ENVIRONMENTAL AND SOCIAL REQUIREMENTS FOR CONTRACTORS: ANNEX 05 – SITE DEVELOPMENT, CONSTRUCTION AND REINSTATEMENT

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 Site Development, Construction and Reinstatement.

1.2. Scope

For the purposes of this document, Site Development, Construction and Reinstatement encompasses the following land-based activities: siting of project infrastructure, civil works, land reclamation, establishment of buffer zones, clearance of vegetation, soil management, storm-water run-off management, erosion and sediment control management of ancillary activities such as concrete batching plants, chemical storage etc, reinstatement and revegetation. Special measures related to wetlands are also found in this document. Measures related to building roads are found in the Road Traffic and Transport document.

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 the Waste Management and Dredging Annexes. Where additional land is required, the requirements in the Additional Land Access Protocol document shall be followed.

1.4. Background Context

The siting of major infrastructure within the DUAT has largely been determined following detailed engineering, environmental and social assessments, as described in the Anadarko / Eni EIA (2014) and a set of government-approved Environmental Management Plans (Anadarko/Eni, 2017a, b, c, d, e). Options for optimizing siting and minimizing impacts to

known Critical Habitat occurring within the DUAT and other important environmental features has therefore already occurred. Nevertheless, there is an assumption that there may still be opportunity for site optimisation and footprint minimisation for some facilities. Similarly, while strategies for site development and reinstatement have also been described, some options remain open, for example, the possible use of dredge material from Palma Bay for landfill, including the reclamation of wetlands. Successful execution of these strategies will require the implementation of a range of control measures and on-going monitoring.

1.5. E&S Risks and Potential Impacts

Table 1-1 outlines the E&S risks and potential impacts identified to date associated with Site Development, Construction and Reinstatement. 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
Vegetation clearing	Loss or degradation of habitat	Reduced population numbers and viability of native plants and animals, including listed species (NR1)
		Increased prevalence of alien and / or invasive species (NR12)
	Sediment laden runoff from disturbed areas	Reduced ecological function and diminished quality of ecosystem services (NR13)
		Reduced water quality in local waterways due to increased turbidity and sediment loading; fish kills; reduced ecological function (P6)
	Diesel/fuel spills	Contamination of surface and groundwater (by petroleum hydrocarbons) (P5)
	Green waste	Greenhouse emissions resulting from burning and decomposition (P12)
Bulk earthworks	Sediment laden runoff from disturbed areas	Reduced water quality in local waterways due to increased turbidity and sediment loading; fish kills; reduced ecological function (P6)
	Dust	Degradation of ambient air quality (P1)
		Dust deposition on plants restricting growth (P7)
	Diesel/fuel spills	Contamination of surface and groundwater (by petroleum hydrocarbons) (P5)
Topsoil removal and storage	Dust	Degradation of ambient air quality (P1) Dust deposition on plants restricting growth (P7)
	Topsoil and subsoil mixing	Degradation or destruction of natural seed bank and soil quality (NR10)
Civil works, including	Altered surface drainage	Altered hydrological regimes to wetlands (increased or diminished flows and accumulations) (NR15)

ACTIVITY	POTENTIAL CONSEQUENCE	RISKS AND POTENTIAL IMPACTS
operation of ancillary facilities, including chemical storage, refueling, concrete batching, materials processing sites	Sediment laden run-off	Reduced water quality in local waterways due to increased turbidity and sediment loading; fish kills; reduced ecological function (P6)
	Erection of barriers (embankments, fences and trenches)	Wildlife entrapment (NR9)
		Fragmentation / partitioning of habitat (physical barrier) (NR2)
		Visual impact (P11)
		Disturbance of important environmentally sensitive animals (NR7)
		Restrictions in the movement of wildlife (NR14)
	Noise generation (Blasting)	Detrimental impact on community health (C2)
	Diesel/fuel spills	Contamination of surface and groundwater (by petroleum hydrocarbons) (P5)
	Concrete slurry spills	Contamination of surface and groundwater (by concrete slurry
	Release of alkaline water from batch plants or from concrete washout activities	Contamination of surface and groundwater (by alkaline water) (P5)
Land reclamation	Loss or degradation of habitat (including Critical Habitat)	Reduced population numbers and viability of native plants and animals, including listed species (NR1)
		Detrimental impact on natural habitat and populations of indigenous plant and animal species (NR3)
	Altered surface drainage	Altered hydrological regimes adjacent to and downstream from reclaimed areas, including wetlands (increased or diminished flows and accumulations) (NR15)
		Erosion and sedimentation along new flow-lines (NR16)
	Sediment laden run-off from reclaimed areas	Reduced water quality in local waterways due to increased turbidity and sediment loading; fish kills; reduced ecological function (P6)
	Diesel/fuel spills	Contamination of surface and groundwater (by petroleum hydrocarbons) (P5)
Water use/extraction	Dewatering of deep excavations	Drawdown of local groundwater levels (NR17)
		Reduced water quality in local waterways due to increased turbidity and sediment loading (P6)
Revegetation	Accidental introduction of invasive plants	Detrimental impact on natural habitat and populations of native plant and animal species (NR3)
		Livelihood impacts on agriculture (LH1)

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 2), 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 Site Development, Construction and Reinstatement the assessment, all 3 stages are required.

