NEMA/TOR/5/2/ PR 16,582 Date: 18/11/2016

Zarara Oil & Gas

RE: ACKNOWLEDGEMENT AND APPROVAL OF TERMS OF REFERENCE (TOR) FOR THE ENVIRONMENTAL IMPACT ASSESSMENT STUDY

We acknowledge receipt of the TOR for the above subject.

Pursuant to the Environmental Management and Coordination Act, 1999 the Second schedule and the Environmental (Impact Assessment and Audit Regulations 31 and 25, your terms of reference for the Environmental Impact Assessment (EIA) study for the proposed Gas Exploratory Drilling in Blocks L4 and L13 in Lamu County has been approved.

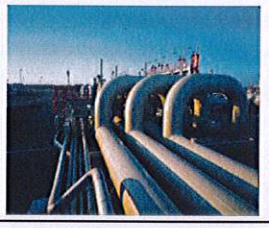
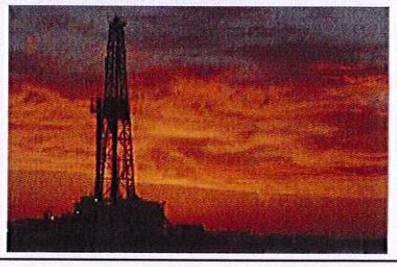
You shall submit ten (10) copies and one electronic copy of your report prepared by a registered expert to the Authority.

BONIFACE MAMBOLEO
EIA SECTION HEAD

Terms of Reference for the Proposed Gas Exploratory Drilling in Blocks L4 and L13 in Lamu County





Prepared for

Zarara Oil & Gas
Limited

Prepared by

ESF Consultants
Environmental Management Consultants

1C Suite 1st Floor| Woodlands Office Park|
Woodlands Road| Off Lenana Road|
Park. P.O Box 7745 00100, Nairobi Kenya|
Cellphone. +254 736 100 204/5/6|
www.esfconsultants.org
Your Environmental Partner

November 2016

Approved
18/11/16

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY
15 NOV 2016
ENVIRONMENTAL IMPACT ASSESSMENT
P.O. BOX 67839 - 00200, NAIROBI

Abbreviation

2D	two-dimensional
3D	three-dimensional
EMCA	Environmental Management and Coordination Act
EMP	Environmental Management Plan
ESIA	Environmental and Social Impact Assessment
GIIP	Good International Industrial Practice
GIS	Geographic Information System
NEMA	National Environment Management Authority
NGO	Non-governmental organization
NMK	National Museum of Kenya
PSC	Production Sharing Contracts
TOR	Terms of Reference

Units

Km	Kilometre
M	Meter

Contents

List of Figures

List of Tables

1. Introduction

Zarara Oil and Gas Limited (Zarara), a wholly owned subsidiary of Midway Resource International with a 75% working interest in Blocks L4 and L13, is the operator of the blocks and wishes to carryout Gas Exploratory Drilling in the said Blocks in Lamu County. Zarara plans to undertake a hydrocarbon exploration drilling programme to further explore and appraise the gas discoveries made by Shell in the 1970s.

A project Report was submitted to National Environment Management Authority (NEMA) on the 29th of September 2016 (Reference number **NEMA/PR/5/2/16,582**) and a response was received from NEMA indicating that a full ESIA Study should be performed. This document presents the Terms of Reference (TOR) for undertaking an Environmental and Social Impact Assessment (ESIA) for the proposed Gas Exploratory Drilling in Blocks L4 and L13 in Lamu County.

The purpose of the TOR is to outline the process for conducting the project ESIA. This TOR has been developed subject to the guidelines and requirement of the Environmental Management and Coordination Act (EMCA), 1999 (Amendments 2015). The ESIA Study seeks to examine both the positive and negative impacts associated with the proposed development on both the physical and socio-economic environment. This will enable sound decision making to promote human activities that align synergistically with the natural world within a suitable development framework. Therefore, the ESIA report will be an important planning tool for the project proponent as it will outline any significant project effects and clearly define mitigation measures to avoid or curb any adversities.

