AECOM

Eco & Partner Consult

EA-1/EA-1A & EA-2 North Project –

Environmental and Social Impact Assessment (ESIA) Scoping Report / Terms of Reference

December 2015

TULLOW OIL

TOTAL

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LIST OF ACRONYMS AND ABBREVIATIONS

ACRONYM	DESCRIPTION
ACOP	Africa Child Online Protection
AEAM	Adaptive Environmental Assessment and Management
AG EMP	Albertine Graben Environmental Management Plan
ALC	Area Land Committee
ART	Antiretroviral therapy
ASL	Above Sea Level
AUTO	Association of Uganda Tour Operators
BAT	Best Available Technique
BIRUDO	Buliisa Initiative for Rural Development Organisation
BPEO	Best Practical Environmental Option
BUCAWA	Buliisa Catholic Women's Association
BVS	Block Valve stations
Bwpd	Barrels of water per day
CAA	Civil Aviation Authority
CAO	Chief Administration Officer
CEDAW	Convention on the Elimination of All Forms of Discrimination against Women
CFR	Central Forest Reserves
CIA	Cumulative Impact Assessment
CMS	Convention on Migratory Species
CNOOC	China National Offshore Oil Company
CPF	Central Processing Facility
CRED	Civic Response on Environment and Development
CRI	Cuttings Re-injection
CSBI	Cross Sector Biodiversity Initiative
CSO	Civil Society Organisation
CWA	Community Wildlife Area
DCDO	District Community Development Officer
DFR	Directorate of Fisheries Resources
DHMT	District Health Management Team
DHO	District Health Officer

DLB	District Land Board
DLO	District Land Office
DMU	Discrete Management Units
DMM	Department of Museums and Monuments
DMU	Discrete Management Unit
DPMD	District Production and Marketing Department
DWC	District Wildlife Committee
DWRM	Directorate of Water Resource Management
EA	Exploration Area
EARS	East African Rift System
EBA	Endemic Bird Area
EBS	Environmental Baseline Study
EDD	Environmental Due Diligence
EIA	Environmental Impact Assessment
EHS	Environmental Health and Safety
ENVID	Environmental Impact Identification
ERA	Environmental Risk Assessment
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
EU	European Union
FEED	Front end engineering design
FGD	Focus Group Discussion
GBIF	Global Biodiversity Facility
GDP	Gross Domestic Product
GHG	Greenhouse gas
GIIP	Good International Industry Practice
GIS	Geographic Information System
GNI	Gross National Income
HC	Health Centres
ha	Hectares
HDD	Horizontal Directional Drilling

HMIS	Health Management Information System
HRW	Human Rights Watch
HSE	Health, Safety and Environment
IA	Impact Assessment
IBA	Important Bird Area
IDP	Internally-Displaced Persons
IFC	International Finance Corporation
IFC PSs	IFC Performance Standards
IPIECA	Global Oil and Gas Industry Association for Environmental and Social Issues
IUCN	International Union for Conservation of Nature
Km^2	Kilometre squared
LACWADO	Lake Albert Children and Women's Development
LARF	Land Acquisition and Resettlement Framework
LC	Local Council
LRP	Livelihood Restoration Plans
LEAF	Lakes Edward and Albert Fisheries
MBOPD	thousand barrels of oil per day
MEMD	Ministry of Energy and Mineral Development
MFNP	Murchison Falls National Park
MFCA	Murchison Falls Conservation Area
MGLSD	The Department of Occupational Safety and Health, Ministry of Gender Labour and Social Development
MHLUD	Ministry of Lands, Housing and Urban Development
MMSCFD	Million Standard Cubic Feet per Day
MoESTS	Ministry of Education, Science, Technology and Sports
MOWT	Ministry of Works and Transport
MPFM	Multi-Phase Flow Meters
MTWH	The Department of Museums and Monuments, Ministry of Tourism, Wildlife and Heritage
MWE	Ministry of Water and Environment
NADFs	Non-aqueous drilling fluids
NaFIRRI	National Fisheries Resources Research Institute
NBDB	National Biodiversity Databank
NBI	Nile Basin Initiative

NCD	Non Communicable Diseases
NDP	National Development Plan
NEMA	National Environment Management Authority
NEMP	National Environment Management Policy
NFA	National Forestry Authority
NGWDB	National Groundwater Database
NIS	Environmental Information Network
NGO	Non-Governmental Organisation
NTS	Non-Technical Study
OECD	Organisation for Economic Cooperation and Development
OC	Operator Camps
OGP	International Association of Oil and Gas Producers
OSB	Operation Support Bases
PAPs	Project Affected Persons
PEDPD	Petroleum Exploration Development and Production Department
PDP	Physical Development Plan
PDU	Polymer Dissolution Unit
PS	Performance Standards
PSA	Production Sharing Agreement
RAP	Resettlement Action Plan
SEA	Strategic Environmental Assessment
SEP	Stakeholder Engagement Plan
SHBS	Social and Health Baseline Survey
SRTM	Shuttle Radar Topography Mission
STOIIP	Stock tank oil-initially-in-place
TEP Uganda	Total Exploration & Production (E&P) Uganda B.V
ToR	Terms of Reference
t	Tonnes
TUOP	Tullow Uganda Operations Pty Ltd
UEB	Uganda Electricity Board
UETCL	Uganda Electricity Transmission Company Limited
UGX	Ugandan Shilling

