize national laws and regulations pertaining to land acquisition, compensation payment, and relocation of affected persons in the resettlement plan.	Not relevant – no relocation of affected persons
All costs of compensation, relocation, and livelihood rehabilitation will be considered project costs.	Not relevant – no relocation of affected persons or need for livelihood restoration,
The borrower/client will include detailed measures for income restoration and livelihood improvement of displaced	No resettlement plan needed – the project

Safeguard Requirement 2: Involuntary Resettlement	Reference to this ESIA
persons in the resettlement plan.	does not involve IR impacts.
The information contained in a resettlement plan may be tentative until a census of affected persons has been completed.	No resettlement plan needed – the project does not involve IR impacts
Projects with significant involuntary resettlement impacts will need adequate contingency funds to address involuntary resettlement impacts that are identified during project implementation.	Not relevant – the project does not involve involuntary resettlement impacts.
The borrower/client will use qualified and experienced experts to prepare the social impact assessment and the resettlement plan.	ESIA preparation undertaken using independent experienced and qualified experts.
4. Negotiated Land Acquisition	
Safeguard Requirements 2 does not apply to negotiated settlements, unless expropriation would result upon the failure of negotiations.	Not relevant – the project does not involve involuntary resettlement impacts. Due diligence report (appendix 2) has been prepared
5. Information Disclosure	
The borrower/client will submit the following documents to ADB for disclosure on ADB's website: a draft resettlement plan and/or resettlement framework endorsed by the borrower/client before project appraisal; the final resettlement plan endorsed by borrower/client after census of affected persons has been completed; a new resettlement plan or an updated resettlement plan, and a corrective action plan prepared during project implementation, if any; and the resettlement monitoring reports.	No resettlement plan needed – the project does not involve involuntary resettlement impacts. Due diligence report (appendix 2) has been prepared
The borrower/client will provide relevant resettlement information, including information from the documents in para. 26 in a timely manner…...	No resettlement plan needed – the project does not involve involuntary resettlement impacts.
6. Consultation and Participation	
The borrower/client will conduct meaningful consultation with affected persons, their host communities, and civil society for every project and subproject identified as having involuntary resettlement impacts…..	Effective and proper consultation was undertaken to provide an appropriate basis for this ESIA.
7. Grievance Redress Mechanism	
The borrower/client will establish a mechanism to receive and facilitate the resolution of affected persons' concerns and grievances about physical and economic displacement and other project impacts, paying attention to the impacts on vulnerable groups. The grievance redress mechanism should be scaled to the risks and adverse impacts of the project….	See Section 9 of the ESIA
8. Monitoring and Reporting	
The borrower/client will monitor and measure the progress of implementation of the resettlement plan. The extent of	No resettlement plan needed – the project

Safeguard Requirement 2: Involuntary Resettlement	Reference to this ESIA
monitoring activities will be commensurate with the project's risks and impacts. The borrower/client will prepare semi-annual monitoring reports that describe the progress of the implementation of resettlement activities and any compliance issues and corrective actions	does not involve involuntary resettlement impacts. Ongoing social impact monitoring is proposed in ESMP Table 8.2
9. Unanticipated Impacts	
If unanticipated involuntary resettlement impacts are found during project implementation, the borrower/client will conduct a social impact assessment and update the resettlement plan or formulate a new resettlement plan covering all applicable requirements specified in this document.	Table 8.2
10. Special Considerations for Indigenous Peoples	
The borrower/client will explore to the maximum extent possible alternative project designs to avoid physical relocation of Indigenous Peoples that will result in adverse impacts on their identity, culture, and customary livelihoods…..	There will be no relocation of any parties because of the project.