2. Project Background

2.1. Project Proponent

Zarara is the Operator of Blocks L4 and L13, with a shareholding with two other companies as represented in Table 1. Two Production Sharing Contracts (PSC) were signed on the 3rd December 2008 with SOHI-Gas Lamu Limited for a 90% interest in Block L4 and SOHI-Gas Dodori Limited for a 90% interest in Block L13, collectively SOHI with the balance of 10% being a carried interest for the Government of Kenya through to commerciality. The PSCs were for an initial three-year exploration period, which have been extended on two occasions through to 3rd June 2017. The PSCs contain minimum work programmes of two-dimensional (2D) and three-dimensional (3D) seismic, together with a high-resolution ground magnetic and gravity survey over the Pate structure and the drilling of one exploratory well to a minimum vertical depth of 4,500 m. On 4th April 2011, SOHI farmed out its interests to Zarara, whereby Zarara, committed to fund the minimum work programme for a 75% interest in the blocks from SOHI.

Table 1: Current shareholding interest for oil blocks L4 and L13

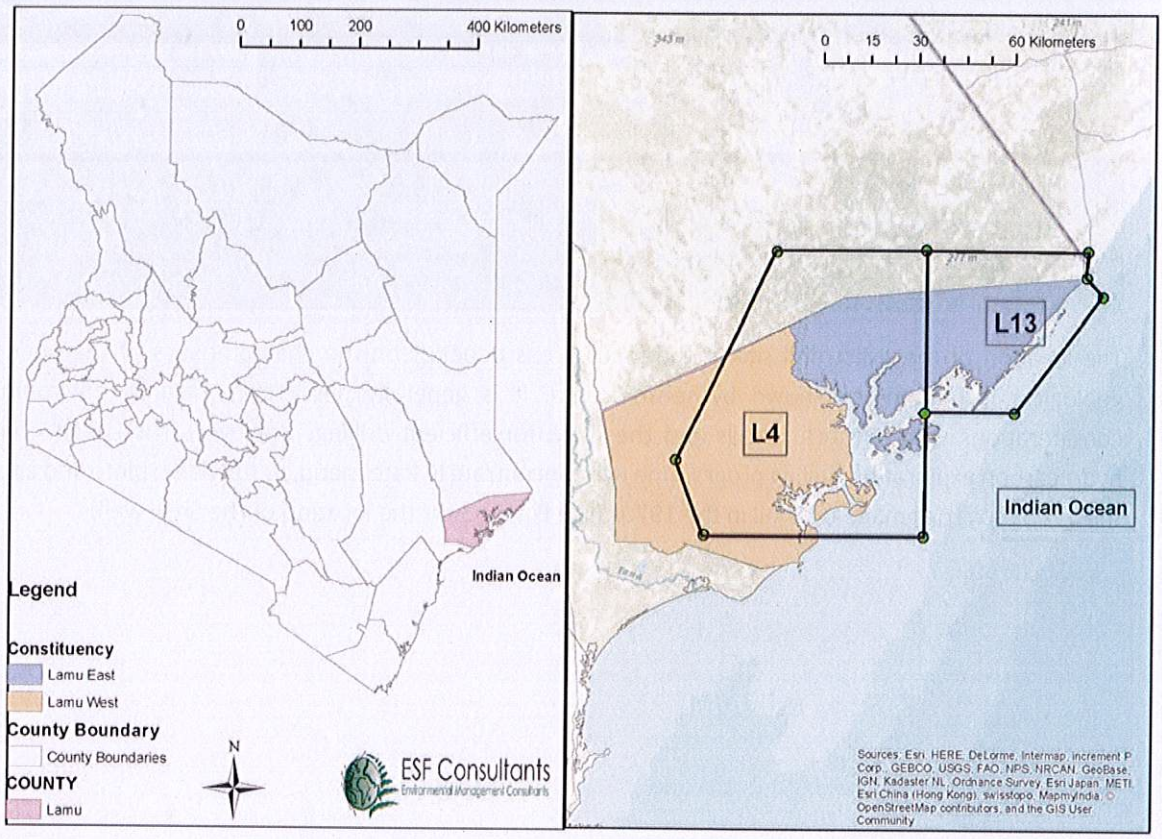
Company	Equity (%)
Zarara (Operator)	75
SOHI	15
Government of Kenya	10

Zarara's business plan is to commercialise the prospect in a phased approach. Phase I is a drilling programme covering the drilling and testing of wells to explore and appraise the resource potential. Zarara plans to undertake a hydrocarbon exploration drilling programme on Blocks L4 and L13 in Lamu County to further explore and appraise the gas discoveries made by Shell in the 1970s which encountered high-pressure gas, but in an unknown quantity and quality as the well did not fully penetrate the reservoir section and was neither logged nor tested due to technical problems whilst drilling.

2.2. Project Location

The hydrocarbon exploration drilling programme on Blocks L4 and L13 in Lamu County, with specific focus on Pate Island (See Figure 1 and Figure 2 below).