Stage 1 – Assessing Alternatives to Develop a Project Base Case

For Site Development, Construction and Reinstatement, the siting alternatives for significant and permanent plant and infrastructure are assumed to have been largely been determined (as described in the set of EMPs referred to in Section 1.4). The need for additional alternatives analyses relating to siting issues is therefore assumed to be limited to facilities such as landfills, incinerators, and temporary facilities such as laydown areas, temporary storage sites, etc. Other activities such as land reclamation involve options and similarly require formal evaluation.

The requirements outlined in Table 2-1 must be completed in order to assess alternatives and determine the Project base case.

Table 2-1: Process for Analysis of Alternatives

Step	Specific Requirements	Responsibility
1	Collect relevant environmental and social baseline data within and adjacent to the latest project footprint, including (but not limited to) the following: • Groundwater • Surface water (i.e., wetlands) • Surface water ecology • Land cover (including habitat) and land use • Weeds and pests • Herpetofauna • Avifauna • Mammals • Settlements (potentially sensitive noise receptors) • Ambient noise • Cultural heritage Document the results of the baseline assessment including the method of baseline collection.	Company

Step	Specific Requirements	Responsibility
2	Develop a Pre-Construction Survey Procedure that will be used as part of the site selection process to identify sites for facilities and infrastructure, taking due consideration of E&S issues (and informed by a Constraints Analysis)	Contractor
3	Assess options for land reclamation, including the use of dredging material sourced from Palma Bay.	Company

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

No	Specific Requirements	Responsibility
1	Update (as required) the plant layout, and location of permanent and temporary facilities and civil infrastructure (i.e., project base case).	Contractor
2	Once the project base case is defined, determine if additional baseline data is needed.	Contractor
3	If required, collect additional (more detailed) environmental and social baseline information.	Company
4	Refine E&S impact / risk assessment considering risks and impacts identified in Table 1-1 and any recently collected data.	Contractor
5	Carry out or refine cumulative impact assessment as required.	Company
6	Assess whether the design and / or execution strategy needs to be modified or optimised in the light of knowledge gained from steps (3) (4) and (5).	Contractor
7	Assess whether there are sufficient / appropriate design and execution control measures in Table 2-3 and Table 2-4 to mitigate the identified impacts and risks and update if necessary and refine as necessary.	Contractor
9	Document results including a summary of the project description for Site Development, Construction and Reinstatement, summary of the environmental and social baseline, risk / impact assessment method, results of the risk / impact assessments, and the proposed list of refined control measures to be applied.	Contractor
10	Update (as required) the plant layout, and location of permanent and temporary facilities and civil infrastructure (i.e., project base case)	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 2-3 (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 2-3 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 2-3: E&S Control Measures

ACTIVITY / SOURCE OF POTENTIAL IMPACT	CONTROL MEASURE	IMPACT / RISK BEING ADDRESSED	SOURCE			Notes
			EIA	EMP	Other	
Overarching Requirements						
	Plan carefully the layout of the Project Footprint Area during the engineering design phase, and consider alternatives to minimise the required Project footprint and reduce the potential impact on High sensitivity areas.		EIA 12.10.2	Area 4 VE 1 Shared VE 1 LNGMT VE 1 MOF VE 1		
	The placement of Project infrastructure should be located on areas of Low to Medium vegetation sensitivity to the extent practicable.		EIA 12.10.2	Area 4 VE 2 Shared VE 2 LNGMT VE 2 MOF VE 2		
	Very high and high sensitivity areas and protected tree species should be preserved to the extent possible through further design adjustment during detailed Design.		EIA 12.10.2	Area 4 VE 3 Shared VE 3 LNGMT VE 3 MOF VE 3		
	Minimise site clearance activities within areas of Very High and High herpetofauna sensitivities to the extent practicable.			Area 4 HE 1 Shared HE 1		
	Minimize site clearance activities within areas of High mammalian sensitivities to the extent practicable.			Area 4 MA 1 Shared MA 1		
	Locate onshore Project infrastructure in areas of low herpetofauna sensitivity to the extent practicable.		EIA 12.11.2	Area 4 HE 2 Shared HE 2		
	Project infrastructure will be located outside wetland areas and natural drainage routes to the extent possible.		EIA 12.11.4 EIA 12.12.4	Area 4 HE 19, AV 11 Shared HE18, AV11 LNGMT AV 10 MOF AV 10		
	Minimise Project Footprint Area within areas of High avifaunal sensitivities to the extent practicable.		EIA 12.12.2	Area 4 AV 1 Shared AV 1		