Appendix 5: Potential Cable Alignments and Beach Manhole Sites

Figure 5a: Potential cable alignments for BMH1 (white dashed lines) in Kosrae

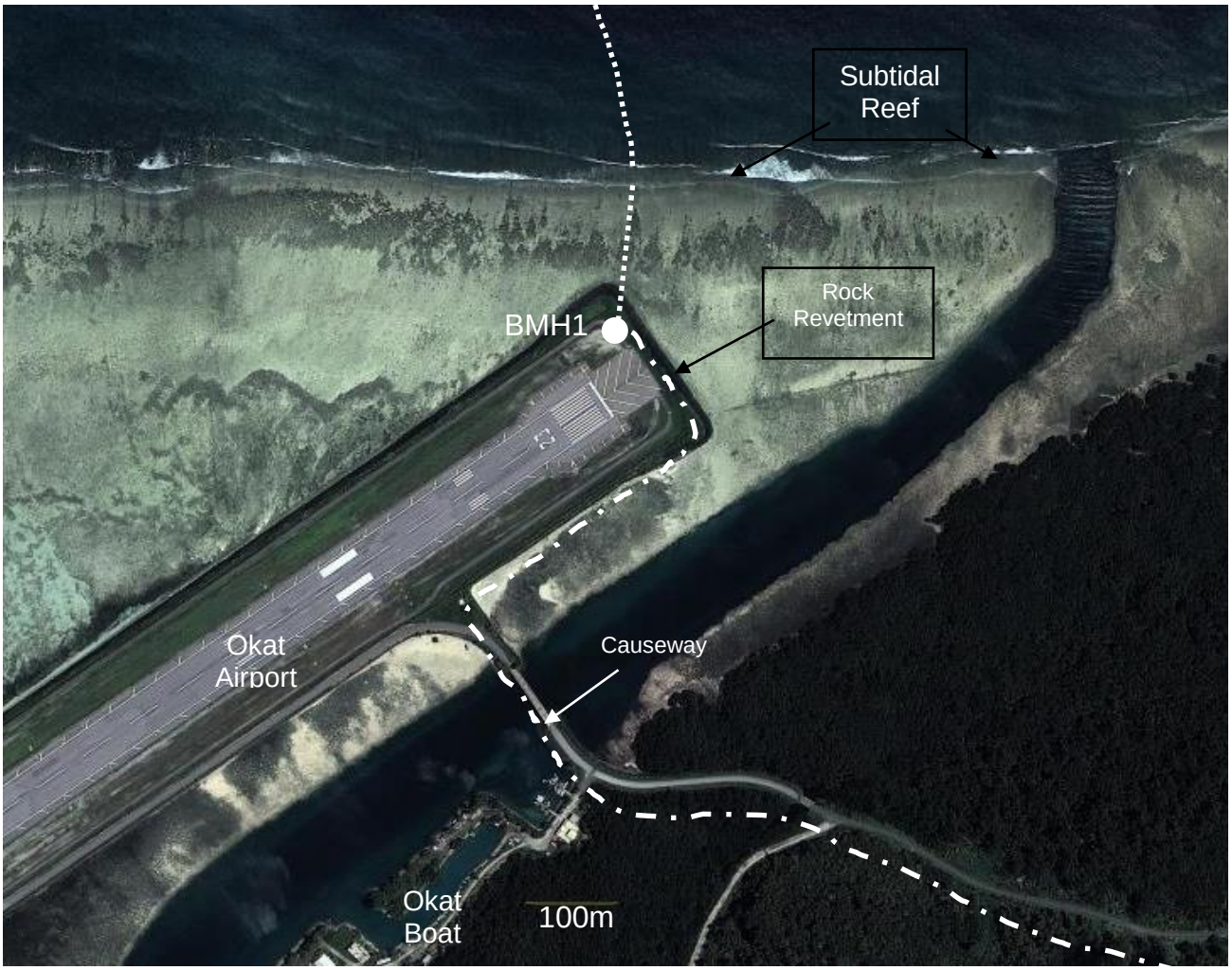


Figure 5b: Potential cable alignments for BMH4, 5 & 6 (white dashed lines) in Kosrae

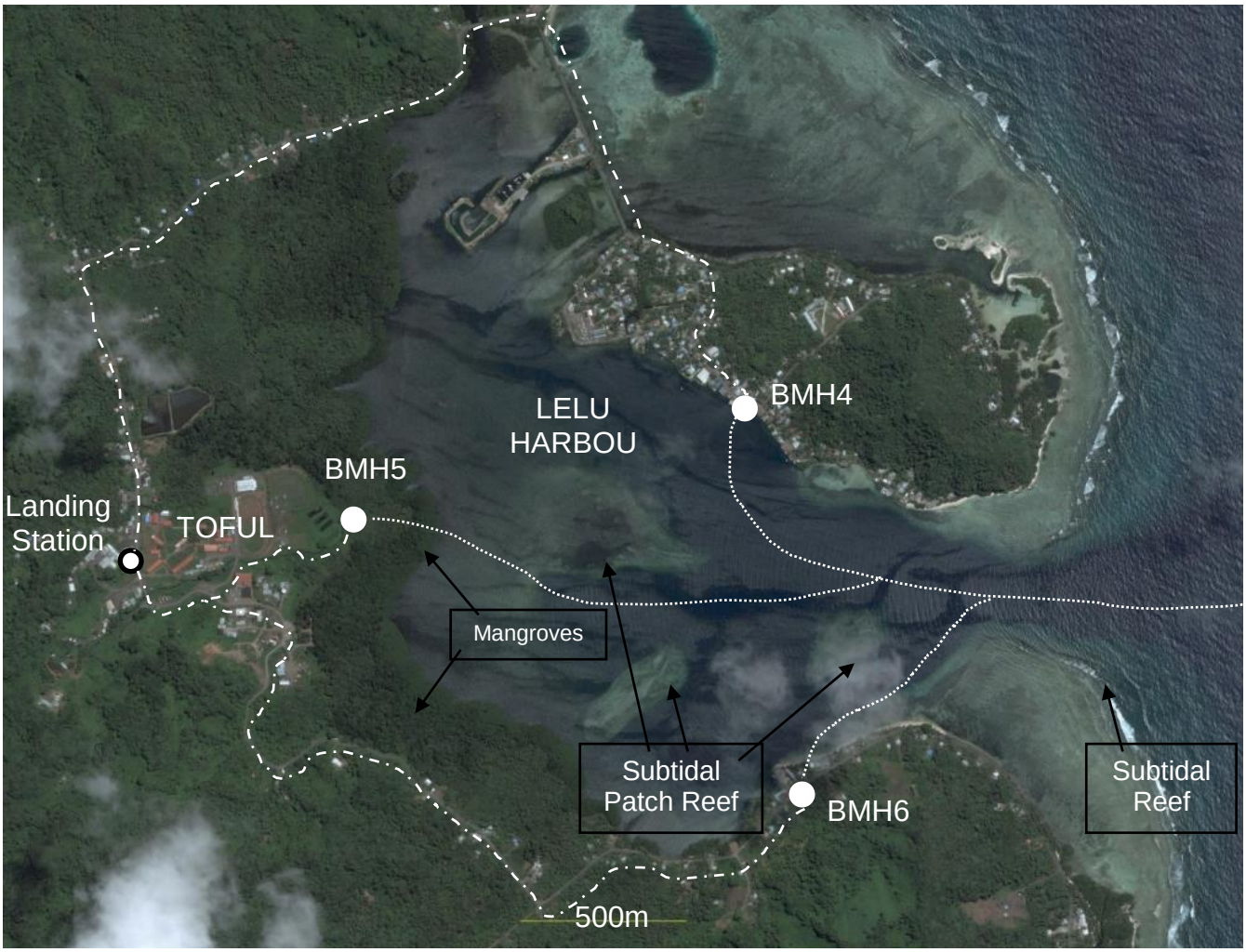


Figure 5c: Potential cable alignments for BMH7 & 8 (white dashed lines) in Kosrae