Figure 1: Location of Block L4 and L13 in Lamu County

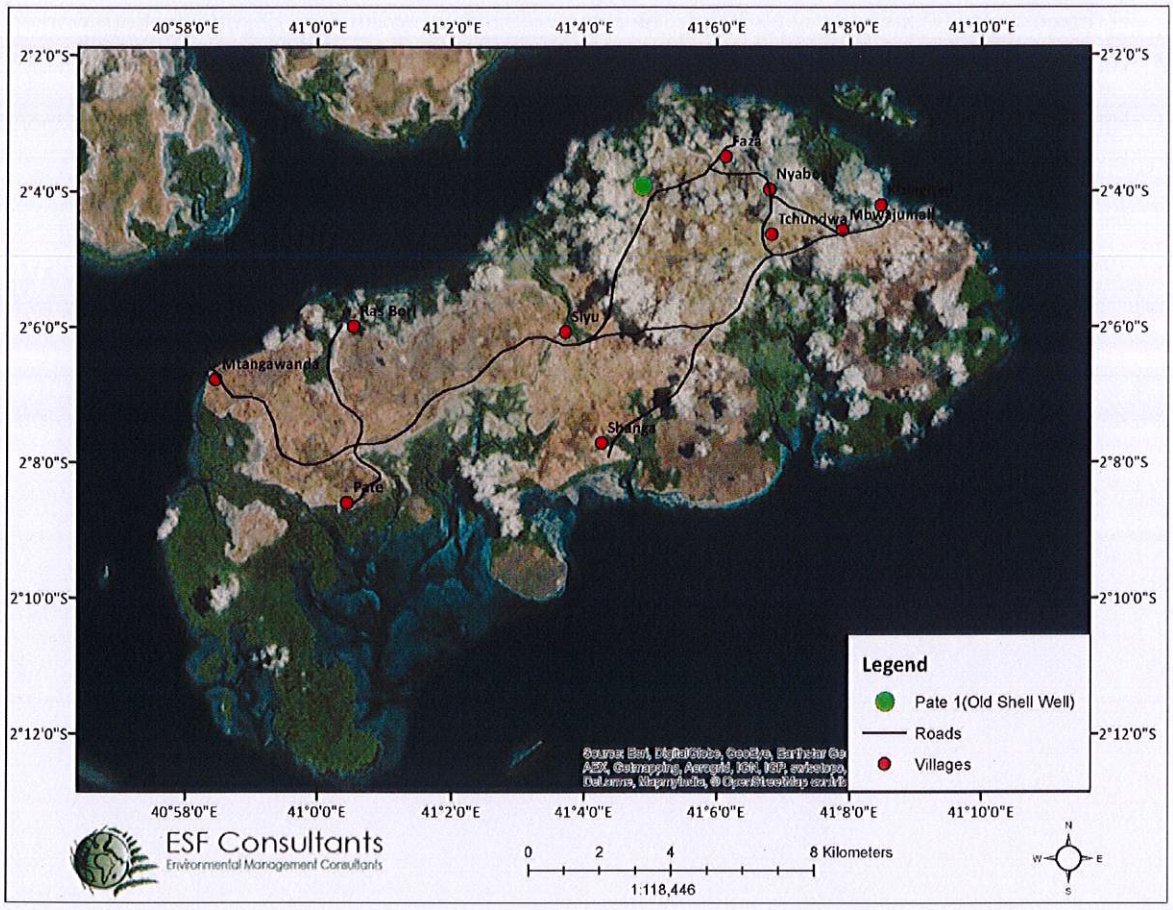


Source: ESF Consultants

Figure 2: Location of the three islands in Lamu County

The location of the exact drill site in the focus areas depends on the characteristics of the underlying geological formations as shown by seismic data. It is generally possible to balance environmental considerations with logistical needs and the need for efficient drilling. However, it is known that the hydrocarbon exploration drilling programme will concentrate in Pate Island, to further explore and appraise the gas discoveries made by Shell in the 1970s (see Figure 3 for the location of the Shell well)

Figure 3: Location of Pate 1 - Shell Well



Source: ESF Consultants

In 2012, Zarara conducted a 6,200 kilometres (km) high resolution airborne magnetic and gravity survey in order to produce a regional map of the main depocentres where hydrocarbons may be generated thereby permitting a more optimised location and orientation of the 2D seismic lines over prospective structures in the blocks. In 2013, Zarara acquired 400 km of 2D seismic, interpretation of which enabled more detailed maps to be produced. These surveys together with past seismic, well log and past geological interpretations have been integrated by Zarara, as Operator, to estimate the potential resource and define the drilling targets for the drilling campaign.

