ENVIRONMENTAL AND SOCIAL REQUIREMENTS FOR CONTRACTORS: ANNEX 7 - MARINE OPERATIONS

ROVUMA LNG PROJECT

MZLN-EL-RBENV-00-0001

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1. PURPOSE AND SCOPE

This document is one of a series of topic-specific supporting annexes contained in the overarching document: Environmental and Social Requirements for Contractors: Environmental and Social Management System (ESMS).

These annexes define the processes that need to be followed and the control measures that must be applied to ensure the delivery and approval of a topic-specific Contractor Implementation Plan (CIP) and other implementation deliverables ahead of commencing activity.

Where the final design basis or execution strategy has not been determined and alternatives exist, an analysis of alternatives (taking environmental and social (E&S) factors into account) shall be undertaken. This analysis shall be based on an accurate characterisation of the local setting using up-to-date baseline data and an assessment of the risks and impacts related to each alternative.

Where the project base case has already been determined, additional baseline information may be required to inform an up-to-date / site-specific E&S risks and impacts evaluation. This evaluation may result in a refinement of control measures relative to the local conditions and licensing requirements.

1.1. Objectives

The overall objective of this document is to set out all the E&S requirements that need to be fulfilled in order to prevent and manage potential E&S risks and impacts associated with Marine Operations.

1.2. Scope

For the purposes of this document, the term Marine Operations refers to all Project-related vessel activities and movements as well as associated management activities including:

- Navigation, construction works and operational activities by Project related vessels
- Engagement with the Mozambican Maritime Authorities, affected communities, fishermen and other area users involved in marine activities
- Notifications of Project activities in nearshore and offshore areas
- The development of a Vessel Traffic System (VTS) based at Company facilities on the Afungi Peninsula in Palma Bay using information provided by radar, Automatic Identification System (AIS), and Very High Frequency (VHF) signals. The VTS will integrate this information in order to provide effective marine traffic organization and communication and surveillance
- The demarcation and enforcement of safety exclusion zones around the Project's marine operational areas

The HSE management of Project related vessels including waste management, emission and noise controls, regulatory compliance, health and safety measures, wildlife protection measures, spill contingency and emergency response plans, logistics support.

Requirements for Dredging, Ballast Water and Biofouling Controls and dispersion modelling for vessel air emissions, are dealt with in separate documents.

The term “vessels” in this document refers to self-propelled and towed seagoing and coastal vessels, including but not limited to barges, LNG carriers, tankers, ships and smaller craft.

The term “Project-related vessels” in this document refers to all vessels engaged in activities and support functions for the Project including but not limited to those owned, leased, hired and directly or indirectly contracted by Company or the EPC Contractor and its associated / affiliated organisations and subcontractors, and whether working on a full-time, part-time, occasional, one-off or on-call basis.

1.3. Linkage to Other Contractor Requirements

This document is an overarching document which is supported by a number of topic-specific annexes. It also needs to be read in conjunction with Section D (Scope of Work) and Section F (Coordination Procedure) to provide a holistic view of E&S requirements.

This document should be read specifically in conjunction with Ballast Water and Biofouling Annex, Dredging Annex and Air Quality, Greenhouse and Energy Efficiency.

1.4. Background Context

The Project is dependent on vessels for offshore installation of subsea gas production infrastructure, offshore drilling, offshore and nearshore installation of flowlines, associated construction activities and logistics support, the marine transport of equipment, materials and personnel, and the export of LNG from onshore facilities in Palma Bay.

Palma Bay is located towards the northern end of the Quirimbas Archipelago which extends for some 400 km parallel to the Mozambican coast and comprises 32 islands with associated coral reefs, seagrass beds, mangroves, sandy beaches and mudflats. Quirimbas is part of the wider East African Marine Ecoregion. It is of global importance for biodiversity and has the highest recorded diversity of corals in the Western Indian Ocean.

Key biodiversity features in Palma Bay include coral, seagrass and coastal mangroves, all of which support a wide range of fauna. These are highly threatened habitats at a global level and the places they occur in Palma Bay have therefore been assessed as Critical Habitat[1] according to the definitions in IFC Performance Standard 6 (PS6): Biodiversity Conservation and Sustainable Management of Living Natural Resources. In addition, Critically Endangered and Endangered species are present in the bay including several turtle and one dolphin species. There is also extensive use of Palma Bay by small-scale fisheries providing income and subsistence to local communities who are therefore dependent on the quality of the marine and coastal habitat.