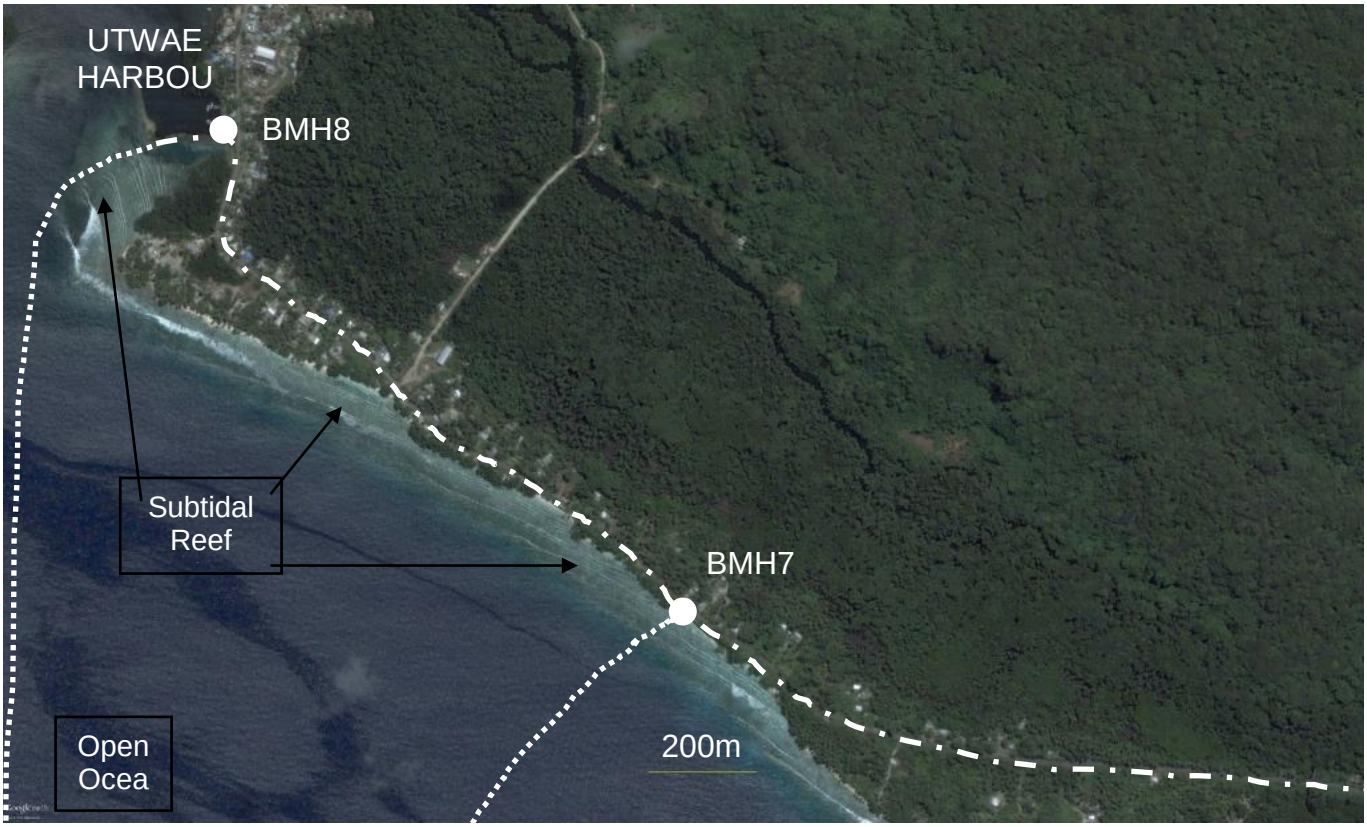


Figure 5d: Potential cable alignments for BMH1 (white dashed lines) in Kiribati

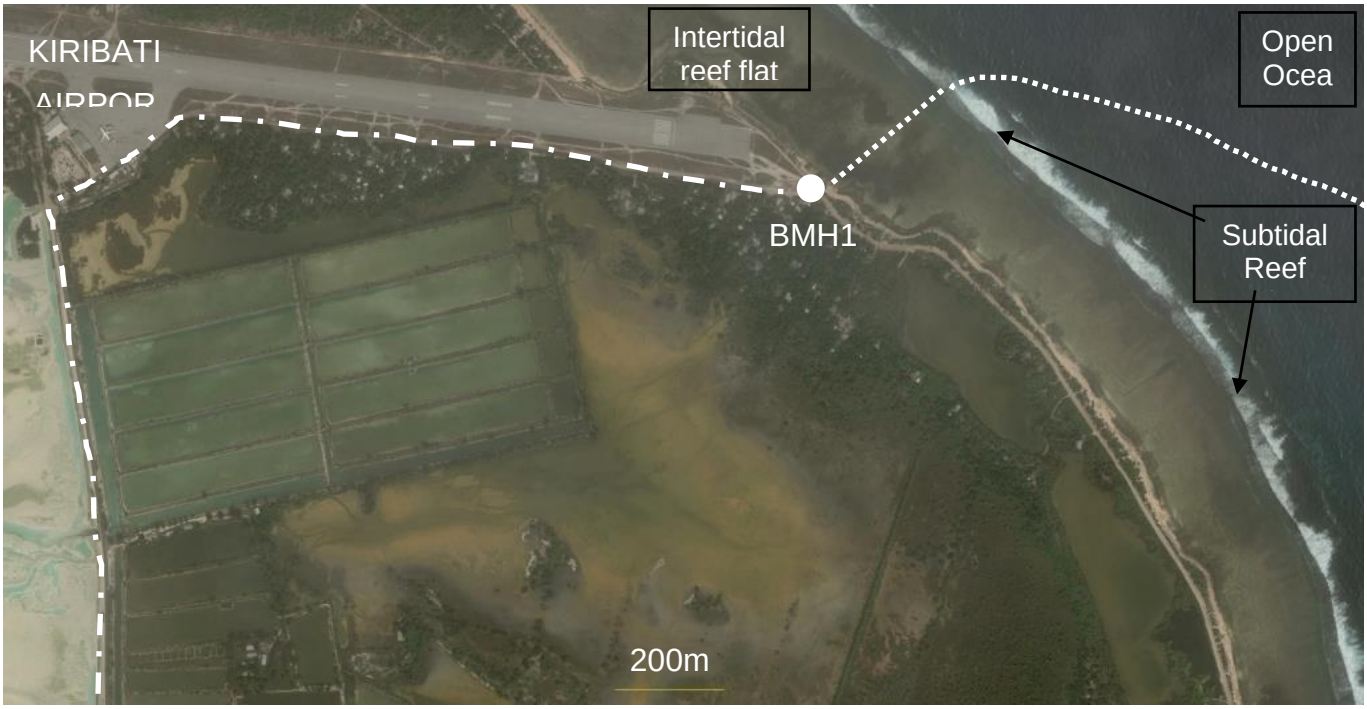


Figure 5e: Potential cable alignments for BMH2 (white dashed lines) in Kiribati

Figure 5f: Potential cable alignments for BMH3 & 4 (white dashed lines) in Kiribati