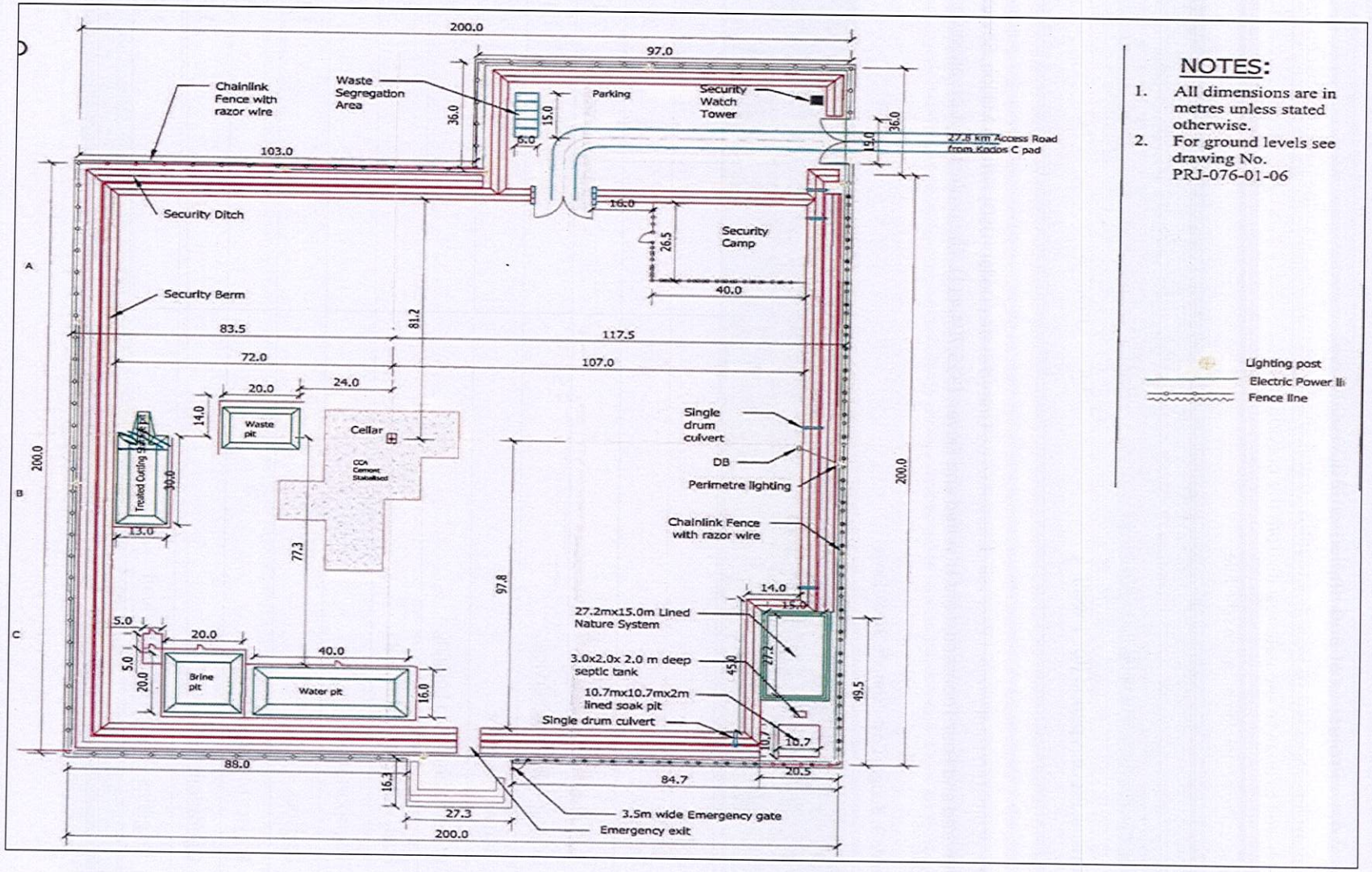
2.3. Project Design

Exploratory drilling is a temporary and short duration activity and includes site preparation, equipment assemblage, well-site and drilling pad construction, erection of the rig, drilling, testing and restoration of the well-site. In the event that potentially commercial volumes of hydrocarbons are discovered additional exploration wells and/or appraisal wells are likely to be drilled in the future to provide greater information on the likely nature and scale of the hydrocarbon resources.