The sensitivity of the environment in Palma Bay and surrounding waters and its importance for local communities means that Marine Operations need to be based on more than just regulatory compliance (e.g. MARPOL 73/78). There is a commitment to additional measures aimed at ensuring community safety and environmental protection, continuous engagement with local communities and other stakeholders, and environmental awareness training for vessel masters and crews.

[1] Mozambique Program. Mozambique Straddling Resources. *Critical Habitat Screening and Assessment Using IFC PS6 Criteria – Interim Report*. CH2M Hill Mozambique Lda for Eni S.p.A. March 2018.

1.5. E&S Risks and Potential Impacts

Table 1-1 outlines the E&S risks and potential impacts identified to date associated with Marine Operations. This table is meant to provide insight to the risks and potential impacts which are possible and a guide for additional assessment activities required by Section 2.1 of this document. It also provides a reference to the control measures table (Table 2-3).

Table 1-1: A Guide to Activities, Consequences, Risks and Potential Impacts

ACTIVITY	POTENTIAL CONSEQUENCE	RISKS AND POTENTIAL IMPACTS
Vessel operations (presence and movements)	Accidental or planned discharge of vessel wastes/effluents to the marine environment	Detrimental impact on natural habitat and populations of indigenous plant and animal species (NR3)
		Reduced ecological function and diminished quality of ecosystem services (NR13)
		Pollution of marine environment (P4) Littering of the landscape from blown material (P8)
		Contravention of international conventions (O1)
		Reduced ecological function and diminished quality of ecosystem services (NR13)
		Detrimental impact on community health (C2)
		Livelihood impacts on fisheries and intertidal foraging (LH4)
	Air emissions	Degradation of ambient air quality (P1)
		Detrimental impact on community health (C2)
	Noise generation	Disturbance of important environmentally sensitive receptors (NR7)
		Community disturbance / nuisance (C1)
	Potential accidental collisions with non-Project vessels or damage to fishing gear	Detrimental impact on community safety (C3)
		Livelihood impacts on fisheries and intertidal foraging (LH4)
	Potential accidental collisions with marine fauna	Injury or death of important domestic animals and/or wildlife (NR8)
Vessel refueling	Potential accidental spills of fuel	Detrimental impact on natural habitat and populations of indigenous plant and animal species (NR3)
		Injury or death of important domestic animals and/or wildlife (NR8)
		Reduced ecological function and diminished quality of ecosystem services (NR13)
		Pollution of marine environment (P4)
		Contamination of surface and groundwater by petroleum hydrocarbons (P12)
		Reduced ecological function and diminished quality of ecosystem services (NR13)
		Detrimental impact on community health (C2)

ACTIVITY	POTENTIAL CONSEQUENCE	RISKS AND POTENTIAL IMPACTS
		Livelihood impacts on fisheries and intertidal foraging (LH4)
Establishment and maintenance of marine / coastal exclusion zones	Reduced access to areas used by communities for fishing and other activities	Livelihood impacts on fisheries and intertidal foraging (LH4)

2. REQUIREMENTS

2.1. E&S Assessment and Evaluation and CIP Development

As discussed in the overarching Environmental and Social Requirements for Contractors: Environmental and Social Management System (Section 1.1), due to the further refinement of the design since the EIA was prepared, and due to the Project seeking finance (which requires compliance with the International Finance Corporation (IFC) E&S requirements), it is anticipated that additional E&S assessment will be required for some topics which may result in the addition or refinement of E&S controls specified to date. This assessment, as outlined in the overarching ESMS document, includes three stages:

- Stage 1: Analysis of Alternatives
- Stage 2: E&S risk and impact evaluation of the project base case and refinement of control measures
- Stage 3: CIP development (based on the refined control measures).

For Marine Operations, only stages 2 and 3 are required.

Stage 2 – Assessing the Project Base Case and Refining Control Measures

Once the base case has been determined, the actions outlined in Table 2-2 are required in order to refine the preliminary E&S control measures outlined in Section 2.2.