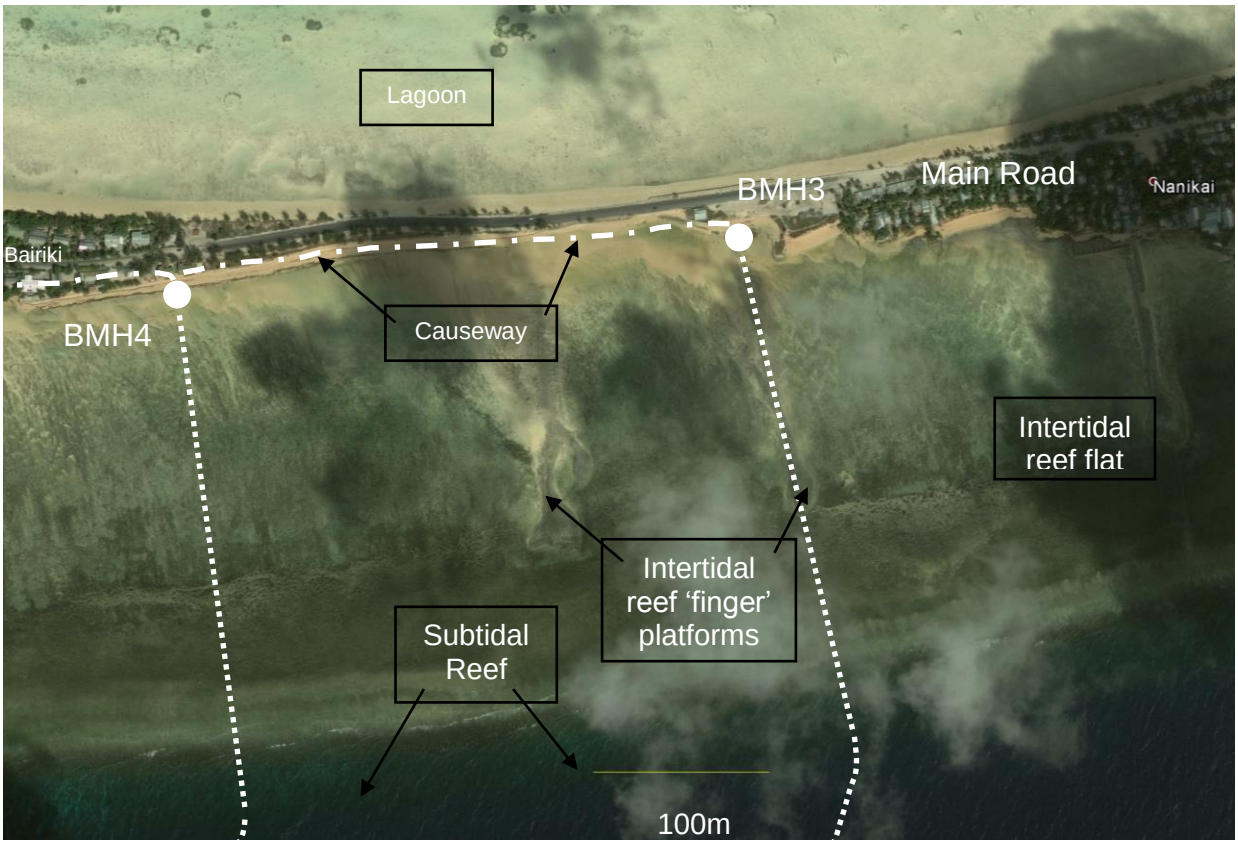
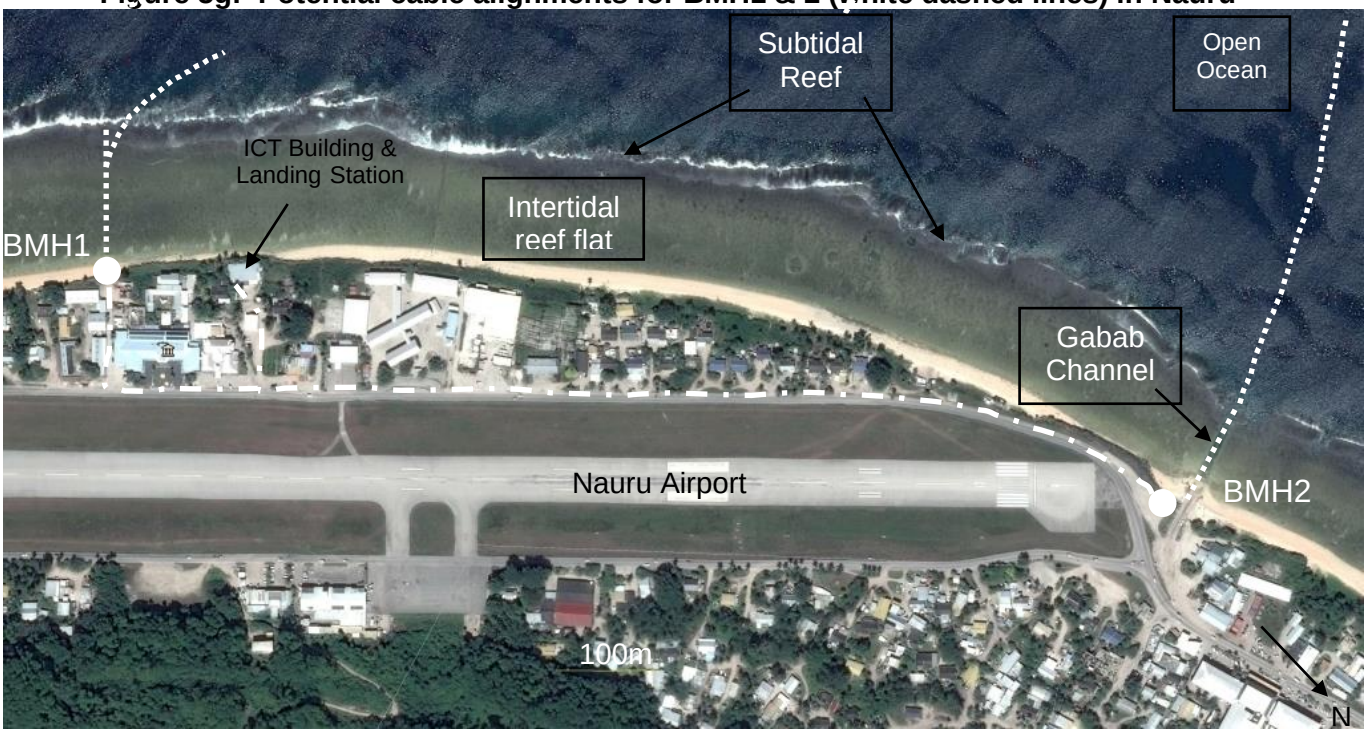


Figure 5g: Potential cable alignments for BMH1 & 2 (white dashed lines) in Nauru



Appendix 6: List of Consultation Attendees

Date/Location	Name	Role/Designation
20.10.16 Kosrae	Smith Sigram	Kosrae Chamber of Commerce
	Naimi Jerry	Kosrae Chamber of Commerce
	Stanley Raffilman	Administrator, DREA
	Grant Ismael	Executive Director
	Movida Edwin	Vice-Chairman
	Isao Mike	Secretary KCC
	Edward Sallous	KCC Board of Directors
	Shrew Jonas	KCC Board of Directors
	Naila Halatmitmia	Project - social safgeuards
	Luke Gowing	Project - environment safeguards
20.10.16 Kosrae	Fores Abraham	Acting Station Manager
	Robert Jackson	Administrator
	Maxwell Salic	Administrator - Fisheries
	Kiobu Luey	Inspector KIRMA
	Presney Abraham	KIRMA
	Standon Andrew	Administrator - HPO
	Heidi Sigrah	Administrator - DREA
	Lyndon Cornelius	Director - DREA
	Erik Wagnuk	KIRMA
	Blair Charley	KIRMA
	Steven Palik	Fisheries Specialist - KIRMA
	Robinson Timothy	Kosrae Land Court
	Aaron Warren	Project Coordinator
20.10.16 Kosrae	Rinson Edmund	State Senator
	Maker Palsis	Kosrae State Legislature
	Gilton Esahu	State Senator
	Josaiah Wagnuk	State Senator
	Salpasr Tilfas	Kosrae State Legislature
	Walter Tally	Malem Youth
	George Tulukea	KIPLA
	Swiston Robert	Finance
	Erik Wagnuk	KIRMA
	Steven Palik	Fisheries Specialist - KIRMA
	Jacob George	Tefimsal Mayor
	Robert Jackson	Administrator - KIRMA
	Lyndon Cornelius	Director - DREA
	Gason Jackson	Former Ambassador
	Albert Welly	KSL Kosrae State Legislature
	John Sisrah	FSMTC Board

Date/Location	Name	Role/Designation
	Fores Abraham	Acting Station Manager
	Nena William	Chief of Staff
	John Sigrad	FSMTC Board
25.10.16 Kiribati	Meere Karotu	ICT Project Manager
	Renga Teannaki	ICT Policy Analyst
	Rea Tioti	Lands - MELAD
	Tiaotui Enasi	Lands - MELAD
	Sonia Schutz	Deputy Secretary - Fisheries
	Kanaan Ngutu	ICT Officer
31.10.16 Nauru	John Rebuku	Senior Government Counsel
	Calistus Cain	Representative - Climate Change
	Bryan Star	DCIE
	Joel Waqa	ICT
02.11.16 Nauru	Cecilia Giouba	Director – Education Adminstration
	Esau Tamaki	
	Claytus Eka	
	Tyrone Deiye	Eco Nauru
	Humble Pes	Community Liaison Officer
	Alumita Lekenaua	Legal Manager EHC
	Dempsey Detenano	General Manager Engineering
	Douglas Audoa	President NPBSO and NLOA
	Cindy Kephas	Nauru Women’s National Council
	Muzzin Gadd	ICT Technician

Appendix 7: Consultation Summaries

Appendix 7A: Summary of Kosrae Consultation

October 17, 2016		
General Consultation	List of attendees (see Appendix 6)	Preferred cable landing station location is Tofol Can use existing roadside easement Several sites used for coastal monitoring Series of maps available to access (Conservation area, bathymetry, coastal erosion, seawalls) beach manhole description provided, issue with private land owners Issue of eroding private land into road easement. Discussion re potential beach manhole sites – Airport site (disputing which department internally has jurisdiction), southern sites (conservation areas nearby) and Lelu Harbour sites (school is State Land). environmental assessment requirements
October 18, 2016		
Bank of Guam	Gwendolyn E Nicolas Assistant Vice President Branch Manager	Bank operation hindered by limited and slow Internet At times staff had to stay on until late at night, to complete transactions & transmitting to Main Branch (Guam) Services available are also limited due to slow Internet Products offered can be expand and delivered with a better Internet We are happy to express our support for this project
FSM Bank	Lynn Langu Assistant Branch Manager	Had to work long hours some days to complete work needed because of the slow Internet Relaying information to and from Pohnpei can be frustrating Mobile banking is a real possibility, if the fibre optic cable provides us with fast Internet There is real need for this project in Kosrae
FSM ACE	Smith Sigrah Kosrae Manager	Businesses like ours do need this for our website and dealing with customers Doing business on the Internet can be slow and impacts on our business operation. It can be difficult to relay finance information with our head branch in Pohnpei We need a better and faster Internet It is necessary to invite you to address the Commerce Board this Thursday
Lelu Municipal Government	Ben Jesse Mayor	Appreciate this, for including our office in your consultation. To me, our work in this municipality will benefit from this project. We need to inform and raise public awareness in a timely manner. This is difficult with the existing Internet.

		May be a chance for our people to do courses online in Hawaii or the States. We support whatever happens. If this cable lands on our municipality, that is great. If not, we still support it.
October 19, 2016		
Utwe Resident	Simon Lak Former Mayor	This is a good chance for our people Contacting our family members overseas is important for us
Utwe Resident	Aluk Levi Former Mayor	We need better Internet to contact our family members overseas About time to see this new technology implemented in Kosrae No issues with landing the cable here
Utwe Municipal Government	Truman Waguk Mayor	Hoping that the cable lands here in Utwe We need better communication/Internet for our local people Support this and will talk to local people about this new project Utwe seemed to be always the last to get these types of developments. Anyway, it is good because we get the best projects result, because we get it with lesson learned from other municipalities, like the water system. See no real issue with our local fishing activities The sooner the better
Malem Resident	Malon Talley Church Pastor & Youth Leader	Built a Gym for the youth; to give them something to occupy their time with, otherwise they will drift into drinking etc. The local school is also using this gym as well. We have a vision and program that includes a Youth Centre, as an extension of our gym. This requires a better Internet; kids can do research or distant learning. This project is what we need. Also, need better communication with our families overseas; this is important to us locals.
Ahmadiyya Muslims Community	Imam E.M. Kauser Religious Minister	It is now difficult to communicate with our head quarter in London. Sometimes we need to pay our orders from ACE but cannot, as such service (eftpos) is not available. We had to carry large cash to do that, and that is not advisable for anyone to carry large cash around. Predecessor used to go to either Treelodge or Nautilus and stay there the practically the whole day, so he can access the Internet. We cannot access the Muslim television now, but that is an important part of our operation. We pay the maximum package, but the access we received is not consistent. We note the negative impacts of such Internet capability but these are insignificant comparing to the benefits we will have. We support this project; and we will arrange for the Kiribati counterpart to meet you.
Kosraean Women Association	Salorne Mast (President) Masy Livae Merbina Nena	President welcomes the opportunity to be involved and to hear about the project. Concerns with the exposure of youths to the negative impact of the Internet. Some mothers/women are rather better prepared than most to receive this new technology and exposure. In fact, most

	Brnisda Nakumura Jenny Seymour Hetty J Palik Tamoe E Ylaguk Priscilla Labonete Rose K Sigrah	do not fully comprehend this exposure, and kids are better versed with the Internet. So hard for mothers to monitor kids' activities over the Internet, especially with the kind of exposure this technology will bring. As mothers, this will be another role for us, making sure that the new Internet is used properly. However, support will be needed to inform/educate or prepare us for this technology. Interests raised about who will be managing or in charge of this cable. We can see the capacity and speed of this technology, but there is a need to guarantee that the rates will be affordable.
October 20 2016		
Community Consultation	Senators Members of public Business List of Attendees (see Appendix 4)	Need to know who fund this project Concerns with maintenance of this cable ('Warranty') Impact on fish and sea creatures Telecom need to negotiate their role with regards to this cable Highlight the role of Municipal stakeholders
Chamber of Commerce	Business owners (see Appendix 4)	Keen to see this project completed Liberalisation of communication is welcomed Noted that the road at Utwe will move inland due to continuous erosion of the existing road Keen to see more than one operator (competition) Expected the rates to be much cheaper