A well-pad will be constructed at the drilling site to accommodate the following, but not limited to: the rig, ancillary drilling equipment, accommodation and offices, among others and it will cover an area of approximately 200 metres (m) by 200m. The camp will hold approximately 120 people, both workers and contractors. The mobilisation and establishment phase is expected to last up to 60 days.

Figure 4 below shows a typical layout of a well-pad. The type of well-pad to be contracted will depend on terrain, soil conditions, and seasonal constraints.

Figure 4: Well-pad layout



2.4. Project Cost and Implementation Schedule

Each well is expected to take 3- 4 months to drill and there may be a standby period between drilling of each well to analyse the data results from the previous well.

Table 2: Project Implementation schedule

Task	Period
Rig mobilisation and establishment phase	60 Days
Drilling Process period (for 1 well)	3-4 months

The estimated total project cost is estimated to be **United States Dollar (USD) Fifteen Million, Seven Hundred and Four Thousand, Four Hundred and Eleven ($15,704,411).** The project cost breakdown is as follows:

Table 3: Budget Cost Estimate Breakdown

Budget Cost Estimate	
Line Items	**Cost Estimate (USD)**
Civils	1,060,000
Rig move	2,250,000
Drilling Unit	2,114,300
Drilling Tools and Services	1,400,973
Mud and Cement	2,219,742
Wireline and Mud Logging	940,809
Fuel, water and lubricants	596,328
Transportation	328,116
Logistics	1,109,876
Project Management	922,045
Operations Support	1,271,707
Tangibles - Casing and Wellhead	1,490,515
Budget Cost:	**$15,704,411**

As per the updated NEMA levies and processes hydrocarbon projects are classed as high risk projects, hence the EIA license fee will be **0.1% of the total cost of the project subject to a minimum of Kenya Shillings Fifty Thousand (Ksh. 50,000) and a maximum of Kenya Shillings Forty Million (Ksh. 40, 000, 000)**

Hence, the 0.1% to be paid to NEMA is **USD Fifteen Thousand, Seven Hundred and Four, and Forty-One Cents ($15,704.41)**. Equivalent to **Kenya Shillings One Million, Five Hundred and Eighty-Six Thousand, One Hundred and Forty- Five, and Fifty-One Cents (Ksh. 1,586,145.51)** using the exchange rate of 1 US DOLLAR: Ksh.101 (Central Bank of Kenya Rate on the 17th August 2016).

3. `The ESIA Process

ESF Consultants will undertake the ESIA Study under the requirements of the EMCA 1999 schedule II as stipulated by NEMA. The study will break down the proposed project activities into four phases:

- Design phase
- Construction phase
- Operational phase
- Decommissioning phase

The objectives of an ESIA study is to:

- Identify and analyze the impacts of the proposed project on the natural environmental
- Evaluate impacts of the project on the socio-cultural environment and socio-economic environment
- Assess impacts on infrastructure and social amenities
- Assess and predict any effects on any sensitive ecosystems
- Identify and predict impacts on and changes in development policy with respect to the area; and develop project mitigations

To achieve the ESIA objectives the ESIA has to cover the following aspects:

- Define the legal, institutional and policy framework of the proposed project
- Establish the existing environment where the project falls
- Analyse the alternatives to the proposed project
- Analyse the potential impacts of the proposed project
- Develop accurate and practical mitigation measures for the significant negative impacts
- Develop an Environmental and Social Management Plan (ESMP) for the significant negative impact
- Identify, consult and involve all stakeholders to facilitate all study objectives

We will further expand the information gathered in the Project Report using the methodology shown illustrated below.

3.1. ESIA Methodology

3.1.1. Policy, Legislative and Administrative Framework

Through a detailed desktop study, we will identify and review the existing Kenyan institutions, legislation, policies, plans and programmes; which will influence the implementation of the project, maintenance, and enhancement of the environmental resources. The task will therefore involve examination and description of pertinent regulations and standards governing environmental quality; health and safety; protection of sensitive ecosystems and endangered species; site selection; carrying capacities and threshold values land use control etc. The study will describe and assess Kenyan regulations and standards; International Laws, Conventions, Protocols and Guidelines which Kenya has ratified pertinent to the Project and Natural Resource Management.

In order for the proposed project to be environmentally sustainable, we will review the project against both National and International regulatory frameworks to ensure compliance. Some of the Kenyan legislative and legal frameworks the ESIA team will review will include, but not limited to: