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Expansion of Maio Port in Cape Verde

Biodiversity Action Plan

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12 Whiteladies Road, Clifton, Bristol, UK, BS8 1PD
Phone +44 (0) 117 230 1205

www.bluedotassociates.com

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1 Introduction

Port Ingles is an established port on Maio Island. The port facility is degrading and limited in its operational capacity. As the port operator, Enapor are seeking to expand the facility with financial funding from the African Development Bank (AfDB). The aim of the project is to improve berthing facilities and conditions for visiting passenger ferries. Enapor is a state owned company.

A national level ESIA study has been completed for the port project with a report produced in August 2017 by Consulmar on behalf of Enapor. A further addendum was produced in December 2017 to address comments made by Ministry of Agriculture and the Environment (MAA) on the ESIA Report as included in the addendum. The project and national level ESIA Report were approved by MAA in February 2018 with various conditions that included measures to manage biodiversity and related pollution issues. Following AfDBs involvement in the project, Enapor have commissioned Consulmar to update the ESIA Report and to produce an Environmental and Social Management Plan (ESMP) to meet AfDB Integrated Safeguards System (ISS) requirements (AfDB, 2013 and 2015a, b and c). This Biodiversity Action Plan (BAP) has been developed in parallel with the finalisation of the updated ESIA Report. It has been developed to provide details on the proposed management framework for coastal and marine biodiversity that may be affected by the proposed scope of work.

1.1 Biodiversity Context

The port has been defined as being located in a critical habitat area with high biodiversity values present. The port lies adjacent to a legally protected and internationally recognised area. The project site is connected to this area species connectivity and sits in a broad continuous habitat that support nesting and foraging of Critically Endangered and Endangered sea turtles, breeding and nesting endemic and restricted range bird species and congregatory and migratory marine mammal and bird species (in addition to sea turtles). Some species that are present in the project area are endemic and restricted range, and the diversification from wider populations demonstrates the importance of the unique local ecosystem that is present.

The project site sits outside of the legally protected and internationally recognised area, but the boundaries of this area have been formed to reflect threats and do not relate to the presence of high biodiversity values. This is clearly demonstrated by the presence of sea turtle and Kentish plover nests within and outside of the protected area in vicinity to the port site. Irrespective of the value within the port, at a landscape/seascape level, the port sits within a broad area that is defined as critical habitat as a whole.

The presence of high biodiversity features and the potential for adverse impacts to occur from the proposed activities requires a specific BAP to be developed to address issues, and also to demonstrate how to deliver net gains. This BAP sets out the mitigation measures that Enapor will be required to implement undertake to avoid, minimise and, where appropriate restore and offset impacts on priority habitats and species.

1.2 Enapor's Commitment

Through the adoption and delivery of this BAP, Enapor must adopt a robust commitment to the mitigation and management of the impacts on the biodiversity values and ecosystem services that have been defined in the ESIA Report (Consulmar, 2018) and this BAP. Through the delivery of recommendations provided in this BAP, Enapor will align with the requirements of the AfDB ISS, and in particular Operational Safeguard 3 (OS-3) and OS-4. This includes requirements for the implementation of the mitigation hierarchy and to achieve net gain for any features that qualify as critical habitat where residual impact occur. Enapor will aim to maintain the value and function of priority ecosystem services through avoiding significant residual adverse impacts to ecosystems that provide services to local people. Enapor also commit to delivering upon these commitments in partnership with the local community and research groups on Maio Island that are engaged in biodiversity studies so to develop a long term partnership for ensuring robust and effective management of priority biodiversity features and ecosystem service values.

As part of this commitment it is recommended that a Biodiversity Policy be defined by Enapor and signed by senior management; and that this be communicated to company staff members at all levels and also key partner organisations. No current policy exists in this regard so the establishment of one will help to demonstrate robust commitment to the delivery of measures held within this BAP.

1.3 The Biodiversity Management Framework

The BAP is an over-arching document that describes the overall framework and general approach. The BAP sits within a project level environmental and management framework with different levels as summarised below:

- Tier 1: An ESIA study, including baseline data collection and reporting, impact assessment, mitigation and monitoring commitments and the undertaking of the critical habitat assessment.
- Tier 2: Corporate and port specific Environmental Management System (EMS) developed to ensure commitment and connected delivery of measures for implementation, monitoring and audit of all environmental components.
- Tier 3: An ESMP for the project and that has been produced as part of the overall ESIA process. This contains broad environmental management plan proposals for biodiversity and related factors that have a biophysical connection, for example, water quality. The ESMP addresses all biophysical issues, whilst the BAP has a focus on priority biodiversity values. The ESMP therefore provides the overall framework in which the BAP sits. Information contained in the ESMP is not repeated in the BAP, including a project description, detailed description of all potential impacts and their significance, consultation, requirements for development of company systems and procedures, general internal and external capacity building requirements, implementation costs for measures identified (including those contained in the BAP). The ESMP must therefore refer to and embed the recommendations in this BAP to provide an overall context for the delivery of environmental management for the project.

- Tier 3a: BAP, which provides general biodiversity management measures for priority habitat and species. Once the BAP has been developed a range of more detailed plans are required as outlined below:
 - Tier 3a(i): Detailed management plans to address specific priority issues, including method statements as appropriate. This includes:
 - Construction and Environmental Management Plan (CEMP)
 - light management plan
 - staff training and awareness plan
 - pollution prevention and control plan
 - integrated waste management plan
 - stakeholder engagement plan
 - rehabilitation and restoration management plan
 - Tier 3a(ii): Detailed offset implementation and evaluation plan to deliver recommendations within this BAP
 - Tier 3b: Biodiversity monitoring and evaluation system

Following the development of this BAP the delivery of sub-tiers 3a(i-ii) and 3b should be commissioned by Enapor as part of the implementation of recommendations held within.

Key Performance Indicators will be used to evaluate the success of measures. The outcomes of the evaluation will be to continue, adjust or to cease activities. In this regard the BAP is designed to deliver an adaptive management approach. This is to ensure that proposals continue to be fit-for-purpose, but also take account of the results of monitoring. This BAP and any associated plans are considered to be 'live' and modification is expected as part of this adaptive management approach.

1.4 Objectives

The overarching objective of the BAP is to reduce direct and indirect impacts on priority biodiversity values and ecosystem service features by providing mitigation measures that seek to avoid, minimise, restore, and as a last resort, offset impacts. Supporting objectives include to:

- retain the priority biodiversity values in the project area and related landscape/seascape for the long term;
- retain and conserve the intactness of critical habitat areas that key priority species rely upon;
- protect priority species; and
- identify, measure and offset residual impacts on biodiversity values that relate to the designation of critical habitat.

1.5 Resources

1.5.1 Staffing

Enapor will need to appoint appropriate staff and managers to ensure effective implementation of the BAP and related plans. As well as appointing staff it is essential that a system is developed to ensure:

- Adequate communication of the biodiversity goals for the project across the company, including senior management.
- That tasks and responsibilities are clearly defined.
- That implementation is audited and that the actions at an individual level are monitored and acknowledged to ensure commitment to delivery.
- Integration of biodiversity and ecosystem service requirements held within this BAP into other relevant management plans.
- Engagement of experts, including local biodiversity research groups and individuals, as required to undertake the scope of work for implementing mitigation, monitoring and any associated actions.
- Co-ordination between internal and external parties that are engaged to deliver activities, and communication with local stakeholders. It is recommended that a Biodiversity Working Group be established that includes relevant elected Enapor staff, including social teams, and third party resources, to ensure a holistic management approach to delivering upon the recommendation in the BAP.

1.5.2 Roles and Responsibilities

Table 1-1 provides a framework for the management of responsibilities for the Project. It must be noted that a management framework has not yet been established and the information presented here is therefore a suggested approach that will be subject to future agreements on the preferred approach, including discussions with any third party collaborators.

Table 1-1 Roles and Responsibilities for Biodiversity Management

Role	Responsibility
Enapor General Manager	<ul style="list-style-type: none"> • Overall responsibility to ensure that project operations are compliant with the AfDB ISS, and in particular OS-3 and OS-4; and also this BAP and related plans are implemented effectively.
Port Manager	<ul style="list-style-type: none"> • Ensure that the BAP and related plans are integrated into construction and operational activities at the port.
Environmental Manager	<ul style="list-style-type: none"> • Overall responsibility for the delivery of the BAP and related plans. • Establishment of required resources for implementation, including internal and third party resources. • Define a communications strategy with internal and external stakeholders, including local partners, MAA, Municipality and community members. • Ensure understanding and delivery of requirements by internal staff, partners, contractors, suppliers and vessel operators. • Provide for the submission of reports to stakeholders as required. • Manage the evaluation process. Review all related reports for non-compliance and incidents; and provide direction on the

Role	Responsibility
	<p>timeframe within which remedial measures are to be completed by elected parties.</p> <ul style="list-style-type: none"> • Support the implementation of day-to-day requirements.
Community Manager	<ul style="list-style-type: none"> • Ensure that social management plans address biodiversity requirements. • Support internal and external environmental staff to implement and monitor actions to maintain priority ecosystem services.
All employees and contractors	<ul style="list-style-type: none"> • To comply with the requirements of this BAP.
Independent review panel	<ul style="list-style-type: none"> • It is recommended that an independent review panel be established by AfDB to work with Enapor to ensure adoption and compliance with this BAP, including third party approval of any subsequent connected plans.

1.5.3 Delivery through Collaboration

Through the commitment to a participatory approach, Enapor will seek to develop local to collaborate on the delivery of measures contained in this BAP. This may include collaboration with Civic Society Groups, Ministry of Agriculture and the Environment (MAA) and the Municipality of Maio Island to co-ordinate management approaches and inform offset plans.

Local consultation undertaken during the ESIA process has resulted in the sharing of highly valuable data to inform the ESIA process. Local research groups and their connected experts is considered to be a valued resource that can be used to support the implementation of measures held in this BAP and the development of any subsequent related more detailed plans, including the delivery of offset recommendations. In this regard, mitigation measures include the establishment of a local Biodiversity Working group to support co-ordination across the different stakeholders for certain important aspects.

Of note, the monitoring that is already undertaken locally means that partnership approaches for co-ordinated actions can be delivered; and also that long term data is available to inform the understanding of impacts and required adaptive management actions.

2 Legislation

The national legislation, international conventions and local plans that provide a context to the project are discussed in detail in the ESIA Report (Consulmar, 2018). The key national legal instruments that are of relevance to this BAP are listed below:

- Decree-Law no. 86/IV/1993 defining environmental policy;
- Decree-Law no. 7/2002 establishing conservation and protection measures for fauna and flora species;
- Decree-Law no. 3/2003 establishing the legal regime for the management of protected areas;
- Decree-Law no. 29/2006, establishing the legal framework for Environmental Impact Assessment (EIA) of the projects;
- Decree-Law no. 53/2005, which protects against the possession and trade in turtles and their meat or eggs;
- Resolution no. 72/2010, approving the National Plan for the Conservation of Sea Turtles in Cape Verde;
- Decree Law no. 1/2018, which provides law for the protection and conservation of sea turtles in Cape Verde;
- Decree-Law no. 7/2004, of February 23, which establishes the rules of release for wastewater; and
- Decree-Law no. 2/2002, which prohibits the extraction and exploitation of sand in dunes, beaches and interior, coastal and territorial sea.

3 Priority Features

3.1 Priority Biodiversity Features

The ESIA Report (Consulmar, 2018) provides a detailed discussion of baseline conditions, which has been informed by the collection of data for the local area, which primarily relates to monitoring of priority habitats and species by Maio Biodiversity Foundation (FMB) as part of their ongoing research operations. The review of baseline conditions has determined critical habitat is defined at the landscape/seascape scale.

The project site itself is comprised of modified habitat, but data shows that there is limited potential for the presence of nesting sea turtles, nesting sites for important endemic and restricted bird species within the project site boundary. There is perhaps potential for habitat for some endemic lizard species to be located within port site area, but this has not been confirmed at this time. However, as already noted, the project site sits in a broader continuous habitat with high biodiversity values, including connection with species across the boundary of legally protected and internationally recognised areas. Nesting of priority species has been recorded in close proximity to the project site. The following provides a summary of the priority biodiversity features. More information is available in the ESIA Report (Consulmar, 2018).

3.1.1 Legally Protected and Internationally Recognised Areas

The following presents a summary of the legally protected and internationally recognised areas, which are located within the broad landscape/seascape area in which the port site is located. The project activities during construction and operation have the potential to adversely impact on the features contained within these areas. The boundaries of the sites in relation to the port are presented in Figure 3-1.



Figure 3-1 Legally Protected and Internationally Recognised Areas

3.1.1.1 Salinas do Porto Ingles Protected Landscape Area and Ramsar Site

Salinas do Porto Ingles is a nationally Protected Landscape Area (PLA) and also an internationally recognised Ramsar site that is located immediately adjacent to the port area, but outside of the proposed footprint of works. A summary of the features of this area is provided below.

The area was established as a protected landscape by Cape Verde law (DL 3/2003), after the studies carried out the Natura 2000 project (Cape Verde Natura 2000, 2001), which valued its ecological, landscape, historical and cultural heritage (DGA, 2014 RAPIM Report). Protected landscapes are defined as terrestrial or coastal zones where the integrated action of man and nature have configured a landscape of aesthetic quality or cultural value that deserve conservation, focusing on protection in the maintenance and restoration of traits aesthetic and cultural values that define them.

The protected area is considered to be the largest wetland on Maio Island and one of the most important in the Cape Verde archipelago. The area provides beaches for nesting sea turtles, a saline lagoon area that provides roosting and foraging habitat for resident and migratory birds; and also an area for traditional artisanal salt extraction. As shown by its designation, the area is

important not just for biodiversity, but also for culture, landscape setting and socio-economic aspects. Some priority important species that are present in the area include endemic and restricted range birds, such as the Cream-coloured courser (*Cursorius cursor excul*) and Kentish plover (*Charadrius alexandrinus*), migratory/congregatory loggerhead turtles (*Caretta caretta*), the endemic gecko species (*Tarentola rudis maioensis* and *Mabuya spinalis maioensis*) and the endemic skink (*Chioninia spinalis malonensis*).

The PLA has a total area of 534.66 ha, distributed over terrestrial (400.5 ha) and marine (134.1 ha) zones. The delineation of the PLA has taken account of the position of flooded saline areas and also to provide a long term buffer protection. The water in the flooded areas derives from seawater inundation, freshwater run-off and saline intruded groundwater. However, the area outside of the flooded zones is important for other species of conservation interest and therefore should not be considered as being part of a buffer area. Boundary limits to the south have been drawn where development begins and where a formal road is located. It was also agreed with the Municipality that the PLA would exclude a zone around the existing port to allow for some expansion and redevelopment of the port. The eastern boundary of the PLA coincides, in large part, with the road linking Port Ingles with Morro and the presence of stone walls. The northern boundary coincides with the presence of Morro village. Finally, the boundary extends 300 m into the sea. In relation to the port site, the marine and terrestrial boundaries of the PLA are 300 m and 150 m away from the existing developed port area, respectively. It is notable that the boundaries of the PLA have been defined in relation to zones of existing development rather than presence of biodiversity values.

The PLA comprises a number of zones of use. The core integral protected area coincides with the flooded open saline lagoon area. This area is afforded strict protection. The beach is located in the zone of moderate use. However, this area is categorised as an integral protected zone between 15 May and 15 November, which coincides with the sea turtle nesting season. The marine zone forms part of additional protection area for sea turtles during inter-nesting periods. In close proximity to the port at the entrance to the PLA, a small area has been set aside for the manufacture of salt and to include the construction of a "centre of biodiversity", areas for recreation and educational activities, etc.

The Salinas do Porto Ingles area is also a Ramsar site, which is classified as an internationally important Key Biodiversity Area (KBA). The boundary of the Ramsar site coincides precisely with the boundary of the PLA. The information sheet that informs the designation of the Ramsar site states that the significant physical feature of the Ramsar site is the open lagoon area. It also defines the following key Criterion for designation: (2) nesting habitat for loggerhead turtles, (3) important habitat for sand dune and semi-desert species, including Greater Hoopoe Lark (*Alaemon alaudipes*), the Black Crowned Sparrow Lark (*Eremopterix nigriceps*), the Bar-tailed Desert Lark (*Ammomanes cinturus*) and wetland species such as the Sanderling (*Calidris alba*), the Bar-tailed Godwit (*Limosa lapponica*), and (6) breeding populations of Cream-coloured courser.

Other features of conservation interest include the presence of breeding Black winged stilt (*Himantopus himantopus*) and endemic lago sparrow (*Passer lagonensis*).

3.1.2 Reserva Marinha das Casas Velhas

The offshore zone of the reserve covers a large part of the south of Maio Island extending offshore for three nautical miles. The main reasons for designation of this marine reserve relate to the presence of endemic flora, nesting sea turtles and lagoon and salt flat habitat for breeding and migratory birds. The area is also considered important for rocky coral habitats and important habitat for fishes, including for refuge, spawning and nursery. As such the reefs in the reserve play an important wider ecosystem function. It is also noted that many marine mammal sightings are located within and in proximity to the reserve, including of note, migratory and breeding humpback whales (*Megaptera novaeangliae*). As would be expected sightings of this species are also found outside of this area, including in proximity to the port. The port is approximately 2.2 km from the boundary of this site and <3 km from the core protected area.

3.1.3 Habitats important to Critically Endangered and footprint-impacted species

There are no known Critically Endangered species within the terrestrial zone of project site or adjacent PLA. As noted above, whilst this criteria does not explicitly mention Endangered species, reference to other safeguard guidelines and how impacts on critical habitat are evaluated, would suggest that loggerhead turtles should be included as a trigger in this category. The loggerhead turtles that nest on Maio Island form part of the North East Atlantic sub-population as defined by IUCN. This population is classified by the IUCN Red List as Endangered. This population primarily nests in Cape Verde with some recorded nesting in Mauritania and Guinea. In addition, green turtles (*Chelonia mydas*) are known to nest in very low numbers in Cape Verde. The green turtle is classified by the IUCN Red List as Endangered.

In addition to sea turtles nesting on beaches, they will also be present in offshore areas during mating and the inter-nesting period. In addition, sea turtle species may be present in offshore waters for foraging, including, hawksbill turtle (*Eretmochelys imbricata*). The hawksbill turtle is classified by the IUCN Red List as Critically Endangered. The abundance of turtles in the offshore zone is unknown due to data paucity, although the presence of green turtles has been recorded in low numbers through incidental sightings by FMB. Both green turtles and hawksbill turtles are known to use the waters of Cape Verde for foraging. The presence of turtles in the offshore zone may be transient and unpredictable, particularly for the hawksbill turtle where sightings are rarer.

All turtles may be considered as being 'footprint-impacted', which is defined as species whose population are primarily threatened because of unsustainable utilisation practices. This relates to possible threats from poaching and also potential by-catch of turtles in fishing nets etc. It is known that turtles and also bird nests are poached in the PLA and wider area. Poaching of turtle nests has been identified as a significant threat on the beaches of Reserva Marinha das Casas Velhas. Local inhabitation of the Port Ingles area by humans also brings other pressures such as predation by pets (e.g. dogs and cats). Therefore the breeding bird species and sea turtles may be considered as being footprint-impacted.

3.1.4 Habitats of significant importance to endemic and/or restricted-range species and subspecies

An endemic species is defined as one that has ≥ 95 percent of its global range inside the country or region of analysis (IFC, 2012). According to the OS-3 Guidance Note, a restricted range species is defined for a terrestrial vertebrate as a species that have an extent of occurrence in a range of less than 50,000 km², and for marine species an area of less than 100,000 km². The extent of occurrence can be defined as “the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon, excluding cases of vagrancy. This measure may exclude discontinuities or disjunctions within the overall distributions of taxa (e.g., large areas of obviously unsuitable habitat) (IFC, 2012).”

As noted above, a number of endemic species are known to occur in the Salinas do Porto Ingles area, including Cream-coloured courser, Kentish plover, gecko and skink species and the lagoon sparrow. These species are all potential critical habitat triggers. The PLA and wider habitat in which the port sits provides important habitat for these species, with the exception of the lagoon sparrow, which is mainly connected with the urban town habitat.

3.1.5 Habitats of significant importance to globally significant concentrations of migratory species and/or congregatory species

The presence of sea turtles is noted above. Loggerhead turtles may be classified as both migratory and congregatory. Green turtles are known to breed/nest in Cape Verde, but the low numbers would suggest that species present should primarily be classed as migratory. Hawksbill turtles are considered to be only transient/migratory. Other sea turtle species may only be transitory in Cape Verdean waters as part of a wider migratory range of movement, including olive ridley turtle (*Lepidochelys olivacea*) and leatherback turtle (*Dermochelys coriacea*).

As noted above, humpback whales are present in Cape Verdean waters and have been recorded in close vicinity to the port by FMB. This species is considered to be both congregatory and migratory. The whales that are present are thought to be from Northern Atlantic sub-population and south east Atlantic sub-population (with feeding grounds in the Antarctic region). Local sightings data from FMB data shows that that presence is mostly of the North Atlantic sub-population that visit Cape Verdean waters to breed; although a sighting was made in August 2014, which due to timing, may be an individual within the south east Atlantic sub-population.

The Ramsar Site provides habitat for a range of migratory species, which includes nine recorded wader species, with the most abundant being sanderling. These birds are focused in the open saline lagoon area, which is approximately 2 km from the port site.

3.1.6 Regionally significant and/or highly threatened or unique ecosystems

The Salinas do Port Ingles area is confined and may be considered to contain unique species assemblages, including endemic species. However it should be noted that other wetland areas do exist on Maio Island and wider archipelago. Whilst the area is protected it is adjacent to developed areas and the overall development area is also formed by zones of use, which do not

negate some level of development and use within its boundary. Indeed, some low-scale development is proposed within its boundary. Therefore the features within the site may be considered to be in some way threatened.

3.1.7 Areas that are associated with key evolutionary processes

The project site is located on an island, with biodiversity that shows some local endemism and genetic variation from wider populations. These components would suggest some link to key evolutionary processes that must be considered as part of the critical habitat designation.

3.1.8 Areas that are important to species that are vital to ecosystems

It is possible that sea turtles and humpback whales may be considered as a keystone species. However, this largely relates to the relationship with foraging areas and local ecosystem dynamics. It is not expected that the foraging activities of individuals present will play a significant role in this regard at the landscape/seascape level. Importance would largely dependent on the inter-nesting foraging activities of the congregatory and migratory turtle species and how this helps to regulate the balance of the local ecosystem.

3.1.9 Summary of priority biodiversity features

Table 3-1 provides a summary of the main priority habitats and species that have been determined through the evaluation of baseline conditions.

Table 3-1 Priority Biodiversity Values

Name	Reason for qualifying as a priority feature
Salinas do Porto Ingles Protected Landscape Area and Ramsar Site	Legally protected and internationally recognised area; unique ecosystem and an area associated with key evolutionary processes. It is noted that the important habitats within this area extend beyond the boundary to include areas immediately adjacent to where project activities will take place – see priority habitats for species listed below.
Reserva Marinha das Casas Velhas	Legally protected marine area.
Sea turtles	Endangered loggerhead and green turtles that are both migratory and congregatory. The priority species is loggerhead turtles. The priority habitat for this species is the intertidal crawl and supratidal nesting zones that are available to the north and south of the project site, with the Salinas beach being of higher priority for protection due to low current levels of disturbance. As noted above, offshore waters may provide foraging habitat for turtles, including the Critically Endangered hawksbill turtle.
Cream-coloured courser	An endemic and restricted range species. The priority habitat for this species is the coastal dune system and hinterland surrounding the saline lagoons.
Kentish plover	An endemic and restricted range species. The priority habitat for this

Name	Reason for qualifying as a priority feature
	species is the coastal dune system and hinterland surrounding the saline lagoons.
Skink and gecko species	Endemic and restricted range species. The priority habitat for these species is where rocky substrate is present.
Humpback whale	Migratory and congregatory species. This species is present in all offshore waters most likely and no local priority habitat is therefore defined.

3.2 Priority Ecosystem Services

The priority ecosystems services include *provisioning services*: the use of sea turtle meat and eggs and fish for food and the recreation that is connected to biodiversity in the area (e.g. fishing, whale watching etc); *cultural services*: including the traditional use of the saline lagoon in the PLA for salt extraction; and *supporting services*: associated with ecosystem functions that support fisheries etc. As noted above Reserva Marinha das Casas Velhas provides important habitat to support artisanal fisheries.

All of these ecosystem services are defined by the biodiversity values. Project impacts on ecosystem services therefore directly link to how these biodiversity values may be impacted. Therefore the adoption of measures to protect and conserve biodiversity will also ensure that local people continue to derive benefits that these values provide. It should be noted that maintaining ecosystem services will require co-ordination between environment and social teams. Collaboration for holistic delivery of measures across environmental and social priority themes is essential during implementation of measures.

No specific measures are therefore proposed for ecosystem services beyond those recommended to manage impacts on biodiversity. The value of fisheries is recognised and impacts could occur from the project. Individual fish species do not trigger critical habitat and therefore are not considered specifically within this BAP. However, mitigation approaches to address general issues, such as pollution, and specific issues such as underwater sound generation for priority species considered, will also mitigate impacts on fish.

4 Impacts, Mitigation and Monitoring

4.1 Approach

The approach to the development of the BAP is to consider each biodiversity value in turn, addressing the following key requirements:

- General measures that apply to all biodiversity features. Consideration is given to direct impacts that are under control of the project and to wider indirect and cumulative impacts.
- Species measures for the priority features that have been identified.
- Summary of the potential impacts on priority biodiversity values associated with general and species specific risks. It should be noted that the ESIA Report (Consulmar, 2018) provides a detailed discussion of impacts. This BAP only provides an overview of the key impacts on the priority biodiversity values that have been considered.
- The mitigation approach, including how the mitigation hierarchy has been applied. The project has sought to implement avoidance as a priority. Where this is not possible impacts have been mitigated through minimisation or restoration measures. Where residual impacts are to occur on priority habitats and species, recommendations are made to achieve net gains, which includes averted loss and restoration offset approaches.
- Monitoring and evaluation measures are proposed to ensure that the mitigation measures are effective and adaptively managed. Key Performance Indicators (KPIs) have been defined to track the implementation of actions proposed. These KPIs should be periodically reviewed as appropriate to the timescale of the monitoring proposed across the construction and operation phases. It is recommended that when the details of monitoring are appropriately defined that a Monitoring and Evaluation Management Plan is developed. The plan should be used to define precise methods; and the resources required for implementation, including finances, internal and external staff. The plan should be used to quantify impacts, to track whether the project will meet net gain for priority biodiversity features; and to determine monitoring thresholds, responsibilities and audit and reporting procedures. The outcomes of the evaluation should lead to one of three actions:
 - **Continue** if KPIs remain on target.
 - **Adjust** if KPIs are not on target.
 - **Cease** if KPIs and the overall objectives of the BAP are consistently met over time.

4.2 General Measures

General measures have been defined for risks that relate to all priority biodiversity features and also broader biodiversity conditions.

4.2.1 Overview of Risks

The following general risks may occur as a result of project activities during both construction and operation:

- Wider indirect and cumulative effects associated with increased development in the area that may lead to habitat loss, habitat degradation, species disturbance and loss of nest sites. The construction of the port may result in a long-term increase in the human population of the area and increased tourism, fishing, use of beaches, movement of vehicles, poaching etc. There may also likely to be related growth in housing, infrastructure, facilities and services, which may lead to increased light impacts and noise disturbance etc.
- Habitat loss, habitat degradation, species disturbance and poaching associated with increased number of site staff, especially associated with uncontrolled activities of the local workforce that may be introduced to the area.
- Potential for increased predation of wildlife (including eggs) by humans, pests (e.g. rats) and domesticated and feral/stray animals (i.e. dogs).
- Potential for habitat degradation on land and at sea resulting from pollution.

4.2.2 Mitigation

The overall objective of mitigation proposed is to promote good long term management of the port and adjacent areas to address risks to biodiversity. This includes the management of direct, indirect and cumulative effects. As well as providing general measures to avoid, minimise and restore, where residual impacts on critical habitat will occur recommendations are provided for offsets to achieve net gains.

The specific aims of the general measures are to:

- To prevent long term degradation to critical habitat.
- To minimise the potential for cumulative impacts.
- To prevent injury to priority biodiversity features.
- To maintain and enhance the extent of priority biodiversity features.

The mitigation strategy is outlined in the table below.

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
Avoidance	GM1	Avoidance through staff training and awareness	Enapor	Prior to Construction	Continuous	<p>Staff Awareness and Training Plan</p> <p>Induction records</p> <p>Evidence of contractor communication and training</p>
		<p>1. The ongoing management of staff and contractors is required to minimise disturbance to wildlife and to avoid habitat degradation. A code of conduct should be developed outlining acceptable rules, procedures and prohibitions. All staff should be trained to understand the local biodiversity values and their responsibilities with respect to the code of conduct and also the content of this BAP and associated plans, as required. Where specific operational training is required this should be provided. Training procedures should include adequate reporting and continuous refreshment of training on an individual basis. Operational procedures should be in place to ensure that all measures are being implemented effectively. It is recommended that a Staff Awareness and Training Plan be developed to include the appropriate procedures and related forms for recording delivery of these mitigation requirements. Some proposed measures may include, for example:</p> <ul style="list-style-type: none"> Prohibit of harassment of wildlife, including hunting, touching, handling or collection (unless required to implement the mitigation included in this BAP). Prohibit of recreational activities, including 				

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
		<p>fishing within the port and around new port structures if they aggregate fish in the area. This will require communication, monitoring and enforcement plans to be developed.</p> <ul style="list-style-type: none"> • Development of an induction program to train new staff and contractors on the code of conduct, to identify priority features and to communicate the implications of non-compliance. • Develop specific training for roles that may impact upon priority features either using internal resources or employing external experts. • Implement penalties for staff and contractors who disregard the code of conduct. • Co-ordination of patrol and monitoring strategies for inspection and enforcement associated with the protection of priority habitats and species. 				
Avoidance	GM2	Avoidance of wider indirect effects from the port expansion, including from associated development, increased traffic and tourism etc				
		<p>1. Limiting any additional associated development for the port will help to avoid impacts. There is, however, possibility that some wider development will be outside of the control of Enapor, especially if tourism levels increase. The ongoing protection of the Salinas do Porto Ingles area will limit development in the local area, but is noted that some development for</p>	Enapor	Prior to Construction	Continuous	<p>Terms of Reference</p> <p>Meeting Records</p>

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
		<p>recreation is already proposed here. Also, part of the site will continue to be used for traditional salt extraction. It is likely that there could be increased visitation to the protected area and this will need to be managed appropriately. There is also new development (the Salinas Beach Resort) that has been halted in proximity to the port, which may be reinvigorated in time. It is therefore recommended that Enapor liaise and participate with local external stakeholders, including research groups, to avoid habitat degradation and species disturbance in protected area and other external areas that may provide habitat for priority species. This is considered especially important related to the management of tourist visits via the port. It is recommended that a Biodiversity Working Group be established to support co-ordination across the different stakeholders. This group should be established with agreed Terms of References, which should include sharing of management plan proposals for the protected area, identifying management responsibilities, monitoring approaches, information sharing etc. This working group should also engage to participate on long term monitoring in the protected area for priority biodiversity features. Where local groups already lead biodiversity</p>				

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
		monitoring for these features in this area connection of this work can be made so that this brings benefits to the project and the local environment. It is therefore recommended that through the working group Enapor support such programmes to co-ordinate long term monitoring of impacts from the port construction and operations, which will include indirect effects. The working group should adopt an adaptive management approach to address any concerns that arise with co-ordinated actions implemented, which may include recommendation for the management of port operations.				
Avoidance	GM3	Avoidance through design				
		<ol style="list-style-type: none"> 1. Ensure that priority habitat is avoided wherever possible. 2. The access jetty that will allow for the construction of the breakwater is temporary and will be completely removed once the construction work of the breakwater is finished. As part of the ongoing design phase, it is recommended that all options for avoiding impacts on the beach area be investigated so to avoid footprint impacts on nesting turtles, nests in situ and hatchling movements. This may include spanning of temporary structures over the beach. 3. Site non-permanent facilities, waste storage areas and 	Enapor	Prior to construction	Ongoing	Detailed design and construction plans GIS database

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
		<p>vehicle/plant parking areas away from the priority habitat areas.</p> <p>4. A GIS plan should be developed to mark priority habitats with areas defined as no-go or amber areas requiring action prior to any works taking place. Specific species requirements to inform this process are provided below. In general, monitoring should be used to mark priority species records and appropriate actions defined to manage impacts.</p> <p>5. As primary mitigation step to address impacts of underwater and air-borne sound impacts, the avoidance of drive piling is recommended. This will reduce the potential for injurious impacts on marine wildlife and also to reduce overall disturbance on land and at sea. Drilled piling, vibro-piling or gravity piling is less noisy and will likely remove the likelihood of injurious impacts. It would also most likely minimise behavioural effects. All techniques can still cause disturbance and may produce similar sound levels to vessels so would still require some minimisation measures. These are recommended for species below as appropriate.</p>				

Stage of the Mitigation Hierarchy	Mitigation Actions	Responsibility	Timing	Frequency	Verification
Avoidance and Minimisation	GM4	Avoid and minimise impacts through the adoption of pollution abatement and emergency response plans			
	1. There should be integration of the BAP with other environmental plans that may be contained with the ESMP or developed separately, including a Pollution Prevention and Control Plan, Integrated Waste Management Plan, Monitoring and Evaluation Plan etc to address risks. These plans will include measures such as:	Enapor	Prior to construction	Continuous	Monitoring records
	<ul style="list-style-type: none"> • Ensuring that soil, sediment and water quality pollution is avoided on land and at sea. • Ensuring appropriate storage and handling of materials following best practice. • Ensure that no waste or other materials are disposed of in an unmanaged way, especially in critical habitat areas. • Actively intervene to remove waste that may have an adverse impact on wildlife. • Ensuring the equipment is well maintained. • Ensuring that no ballast water discharge in the port area. Ballast water should be managed in accordance with the International Convention for the Control and Management of Ship's Ballast Water and Sediments (IMO). • Ensuring no wastewater discharge to the local environment. 				

Stage of the Mitigation Hierarchy	Mitigation Actions	Responsibility	Timing	Frequency	Verification
	<ul style="list-style-type: none"> • Management of drainage in areas that may have some contamination so that there is no direct discharge to the marine environment and priority habitat areas. • Providing receptacles for litter and prohibit littering in all areas. • That there are appropriate emergency response procedures in place for accidental spill events following best practice. • The adoption of good practice air-borne noise mitigation guidelines. Measures to address impacts on the human population would also mitigate impacts on wildlife. It is expected that noise monitoring will be completed, which can be combined with monitoring of birds during the construction period. Local monitoring of birds in the protected area and therefore Enapor may liaise with local researchers to support their ongoing monitoring efforts during construction for birds to determine if any noise impacts are on migratory, endemic and breeding species are apparent for management. Adaptive management approaches adopted if any impacts are noted. • Implementation of dust abatement practices to minimise dust generation from transport 				

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
		activities (e.g. vehicle and ore handling generated irrigation of material).				
All Stages	GM5	Optimise implementation of mitigation through employment or the contracting of specialist staff				
		<ol style="list-style-type: none"> 1. Employ environmental staff to oversee and optimise the implementation of best practice mitigation and monitoring during construction and operation. 2. A core recommendation of this BAP is for a collaborative partnership approach is developed. This could include the delivery of training, management and monitoring of priority biodiversity features during both construction and operation phases. The format of this collaboration should be agreed as part of the implementation of this BAP and related plans, but should include agreed Terms of References. 	Enapor	ASAP	Continuous	Staff records Terms of References
All Stages	GM6	Minimisation through community awareness and local participation				
		<ol style="list-style-type: none"> 1. A communication strategy should be developed to provide education and awareness of biodiversity measures with local stakeholders, including the local community and fishermen. This should be established with social experts engaged by Enapor to manage local liaison. The aim should be to increase community awareness of local biodiversity values, the actions being undertaken by Enapor and their partners to management biodiversity impacts, any 	Enapor	Prior to construction	Continuous	SEP

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
		local restrictions that have been agreed and to also support local community members that may want to engaged in maintaining local biodiversity value and ecosystem services. A Stakeholder Engagement Plan (SEP) should be defined to inform who to consult, how and when during the mitigation design, implementation and evaluation stages that are subsequent to the production of this BAP. The SEP should include information on how the results of consultation are to be transparently shared within the port operator and with stakeholders.				
Minimisation	GM7	Minimisation of increased predation risk				
		<ol style="list-style-type: none"> 1. Limit the possibility for the introduction of pests by people and also vessels that visit the port. This should include an inspection protocol following best practice and also form part of the code of conduct for staff. 2. Liaise with local authorities and groups to support the management of uncontrolled predation by pets in the area. 	Enapor	Prior to construction	Continuous	Port inspection records Staff training records
Minimisation	GM8	Minimisation through Monitoring and adaptive management				
		1. All of the monitoring measures include in this BAP should be compiled in Monitoring and Evaluation Plan. The aim of this plan is to provide all details on the proposed monitoring approach for construction	Enapor	Prior to construction	Ongoing	Monitoring and Evaluation Plan

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
		<p>and operation, including the species specific monitoring that is recommended.</p> <p>2. Again, a local partnership approach should be development to deliver monitoring, including co-ordination with existing programmes. This will ensure that data collected for the project is not duplicative and also relates to longer term data sets to enable the understanding of trends and requirements for adaptive management.</p>				
Offset	GM9	Offset residual impacts to priority species				
		<p>1. Pre-feasibility studies should be undertaken to assess the potential gains via offset proposals that are recommended for key biodiversity features, with specific emphasis on sea turtle nesting activity and also breeding/nesting habitat for Kentish plover and Cream-coloured courser. This should involve consultation with key local stakeholders for planning, assessment and implementation. Pre-feasibility studies should consider:</p> <ul style="list-style-type: none"> • Offset options. • Land required for offsets. • Resource requirements and costs. • Stakeholder agreement, especially if it relates to land ownership or infrastructure beyond that under control of the port operator. 	Enapor	Prior to construction	Ongoing	Offset Implementation and Evaluation Plan and demonstration of offset

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
		<ul style="list-style-type: none">Establish a governance, management and economic structure for the offset. <ol style="list-style-type: none">An Offset Implementation and Evaluation Plan should be developed once pre-feasibility studies have been completed. This should include monitoring requirements for offsets to determine success and to deliver adaptive management to optimise outcomes.It is recommended that any offset strategies are developed and delivered with local stakeholders; and design and implementation be incorporated into the aims and objectives of the proposed Biodiversity Working Group.Independent external experts should be engaged to review plans to ensure that the best strategy is taken forward.				

4.2.3 Monitoring the Implementation of Measures

The following presents an overview of monitoring requirements for each of the general measures identified, including KPIs and related targets. KPIs for monitoring that relate to GM8 are presented under species measures below.

GM1	Avoidance through staff training and awareness		
	<i>Key Performance Indicator</i>	<i>Target</i>	<i>Record</i>
KPI 1	% of new staff and contractors receiving training	100%	Training records
KPI 2	Number of staff incidents of non-conformance	Zero	Staff records

GM2	Avoidance of wider indirect effects from the port expansion, including from associated development, increased traffic and tourism etc		
	<i>Key Performance Indicator</i>	<i>Target</i>	<i>Record</i>
KPI 3	Ha of additional cumulative development or disturbance occurring to critical habitat or species from port associated facilities, increased traffic and tourism	Zero	Habitat and development maps, verification of impacts from field monitoring
KPI 4	% of Biodiversity Working Group activities implemented	100%	Terms of Reference, Working Plans and Meeting records
KPI 5	% of local stakeholders made aware of port restrictions	100%	SEP and training and community awareness records

GM3	Avoidance through design		
	<i>Key Performance Indicator</i>	<i>Target</i>	<i>Record</i>
KPI 6	Ha of priority habitat impacted beyond the project footprint requirements	Zero	Field verification and monitoring records

GM4	Avoid and minimise impacts through the adoption of pollution abatement and emergency response plans		
	<i>Key Performance Indicator</i>	<i>Target</i>	<i>Record</i>
KPI 6	Reduction to nesting abundance and success	Zero	Field verification and monitoring records

GM5	Optimise implementation of mitigation through employment or the contracting of specialist staff		
<i>Key Performance Indicator</i>		<i>Target</i>	<i>Record</i>
KPI 7	Employment of an environmental lead	100%	Employment records

GM6	Minimisation through community awareness and local participation		
<i>Key Performance Indicator</i>		<i>Target</i>	<i>Record</i>
KPI 8	% of Stakeholder Engagement activities implemented	100%	SEP

GM7	Minimisation of increased predation risk		
<i>Key Performance Indicator</i>		<i>Target</i>	<i>Record</i>
KPI 9	Reduction to nesting success as an obvious result of increased predation	Zero	Field verification

GM9	Offset residual impacts to priority species		
<i>Key Performance Indicator</i>		<i>Target</i>	<i>Record</i>
KPI 10	Number of priority species in new offset sites	To meet the offset implementation plan	Field verification
KPI 11	Established offset	To meet the offset implementation plan	Offset implementation plan and monitoring to determine net gains

4.3 Species Measures

This section identified measures for specific priority species that have been identified.

4.3.1 Sea turtles

Loggerhead turtles have been identified as a priority biodiversity species and therefore a focus is provided for this species. However, all measures that are recommended are relevant to all turtle species.

4.3.1.1 Overview of Risks

Some key impacts associated with project activities include:

- Footprint impacts during construction and operation.
- Light pollution from artificial lighting during construction and operation.
- Vessel collision during operation.
- Underwater sound generation during construction and operation.
- Project cumulative and long-term effects during operation.

The land-based impacts from the project will primarily be felt in the 'turtle crawl' and 'nesting zone'. Turtles will leave the sea and crawl to a suitable nesting position. The turtle crawl area therefore includes the intertidal area and the zone where nesting takes place. The nesting position is normally above High Water (HW) and will normally extend to the primary dune or where structures are located. This area is classed as the turtle nesting zone. Nesting can occur in the in the intertidal zone, but this is rare and eggs laid in this area have a naturally low chance of survival. The turtle nesting zone refers only to natural beach habitat within and adjacent to the Project site.

Existing impacts to sea turtles are likely to include:

- Incidental and/or deliberate capture of sea turtles as a result of fishing activities.
- Sea turtle egg poaching and potentially harvest of nesting females.
- Disturbance from recreational activities.
- Light impacts adjacent to the port to the north (Salinas do Port Ingles) and to the south (Bitxi Rotxa). It must be noted that there are no electrical lights within the Salinas do Port Ingles protected area. The lights in the area are mainly comprised of yellow Most of the existing light in the area seems to be low pressure sodium (LPS) – although some white light is visible, which are 'problem lights' in this regard. LPS is the least disruptive light source among those commonly used. They emit a pure (monochromatic) yellow, a region of the spectrum that is only weakly attractive or even aversive (at higher intensities for loggerheads only) to orienting hatchlings (Witherington and Martin, 2003).
- Beach litter, logs, other flotsam/jetsam that obstruct nesting turtles and hatchlings.
- Predation by natural predators, pests (e.g. rats) and domesticated and feral/stray animals (i.e. dogs).

4.3.1.2 Footprint impacts

Impacts

Construction activities could lead to the following footprint related impacts:

- Injury/mortality to adult turtles that crawl across the beach to their nesting zones or injury/mortality to hatchlings moving to sea.
- Loss or damage to nesting habitat and/or nests.
- Disturbance that means that the area where nesting normally occurs is no longer suitable.
- Obstruction of turtles and hatchlings on nesting beaches, which could lead to injury or mortality and/or prevent turtles from nesting.
- Pollution and entanglement leading to injury, mortality or reduced quality of life.
- Off-duty activities of workforce resulting in disturbance through hunting and/or harassment and also the potential use of lights/lighting of fires.

Operation phase impacts may include the following:

- Alteration to beach morphology and sedimentation, which could alter the nesting habitat for turtles.
- Any long term beach management activities may lead to disturbance of the beach and affect the conditions for nesting.
- Project cumulative and long-term effects during operation.

Mitigation

General mitigation measures that have been identified above will address some of the impacts on sea turtles. However, additional species specific measures are proposed.

The overall objective of the mitigation proposed is to manage construction and operation activities to avoid or minimise footprint impacts to nesting beach habitat, individual turtles that are in the process of nesting, nests, eggs and hatchlings. In addition, the aim is to restore beach habitat affected by works.

The mitigation strategy is outlined in the table below.

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
Avoidance	SM1	Avoidance through scheduling to avoid construction activities at key sensitive times				
		<div>1. Where construction or longer term beach management works may affect the turtle crawl or nesting zones activities should be timed so that the nesting period (or at least peak nesting periods) is avoided. The nesting period is June to October. This is considered to be the primary mitigation step. Minimisation measures would not be required if this step is adopted.</div> <div>2. If the above mitigation is not delivered then, as minimum, works in the turtle crawl or nesting zone should be avoided during the night when turtles are most likely to nest or hatchling are to emerge. This is considered the secondary mitigation step. Minimisation measures would still be required if this step is adopted.</div>	Enapor and Contractor	ASAP	Once	<div>Detailed schedule of activities</div> <div>CEMP</div>
Minimisation	SM2	Monitor to protect or translocate sea turtle nests in areas that may be impacted in the footprint of works				
		<div>1. If the timing of works cannot avoid the nesting season then monitoring will be required to protect sea turtle nests in situ or to translocate eggs to a suitable donor site. Surveys will be required to regularly locate new nests and evaluate nesting success, to define ‘turtle clear’ areas, to protect nests if appropriate, to avoid injury during night time works, to allow eggs to be</div>	Enapor and Contractor	90 days prior to and during construction	Continuous	<div>Monitoring and Evaluation Plan</div> <div>CEMP</div> <div>Monitoring</div>

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
		<p>translocated in the correct timeframe should protection not be feasible and to allow obstructions to be monitored. The general process should be as follows:</p> <ul style="list-style-type: none"> • Surveys should be undertaken in areas that may be impacted by the works regularly to locate new nests and evaluate nesting success. These surveys should commence 90 days prior before footprints may occur so that nests are protected until hatchlings emerge or so that egg translocation can occur within appropriate timeframes. This timeframe is proposed as turtles eggs generally have a 60 day incubation period, but this can be affected by temperature and therefore three months is considered to be a precautionary approach. • Daytime nesting beach surveys should be undertaken to monitor the occurrence of sea turtle nesting activities using the signs left behind by turtles (tracks and nest pits) after they have emerged from the sea at night, attempted to nest (either successfully or unsuccessfully), and then returned to the sea. The purpose is also to allow for nests to be marked and protected. If nests are recorded during the day then the default will be to mark and protect these nests rather than to 				<p>records</p> <p>GIS database</p>

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
		<p>attempt to translocate eggs. This is due to the fact that eggs should be translocated into a donor nest chamber ideally within 2 hours of nesting, with an allowed maximum of 5 hours. If the nesting event is not witnessed the amount of time the eggs have been in situ will be unknown and therefore to default should be to not attempt a translocation.</p> <ul style="list-style-type: none"> • Night time surveys should be undertaken in areas where works will take place in the turtle nesting zone to enable translocation to occur and provide flexibility to the mitigation and construction programme. These surveys will enable translocation of eggs to occur in the correct timeframes. If translocation does not occur then nests should be left in situ and monitored for hatchling emergence before any works can take place. Given the nature and scale of works, the most pragmatic strategy within the footprint of works is likely to involve the translocation of eggs rather than promote in situ protection. • If nests are protected they should be marked and their location included in a GIS database. Each nest should be covered with a nest cage and these cages will be inscribed with an individual nest code. • Egg translocation should only occur in areas 				

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
		where works impact upon them. Egg translocation should be done carefully following best practice protocols. Extra care is required if the eggs are transported more than 2 hours after being deposited. The translocation will require a donor site to be identified. It is recommended that the donor site be developed at least 500 m from the boundary of the construction area. Translocated nest sites should be marked and protected, and subsequently monitored for hatchling success.				
Minimisation	SM3	Minimisation through physical controls to protect sea turtle nesting areas				
		<ol style="list-style-type: none"> 1. Strictly prohibit all vehicular access to the nesting beach at all times unless a monitoring survey has been completed that satisfies that the area can be classed as 'turtle clear'. Any nests recorded should be protected as per SM2. 2. Where access is necessary for works to be completed then measures should be adopted to ensure that the vehicle does not damage the profile of the beach and create ruts that obstruct/trap hatchlings, and that the beach is remediated/restored. Any temporary surfaces used to support access should not be left in situ. Vehicles should not be left on the beach overnight as these could cause obstruction. 3. Avoid obstructing the seaward side of nests to allow 	Contractor	Construction	Continuous	Monitoring and Evaluation Plan Construction Environmental Management Plan Monitoring records

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
		<p>for the uninterrupted movement of hatchlings to sea.</p> <p>4. Avoid obstructing the movement of adult turtles to their 'nesting zone' with non-permanent structures.</p> <p>5. During surveys actively intervene to remove obstructions (e.g. spills, waste, litter, logs) from the nesting beach that can be relocated without additional disturbance or damage to the environment – seek specialist advice if necessary. Hatchlings should be translocated if they are being obstructed. Review construction plans based on environmental monitoring results to determine the possibility of accommodating modifications to avoid future obstructions if they occur.</p>				
Minimisation	SM4	Minimisation through operational controls to manage footprint disturbance in turtle crawl and nesting zones				
		<p>1. All works in the turtle crawl and nesting zones or where there is proposed access across this zone should be preceded by a rapid survey (undertaken by Environmental Monitoring Team) to determine if the working area is 'turtle clear' and to protect nests if appropriate.</p> <p>2. Prohibit beach access where access is not essential, using signage. Lateral transport corridors should be placed behind the beach away from the turtle nesting zone and access to the beach to be restricted to identified working areas that have been 'managed'</p>	Contractor	Construction	Continuous	<p>Monitoring and Evaluation Plan</p> <p>CEMP</p> <p>Monitoring records</p>

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
		from a turtle perspective by adopting measures highlighted below. Particular attention needs to be given to access across the turtle nesting zone during the day; and to both the nesting and crawl zones during the night. 3. Prohibit fishing activities within port boundaries and regularly monitor for, and remove, abandoned or discarded nets.				
Minimisation	SM5	Minimisation through long term monitoring of beach morphology				
		1. Monitoring will be required to observe changes to beach morphology to ensure that beaches continue to provide suitable habitat for long term turtle nesting and that effective beach management is implemented to address any issues identified. If monitoring shows that unacceptable changes are occurring then adaptive management will be required to address impacts.	Enapor	Construction and Operation	Ongoing	Monitoring and Evaluation Plan Monitoring records
Restoration	SM6	Restoration of habitat following construction works or during any long term beach management works				
		1. If works are undertaken in the turtle crawl or nesting zones, restoration of the beach to as close to its former condition as possible should be undertaken, preferably passively by allowing natural processes to occur, given that works will change beach levels and profiles. Specialist advice should be sought prior to any active restoration to ensure that works are done	Enapor	Construction and Operation	As required	Monitoring and Evaluation Plan CEMP Monitoring

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
		<p>sensitively for turtles. All works done to restore beach habitat will require monitoring to determine the success of operations.</p> <p>2. Where unintended morphological alteration (e.g. erosion or deposition) resulting from the development of structures, or damage as a result of movement of vehicles or heavy machinery, occurs, an assessment of the need for, and details of, restoration of sections of the beach may be undertaken (e.g. movement of materials and nourishment etc). A rehabilitation and restoration management plan should be developed to detail how restoration work will be completed. All beach management proposals should be done with the importance of the beach for nesting sea turtles in mind.</p>				<p>records</p> <p>Rehabilitation and restoration management plan</p>

Monitoring the Implementation of Measures

SM1	Avoidance through scheduling to avoid construction activities at key sensitive times		
	<i>Key Performance Indicator</i>	<i>Target</i>	<i>Record</i>
KPI 10	Reduction of nesting in the project area in comparison to long term data	0%	Monitoring records

SM2	Monitor to protect or translocate sea turtle nests in areas that may be impacted in the footprint of works		
	<i>Key Performance Indicator</i>	<i>Target</i>	<i>Record</i>
KPI 11	Uncontrolled damage to sea turtle nest sites	0%	Field verification and monitoring records

SM3	Minimisation through physical controls to protect sea turtle nesting areas		
	<i>Key Performance Indicator</i>	<i>Target</i>	<i>Record</i>
KPI 12	Uncontrolled damage to sea turtle nesting habitat and nest sites	0%	Field verification and monitoring records
KPI 13	Obstruction of adult and hatchlings affecting movement to and from nest sites	0%	Field verification and monitoring records

SM4	Minimisation through operational controls to manage footprint disturbance in turtle crawl and nesting zones		
	<i>Key Performance Indicator</i>	<i>Target</i>	<i>Record</i>
KPI 14	Uncontrolled damage to sea turtle nesting habitat and nest sites	0%	Field verification and monitoring records
KPI 15	Number of fishing events within the port boundaries	0%	Monitoring records

SM5 and SM6	Minimisation through long term monitoring of beach morphology and restoration of habitat following construction works or during any long term beach management works		
	<i>Key Performance Indicator</i>	<i>Target</i>	<i>Record</i>
KPI 16	Long term maintenance of sea turtle nesting habitat in the same condition as before works commenced	100%	Monitoring records

4.3.1.3 Impacts from Artificial Lighting

Impacts

Artificial lighting may be emitted at night during construction and operation. Light pollution is known to result in negative impacts on sea turtles due to the following effects:

- Disruption of nest-site selection. Females sometimes may not emerge from the sea due to the presence of artificial lighting, or may emerge at an alternative site, at a minimum causing them to waste energy and at worst preventing them from nesting entirely.
- Disruption of the process of returning to sea. Females that complete nesting may have difficulty finding the sea again due to the effects of artificial lighting.
- Misorientation and disorientation of hatchlings. Light pollution may cause hatchlings trying to find the sea to move in the wrong direction (misorientation) as well as interfering with their ability to orient in a constant direction (disorientation). In both cases, this may result in death as hatchlings become exhausted, dehydrated and ultimately fall victim to predators such as crabs and birds.

Mitigation

The overall objective is to identify light pollution problems on nesting beaches as a result of the project and to use best available technology to reduce the effects of artificial lighting as much as practicable within the constraints of the complex lighting needs of the port. Lighting impacts begin during the construction phase and continue into operation, enduring for the entire operational life of the port. Management of this issue is therefore a long-term concern.

The mitigation strategy is outlined in the table below.

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
Avoidance	SM7	Avoidance of light impacts through design				
		<div>1. Ensure that the best available technology is in place to minimise lighting impacts, such Low Pressure Sodium (LPS) or Red LED luminaires as appropriate in the port area.</div> <div>2. Prior to the start of each construction activity, and at any time that new lighting is required either during construction or operation, review lighting plans in consideration of potential impacts to sea turtles and modify accordingly to reduce overall lighting needs, intensity and glow.</div>	Enapor	Prior to construction	Ongoing	Light Management Plan
Avoidance	SM8	Avoidance of light impact through scheduling				
		<div>1. It is already recommended that construction works in nesting periods (or at least peak nesting periods) are avoided where footprint impacts may occur. This would also have the advantage of avoiding light impacts in these areas.</div> <div>2. Another possible measure is to avoid construction work at night in the port site area which is not currently impacted by large-scale light impacts. This will help to avoid impacts during construction.</div>	Enapor and Contractor	Prior to construction	Ongoing	<div>Detailed schedule of activities</div> <div>CEMP</div>
Minimisation	SM9	Minimisation of light impacts through physical controls				
		<div>1. It will be necessary to develop a specific, detailed Sea</div>	Enapor and	Prior to	Ongoing	Light

Stage of the Mitigation Hierarchy	Mitigation Actions	Responsibility	Timing	Frequency	Verification
	<p>Turtle Lighting Plan based on detailed lighting proposals to enable construction phase and especially operation phase lighting issues to be 'designed-away' as far as possible. This plan should aim to implement the recommendation for mitigation provided in this BAP.</p> <ol style="list-style-type: none"> 2. Light sources should be registered within an inventory as soon as they are commissioned on site. Sources are to include those fitted outside as well as inside where windows allow light to spill out. The Inventory is to note the associated building and position, the type of light, fixture and options for improving the light impact situation. Referring to the inventory, all new lights should be located during daylight hours, with details taken on: type of light source, fixture arrangement, shielding arrangement and ownership details. Additional notes are to be made on suitable solution options for these lights; shielding, redirecting, changing fittings, etc. 3. Where 'problem lights' cannot be turned off (even temporarily), redirect, reduce fixture height, shield, recess, cover windows, modify fittings or replace bulbs to minimise effects on sea turtles. 4. During construction, surveys are to be conducted on the nesting beach at night once per week during the known nesting and hatching season to identify problem lights, and should be complemented by surveys around the 	Contractor	Construction		<p>Management Plan</p> <p>Monitoring and Evaluation Plan</p>

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
		<p>site during the day to identify and inventory the details of any problem light sources. Monitoring should also take place during operation once per month. This monitoring frequency can be reduced if issues are not identified after the first seasonal survey and no additional lights are added. The focus of the monitoring during construction and operation should be to manage lights rather than to monitor turtle behaviour. The aim is to address the impact at source rather than to determine how to influence any change in behaviour of turtles once the impact has occurred. To this end surveys are to be undertaken to identify any unnecessary lighting; and lighting that can be modified to reduce intensity and glow. As mitigation is introduced and lighting issues are resolved, so the frequency of monitoring can be reduced. It should be noted that sea turtle monitoring on nesting beaches is already undertaken by a local research group and connection could be made with ongoing efforts to help survey lights.</p>				
Minimisation	SM10	Minimisation of light impacts through operational controls				
		<ol style="list-style-type: none"> 1. Turn off unnecessary lighting, and manage the times at which lights are used, both nightly and seasonally 2. Control use of transient light sources, such as vehicle headlights, torches/flashlights, lighting on vessels and 	Enapor and Contractor	Construction and Operation	Ongoing	Monitoring and Evaluation Plan

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
		<p>navigation lighting through use of best available technology and managing their directional use.</p> <p>3. Prohibit recreational activities involving lights or fires within sight of the nesting beach at all times.</p> <p>4. For lights that can be repositioned, face them away from the beach so that the light source is no longer visible.</p> <p>5. If lighting has not been effectively controlled, translocate misoriented hatchlings to the sea and redirect or transport disoriented adults back to the sea. This will require monitoring to be undertaken during the nesting season. As noted above, a recommendation has been made above to co-ordinate monitoring activities with existing sea turtle monitoring in the area to also review light impacts. Should their activities identify problems then they should inform Enapor so that 'problem lights' can be identified and addressed.</p>				

Monitoring the Implementation of Measures

All mitigation measures to address light impacts			
Key Performance Indicator		Target	Record
KPI 17	Number of problem lights in the port site and construction areas	0%	Monitoring records
KPI 18	Reduction of nesting in the project area in comparison to long term data set patterns	0%	Monitoring records
KPI 19	Number of misorientated and disorientated hatchlings	0%	Field verification and monitoring records

SM10	Minimisation of light impacts through operational controls		
Key Performance Indicator		Target	Record
KPI 20	Number of fishing events within the port boundaries	0%	Monitoring records

4.3.1.4 Potential Vessel Collision Impacts

Impacts

Vessels operating in and around the port may collide with sea turtles causing injury or mortality. Impacts will occur in the offshore zone only where turtles interact with vessels. The ESIA Report (Consulmar, 2018) has confirmed that the increase of vessel movements during operation will be relatively low. In addition, vessels are likely to be slow moving. During construction there will be only a couple of vessels used to support works. The risks of collision are not considered to be significant, but mitigation is proposed as some risks exist.

Mitigation

The overall objective is to detect sea turtles within the path of moving vessels (where possible) and to follow a process of avoidance actions to minimise risk of collision and subsequent injury or mortality.

The mitigation strategy is outlined in the table below. Total avoidance of impacts would involve total detection of turtles and their avoidance. Given the behaviour of turtles this is unfeasible and therefore only minimisation measures are proposed.

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
Minimisation	SM11	Minimisation of potential vessel collision with sea turtles through operational controls				
		<div>1. All vessel operators should be given a briefing alerting them to the possible presence of sea turtles in the area, and provided with guidelines for safe vessel operation in the presence of such species. Training of vessel operators in marine turtle observations and recognition will likely be required. This should form part of training to introduce the code of conduct for the port. Guidance should include the restriction of vessel movements according to established routes/approach channels so that wildlife become habituated. Following existing long term routes will clearly help in this regard. An operational strategy for low boat speeds should be communicated to all vessel pilots, and should be monitored and enforced. Speed limit of 10 knots area to be recommended and communicated to vessels on approach to port, during both day and night, during main nesting season.</div> <div>2. Vessels should never deliberately approach, pursue or otherwise enforce close encounters with sea turtles. Vessel speeds within 50 m of sea turtles should be limited to no wake speeds. If necessary, the vessel course should be altered if it is safe to do so.</div> <div>3. Any sightings of sea turtles in proximity to vessels should</div>	Enapor and all vessel operators	Construction and Operation	Continuous	Monitoring and Evaluation Plan

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
		be recorded by vessel operators. Any incidents should also be reported to Enapor so that adaptive management to address issues can be considered.				

Monitoring the Implementation of Measures

SM11	Minimisation of potential vessel collision with sea turtles through operational controls		
	<i>Key Performance Indicator</i>	<i>Target</i>	<i>Record</i>
KPI 22	Number of vessel strikes on sea turtles	0%	Monitoring records
KPI 23	% of vessel crew trained in sea turtle identification	100%	Induction and training records

4.3.1.5 Underwater Sound Generation

Impacts

In addition to underwater sound generation, air-borne sound could lead to females not emerging to nest or abandoning nesting attempts. General measures have been provided to address these impacts above. This section is therefore only concerned with the impacts of underwater sound generation.

All marine activities during construction and operation that may create underwater sound may lead to some impacts on turtles. However, the main impact sources that could create impacts may relate to piling activities during construction and increased vessel movements during operation. Underwater sound generation may cause forced egg deposition offshore and/or avoidance of nesting.

Mitigation

The overall objective is to manage construction and operation activities through the adoption of mitigation to ensure that sea turtles continue to nest at the same or increasing numbers in the project area and wider landscape/seascape area. Supporting aims are to:

- To prevent injury to sea turtles from 'noisy' construction activities; and
- To limit disturbance during nesting periods.

The mitigation strategy is outlined in the table below.

Stage of the Mitigation Hierarchy	Mitigation Actions	Responsibility	Timing	Frequency	Verification
Avoidance	SM12	Avoidance through scheduling to address 'noisy' subtidal construction activities that could occur during important nesting periods			
		Enapor	Prior to Construction	Ongoing	Detailed schedule of activities CEMP

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
		importance of the area for nesting. Therefore if 'noisy' driven piling activities are not avoided, a strategy to avoid such activities during the sensitive nesting season is recommended.				

Monitoring the Implementation of Measures

SM12	Avoidance through scheduling to address ‘noisy’ subtidal construction activities that could occur during important nesting periods		
	<i>Key Performance Indicator</i>	<i>Target</i>	<i>Record</i>
KPI 24	Reduction of nesting in the project area in comparison to long term data	0%	Monitoring records

4.3.2 Humpback whales

Humpback whales have been identified as a priority species and therefore a focus is provided for this species. However, impacts are not specific to only humpback whales, but may apply to any marine mammal species that may be present offshore waters. The same applies to mitigation and monitoring measures that are proposed.

4.3.2.1 Overview of Risks

The following presents an overview of the key risks to marine mammals, during construction and operation:

- Underwater sound generation that may cause injury or disturbance.
- Potential for increased collision with vessels.

The following provides a discussion of the key impacts on humpback whales and provides recommendations for mitigation and monitoring. Pollution issues are addressed under general measures above. The following provides a discussion of other key impacts and provides recommendations for mitigation and monitoring.

Existing impacts to humpback whales are likely to include:

- Disturbance from underwater sound generated by vessels (e.g. existing boats that visit the port and artisanal fishing boats).
- Potential for vessel collision.
- Disturbance from recreational activities, particularly whale watching activities.

4.3.2.2 Underwater Sound Generation

Impacts

All marine activities during construction and operation that may create underwater sound may lead to some impact. However the main impact sources that could create impacts may relate to piling activities during construction and increased vessel movements during operation. With respect to piling the significance of impacts is dependent upon the construction technique. As noted above a general mitigation measure to avoid driven piling has been provided. For vessel movements, the increase in traffic that is set out in the ESIA Report (Consulmar, 2018) is relatively low so significant impacts are not expected.

The marine mammals that are present in nearshore waters include low and mid frequency hearing cetaceans that have sensitivity to sounds that may be generated by the project activities (see classifications of species in NOAA, 2016). Of specific note is the potential proximity of humpback whales to where construction works will take place and also in the zones of where they may be increased vessel movement.

The possible effects on marine mammals can be placed into the following zones of influence (Richardson et al., 1995):

- Physical (including physiological) effects: to include damage to body tissues, gross damage to ears, permanent auditory threshold shift (PTS), temporary auditory threshold shift (TTS) with eventual recovery, and chronic stress effects that may lead to reduced viability.
- Perceptual effects: including masking of biologically significant sounds (e.g. communication signals, echolocation, and sounds associated with orientation, finding prey or avoiding natural or manmade threats).
- Behavioural effects: including disruption of foraging, avoidance of particular areas, altered dive and respiratory patterns, and disruption of mating systems.
- Indirect effects: including reduced prey availability resulting in reduced feeding rates.

Mitigation

The overall objective is to manage construction and operation activities through the adoption of mitigation to ensure that humpback whales are present in the same or increasing numbers in the project area and wider landscape/seascape area. Supporting aims are to:

- To prevent injury to humpback whales from 'noisy' construction activities; and
- To limit disturbance during migratory periods.

The mitigation strategy is outlined in the table below.

Stage of the Mitigation Hierarchy	Mitigation Actions	Responsibility	Timing	Frequency	Verification
Avoidance	SM13	Avoidance through scheduling to address 'noisy' subtidal construction activities that could occur during migratory periods			
		Enapor	Prior to Construction	Ongoing	<p>Detailed schedule of activities</p> <p>Construction and Environmental Management Plan</p>
		<p>1. 'Noisy' activities should be defined once more detailed design information is available and construction methods are better defined. It is noted that general measures under GM3 should avoid the potential for 'noisy' driven piling activities that may be of greatest concern. This is considered to be the primary mitigation step. If these measures are implemented then avoidance of activities in the migratory season may not be necessary. If the implementation of this mitigation is not possible then, as a secondary mitigation step, consideration should be given to avoiding noisy subtidal works (i.e. driven piling) during sensitive migratory periods for humpback whales, which is February and May.</p> <p>2. In the short term, impacts of underwater sound disturbance from vessel movements are unlikely to be much greater than the present situation so adaptive monitoring and management is considered sensible following the guidance set out below. Long term monitoring for humpback whale presence should be undertaken in partnership with local existing monitoring programmes to understand if there are any changes that may be attributed to disturbance from increased vessels movements. Adaptive management</p>			

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
		approaches to address impacts can then be recommended to address impacts, which may include limits on vessel movements during the migratory season etc.				
Minimisation	SM14	Minimisation of underwater sound impacts through operational control				
		<p>1. Adoption of the general measures under GM3 would avoid the potential for driven piling activities that may lead to injurious impacts. This is considered the primary mitigation step to address injurious impacts on the northern stock of humpback whales that migrate to and breed in Cape Verde. However, if driven piling is proposed then the following minimisation measures will be required as a secondary mitigation step. The mitigation approach should follow best practice JNCC guidance for minimising the risk of injury to marine mammals from piling activities (JNCC, 2010):</p> <ul style="list-style-type: none"> • Piling should be avoided at night time. No works will be undertaken during times of low visibility • The project area should be monitored by an appropriately trained Marine Mammal Observer (MMO) and Passive Acoustic Monitoring (PAM) operative whose primary role is to detect marine mammals to potentially recommend a delay in the commencement of activity if any marine mammals are detected 	Enapor and Contractor	Construction – during piling activities	Continuous	CEMP Monitoring and Evaluation Plan

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
		<ul style="list-style-type: none"> A mitigation zone of 500m radius will be scanned around the work area for at least 30 minutes prior to the start of works from an elevated observation point on land by the MMO / PAM operative. If marine mammals are observed in the exclusion zone, these works will be delayed until they have left the area or until 20 minutes after the last visual or acoustic detection. This measure will ensure the area in the vicinity of the works is clear of marine mammals prior to the commencement of works and will serve to reduce any disturbance to marine mammals A progressive increase in piling activity is recommended (soft-start) as a means of reducing the risk of injury, by allowing time for wildlife to move away from the area. The soft start process should be for a period of not less than 20 minutes The training of all construction personnel on the likely effects of works on marine mammals and the agreement on the role of the MMO and PAM operative in managing construction work should be undertaken prior to works commencing As part of the guidance should be to restrict vessel movements in and out of construction area or the operational port according to established routes/approach channels so that wildlife are 				

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
		<p>habituated.</p> <ul style="list-style-type: none"> Periodic re-assessment of mitigation measures for marine mammals and their effectiveness will be undertaken with feedback given on how operations may need to be altered as appropriate <p>2. Even if driven piling activities are not taken forward, all subtidal works have the potential to create underwater sound that may lead to some behavioural disturbance. In line with a precautionary approach, it is recommended that a general monitoring approach for humpback whales be undertaken in the potential Area of Influence of activities to determine if wider behavioural impacts are occurring during construction so that activities can be adaptively managed. It is recommended that such monitoring is co-ordinated with existing research effort in the area so that it forms part of the existing monitoring programme for humpback whales. This will enable comparison with long term data to determine if there is an alteration to the presence or behaviour of humpback whales during the construction period.</p>				

Monitoring the Implementation of Measures

All mitigation measures			
Key Performance Indicator		Target	Record
KPI 25	Number of injurious impacts to humpback whales	0%	Monitoring records
KPI 26	Reduction of humpback whale numbers in the Area of Influence in comparison to long term data	0%	Monitoring records

4.3.2.3 Vessel Collision

Impacts

Any increase in vessel movements creates a greater risk of collision that may cause injury or mortality. Slow moving whales are particularly vulnerable, but small cetaceans are also known to be affected. It is expected that the vessels using the port facilities will be largely slow moving, but this requires confirmation and may change in the future related to increased tourism etc.

Mitigation

The overall objective is to detect humpback whales within the path of moving vessels (where possible) and to follow a process of avoidance actions to minimise risk of collision and subsequent injury or mortality.

The mitigation strategy is outlined in the table below.

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
Avoidance	SM15	Avoidance through scheduling				
		<ol style="list-style-type: none"> 1. Restrictions should be placed on vessel movements at times of low visibility and at night time during the migratory season for the northern humpback whales. At night time, the risk of death or injury to marine mammals from boat strike is increased. 2. It is unlikely that the risk of vessel collision will increase significantly with the projections that have been discussed in the ESIA Report. Therefore an adaptive monitoring and management approach is considered sensible. The long term monitoring for humpback whale strandings or injury should be undertaken in partnership with existing monitoring programmes to add project requirements. Adaptive management approaches to address vessel movements can be recommended to address impacts that are recorded, which may include limits on vessel movements during the most sensitive periods. 	Enapor	Construction and Operation	Continuous	Vessel Logs
Minimisation	SM16	Minimisation through operational controls				
		<ol style="list-style-type: none"> 1. All vessel operators that will be used for works should be given a briefing alerting them to the possible presence of marine mammals in the area, and provided with guidelines for safe vessel operation in the presence of such species. This will require training in marine 	Enapor and vessel operators	Construction and Operation	Continuous	Vessel Logs Monitoring and Evaluation

Stage of the Mitigation Hierarchy	Mitigation Actions	Responsibility	Timing	Frequency	Verification
	<p>mammal identification. This should form part of training to introduce the code of conduct for the port. Guidance should include:</p> <ul style="list-style-type: none"> • Vessel should move to and from the port using established routes/approach channels so that wildlife become habituated. The use of established long term navigation routes will clearly help in this regard. An operational strategy for low boat speeds should be communicated to all vessel pilots, and should be monitored and enforced. Speed limit of 10 knots to be recommended and communicated to vessels on approach to port, during both day and night, during main nesting season. • Vessels should never deliberately approach, pursue or otherwise enforce close encounters with marine mammals. Vessel speeds within 50 m of marine mammals should be limited to no wake speeds. If necessary the vessel course should be altered if it is safe to do so. • Vessels should not deliberately enter within 100 m of whales (50 m for dolphins) and and/or wait in the in front of the direction of travel of a marine mammal or group of marine mammals. • Any injuries to or deaths of marine mammals, irrespective of whether they are related to the proposed works, shall be documented and reported 				<p>Plan</p> <p>GIS database</p>

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
		<ul style="list-style-type: none"> All vessels are to follow and maintain a constant route, course and speed (within identified speed limits). A record of the above should be maintained and reported; Vessels should be manoeuvred around the perimeter of any groups of marine mammals rather than through the middle Vessels in transit that encounter a marine mammal should endeavour to get between the animal and the shore to avoid possible stranding <p>2. Any observations of marine mammals should be recorded and be added to a GIS database.</p>				

Monitoring the Implementation of Measures

All mitigation measures			
Key Performance Indicator		Target	Record
KPI 27	Number of vessel strikes on humpback whales	0%	Monitoring records
KPI 28	% of vessel operators trained in marine mammal identification	100%	Induction and training records

4.3.3 Kentish Plover and Cream-coloured courser

Kentish plover and Cream-coloured courser have been identified as priority species. However, the mitigation that is proposed will apply to all bird species.

4.3.3.1 Overview of Risks

The following presents an overview of the key risks to Kentish plover and Cream-coloured courser, during construction and operation:

- Air-borne sound that may cause disturbance during construction;
- Footprint impacts on nesting sites;
- Degradation of nesting habitat due to pollution;
- Disturbance from increased numbers of people in the area; and the potential for increased predation from the introduction of pests (e.g. rats) and domesticated and feral/stray animals (i.e. dogs).

Existing impacts to Kentish plover and Cream-coloured courser are likely to include:

- Damage to nests from traffic access or trampling by people and animals;
- Disturbance from access, recreational activities and traditional uses; and
- Predation by predators, including other birds (e.g. ravens), pests and domesticated and feral/stray animals.

4.3.3.2 Air-borne Sound

Impacts

Construction will lead to the generation of sound, which may disturb bird species. Behavioural disturbance may include disruption to breeding activities and foraging, and possibly, the avoidance of particular areas. This disturbance is of greatest concern during breeding periods.

Mitigation

General measures to manage noise impacts are provided above. The following therefore presents only specific measures. The overall objective is to manage construction and operation activities through the adoption of mitigation to ensure that Kentish Plover and Cream-coloured courser are present in the same or increasing numbers in the project area and wider landscape/seascape area. The mitigation strategy is outlined in the table below.

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
Avoidance	SM17	Avoidance through scheduling of ‘noisy’ activities outside of the breeding seasons				
		1. Avoidance of ‘noisy’ construction works is recommended during the breeding season for Kentish plover and Cream-coloured courser. The breeding season to incorporate both species is September to February. Given the proximity of nest sites to the project area, the possibility of disturbance from air-born noise is high. Disturbance will relate directly to the sound generated with some activities giving rise to higher levels of disturbance than others – e.g. the piling works. It is noted that general measures under GM3 should avoid the potential for driven piling activities that may be of greatest concern. Whilst this is considered to be the primary mitigation step, other activities (ground breaking, large-scale traffic movements etc) will likely lead to air-borne noise generation and these will also need to be mitigated through scheduling avoidance due to the importance of the biodiversity features, proximity and likely sensitivity. An inventory of activities and potential noise that may be generated should be defined so that those activities that may cause disturbance on land can be avoided during the breeding period. It is, of course, not expected that all construction work should be avoided. This will require a detailed schedule of works to be developed that takes account of sensitivities.	Enapor and Contractor	Prior to Construction	Ongoing	Detailed schedule of activities CEMP

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
		2. It is recommended that connection is made with existing monitoring programmes being delivered locally so that impacts can be monitored and adaptively managed as required.				

Monitoring the Implementation of Measures

SM17		Avoidance through scheduling of 'noisy' activities outside of the breeding seasons	
Key Performance Indicator		Target	Record
KPI 29	Reduction of the local Kentish plover and Cream-coloured population and nest sites numbers in comparison to long term data	0%	Monitoring records

4.3.3.3 Footprint impacts

Impacts

The coastal zone around the port site provides nesting habitat for both Kentish Plover and Cream-coloured courser. Construction activities could lead to the following footprint related impacts:

- Loss or damage to nesting habitat and/or nests.
- Disturbance that means that the area where nesting normally occurs is no longer suitable.
- Pollution leading to injury, mortality or reduced quality of life.
- Off-duty activities of workforce resulting in disturbance through hunting and/or harassment and also the potential use of lights/lighting of fires.

Operation phase impacts may include the following:

- Release of waste and pollutants into the local environment.
- Increased harassment with higher levels of activities in the area.

The main activities of concern for construction and operation include:

- Movement of plant and people in nesting zones.
- Laydown of materials in nesting zones.
- Installation of work boundaries.
- Accidental releases of pollutants.
- Uncontrolled activities of the local workforce introduced to the area, including poaching and harassment.
- Increased general activities in the port area and potential for cumulative growth around the port.

Mitigation

General mitigation measures that have been identified above will address some of the impacts on Kentish plover and Cream-coloured courser that are listed above. However, additional species specific measures are proposed. The overall objective is to manage construction and operation activities through adoption of active mitigation to avoid or minimise footprint impacts, especially, but not limited to, nesting habitat. The mitigation strategy is outlined in the table below.

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
Avoidance	SM18	Avoidance through scheduling to avoid construction activities at key sensitive times				
		1. Where works will take place in potential nesting habitat, investigate options to time construction such that the breeding period is avoided. This is considered to be the primary mitigation step. Minimisation measures would not be required if this step is adopted.	Enapor and Contractor	Prior to Construction	Ongoing	Detailed schedule of activities
Minimisation	SM19	Monitor to protect or translocate eggs in areas that may be impacted in the footprint of works				
		1. If avoidance of priority nesting habitat is not possible or the timing of works cannot avoid the breeding season then monitoring will be required to protect nests or to translocate eggs for off-site incubation in dedicated facilities. Surveys will be required to regularly locate new nests, to define ‘nest clear’ areas, to protect nests if appropriate, to avoid injury during night time works, to allow eggs to be translocated. The general process should be as follows: <ul style="list-style-type: none">• Surveys should be undertaken in areas that may be impacted by the works regularly to locate new nests. These surveys should commence prior to any works taking place where footprints may occur• If nests are protected in situ they should be marked and their location included in a GIS database.• Egg translocation should only occur in areas where works may impact them.	Enapor and Contractor	Prior to and during construction	Continuous	Monitoring and Evaluation Plan CEMP Monitoring records GIS database

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
Minimisation	SM20	Minimisation through physical controls to protect nesting areas				
		<div>1. Strictly prohibit all vehicular access to nesting habitat at all times during construction unless a monitoring survey has been completed that satisfies that the area can be classed as ‘nest clear’.</div> <div>2. Prohibit access off hard standing areas for vehicles moving to and from the port where access is not essential. Formal transport corridors should be defined using signage. Signage should include restrictions for vehicle movements beyond the defined corridors.</div>	Enapor and Contractor	Construction	Continuous	CEMP Monitoring records
Restoration	SM21	Restoration of habitat following construction works				
		<div>1. Any degraded areas that may form nesting habitat for Kentish plover or Cream-coloured courser that are degraded due to construction works should be restored to enable long term nesting to occur. A rehabilitation and restoration management plan should be developed to inform the implementation of restoration activities.</div>	Enapor and Contractor	After Construction	As required	Monitoring records Rehabilitation and restoration management plan

Monitoring the Implementation of Measures

SM18	Avoidance through scheduling to avoid construction activities at key sensitive times		
<i>Key Performance Indicator</i>		<i>Target</i>	<i>Record</i>
KPI 30	Reduction of nesting in the project area in comparison to long term data	0%	Monitoring records

SM19	Monitor to protect or translocate eggs in areas that may be impacted in the footprint of works		
<i>Key Performance Indicator</i>		<i>Target</i>	<i>Record</i>
KPI 31	Uncontrolled damage to nest sites	0%	Field verification and monitoring records

SM20	Minimisation through physical controls to protect nesting areas		
<i>Key Performance Indicator</i>		<i>Target</i>	<i>Record</i>
KPI 32	Uncontrolled damage to nesting habitat and nest sites	0%	Field verification and monitoring records

SM21	Restoration of habitat following construction works		
<i>Key Performance Indicator</i>		<i>Target</i>	<i>Record</i>
KPI 33	Long term maintenance of nesting habitat in the same condition as before works commenced	100%	Monitoring records

4.3.4 Endemic lizard species

4.3.4.1 Overview of Risks

The key risks for endemic lizard species that may be present in the areas where works will take place include:

- Footprint impacts;
- Degradation of nesting habitat due to pollution;
- Potential for increased predation from the introduction of pests (e.g. rats) and domesticated and feral/stray animals (i.e. dogs).

Pollution issues and the potential for increased predation are addressed under general measures above. The following provides a discussion of other key impacts and provides recommendations for mitigation and monitoring.

Existing impacts to endemic lizard species are likely to include:

- Damage to nests from traffic access or trampling by people and animals;
- Disturbance from access, recreational activities and traditional uses; and

- Predation by natural and feral predators; and also pets introduced by workers etc (i.e. dogs).

4.3.4.2 Footprint impacts

Impacts

It is possible that rocky habitat within the footprint of the proposed construction works provides habitat for endemic lizard species. Construction works may lead to a disturbance and loss of this habitat; and also possible injury/mortality of individuals present.

Mitigation

The overall objective is to manage construction activities through adoption of active mitigation to avoid or minimise footprint impacts and to prevent injury to individuals present.

The mitigation strategy is outlined in the table below.

Stage of the Mitigation Hierarchy	Mitigation Actions		Responsibility	Timing	Frequency	Verification
Minimisation	SM22	Minimisation through physical controls				
		1. Identify potential habitat where lizards may be present supported by field assessment prior to construction. If protection of these areas is not possible then individual lizards should be captured and translocated to a suitable donor site.	Enapor and Contractor	Prior to and during construction	Continuous	Monitoring and Evaluation Plan CEMP Monitoring records GIS database
Minimisation	SM23	Provision of new habitat following construction works				
		1. If these species are recorded during pre-construction monitoring work then suitable habitat should be provided as part of the design for the port.	Enapor and Contractor	After Construction	As required	Monitoring records Rehabilitation and restoration management plan

Monitoring the Implementation of Measures

SM22	Avoidance through scheduling to avoid construction activities at key sensitive times		
<i>Key Performance Indicator</i>		<i>Target</i>	<i>Record</i>
KPI 34	Injury and mortality to individuals	0%	Monitoring records

SM23	Restoration of habitat following construction works		
<i>Key Performance Indicator</i>		<i>Target</i>	<i>Key Performance Indicator</i>
KPI 35	Long term provision of habitat in the same condition as before works commenced	100%	Monitoring records

5 Residual Impacts and Net Gain Analysis

5.1 Approach to delivering net gain objectives

The adoption of the mitigation measures proposed in this BAP will mean that no significant residual adverse effects will occur. However, as noted, the project site is located within a critical habitat area and some minor residual impacts are expected. Therefore there is a need to deliver net gains for the critical habitat features affected. This will need to be delivered through offset as the final step in the mitigation hierarchy.

The main residual effects include:

- Air-borne and underwater noise disturbance that will persist through activities. All significant noise effects will be avoided, but minor impacts will continue even with the adoption of minimisation measures.
- There is potential for pollution events to occur even though robust best practice mitigation will be adopted to avoid and minimise the likelihood and consequence of events. However, even if a small pollution event occurs in the marine environment this is potentially an irreversible impact and therefore there may lead to some small-scale residual impact.
- There is potential for long term wider indirect and cumulative effects to occur. Minimisation measures are proposed to address these, but it is likely that not all impacts can be managed. Therefore some residual impacts would be expected. The area of effects cannot, however, be defined.
- Avoidance and minimisation measures have been proposed to address light impacts during construction and operation. Whilst light impacts can be avoided during construction, it is unlikely that this will be possible in entirety during operation. Impacts will, however, be minor if the mitigation that is proposed is adopted.
- The ESIA Report (Consulmar, 2018) has determined that there will be long term effects beaches due to the presence of new structures and also changes to beach morphology. The permanent loss of beach habitat will only occur in the area that is seaward of the existing rock revetment that protects the existing port. This revetment is located below

HW and this area is therefore not considered to provide sea turtle nesting habitat. The key residual impact therefore relates to any alteration to beach morphology. The main residual impact in this regard relates to permanent structures as the removal of temporary structures will likely maintain the status quo over time. The ESIA Report states that the main residual effects from permanent structures will occur on Bitxi Rotxa beach. The overall area of impact is, however, uncertain. Whilst this area is not considered the most important nesting habitat at the landscape/seascape level, nesting does occur here and therefore long term residual impacts are likely based on the conclusions of the ESIA Report.

- There will be a long term loss of potential nesting habitat for Kentish plover and Cream-coloured couriers in the footprint of works. In the ESIA Report, the loss of habitat in the footprint of the new port site has been estimated as 0.8 ha. The ESIA Report does not provide sufficient detail to understand the area of footprint impact with respect to the widening transport corridors, but it is expected to be small. It must be noted that the area where expansion works are proposed are already degraded and are unlikely to present important habitat for these species. Residual impacts are therefore not considered to be of note.

A standard approach to determining residual effects is to use a habitat quality metric. This metric combines the area of habitat with ecological condition to determine the residual impact. This is then used to define the extent of offset required to achieve net gains. Given the minor significance and/or uncertainty for some of the residual impacts that are expected, it is considered inappropriate to use the habitat quality metric to define overall offset strategies in this instance. Instead, a range of offset approaches have been considered that will ensure that net gains are achieved.

There are two basic types of offsets that can be used to address residual impacts:

- Restoration offsets that are designed to remediate past damage to biodiversity by promoting conservation interventions
- Averted loss offsets that are designed to improve protection to biodiversity values.

As discussed under GM9, a pre-feasibility study is required to assess the potential for gains via offset proposals. Pre-feasibility studies should consider options and how options will be implemented. An Offset Implementation and Evaluation Plan should be developed once pre-feasibility studies have been completed. On a general level, it is recommended that the offset strategy is developed in accordance with best practice, such as the Business and Biodiversity Offsets Programmes (BBOP) Standard on Biodiversity Offsets (2012). The offset strategy should include monitoring requirements to determine success and to deliver adaptive management to optimise outcomes. It is also strongly recommended that any offset strategies are developed and delivered in consultation with the proposed biodiversity working group. It is essential that offsets are driven in a co-ordinated way with existing plans and programmes and that there is a framework in place that allows for implementation. It is also necessary to ensure that appropriate financing is available and that there is permanence to the offset approach to secure long term net gains. As this framework has yet to be established, it is not possible or appropriate

to precisely define offset strategies in this BAP. However some objectives for the offset strategy are as follows:

- Offsets should focus on addressing residual effects on priority species identified in this BAP, with particular emphasis on addressing impacts on breeding and nesting species related to footprint impacts and wider indirect effects.
- The offset principles should be consistent with existing biodiversity strategies and management plans defined for protected areas on Maio Island.

Some potential options for offsets for the project are provided below:

- Provide support to existing local monitoring programmes to address sea turtle poaching on Maio Island with an emphasis on the critical habitat area in which the project site is located.
- Provide support to local stakeholders to develop a programme to manage and reduce existing predation risks to improve nesting success for priority species.
- Provide support to local researchers to undertake tagging of sea turtle movements from nesting beaches on Maio Island to record offshore movements during inter-nesting periods. This will help to understand habitat inter-linkages and also define if there are important offshore aggregation areas that may warrant further conservation action and protection.
- Provide funding and co-ordination to support the development of a biodiversity working group to manage and address wider indirect impacts on the Salinas do Port Ingles protected area; including support to the implementation of recommended management approaches and monitoring programmes.
- In consultation with the members of the biodiversity working group consider the potential for the rehabilitation of lost wetland habitat that has resulted from the construction of the access road to the port, including possible reconnection to water supply from the wetland area within the legally protected area.
- In co-ordination with local partners provide support to the provision of increased awareness of the local community on the biodiversity value of the area and how to conserve features of interest.
- Investigate the possibility to reduce light impacts and disturbance on Bitxi Rotxa beach to increase the quality of this habitat for nesting sea turtles.

6 Implementation

This BAP should be periodically reviewed and any necessary revisions made to reflect changes or updated information that becomes available. As a minimum, the BAP should be reviewed prior to construction, during construction and on an annual basis during operation.

6.1 Audit and Reporting

It is recommended that the auditing of the implementation of the BAP be embedded within the wider operational management plan for the port and/or dedicated quality or environmental

management system. In addition to internal auditing, it is recommended that a review of implementation and compliance be undertaken by AfDB periodically, which may include external independent review. Internal and external audit findings, along with actions, should be recorded and reported.

It is recommended that implementation of the BAP be reviewed in the following reporting processes:

- Weekly monthly progress reports developed by the Contractor's procedures defined in the CEMP
- Site audit reporting in line with the Contractor's procedures defined in the CEMP
- Annual Environmental Report produced by Enapor

7 References

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