			LNGMT AV 1 MOF AV 1		
Natural linear features (eg drainage lines) will be retained to the extent practicable to facilitate the movement of bird species.		EIA 12.12.3	Area 4 AV 7 Shared AV 7 LNGMT AV 7 MOF AV 7		
The Project will develop a site management strategy (or similar, e.g. execution or implementation plan or procedure) aimed to also reduce herpetofauna impact, mammalian impact, and impact to estuaries, which will include the following measures to reduce impact on sensitive vegetation: 1. minimise removal of trees greater than 20cm diameter at breast height (DBH) to the extent practicable. 2. avoid disturbances to mangrove areas to the extent practicable. 3. rehabilitate temporary-use areas as soon as practicable, using stockpiled topsoil and vegetation native to the area.		EIA 12.10.2	Area 4 VE 6,7,8 HE 7, MA 5, SW 9 Shared VE 6,7,8 HE 7, MA 5, SW 7 LNGMT VE 6,7,8, MA 2, SW 8 MOF VE 6,7,8, MA 2, SW 8		
The Project will develop a Wetland Management Plan.			Area 4 SW 1,13,24,34 LNGMT SW 1,12,21 MOF SW 1,12,21 Shared SW 1,10,21,31		This can be incorporated within the Site Development, Construction and Reinstatement CIP.
Avoid disturbance to listed species (e.g., IUCN threatened Red Data plant species – the Platycoryne mediocris orchid and Berlinia orientalis) to the extent reasonably practicable				A	
Where possible, minimise construction activities at night time.		EIA 12.4.2	Area 4 NO 1 Shared NO 1 LNGMT NO		

				1 MOF NO 1		
	Ambient noise levels at identified receptors (communities outside the Project Site) should not exceed 45dB(A) at night and 55dB(A) during the day.		EIA 12.4.2	Area 4 NO 2 Shared NO 2 LNGMT NO 2 MOF NO 2		For Operations
	Ambient noise levels at the nearest receptor location offsite should not increase by more than 3dB.		EIA 12.4.2	Area 4 NO 3 Shared NO 3 LNGMT NO 3 MOF NO 3		For Operations
	The construction noise limits of 45dB(A) at night and 55dB(A) during the day are replaced with the following tiered standard: - 0 - 1 month: 70 dB(A) in daytime (7am to 10pm) and 60 dB(A) at night (10pm to 7am) - 1 to 6 months: 65 dB(A) in daytime (7am to 10pm) and 55 dB(A) at night (10pm to 7am) >6 months: 55 dB(A) in daytime (7am to 10pm) and 45 dB(A) at night (10pm to 7am) All units are presented in LAeq (dBA).			Area 4 NO 5 Shared NO 10 LNGMT NO 5 MOF NO 5		For Construction
	Comply with international good practice regarding the maintenance of machinery and equipment and good operational management.		EIA 12.4.2	Area 4 NO 4 Shared NO 4 LNGMT NO 4 MOF NO 4		
Aviation	The Project will develop aviation procedures that will address: - night flights - flight paths			Shared NO 5		
	Flights at night should be avoided to the extent practicable, as there is potential to exceed the sleep disturbance impact assessment criteria at the Ngala Fishing Centre.			Shared NO 6		

	The routing of helicopters should be at least 700m from identified communities.			Shared NO 7		
	If practicable, departure flight routes should be designed to make a turn to the west after a safe altitude is reached, to reduce overflying the Ngala Fishing Centre and to avoid Mbawala and Maganja on the coast.			Shared NO 8		
	Any northerly operations (i.e. arrivals from the south and departures to the north) at night time should be minimized if practical, particularly for larger aircraft (e.g. B737-700).			Shared NO 9		
Design Requirements						
Site planning and preparation	Storage and laydown areas, vehicle parking areas and workers' facilities such as accommodation, eating halls and toilet facilities need to be clearly specified, and activities should be restricted to these areas. Construction staff and contractors should be informed of the importance of minimising their footprint and restricting activities to these areas.	NR1, NR2	EIA 12.9.2	Area 4 SW 7 Shared SW 6 LNGMT SW 6 MOF SW 6		
	Buffer zones will be established outside of the Project Footprint Area to prevent adverse impacts on adjacent wetlands, water bodies and senstive areas. These buffer areas will be clearly demarcated to restrict the movement of construction equipment or workers.	NR1, NR2	EIA 12.10.2 EIA 12.11.2 EIA 12.12.2	Area 4 VE 4, HE 5,18, AV 3 Shared VE 4, HE 5,17, AV 3 LNGMT VE 4, AV 3 MOF VE 4, AV 3		
	Consolidate facilities within the boundaries of the Revised Project Footprint Area (Figure 10.3 of the LNG EIA).	NR1, NR2	EIA 12.5.3	Area 4 VI 7 Shared VI 7 LNGMT VI 7 MOF VI 7		
	All site preparation activities and the footprint of the facilities shall give consideration for eventual decommissioning and	NR1, NR2			A	

reinstatement of natural habitats, especially temporary facilities.					
Wherever possible, avoid impermeable hard surfacing in favour of semi-permeable surfaces.	NR1, NR2, NR15	EIA 12.9.3	Area 4 SW 14 Shared SW 11		
Establish temporary construction and laydown sites in areas of low herpetofauna, avifaunal and mammalian sensitivities.	NR1, NR2, NR15	EIA 12.11.2 EIA 12.12.2 EIA 12.13.2	Area 4 HE 3, AV 2, MA 2 Shared HE 3, AV 2, MA 2, BP 4 LNGMT AV 2 MOF AV 2		
To limit the extent to which the Project Footprint Area encroaches onto the lacustrine wetlands the Project will undertake the following: - the Project Footprint Area will be minimised to avoid reclamation and loss of the wetland and estuary of Catchment A; - the Project Footprint Area will be minimised to avoid reclamation and loss of the wetlands of Catchment C; - the Project Footprint Area will avoid reclamation and loss of the wetland and estuary of Catchment E.	P6, NR15	EIA 12.9.2	Area 4 SW 2 Shared SW 2 LNGMT SW 2 MOF SW 2		
Catchments C and D are outside the Project Footprint Area, but need to be monitored going forward to confirm that indirect or secondary effects are minimised.	P6, NR15	EIA 12.9.2	Area 4 SW 3		
Align facilities layout to the revised EIA footprint so that wetlands in Catchments A, C, D, and E, that are outside the revised EIA footprint area, are not lost or disturbed.	P6, NR15	EIA 12.9.4	Area 4 SW 25 LNGMT SW 13 MOF SW 13 Shared SW 22		

	Where reasonably practicable, avoid locating bridge abutments in rivers.	P6, NR15			A	
	Excavated trenches will be left open for as short a time as possible.	P6, NR15	EIA 12.11.3 EIA 12.13.4	Area 4 HE 13, MA 14 Shared HE 12, MA 20		
	Open excavated trenches should have periodic breaks.			Area 4 HE 13 Shared HE 12		
	Open excavated trenches will have periodic breaks in one slope, with an angle of less than 45° to allow animals to climb out.	P6, NR15		Area 4 MA 15 Shared MA 21		
	Pipelines will either be buried to a depth of 30cm or raised on struts to a height of at least 50cm to allow the free movement of mammals underneath.	NR2, NR9, NR14, P11	EIA 12.11.3 EIA 12.13.4	Area 4 HE 11, MA 17		
	Design Pipeline ROW and access road approaches to watercourses to be as close to right angles as reasonably practicable to limit disturbance to watercourse banks.	NR2, NR9, NR14, P11			A	
Reinstatement	Implement a Company-approved Contractor-prepared Reinstatement Plan and apply to all non-permanent areas disturbed by Contractor during the course of the construction activities. This Plan shall address the clean-up and revegetation of the land (using native plant species), and include consideration for reinstatement of pre-existing topography and drainage contours.	NR1, NR3, LH1			A	The Reinstatement Plan can be incorporated within the Site Development, Construction and Reinstatement CIP.
	Ensure that the protection employed for the footwall is suitable for colonization by corals, sponges and associated organisms. This can be concrete, so-called eco-blocks, or large quarried stone, for example.			LNGMT 31 MOF 31		

Drainage	Intercepting channels will be provided to prevent stormwater run-off from washing across exposed soil surfaces.	P6, NR15, NR16	EIA 12.9.4 EIA 12.9.5	Area 4 SW 26, 36 Shared SW 24, 33 LNGMT SW 14, 22 MOF SW 14, 22		
Effluent Management design	Design stormwater management infrastructure to minimize stormwater runoff from areas without a potential source of contamination by limiting impermeable surfaces in those areas.	P6, NR15, NR16			A	
	Stormwater management should encourage infiltration of clean stormwater into the soil.	P6, NR15, NR16	EIA 12.9.3	Area 4 SW 15 Shared SW 12		
	Design stormwater management infrastructure to segregate contaminated and uncontaminated stormwater.	P6, NR15, NR16			A	
	Establish and implement a Water Resources and Wastewater Management Plan with stormwater retention dam(s) sufficient to capture the first-flush of stormwater. Treat any stormwater that may be impacted by hydrocarbons prior to disposal or discharge.			Area 4 ME 58		The Water Resources and Wastewater Management Plan can be incorporated within the Effluent Discharges CIP
	Design stormwater management infrastructure to include stormwater retention dam(s) sufficient to capture the first flush of stormwater from areas susceptible to contamination.	P6, NR15, NR16			A	
	Surface water management structures within the construction areas must include stream diversion channels, internal run-off	P6, NR15, NR16	EIA 12.9.5	Area 4 SW 37 Shared SW		

	capture and diversion channels, to control sedimentation wherever necessary.			35 LNGMT Shared 24 MOF SW 24		
	Where required, drainage channels will be provided onsite to direct stormwater to sand/silt traps for the removal of soil particles.	P6, NR15, NR16	EIA 12.9.5	Area 4 SW 38 Shared SW 36 LNGMT SW 25 MOF SW 25		
	Design stormwater systems for runoff such that discharges comply with specified Project discharge limitations.	P6, NR15, NR16			A	
Execution Requirements						
Buffer Zone & Work Area Demarcation	The outer limits of wetland buffers in the vicinity of planned developments will be surveyed, clearly defined on the ground and marked as no-go areas prior to the onset of construction activities.	P6, NR15, NR16	EIA 12.9.2	Area 4 SW 6 LNGMT SW 5 MOF SW 5		This does not include wetlands within the revised project footprint which have been approved for construction activities.
	Clearly identify and demarcate the edge of the work area prior to site clearance (and maintain during construction activities) to avoid accidental clearance beyond the approved limits.	NR1, NR2			A	
	Establish 150m buffer zones, outside of the Project Footprint Area, around wetlands to prevent adverse impacts. Buffer areas will be clearly demarcated to restrict the movement of construction equipment and workers into adjacent sensitive areas.	NR1, NR2	EIA 12.13.2	Area 4 MA 3 Shared MA 3		

