ENVIRONMENTAL AND SOCIAL REQUIREMENTS FOR CONTRACTORS: ANNEX 8 – WATER USE AND ABSTRACTION

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 Water Abstraction and Use.

1.2. Scope

For the purposes of this document, Water Abstraction and Use encompasses the requirements that apply to the design, operation and maintenance of groundwater abstraction systems. The requirements also outline a project-level approach to water conservation that avoids depletion of groundwater resources to the extent that others using the resources are not adversely affected.

Freshwater sources are limited to groundwater. Water extraction from freshwater surface water bodies, including freshwater or estuarine wetlands, is prohibited.

Water conservation involves implementing technically feasible cost-effective measures to reduce water consumption in core facilities and activities. Conservation measures include water use reduction, reuse and water recycling.

Effluent discharges related to desalination are contained in Effluent Discharges (Annex 04). Potable water requirements are addressed in the Occupational Health section of the ITT.

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.

1.4. Background Context

The EIA relies on a Pre-FEED project description and water use forecast, that is a combined Area 1 / Area 4 development and a single Operator. The EIA is also mainly focused on water use during the operations phase.

The Anadarko / Eni EIA (2014) (henceforth called the EIA), commitments limit groundwater abstraction to sustainable volumes and prohibits water extraction from freshwater wetland sources. Water conservation aspirations are outlined in the EIA but without specific implementation requirements.

Given that the groundwater reserves are likely to be scarce / insufficient for project needs and meeting the needs of other users, the Project currently intends to use an alternative water supply - desalinated seawater - as the main raw water source. This will be supplemented by groundwater to the extent sustainable, particularly during the construction phase.

Further Project-specific actions are needed to systematically avoid/mitigate E&S impacts arising from groundwater abstraction and to address IFC Performance Standard 3's stated objective of promoting more sustainable use of water.

Although the final mode of water supply has been determined (desalination / groundwater combination) the criteria for sustainable groundwater use and therefore the trade-off between the groundwater abstraction and desalination have not been completed and some additional assessment work is required.

1.5. E&S Risks and Potential Impacts

Table 1-1 outlines the E&S risks and potential impacts identified to date associated with Water Abstraction and Use. 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 2-2).

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

Activity	Potential Consequence	Risks And Potential Impacts
Drilling and producing from water wells	Water Consumption	Contamination of surface water or groundwater (P5) Depletion of a scarce resource (NR5)
Use of fresh water for process, camps and other facilities		Depletion of a scarce resource (NR5) Increased pressure on community resource (C5)

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 Water Abstraction and Use, Stage 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 2-1 are required in order to refine the preliminary E&S control measures outlined in Table 2-2.

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

No	Specific Requirements	Responsibility
1	Update water use forecasts for construction and operations with level of detail sufficient to inform E&S risk/impact assessment of groundwater abstraction.	Contractor
2	Obtain Area 1 water use forecasts and related information about planned raw water source(s) and groundwater abstraction point(s) and rate(s). Estimate water use forecast(s) and groundwater abstraction details for other reasonably anticipated third-party facilities/activities (including the additional demand that is likely to arise as a result of Project-induced in-migration).	Company
3	Define additional E&S baseline data needs and methods to be used to collect data. Ensure social baseline data is informed by a suitable community engagement process. Ensure environmental baseline data characterizes seasonal variability and includes a comprehensive hydrogeological data set for groundwater modelling.	Company
4	Collect relevant onshore E&S baseline data for ground water (e.g. hydrogeological assessment; data for current users and use rates)	Company
5	If required, collect additional (more detailed) environmental and social baseline information.	Contractor
6	Model the impacts of planned water abstraction rates by developing and using a calibrated groundwater model. Refine E&S risk/impact assessment of groundwater abstraction considering risks and impacts identified in Table 1-1. Ensure assessment is informed by a calibrated groundwater model.	Contractor

No	Specific Requirements	Responsibility
7	Refine cumulative impact assessment of groundwater abstraction with a particular focus on water stress from Area 1 facilities/activities and Project-induced in-migration and future planned activity. Engage with stakeholders to inform understanding of future water needs.	Company
8	Affirm or revise acceptable groundwater abstraction rates based on E&S risk/impact assessment results (including results from cumulative impact assessment).	Company
9	Affirm or revise groundwater abstraction and freshwater system design specifications based on the results of the above steps and affirm the capacity needs of the desalination units.	Contractor
10	Affirm or revise design and execution control measures in Table 2-2 based on E&S risk/impact assessment results.	Contractor
11	Document results. Include project description excerpt (i.e. groundwater abstraction final design basis and execution strategy along with adopted water conservation measures); summary of E&S baseline data, risk/impact assessment methodology, and assessment results; and proposed list of control measures to be applied.	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	SOURCE			NOTES
		EIA	EMP	Other	
Overarching Requirements					
General	Water extraction from freshwater surface water bodies, including freshwater or estuarine wetlands, is prohibited.			A	
	No water will be pumped from wetlands (for Project needs).	EIA 12.9.3	Area 4 SW 18 Shared SW 15		
	Investigate water sources to utilise the option/s with the least environmental impact where reasonably practicable.			A	
	Limit groundwater abstraction to sustainable volumes considering other users now and in the future.			A	
	Employ air as a cooling medium for process cooling where technically feasible and cost-effective.			A	
Design Requirements					
Management System	Develop a Water Conservation Procedure in accordance with Good International Industry Practice and with the overall objective of minimizing freshwater use. The procedure shall address, at a minimum: · Facility water balances; · Design and execution measures to reduce water consumption in core facilities and activities, including water reuse and water recycling – e.g. stormwater, hydrotest water, treated wastewater;			A	This can be considered within the Water Use and Abstraction CIP.

	· Water use monitoring, including data management; · Continuous improvement, including use of benchmark data to gauge relative performance; · Reporting; and · Awareness training.				
	Develop a Groundwater Protection Procedure in accordance with Good International Industry Practice and with the overall objective of protecting groundwater resources relied on by Affected Communities. The procedure shall address, at a minimum: · Well operations, including limits on abstraction to protect resource; · Equipment monitoring and maintenance; · Water quality and aquifer monitoring, including sampling techniques/frequencies, sample handling, analytical methods, and data management; · Groundwater modelling; · Nonconformance investigations and corrective actions; and · Reporting (internal, external, routine and nonconformance).			A	This can be considered within the Water Use and Abstraction CIP.
Water conservation	Reduce water use in camps, offices and buildings by installing: · Dual-flush toilets, · Auto shut-off taps, · Low-flow shower heads, and · Water-efficient laundry facilities.			A	
Groundwater protection	Design and locate water wells in accordance with Good International Industry Practice in order to avoid contamination of groundwater.			A	
	Ensure groundwater wells have: · Annular seals to prevent contaminants from entering well;				

	· Mounded soil around wellhead to deflect surface runoff; · Lockable cap to prevent unauthorized access; · Sufficient site access to facilitate monitoring; · Safety bollards (or equivalent) to prevent wellhead impacts; · Continuous water level and flow measurement if well is a production well; and · Automated cutoff switch to discontinue abstraction when wellbore water level falls below preset limit.			A	
Execution Requirements					
Water conservation	Reduce water use in camps by only operating dishwashers and laundry washing machines when fully loaded.			A	
	Ensure that freshwater systems are operated and maintained by trained and competent personnel, and according to manufacturer's specifications.			A	
	Routinely inspect freshwater systems for leaks and repair leaks promptly.			A	
	Use water for dust control only at locations identified as having sensitive receptors at risk to dust exposure caused by Project activities. Water use shall be in addition to other practiced dust control measures. Uncontaminated storm water and treated sanitary/domestic wastewater may be used by Contractor for dust control subject to Company prior approval.			A	
	Inspect and clean the inside of water truck tanks prior to using the trucks for dust control. Inspection records shall be kept and made available for Company review.			A	
Groundwater abstraction	The groundwater level limits in the wetlands (noted as ecologically sensitive areas in the Resettlement Plan, 2016) will not fall below 3m above mean sea level (amsl). Drawdown in the water table near these sites shall be minimized in order to prevent possible saline intrusion into the aquifer as well as maintaining baseflow to wetlands. The Replacement Village abstraction rates will be assessed through routine community engagements. If such engagements suggest project related abstraction is adversely affecting water availability such grievances will be assessed and project	EIA 12.8.3 EIA 12.8.4	Area 4 GW 1		Company will conduct the community engagements.

	action taken where appropriate in accordance with the grievance management process.				
	At the end of Year 1 conduct a review of the monitoring data compared to the groundwater model. Recommend whether any new modelling should be conducted.		Area 4 GW 2		
	The groundwater level limits in the wetlands will be monitored by installation of new monitoring wells in the vicinity, while monitoring of ground water levels at the Replacement Village will be undertaken through existing wells.		Area 4 GW 3		Company will conduct the community engagements.
	Ensure that groundwater abstraction equipment, including monitoring systems, is operated and maintained by trained and competent personnel, and according to manufacturer's specifications.			A	
	Ensure that groundwater monitoring, sample handling and sample analysis is performed by trained and competent personnel.			A	

3. DELIVERABLES

The following deliverables are associated with Water Abstraction and Use. 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 2-1	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 2.2	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