Table 2-1: Process for Risk and Impact Assessment of Project Base Case

No	Specific Requirements	Responsibility
1	Determine the status of existing and planned port facilities in Mozambique and surrounds in respect of shipping reception / repair / maintenance facilities and MARPOL compliant waste / effluent management facilities. *[Part of this study will relate to an evaluation of facilities for ballast water reception / treatment, hull inspection / quarantine and the management of associated wastes – refer to Ballast Water and Biofouling E&S Requirements Plan]*	Contractor
2	Analyse the requirements for compliance with MARPOL 73/78 and the additional discharge restrictions to determine the specific implications for the Project.	Contractor
3	Take into account the potential for cumulative impacts and the benefits of joint action with other developers, government agencies, ports and other stakeholders as required.	Company

No	Specific Requirements	Responsibility
4	Taking the findings of the above steps into account, assess whether there are sufficient / appropriate design and execution control measures to mitigate the identified impacts and risks and update if necessary. Identify any areas where additional information is required via pre-construction surveys or audits / verifications.	Contractor

Stage 3 – Contractor Implementation Plan

The Contractor shall develop a CIP which outlines how they propose to implement the control measures in the Table 2-2 (including any proposed additions or refinements as applicable to the update and finalisation of the design and execution strategy), and how they propose to implement the management system requirements (as outlined in the E&S Management System Requirements for Contractors) which relate specifically to the topic of this document, in a way that conforms to E&S requirements. The CIP shall include the refined control measures developed in Stage 2.

2.2. E&S Control Measures

The control measures in Table 2-2 have been defined ahead of the site-specific risk / impact evaluations defined in Section 2.1. The Contractor shall apply these or seek agreement to apply a refined list, with justification for all changes based on the outcomes of assessments described in Section 2.1.

Where these requirements originate from the Anadarko / Eni EIA (2014), henceforth called the EIA, the EIA section reference is included. Similarly, the Government-approved Environmental Management Plans (EMPs) references are included for those relevant controls. As noted in the overarching ESMS requirements document, a number of additional controls have been identified as being required to meet lender expectations. As such, the EIA / EMP controls have been supplemented by good practice design and control requirements where practicable and appropriate, however, where any overlap is present, the EMP (and EIA) commitments should be considered paramount over good practice guidance in the hierarchy of adoption of such controls.

Table 2-2: E&S Control Measures

ACTIVITY / SOURCE OF POTENTIAL IMPACT	CONTROL MEASURE	IMPACT / RISK BEING ADDRESSED	SOURCE			Notes
			EIA	EMP	Other	
Overarching Requirements						
General	All Project vessels will comply with MARPOL 73/78. This will, among other things, necessitate the provision of Port Reception Facilities for vessels based at the facility (i.e. support vessels and tugs), as well as effective waste disposal.		12.24.2, Approval Letter S 10 No 18	MOF: ME 39 MOF: ME 39		
	Ensure Project-related vessels comply with any special requirements with the discharge restrictions in Palma Bay and other Mozambican coastal waters.			LNGMT SE 8,10 MOF SE 9,11	A	
	Prepare a Marine Operations CIP with defined processes and equipment to ensure compliance with Project standards and content, including MARPOL.				A	
	Ensure there is a strong focus on community safety and the protection of the natural resources on which the affected communities depend. This needs to be underpinned by: (a) committed and continuous engagement with communities and other stakeholders; (b) establishment and maintenance of marine exclusion zones around the Project's main construction and operational areas of activity for the safety of communities, fishermen and other area users; and (c) an integrated and inclusive programme of environmental awareness training throughout the life of the Project for all relevant personnel including all vessel masters and crews.				A	
Execution Requirements						
Plans, Procedures and Protocols	A Marine Traffic and Transport Plan shall be developed for all phases of the Project, in liaison with the relevant maritime authorities. It shall address the requirements and guidelines of government, international conventions and industry good practice, and the expectations of communities and area users in respect of	NR3, P4, LH4, O1, O2	EIA 13.7.1	Area 4 SE 106, 107, 108 LNGMT SE 8, 9, 10		The Marine Traffic and Transport Plan can be considered within

	marine pollution control, environmental protection and health and safety performance.			MOF SE 9, 10, 11		the Marine Operations CIP.
	The Contractor shall develop a plan which includes a detailed description of the Navigation Warning Scheme, the schedule of vessel movements, speed limits and other vessel/navigation restrictions, and the size and duration of exclusion zones. It shall seek to minimise risks to fishermen and other area users as a result of potential accidental vessel interactions such as collisions and damage to fishing gear (such as fishing nets). There shall be a particular focus during the operations phase on the risks associated with LNG Carrier movements given the nature of the cargo and size of the vessels.	NR3, P4, LH4, O1, O2	EIA 13.7.2	Area 4 SE 106, 107, 108, 110 LNGMT SE 8, 9, 10 MOF SE 9, 10, 11		
	The plan shall ensure clear communication of all marine activities to stakeholders including but not limited to affected communities, fishermen and other area users, and relevant government agencies. It shall include procedures for notifications and form the basis for ongoing engagement between the Project, maritime authorities, the National Fisheries Administration (ADNAP), operators of international fishing vessels, and local communities in Palma Bay including fishermen and others engaged in marine activities.	NR3, P4, LH4, O1, O2	EIA 13.7.2	Area 4 SE 106, 107, 108, 110 LNGMT SE 8, 9, 10 MOF SE 9, 10, 11		
	Appropriate marine terminal systems, protocols and procedures aligned with national and international industry standards and maritime legislation will be developed for the life of the Project and adapted when operating circumstances change, in collaboration with the Maritime Authority (INAMAR) and INAHINA.	NR3, P4, LH4, O1, O2	EIA 13.7.3	Area 4 SE 115 LNGMT SE 22 MOF SE 23		
Plans, Procedures and Protocols	Take into account the actions defined in the Plano Estratégico de Desenvolvimento da Pescaria de Atum em Moçambique (PEDPA) (Strategic Development Plan for Tuna Fisheries)	O1	EIA 13.7.2	Area 4 SE 112 LNGMT SE 19 MOF SE 20		
Navigation and Communication	The Project will engage with the Maritime Authority and provide relevant information to maintain awareness of the Project and commercial fishing activities in Area 4 among relevant stakeholders.	O1, O2, LH4	EIA 13.7.2	Area 4 SE 108 LNGMT SE 15		

				MOF SE 16		
	Establish, in co-ordination with maritime and port authorities, navigation routes that will not delay the movement of pilot vessels intending to enter the Bay of Palma, considering that some areas of the Rovuma Basin are crossed by national and regional vessels.	C3, LH4	LNG EIA Approval Letter (June 2014)	Area 4 SE 119 LNGMT SE 27 MOF SE 28		
Navigation and Communication	Contractor to follow and implement as necessary the Company Grievance Procedure.	O1, O2, LH4	EIA 13.7.2	Area 4 SE 111 LNGMT SE 18 MOF SE 19		
	Maintain ongoing engagement with stakeholders from the shipping national and regional cabotage sector regarding maritime activities, and to communicate specific Project information, e.g. exclusion zones.	C1, C3, LH4	EIA 13.7.3	Area 4 SE 116 LNGMT SE 23 MOF SE 24		
	In the event of an marine emergency event or major oil spill in Palma Bar or nearshore, inform other users of the sea about the exact timing and location of Project related drilling, construction, operational and decommissioning activities through the issuing of Notices to Mariners via INAMAR in order to minimize the risk of vessel collisions.	C1, C3, LH4	EIA 14.3.7	Area 4 UE 13 LNGMT UE 13 MOF UE 13		
	Provide information to Company on a regular agreed basis on current marine activities and changes in locations for activities so that this can be shared with communities as necessary in advance of operations.	C1, C3, LH4			A	
Navigation and Communication	Ensure that navigation is performed in safe conditions.	C1, C3, LH4	EIA 13.7.2	Area 4 SE 113 LNGMT SE 25		