No impoundments or ponds, stockpiles and waste dumps will be constructed within any of the wetlands or within the 150m buffer zone around streams and wetlands.	P6	EIA 12.9.3	Area 4 SW 20 Shared SW 17		
Buffer zones, outside of the Project Footprint Area, on the estuaries will be strictly adhered to, as they can potentially reduce the impact of run-off as they capture sedimentation as well as potential constituents.	P6	EIA 12.9.4	Area 4 SW 27 LNGMT SW 15 MOF SW 15 Shared SW 25		
Wetlands outside the Project Footprint Area will be considered as sensitive areas, and a minimum 150m buffer zone, outside of the Project Footprint Area, will be maintained around them.	P6	EIA 12.9.5	Area 4 SW 35 Shared SW 32		
Adherence to the 150m buffer zone, outside of the Project Footprint Area, will be regularly monitored and enforced.	P6	EIA 12.9.5	Area 4 SW 30 Shared SW 37 LNGMT SW 26 MOF SW 26		
Construction personnel and equipment will be restricted to the construction area to minimize disturbance to mammal species in adjacent areas.			Area 4 MA 8 Shared MA 8 LNGMT MA 5 MOF MA 5		
Restrict construction personnel to the designated construction area to minimise disturbance to herpetofauna species and avifauna in adjacent areas.	P6	EIA 12.11.3 EIA 12.12.3 EIA 12.13.3	Area 4 HE 14, AV 5 Shared HE 13, AV 5 LNGMT AV 5 MOF AV 5		

Siting and location of stockpiles	Locate stockpiles and waste dumps in accordance with the Site Selection Process and a Constraints Analysis (i.e., no closer than 150 m from a wetland). Cover stockpiles if erosion (and specifically sediment-laded runoff) has the potential to impact sensitive receptors. This is applicable outside the build zone.		EIA 12.9.4		A	
Construction of impoundments or ponds	Avoid the construction of impoundments or ponds within any of wetlands or within the 150m buffer zone around wetlands. This is applicable outside the build zone.		EIA 12.9.3		A	
Vegetation clearance	Work within designated work areas and limit vegetation clearance to the minimum necessary.	NR1, NR12, NR13		Area 4 SW 16 Shared SW 13		
	Vegetation clearance will be limited to the minimum necessary to accommodate construction within the Project Footprint Area in accordance with a Soils, Erosion Control and Reinstatement Management Plan			Area 4 VI 1 Shared VI 1, BP 2 LNGMT VI 1 MOF VI 1		The Soils, Erosion Control and Reinstatement Management Plan can be incorporated within the Site Development, Construction and Reinstatement CIP.
	Carry out clearance of vegetation in a systematic fashion which takes into consideration the displacement of avian, mammal and herpetofauna populations in or near the clearing footprint towards potentially suitable habitats away from the	NR1, NR12, NR13		Area 4 HE 8, AV 4, MA 6 LNGMT AV 4, MA 3		

	clearing activities / off-site to minimise the risk for injury or mortality of fauna to as low as reasonably practicable.			MOF AV 4, MA 3 Shared HE 8, AV 4, MA 6		
	Reclaimed estuaries will be filled in from the upper reaches towards the bay where reasonably practicable to allow motile organisms, fish and crabs to escape to the downstream Palma Bay water body and shoreline.			Area 4 SW 9, ME 59 LNGMT SW 8, ME 37 MOF SW 8, ME 37 Shared SW 7		
	Where tree removal is necessary, limit damage to surrounding habitats by felling trees away from existing stands, where reasonably practicable and safe.	NR1, NR12, NR13			A	
	Clear riparian vegetation in a manner that leaves the roots intact, where reasonably practicable for temporary work areas.	NR13, P6			A	
	Limit the clearing of riparian vegetation at watercourse crossings to the width required to safely accommodate pipeline ROWs and access roads.	NR13, P6			A	
	Where reasonably practicable, stockpile cleared vegetation in a manner that facilitates re-spreading, salvaging and reuse by the Project or communities.	NR13, P6			A	
	Remove trees, debris or soil inadvertently deposited below the top of watercourse banks in a manner that reduces disturbance of the bed and banks, where reasonably practicable and safe to do so.	NR13, P6			A	
Fire Management	Mobile fire-fighting capabilities will be provided to minimise potential impact to habitats from uncontrolled fires.			Area 4 AV 16, MA 25		
	It is recommended that a mobile fire control unit with trained staff be available to extinguish brush fires rapidly in the vicinity of the Project, to minimise potential adverse impacts on habitats from uncontrolled fires.			Area 4 HE 25		

Fauna management	Flush areas of fauna prior to clearing of any habitats, which includes both natural and modified habitats.	NR9			A	
	Aid animals not able to escape readily, such as tortoises, inland terrapins and turtles, chameleons, fossorial reptiles and frogs by capturing and safely releasing into safe and suitable habitats nearby, where these are identified.	NR9			A	
	Surveys and flushing will be conducted at times when such fauna is active and can be readily detected where reasonably practicable.	NR9			A	
	Where fences cross High sensitivity mammalian habitats, allow unhindered passage of mammals to the extent practical, subject to security constraints and requirements.	NR2, NR7, NR9, NR14	EIA 12.13.3	Area 4 MA 9 Shared MA 10		
	Fences will be established in a systematic fashion from the ocean inland, to avoid entrapment within the fence line, subject to security constraints and requirements.			Shared MA 17		
	Larger mammals trapped within the fence line will either be removed by a mammal expert/veterinarian trained in animal trapping and/or chemical immobilisation (in the case of large predators, medium-size predators and larger ungulates). Culling is a last resort.			Shared MA 18		
	If fencing is to be electrified, the lowest electrified strand will be at least 20 cm above the ground surface, subject to security constraints and requirements.	NR2, NR7, NR9, NR14	EIA 12.11.3	Area 4 HE 12 Shared HE 11		
Soil management	Develop and implement a Soils, Erosion Control and Reinstatement Plan, which will inter alia address the following mitigation measures: 1. Restrict extent of disturbance within the Project Site to the extent practicable. 2. Minimise the period of exposure of soil surface, including stockpiles, by revegetating temporary-use areas as soon as practicable after construction activities 3. Use dust suppression measures (eg wetting the ground) when necessary to reduce wind erosion.	NR2, NR7, NR9, NR14	EIA 12.6.2	Area 4 SO 1,2,3,4,5,6 Shared SO 1,2,3,4,5,6, BP 3,6,7 LNGMT SO 1,2,3,4,5,6 MOF SO 1,2,3,4,5,6		Note, this Plan can be consolidated with the Site Development, Construction, Reinstatement CIP.

	4. Stockpiled soil is not to be compacted 5. Stockpiles are to be protected from erosion by stormwater					
	Strip top soil and store for later use in reinstatement of construction activities worksites	NR10, NR12			A	
	Topsoil stockpiles shall be clearly signed for protection and separated from other stockpiles such as subsoil or spoil to avoid mixing or accidental removal.	NR10, NR12			A	
	Minimize the period of exposure of soil surface by re-vegetating areas as soon as reasonably practicable after construction activities (where relevant).	NR10, NR12			A	
	Stockpiles will be covered if erosion is a problem.	NR10, NR12	EIA 12.9.4	Area 4 SW 28 Shared SW 26 LNGMT SW 16 MOF SW 16		
Top soil management	Manage weeds to minimise the potential for spreading during topsoil and subsoil handling.	NR13, P6			A	
	Subsoil stripped off during earthworks shall be stored separately to topsoil to avoid mixing.	NR13, P6			A	
	Topsoil stored during site development shall be stored in a manner that avoids loss or damage.	NR13, P6			A	
Dust management	Dust suppression procedures will be implemented as per the Soils, Erosion Control and Reinstatement Management Plan.	NR13, P6	EIA 12.5.3	Area 4 VI 3 Shared VI 3, BP 9 LNGMT VI 3 MOF VI 3		Note, this Plan can be consolidated with the Site Development, Construction, Reinstatement CIP.
	In large areas of exposed soil such as slope batters, topsoil or subsoil stockpiles or helipads situated next to dust	NR13, P6			A	

	sensitive receptors, Contractor may vegetate using native species or naturalised species approved by Company as a means of dust control.					
	Establish erosion control measures (including for access roads) to prevent the sedimentation of wetlands, water bodies and natural drainage routes.	NR13, P6	EIA 12.9.2 EIA 12.11.4 EIA 12.12.4	Area 4 HE 20, AV 12 Shared HE 19, AV 12 LNGMT AV 11 MOF AV 11		
	Erosion and sediment control measures and practices will be implemented.	NR13, P6		Area 4 SW 11 Shared SW 8 LNGMT SW 10 MOF SW 10		
Erosion and sediment control	Minimize erosion and sedimentation to the extent reasonable practicable by: · Establishing stable landform conditions through design, engineering and revegetation of exposed and disturbed areas · Designing and implementing drainage systems using lining systems where appropriate · Siting and designing infrastructure to limit runoff to natural watercourses · Contouring and limiting the length of slopes · Installing structures to intercept sediment-laden surface runoff to reduce sediment delivery to watercourses · Installing diversion drains to intercept uncontaminated surface runoff around facilities and divert away from cleared areas, where reasonably practicable. · Stockpiling spoil and/or topsoil materials away from watercourses, where reasonably practicable. · Controlling sediment runoff from stockpiles	NR13, P6			A	

· Grading access roads adjacent to watercourses to drain away from watercourses, particularly headwater streams, where reasonably practicable. · Monitoring and maintaining the condition of drainage systems to ensure efficient functioning					
All exposed areas will be stabilised once the covering vegetation has been removed.	NR13, P6	EIA 12.9.5	Area 4 SW 39 Shared SW 38 LNGMT SW 27 MOF SW 27		
Monitor stockpiles for erosion and implement erosion control measures if required.	NR13, P6	EIA 12.9.5	Area 4 SW 40 Shared SW 39 LNGMT SW 28 MOF SW 28		
Silt curtains or traps or another industrial equivalents will be used to restrict the spread of suspended sediments into the wetlands and estuaries.	NR13, P6	EIA 12.9.5	Area 4 SW 42 Shared SW 41 LNGMT SW 30 MOF SW 30		
The sediment removal facilities will be cleaned and maintained on a regular basis to ensure the optimal functionality of the facilities, to prevent sedimentation in wetlands.	NR13, P6	EIA 12.9.5	Area 4 SW 43 Shared SW 42 LNGMT SW 31 MOF SW 31		

	As soon as practicable, revegetate temporary use areas adjacent to wetlands and water bodies, to reduce the likelihood of sedimentation impacts.	NR13, P6	EIA 12.11.4	Area 4 HE 22 Shared HE 20		
	Install measures as necessary (e.g. settlement ponds, silt fences and water treatment) to prevent sediment from being transported off site or to onsite water course within stormwater run-off. Segregate clean stormwater from stormwater containing high levels of suspended solids.	NR13, P6			A	
	Undertake routine inspection of erosion and sediment control measures and carry out appropriate maintenance and repair measures when necessary.	NR13, P6			A	
	If sediment washouts from the worksite occur beyond the project worksite boundary, remedial clean-up action shall be carried out as soon as reasonably practicable after the event.	NR13, P6			A	
	Reduce the time taken between clearing and grading or capping of sites as far as reasonably practicable to limit exposure of soils and subsoils to erosion and scour.	NR13, P6			A	
Effluent Management	Implement a Water Resources and Wastewater Management Plan that is based on GIIP for stormwater management.	P5, P6	EIA 11.21.2	Area 4 ME 57		Note, the Water Resources and Wastewater Management can be consolidated with the Water Use and Abstraction CIP and the Effluent Discharges CIP.
	Establish and implement a Water Resources and Wastewater Management Plan with stormwater retention dam(s) sufficient to capture the first flush of stormwater. Treat any stormwater that may be impacted by hydrocarbons prior to disposal or discharge.	P5, P6	EIA 11.21.2	Area 4 ME 58	A	Note, the Water Resources and Wastewater Management can be

						consolidated with the Water Use and Abstraction CIP and the Effluent Discharges CIP.
	Ensure all discharges comply with specified Project discharge limitations.	P5, P6			A	
	Routinely inspect, clean and repair stormwater management infrastructure.	P5, P6			A	
	Manage sludge and debris removed from stormwater management infrastructure in accordance with requirements set out in the Waste Requirements Plan.	P5, P6			A	
Reinstatement	Undertake site reinstatement for non-permanent areas promptly and progressively as works are staged and as soon as reasonably practicable after disturbance, taking into account the nature of subsequent project activities that will be undertaken at the same sites as well as project approved end uses.	NR15, NR16			A	
	De-compact soils after construction of infrastructures to increase permeability and infiltration, and to improve natural drainage characteristics of soils and minimize erosion	NR15, NR16	LNG EIA Approval Letter S10, No. 42	Area 4 SO 7 Shared SO 7 LNGMT SO 7 MOF SO 7		
	Where excess rock is placed back into the reinstatement works, place a layer of subsoil over the rock to form a 'buffer' between the rock and the final surface topsoil layer that is reinstated last. Topsoil shall not be placed directly over rock because this may impair its quality and function.	NR15, NR16			A	
	When reinstating watercourses, replace stockpiled stream bed rocks, pebbles and/or coarse gravel to facilitate bio-restoration.	NR15, NR16			A	

	Remove all materials or structures temporarily used or placed within or on the ground surface to facilitate construction of the works.	NR15, NR16			A	
	Hardened surfaces will be broken up upon closure of the Project and the areas will be returned to a free-draining state, in accordance with the Decommissioning and Rehabilitation Plan (see Annex F of the LNG EIA).	NR15, NR16	EIA 12.9.3	Area 4 SW 23 Shared SW 20		
	Remove builders rubble/hard core/ demolition waste and any impacted soil from activities, such as operating batching plant, and dispose in accordance with the Waste Management CIP	NR15, NR16			A	
	Development of an active shoreline management and monitoring programme that includes: - a beach monitoring programme; and - Use of land-based construction equipment to move sand from the area of accretion to areas where erosion is evident.			LNGMT ME 31 MOF ME 31		
	Ensure that surface infrastructure used for construction that has no beneficial reuse potential is decommissioned, dismantled and removed from site.	NR15, NR16			A	
Revegetation – general	Temporary use areas will be revegetated / rehabilitated as soon as practicable after sections of work are complete in accordance with a Soils, Erosion Control and Reinstatement Management Plan.	NR3, LH1	EIA 12.5.3 EIA 12.9.3 EIA 12.10.2	Area 4 VI 5, SW 17 Shared VI 5, SW 14 LNGMT VI 5 MOF VI 5		Note, the Soils, Erosion Control and Reinstatement Management Plan can be consolidated within the Site Development, Construction, Reinstatement CIP.