Appendix 7B: Summary of Kiribati Consultation

25 October 2016		
Amalgamated Telecommunication Holding Kiribati	Kamleshwar Sharma CEO	ATH supports the concept; ATH wants to contribute to the process Happy to provide any technical information, but need a written request
	Arobati Teamako A/Manager Earth Station	This is a new technology to us
Ocean Link		Difficult to access and compete with ATHK; Need to have the cable accessible to private operators Difficulty in interconnection between two operators; Keen to see who is going to manage the cable Operator of the cable must be independent of the current operators (fair competition)
Women Development	Bairee. Beniamina. Officer in Charge	Communication is vital for women; especially with families within Tarawa, and with those overseas. Issue now is the “bad image” being downloaded and shared by kids. Children’s’ time being spent on phones, laptops, tablets are an issue with their schoolwork. Imagine if the fibre cable will allow faster Internet. We are aware that teachers have found pornographic materials in student’s phones. Some students pretend to do school work but they spend school time on their phones or Internet. Better communication will allow sharing information with communities, especially community development information. We need to manage this new technology through program for the public.
NGOs	Uriam. Robati. Senior NGO Officer	We have almost 300 NGOs registered with us; and there is more being set up and seeking help on how to incorporate their NGO. Main concern is that we need more public information on this type of new technology. Our people should be aware and have some understanding. There have been some issues with the current project being implemented by McDowell: some people vandalise it because there were no consultation, awareness, and information for the local people (community). Appreciate that you start by informing us. I hope that the public awareness and information will continue so that local people, especially those who are less fortunate, to know and understand this new project.
Social Welfare	Tabotabo.Auatabu. Principal Social Welfare Officer	We are aware that Internet has some negative influence on people. The most vulnerable in this type of development is our children. They access to a fast technology, with little guidance. Be mindful, that some parents have less knowledge of this Internet technology. That make it difficult for them and the kids. There is a need for more consultation, so that people are fully aware of this new technology. They will need help to manage the risks that this will bring to their homes. We will liaise with the Ministry of Communication on this important issue. There is a need to have protection for our kids. Either, educating the parents or have some program, like parent lock, so

		that parents can manage the Internet usage in their homes. Adults, also need some protection with this new Internet technology.
26 October 2016		
MOEL	Uataake Terite Technical Office Barnabas Iotiabata IT Technician	Internet only service Concerns with cable management and operator (independent) Good timing for us to review our satellite contract Will build in the cable into our next business plan We would like to be involved in the planning with Government
27 October 2016		
Public Consultation – Nanikai Community	Attended by approximately 50 people from local community of Nanikai (see Appendix 4)	Will cable affect fish? How is cable brought ashore? Will other islands in Kiribati benefit? Will cable be visible? What will the cost of Internet access be? How will access to offensive websites be managed? Will local labour used in cable installation Project?
28 October 2016		
EcoCare	Dr Kameri Onorio	Provided explanation of Project Several other EIAs have been completed in Kiribati
Environment and Conservation Division	Taoues Reiher (Director) Victoria Hnanguie (Officer)	Provided explanation of Project environmental assessment might not be needed which is a requirement for license to install & operate.
KAP (Kiribati Adaptation Programme)	Etrily Menikaoti	Provided explanation of Project To provide island profile
KANGO	Tereeao Teingiia (President)	Provided explanation of Project; KANGO managers all recognized small NGOs in Kiribati
Ministry of Public Works	Meeting with key enginners	Provided explanation of Project; Programme of seawall works not proactive, its reactive There is duct in the roadside but they don't know whether the cable could be placed in it.
29 October 2016		
Ahmadiyya Muslim Community Tarawa	Imam Khawaja Fahad Ahmad	Long overdue for Kiribati to have a reliable Internet Current Internet is expensive Communicating with us headquarter is vital We provide basic education service for local people, and we need good Internet Better Internet will allow us to expand our community education service

Appendix 7C: Summary Nauru Consultation

31st October		
Department of Commerce, Industry & Environment	List of Attendees (see Appendix 6)	Provided explanation of Project Gabab site has strong currents. To be mindful of public mindset re environmental impacts Looking at establishing MPAs particularly southern coast, working with local community. Could existing pipeline be used in intertidal by government buildings?
1st November 2016		
Lands & Survey	Penisasi Nakautoga	Land survey has been done for most claims; Support by providing the necessary information
Youth Affairs	Lavinia Akken	Youth are very well familiar with the Internet Youth are fast learner in using the Internet Issues with accessing and distributing inappropriate images Work hindered by unreliable Internet service
Culture Affairs	Riverina Scotty	We feel like we are isolated; Need to expose our cultural products to a wider market We need more visitors and tourists
Child Protection	Krystelle McKenzie	Children are vulnerable especially with this coming technology (exposure)
Justice & Border Control	Filipo Masaurua Stella Dubriya Daron Adeang	Rights: Peoples rights to have equal access to this service at an affordable cost The project should be gender sensitive, especially the women and children (rights and protection)
DCEI		Presentation and Briefing on the project; Potential location discussed with no issues raised
Eco Nauru	Tyronne Deiye	Established but currently applying for funds, such as the GEF Small Grant Our team is well equipped (experience and knowledge) to do conservation and environmental work
2nd November 2016		
Public Meeting	List of attendees (see Appendix 4)	Interests on the cable project was evident Keen to access a more reliable and affordable Internet service Open and fair competition will benefit people Government needs to alert landowners of their utilising the leasehold for the cable. There should be not issue, a matter of courtesy. Interested to know who funds the project. Glad to know it is not paid by the Government.