				MOF SE 26		
	Ensure that all Project related marine traffic adheres to Project approved navigation channels within both the concession areas.	C1, C3, LH4			A	
	Reduce propeller wash and enforce vessel speed limits set by Company and enforce strict consequences for breaches as agreed with the Company. Speed limits must be sufficient to avoid creating safety risks for community vessels e.g. wake disturbance / capsizing and adequate crossing time.	C1, C3, LH4			A	
	Ensure that, where possible, safety exclusion zones are clearly demarcated, noted and/or monitored, to enable vessels to be aware when they are close to the safety zones, and appropriate pilot vessels, coastguards and maritime support agreed between the Project, Maritime Authorities and ADNAP.	C1, C3, LH4	EIA 13.7.2	Area 4 SE 110 LNGMT SE 17 MOF SE 18		
	Clearly demarcate marine (e.g. markers and buoys with lights etc) and coastal work sites (e.g. fencing and signage) as specified by the Company.	C1, C3, LH4			A	
	Provide local language speaker(s) onshore during operations and on-board a vessel, as required, within the bay to communicate exclusion zones to communities.	C1, C3, LH4			A	
	Inform communities of activities, including exclusion zones, and the dangers of getting too close to Project vessels, and work with communities to take measures to avoid incidents, especially with fishing communities.	C1, C3, LH4			A	
	Enable safe passage of local vessels through the exclusion zone at relevant times agreed with the Company through a designated traversing passage or similar. Employ bridge watch and patrol boats to identify local vessels and assist with safe passage as required.	C1, C3, LH4			A	
	Establish communication protocols between vessels and patrol boats.	C1, C3, LH4			A	
	Equip vessels involved in dredging and other construction-related activities with navigation equipment and suitable aids (such as buoys and lights) to minimise interference with other vessels and to maintain high visibility at all times.	C1, C3, LH4	EIA 13.7.3	Area 4 SE 114 LNGMT SE 21		

				MOF SE 22		
	Ensure that all service and construction vessels are equipped with functional radar equipment, and that the radar system is continuously monitored.	C1, C3, LH4	EIA 13.7.2	Area 4 SE 109 LNGMT SE 16 MOF SE 17		
	Standard communication (constant bridge watch and radio contact) and navigation systems (lighting and signaling systems) must be used on all vessels	C1, C3, LH4	EIA 14.3.7	Area 4 UE 15 LNGMT UE 15 MOF UE 15		
	Follow strict compliance with the standards of nautical signaling during all marine operations including the launch of the pipelines.	C1, C3, LH4, O1	LNG EIA Approval Letter (June 2014)	Area 4 SE 118		
	Conduct routine maintenance of navigation equipment and all navigation aids (buoys, lights) on all project vessels.	C1, C3, LH4		LNGMT SE 11 MOF SE 12		
Vessels and Crew	Provide relevant documentation to ensure all vessel operators, masters and crew are appropriately qualified and trained.	C1, C3			A	
	Implement routine drug and alcohol tests on vessel masters and crew and maintain documentation to verify drug and alcohol monitoring.	C1, C3, LH4			A	
	Prohibit unauthorized personnel from being on board Project-related vessels.	C1, C3, LH4			A	
	Provide an appropriate level of logistics support and emergency response back-up to ensure the safety of vessels and personnel.	C1, C3			A	
	Enforce vessel ingress/ egress procedures, use of onboard navigation equipment, onboard safety procedures (wearing of life vests, passenger seating) and emergency procedures to be	C1, C3			A	

approved by the Company and enforce strict consequences for breaches.					
Ensure that transport equipment, pumping, transfer and alarm devices are certified by a competent authority.	C1, C3	LNG EIA Approval Letter (June 2014)	Area 4 UE 19 LNGMT SE 28 MOF SE 29 Shared UE 6		
Maintain and service all equipment and machinery on board vessels/barges on a routine basis in accordance with the manufacturer's specification including units/parts that generate air emissions or noise or may be susceptible to spills and leaks.	C1, C3			A	
Ensure that all vessels used during the Project cycle shall be of suitable construction, properly equipped for use and navigation and maintained in a seaworthy condition, and shall comply with Mozambican Law and Regulations and the International Maritime Organization (IMO) requirements and standards, particularly around health and safety and emergency response.	C1, C3			A	
Ensure operational certification of all ships according to applicable requirements. Applicable requirements depend on the purpose and capacity of the ship.	C1, C3			A	
Limit equipment and personnel transport vessel movements to designated routes and mooring areas as approved by COMPANY and enforce strict consequences for breaches.	C1, C3			A	
Utilise only vessel captains that are fully qualified and licensed in accordance with appropriate Mozambican laws and aware of the operating requirements of waterways.	C1, C3, O1			A	
Minimise non-essential lighting on vessels, and shield and/or reduce the number of lights shining directly onto the water as far as possible.	C1, C3	EIA 11.7.2	Area 4 ME 16 LNGMT ME 6 MOF ME 6		
Prohibit all crew members from killing or causing injury to marine fauna (any crew members found to have deliberately killed or	NR3, O1	EIA 11.7.2	Area 4 ME 18 LNGMT		

	caused injury to marine fauna shall be dismissed immediately and removed to shore).			ME 8 MOF ME 8		
	Prohibit all vessel masters and crew members from hunting, fishing, trapping, poaching and/or gathering wildlife (both flora and fauna) for any purpose. Any crew members found to have deliberately killed or caused injury to marine fauna shall be dismissed immediately and removed to shore.	NR3, O1, LH4, NR8	EIA 11.7.2		A	
	Avoid purchasing food from local populations.	O1, LH4, NR8			A	
Waste Management	Wastes are to be segregated and stored separately according to waste type.	P8			A	
	Retain an inventory of all waste streams (solid and liquid)	P8			A	
	Prohibit waste from being thrown overboard.	P8			A	
	Limit the use of single use plastic on board vessels as much as reasonably practicable. On no account shall plastic be disposed of in the marine environment.	P8			A	
	Store solid non-hazardous waste in designated, labelled containers prior to disposal.	P8			A	
	Store medical waste in labelled, fully secured container on the vessel.	P8			A	
	Dispose of solid waste at a Company-approved onshore waste disposal facility.	P8			A	
	Prohibit open burning on board the vessel. Incineration is only allowed if Company air emissions specifications set out in the Project Standards are met. There shall be no incineration of wastes in coastal waters including Palma Bay.	P8, P1			A	
	Collect oily residues from the bilge tank and store in designated, labelled drums and disposed of at an onshore facility approved by the Company to receive such waste. Waste Transfer Notes shall be obtained and retained by Contractor for inspection by the Company or other approved third parties.	O1, P4, LH4			A	
	Inspect bilge water visually on a routine basis to determine if contamination from accidental releases of hydrocarbons, chemicals, detergents or other substances has occurred that requires corrective action.	O1, P4, LH4			A	
	All onshore facilities used for the storage, treatment and disposal of solid and liquid wastes from Project vessels shall comply with	O1, P4, LH4			A	

	MARPOL (73/78) and other applicable national/international standards.					
	Do not discharge hazardous wastes to the sea under any circumstances.	O1, P4, LH4			A	
Air Emissions	Test all machinery and equipment for visible emissions before commencement of all marine construction work. If visible emissions are significantly noticeable (for at least a continuous 10 minute period after 'start-up') the item of machinery or equipment shall be removed from service and repaired or replaced prior to the commencement of works.	O1, P1, P4, LH4, C2			A	
Spills and Leaks	Use reinforced hosing for fuel transfers and use shut-off valves to reduce losses to sea should rupture occur.	NR3, NR8, NR13, P4, P12, C2, LH4	EIA 14.3.7	Area 4 UE 11 LNGMT UE 11 MOF UE 11		
	Ensure all vessels and barges shall be securely moored/anchored during refueling.	NR3, NR8, NR13, P4, P12, C2, LH4			A	
	Where possible and practical, refuel only in calm weather and sea conditions and during daylight.	NR3, NR8, NR13, P4, P12, C2, LH4	EIA 14.3.7	Area 4 UE 12 LNGMT UE 12 MOF UE 12		
	Undertake routine daily inspection of all machinery and equipment (including exhausts) and hydrocarbon and chemicals storage areas throughout the vessel/barge (to include deck, hold and bilge) and storage areas to check for oil or chemical drips, spills and leaks.	NR3, NR8, NR13, P4, P12, C2, LH4			A	
	Ensure all equipment using fuel or lubrication oil (e.g. motors) shall have self-contained drip trays or have a fabricated drip tray installed as a precaution against accidental releases, drips and leaks.	NR3, NR8, NR13, P4, P12, C2, LH4			A	
	Do not use detergents to wash down working areas (other than kitchens and toilets) on deck and in the hold.	NR3, NR8, NR13, P4, P12, C2, LH4			A	

	Ensure all vessel masters and crew members shall be trained in spill/emergency response.	NR3, NR8, NR13, P4, P12, C2, LH4			A	
	Ensure that a spill kit is kept on the vessel including booms, absorbent pads, absorbent granules, bags and shovels. If the spill kit is used, the Contractor shall replace components as soon as reasonably practicable.	NR3, NR8, NR13, P4, P12, C2, LH4			A	
	Report any hydrocarbon/chemical release from primary containment including those in the vessel/barge to the Company in line with Company requirements and ensure cleanup is immediate.	NR3, NR8, NR13, P4, P12, C2, LH4			A	
	Ensure that exposed work areas on deck or in the hold shall not be washed down until any accidental releases have been cleaned up.	NR3, NR8, NR13, P4, P12, C2, LH4			A	
	Safety procedures for the loading and unloading of product to transport systems (eg tanker trucks and vessels) will be implemented, including the use of failsafe control valves and ESD/D equipment	NR3, NR8, NR13, P4, P12, C2, LH4	EIA 14.5.1	Area 4 UE 34		
Safety and Security	Keep and retain SDSs for all hazardous substances on the vessel and ensure they are accessible to the workforce	NR3, NR8, NR13, P4, P12, C2, LH4			A	
Noise Control	Ensure that machinery and equipment selected falls within the Project's noise emissions requirements.	NR7, C1			A	
	Switch off engines of plant, machinery or equipment when not in use, including but not limited to noisy equipment such as generators, compressors and pumps.	NR7, C1			A	
	Keep acoustic doors and hoods on plant and equipment closed except during maintenance or when switched off.	NR7, C1			A	
	Switch off vessel engines or (if necessary) run on low power when vessels are moored.	NR7, C1			A	
	Avoid the use of horns except where necessary for communication and safety purposes.	NR7, C1			A	
Awareness and Training	Undertake environmental awareness training for vessel masters and crews, marine superintendents, logistics operations managers and other relevant managers/personnel. The awareness training shall include but not be limited to: seabed habitat and marine fauna and flora in Palma Bay and offshore; fishermen and other area users; community dependency on the natural environment; the protection and conservation of marine fauna (including whales, dolphins, dugong, turtles); waste management, effects of plastic on	C1, C3, NR8, O1			A	

	the marine environment; discharge restrictions; agreed mitigation and adaptive management measures.					
	Undertake environmental awareness training of all crew members, which includes training on the conservation status of cetaceans and turtles.			Area 4 ME 19 LNGMT ME 9 MOF ME 9		
Monitoring	Develop and implement a Marine Fauna Observation Procedure (MFOP). This will involve the deployment of trained Marine Fauna Observers (MFOs) on board drilling, construction and periodically other vessels as appropriate and reasonably practicable (with nearshore vessels and tugs operating within the immediate vicinity of the Jetty and MOF being exempt from standing MFOs). The MFOP will encompass but not be limited to: the recording of the presence and behaviour of marine mammals (whales, dolphins, dugong), marine turtles and other observed fauna; soft-start procedures; observation of designated navigation routes and operating areas; allowable approach distances depending on marine species; vessel speed limits and adaptive management measures if there is a risk of a collision leading to fauna injury/mortality (boat strike); light/noise avoidance and reduction measures; communications between MFOs and vessel masters/crews; involvement of MFOs in environmental awareness inductions and training; daily/weekly/monthly reporting.	C1, C3, NR8, O1			A	
	Ensure minimum disturbance of marine mammals in all phases of the project	C1, C3, NR8, O1	LNG EIA Approval Letter (June 2014)	Area 4 ME 20 LNGMT ME 11 MOF ME 11		
	An adequate number of trained MMOs shall be present during drilling and construction works (e.g. dredging) in the area of the subsea infrastructure to keep a watch for the presence of marine mammals and turtles and assist vessel masters and crews to avoid putting these animals at risk. They will record all sightings systematically to assist research and to plan additional avoidance strategies.	C1, C3, NR8, O1	EIA 11.7.2	Area 4 ME 13 LNGMT ME 2 MOF ME 2		

Reduce travelling speeds if whales, dolphins or turtles are encountered, to afford the animals the opportunity to move out of the way.	C1, C3, NR8, O1	EIA 11.7.2	Area 4 ME 12 LNGMT ME 3 MOF ME 3		
Periodically check risers, mooring lines and anchor chains to detect any entanglement with marine fauna. Any entanglement of larger fauna (turtle, dolphin, whale, dugong) shall be immediately investigated and additional mitigation implemented as required.	C1, C3, NR8, O1			A	
Develop and implement a Marine Mammal Observation Procedure (MMOP), aligned with Good International Industry Practice (e.g. in accordance with JNCC Guidelines) applicable for the project phase that addresses, at least, the need for trained marine mammal observers (MMO's), record keeping, vessel movement, light, noise, avoidance strategies and helicopter traffic.			Area 4 ME 11 LNGMT ME 1 MOF ME 1		
Instruct helicopters to maintain a minimum height of 500m over bird foraging areas, surfacing cetaceans or groups of turtles, and prohibit circling or hovering over marine mammals (e.g. for casual viewing) unless essential for safety or emergency purposes.			Area 4 ME 15 LNGMT ME 5 MOF ME 5		
Where feasible, the MMOP should allow for a 'soft start' procedure when megafauna are present in the bay, for approximately 20 minutes prior to operating at the full cycle rate for percussion piling.	C1, C3, NR8, O1	EIA 11.17.2	LNGMT ME 33 MOF ME 33		
If any species of marine mammals, particularly whales, are sighted near the path of a vessel, the vessel will gradually divert to avoid the marine mammal or slow down to idling speed, if this can be done safely.	C1, C3, NR8, O1	EIA 11.7.2	Area 4 ME 14 LNGMT ME 4 MOF ME 4		
Keep any disoriented but otherwise unharmed seabirds found on vessels at night in dark containers and release during daylight. Any ringed/banded birds found on vessels will be reported to the appropriate ringing/banding scheme.	C1, C3, NR8, O1	EIA 11.7.2	Area 4 ME 17 LNGMT ME 7 MOF ME 7		

2.3. Pre-Construction Surveys

Contractor shall carry out the pre-construction surveys outlined in Table 2-4 as well as any other pre-construction survey requirements identified through the impact assessment process.

Table 2-3: Pre-Construction Surveys

No	Specific Requirements	Responsibility	Deliverable
1	Confirm that all Project-related vessels are equipped for compliance with MARPOL 73/78 and additional discharge restrictions established by the Project	Contractor	Vessel Pre-mobilization audit • methodology • report
2	Confirm that masters and crews for all Project-related vessels are appropriately qualified	Contractor	Vessel Pre-mobilization audit • methodology • report
3	Confirm location and status of port facilities in Mozambique and wider East Africa region that will be used for vessel reception / repair / maintenance facilities and MARPOL compliant waste / effluent management during construction period	Contractor	Pre-construction audit of port reception facilities to be used in Mozambique and wider East Africa region • methodology • report • photo/film record of facilities audited
4	Confirm location and boundaries of marine exclusion zones in consultation with the Maritime Authorities and taking into account any new information resulting from ongoing engagement with communities and other stakeholders.	Company	Confirm or update marine exclusion zone coordinates and maps

3. DELIVERABLES

The following deliverables are associated with Marine Operations. Contractor deliverables shall be submitted to the Company for Company approval.

Table 3-1: Summary of Deliverables

Section Reference	Deliverable	Responsibility	Deliverable Date
STAGE 2			
Table 2-2	Topic-specific E&S Report, which as a minimum includes: 1) Definition of the approved Project base case 2) Updated/refined baseline description, as applicable to the base case 3) Updated E&S risks and impacts evaluations 4) Refined list of E&S control measures.	Contractor	To be agreed on contract award
STAGE 3			
Table 2-2	Marine Fauna Observation Procedure	Contractor	To be agreed on contract award
Section 2.3	Topic-Specific CIP, which as a minimum includes: 1) Approved list of E&S control measures 2) Details of how the approved control measures will be implemented (including linkage to other Project plans and procedures, where necessary, to demonstrate the implementation of the E&S controls committed to) 3) Details of the monitoring, reporting and assessment.	Contractor	To be agreed on contract award
Table 2-4	Vessel Pre-mobilization audit - vessel • methodology • report	Contractor	To be agreed on contract award
Table 2-4	Vessel Pre-mobilization audit - crew • methodology • report	Contractor	To be agreed on contract award

Section Reference	Deliverable	Responsibility	Deliverable Date
Table 2-4	Pre-construction audit of port reception facilities to be used in Mozambique and wider East Africa region • methodology • report • photo/film record of facilities audited	Contractor	To be agreed on contract award
Table 2-4	Confirm or update marine exclusion zone coordinates and maps	Company	To be agreed on contract award