	Rehabilitate temporary-use areas using methods in accordance with the Decommissioning and Rehabilitation Plan (see Annex F of the LNG EIA).			Area 4 VE 9 Shared VE 9 LNGMT VE 9 MOF VE 9		
	Following site clearance, vegetation needs to be encouraged and managed as part of a revegetation programme.			Area 4 SW 17 Shared SW 14		
	Use slow-release fertilizers for landscaping and revegetation in line with the Project's landscaping plan.	NR3, LH1	EIA 12.11.4 EIA 12.12.4	Area 4 HE 23, AV 13 Shared HE 21, AV 13 LNGMT AV 12 MOF AV 12		
	Where appropriate, undertake works to re-establish vegetation in areas that may be slow or difficult to regenerate naturally, difficult to stabilise or prone to erosion.	NR3, LH1			A	
	Where reasonably practicable, use soil, mulch and vegetation debris (that contains natural seed stock) to facilitate natural revegetation of disturbed areas.	NR3, LH1			A	
	Landscaping and rehabilitation should be restricted to the use of indigenous species and species that are known to be non-invasive in tropical climates in accordance with the Projects landscaping plan.	NR3, LH1	EIA 12.10.3	Area 4 VE 13 Shared VE 13, BP 12 LNGMT VE 13 MOF VE 13		
	Disturbed areas will be revegetated with a diversity of naturally occurring tree species, including locally endemic species such as Berlinia orientalis.	NR3, LH1	EIA 12.9.2	Area 4 SW 5 Shared SW 5 LNGMT SW 4 MOF SW 4		

Training	As part of induction training, the Project will develop and provide Environmental Awareness Training. This will include information related to the preservation of sensitive vegetation and avifauna, herpetofauna importance, mammal importance and will be provided to all staff (as well as visitors and labourers).	NR1, NR12, NR13	EIA 12.10.2 EIA 12.11.3 EIA 12.13.3	Area 4 VE 5, HE 6, MA 4 Shared VE 5, HE 6, MA 4 LNGMT VE 5, MA 1 MOF VE 5, MA 1		
	Communicate to workers and potentially affected community members the potential for increase in snake migration during site clearing.	NR1			A	
Monitoring	The following activities shall be monitored by a trained competent environmental advisor or similar: · vegetation clearance to prevent unauthorized clearance · observance of buffer zones · topsoil stripping · translocation of species (if relevant) · reinstatement and revegetation activities.	NR1, NR12, NR13, NR15			A	
	Undertake water quality monitoring of the wetlands within catchments A,C,D and E in accordance with Company's Minimum Environmental Monitoring and Reporting Requirements.	NR17, P6	EIA 12.9.2 EIA 12.9.3 EIA 12.9.4	Area 4 SW 1, 13, 24, HE 20 Shared SW 21 LNGMT SW 1 MOF SW 1		

2.3. Requirements for Additional Land

Where new land is required for new site development, the Contractor shall follow the agreed Protocol for Additional Land in order to gain access to that land.

2.4. 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 2-4: Pre-Construction Surveys

No	Specific Requirements	Responsibility	Deliverable
1	Prepare Constraints Map and take photographs of existing conditions Establish and clearly demarcate buffer areas / boundaries of work areas prior to clearance Identify and field mark all trees or other flora to be protected or translocated, and sensitive areas to be flushed of fauna Map the presence of weeds and pests in and adjacent to the plant footprint area Any known weed areas (as identified by the Pre-Construction Survey and Constraints Maps) shall be clearly signed prior to construction and the signage maintained until construction and reinstatement works are completed Important cultural heritage to be protected Soil condition (topsoil condition and depth, presence of acid sulphate soils, micro-landform, natural features including vegetation type and density physical or geographical features and areas of significant erosion risk requiring temporary erosion control measures)	Contractor	a) Constraints Map b) Photo evidence of field marking c) Weed presence and abundance map

3. DELIVERABLES

The following deliverables are associated with Site Development, Construction and Reinstatement. Contractor deliverables shall be submitted to the Company for Company approval.

Table 3-1: Summary of Deliverables

Section Reference	Deliverable	Responsibility	Deliverable Date
STAGE 1			
Table 2-1	Baseline report	Company	To be agreed on contract award
Table 2-1	Topic-specific Alternatives Analysis Report, which as a minimum includes: 1) Overview of E&S baseline relevant to the options assessment screening 2) Alternatives analysis review, including details of E&S risks and impacts evaluation, as well as other relevant drivers for the decision-making process 3) Final recommendation on the Project base case.	Company	To be advised on contract award
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			
Section 2.3	Additional Land Use Protocol	Company	To be provided prior to contract award
Section 2.3	Description of land needs	Contractor	As required

Section Reference	Deliverable	Responsibility	Deliverable Date
Section 2.2	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	Pre-construction survey report, constraints map, photo evidence of field marking and weed presence and abundance map	Contractor	To be agreed on contract award