UHRC	Ugandan Human Rights Commission
ULA	Uganda Land Alliance
UNBS	Uganda National Bureau of Standards
UNRA	Uganda National Roads Authority
USAID	United States Agency for International Development
USGS	United States Geological Survey
UWA	Uganda Wildlife Authority
VECs	Valued Environmental and Social Components
VHT	Village Health Teams
WBDFs	Water based drilling fluids
WCS	Wildlife Conservation Society
WHO	World Health Organisation
WWF	World Wildlife Fund

INTRODUCTION AND OVERVIEW

01

1 INTRODUCTION AND OVERVIEW

1.1 PROJECT OVERVIEW

Total Exploration & Production Uganda B.V. (hereafter referred to as 'TEP Uganda') and Tullow Uganda Operations Pty Ltd (hereafter referred to as 'TUOP') plan to develop the discovered oil fields located in the Lake Albert region of Uganda. The location of the Project is outlined in Figures 1-1 and 1-2.

The oil field concessions to which this environmental and social impact assessment (ESIA) Scoping Report relates are for the Exploration Areas 1 and 1A (EA-1 / EA-1A) and the North of Exploration Area 2 (EA-2 (North), hereafter referred to as the 'Project', within Buliisa and Nwoya Districts, which forms part of the wider oil and gas development being undertaken in the Lake Albert region.

Ownership and control of minerals and petroleum in, on or under any land or waters in the country is vested in the Government by Article 244 of the Constitution of the Republic of Uganda, 1995 (Ref. 1-1). The Ministry of Energy and Mineral Development through the Petroleum Exploration Development and Production Department (PEDPD), has promoted and regulated the exploration of oil and gas in the country. Petroleum exploration and production activities in the country are guided by the Petroleum (Exploration, Development and Production) Act 2013 (Ref. 1-2).

The Project is being developed by TEP Uganda and TUOP and comprises the upstream development of twelve fields, six in Exploration Block EA-1/1A, operated by TEP Uganda and six in Block EA-2, operated by TUOP.

The Project will be executed in a series of activities which include:

- Project engineering;
- Land acquisition and resettlement;
- Early works: development of early infrastructure and the temporary facilities by the project operator;
- Development of production infrastructure including:
    - Construction and Drilling;
    - Pre-commissioning; and
    - Commissioning.
- Operation and production; and
- Decommissioning.

The Pre-project phase has already been undertaken which consisted of a number of high level feasibility studies which have been used to help in the initial design of the Project to help avoid significant adverse impacts wherever possible.

There are a number of other schemes which may need to be undertaken by other parties to support the Project. These include in particular, upgrades to existing infrastructure and development of new supporting infrastructure.

In order to comply with Ugandan legislation, an ESIA will be prepared and submitted to the National Environment Management Authority (NEMA) in due course. This document presents the findings of the ESIA Scoping Study and provides an overview of activities which will be conducted as part of the main ESIA.

1.2 PROJECT RATIONALE

1.2.1 Oil and Gas Exploration and Production in Uganda

Uganda is a land locked country in East Africa with Kenya to the East, Tanzania to the South, Rwanda to the South West, Democratic Republic of Congo to the west and South Sudan to the North. The cost of petroleum

products constitutes over 15% of the country's total import bill and these products are mainly imported through the port of Mombasa in Kenya, a distance of 1,300 kilometres (km) from the capital city Kampala. Some products are also imported through the port of Dar es Salaam in Tanzania, which is a longer distance from Kampala.

Commercial quantities of oil were first discovered in Uganda in 2006 within the Albertine Graben in the western part of the country. To date, discoveries of oil and gas have been made containing an estimated total volume of 6.5 billion stock tank oil-initially-in-place (STOIIP) barrels of oil (bbl), of which about 1.4 billion bbl are estimated as recoverable and about 670 billion cubic feet of gas. The oil is generally light to medium gravity, sweet, with low Gas-Oil-Ratio and some associated wax.

The Government of Uganda has plans for commercialization of the discovered resources, which includes development of a 60,000 bbl/day modular refinery starting at a processing capacity of 30,000 bbl/day, use of crude oil to generate electricity in the short term, and export of crude oil by pipeline or any other viable means in the long term.

Implementation of this oil development strategy requires significant financial capital investment. Recognizing the need for foreign investment, the Government of Uganda opened an international bidding process and awarded a number of contracts to international oil companies for the development of various Ugandan oilfields.

The Government of Uganda expects that the development of the oil and gas industry will stimulate accelerated economic growth, job creation, poverty eradication and general prosperity to the people in Uganda.

1.2.2 Oil and Gas Exploration in the Albertine Graben

Currently, approximately 10% of the Graben is licensed to three oil companies: TUOP, TEP Uganda and China National Offshore Oil Corporation (CNOOC) Uganda Limited. Each of the three companies holds 33.3% equity in four licenses. CNOOC as operator was issued a production license for the Kingfisher field. TUOP has submitted applications for production licenses for over nine discoveries in Buliisa and Kaiso-Tonya areas. TEP Uganda has submitted five applications for production licenses for discoveries of Gunya, Mpyo, Jobi-East, Jobi-Rii and Ngiri.

1.2.3 Executing Arrangements for Petroleum Development Operations

Petroleum exploration and production activities in the country are guided by the Petroleum (Exploration and Production) Act. A license is required for any person to carry out petroleum exploration and development and production operations. Licenses are granted by the Minister for Energy and Mineral Development. Applications for Production Licenses for the Project have been submitted by both TEP Uganda and TUOP to allow for the Project to proceed.

In addition to issuing of licenses to oil companies, the Act provides for the entry into agreements by the oil companies and Government. The Government of Uganda has, to date, used a production sharing form of petroleum agreement known as a Production Sharing Agreement (PSA). The parties to PSA's are the government and licensees (oil companies). The PSA details the specific obligations and requirements of the parties to the Agreement. These include work programmes and financial obligations, Health, Safety and Environment (HSE) requirements together with other data and reporting obligations.

Figure 1-1: Geographic Context of Project Location

Figure 1-2: Location within Uganda

1.3 OVERVIEW OF THE PROPOSED PROJECT

1.3.1 Background

In February 2012, TEP Uganda and CNOOC Uganda were each granted the acquisition of a one-third interest in Exploration Areas (License Areas) EA-1 and EA-1A, EA-2 and EA-3 in Uganda, previously held by TUOP. TUOP retained the remaining one-third interest.

The integrated development[1] of the Lake Albert fields (Figure 1-3), covering the four license areas is operated respectively, from north to south, by TEP Uganda (EA-1 / 1A), TUOP (EA-2) and CNOOC (Kingfisher; formerly EA-3). The integrated development of the Lake Albert fields is sub-divided into three areas:

- Buliisa-Nwoya, which comprises TEP Uganda's EA-1 / EA-1A and TUOP's EA-2 Northern fields (which is the focus of this ESIA);
- Kaiso-Tonya, which comprises TUOP's EA-2 Southern fields; and
- Kingfisher, which comprises CNOOC's EA-3.

These four blocks cover a total area of close to 10,000 square kilometres (km^2) (see Figure 1-3). It is the intention of TEP Uganda, TUOP and CNOOC to jointly operate the Buliisa-Nwoya, Kaiso-Tonya and Kingfisher development projects.

Consents for the development of the respective development projects will be sought separately by the individual Block Operators. This ESIA Scoping Report relates specifically to the development of the EA-1 / EA-1A fields and EA-2 Northern fields (Buliisa-Nwoya) referred to herein as the 'Project', as shown in Figure 1-4. Other connected projects include the development of a refinery located within the Hoima region as well as the potential construction of a future export pipeline to transport any produced oil from the region to a suitable export hub.

A3 versions of all the main figures presented within this Scoping Report are provided within Appendix B.

1.3.2 Project Objectives

The overall objective of the Project is to establish production of the known oil fields in an economically prudent manner using sound reservoir management principles and following best industry practice. This will be accomplished while ensuring the safety of workers and the public and while limiting as far as practicable adverse environmental and socioeconomic impacts of the project activities, whilst also seeking to achieve a net gain in biodiversity and ecosystem services for the most sensitive areas, in compliance with IFC standards. The Project includes several reservoirs that provide potential to produce oil and gas. It should be understood that a variety of factors including reservoir quality, oil commodity prices, support from relevant Uganda Government Ministries and development costs will influence the plan that is implemented and anticipated production rate achieved.

1.3.3 Overview of the Project

The Project is part of the wider oil and gas development being undertaken in the Lake Albert region (Figure 1-3). The Project area is approximately 92,000 hectares (ha) (40 km by 23 km), as illustrated in Figure 1-4.

The Project has been broken down into the following phases each of which will be addressed for the Project components:

- Project engineering;
- Land acquisition and resettlement;

[1] The integrated development includes the Kingfisher Field in EA-3A, the Kaiso Tonya Development in the South of Block EA-2 and the Buliisa Development in Block EA-1 and the north of Block EA-2. It is envisaged that two Central Processing Facilities (CPFs) will be constructed; one in Buliisa and one in Kingfisher, feeder pipeline to an export station and to a third party refinery located near Hoima.

- Early works development of early infrastructure and the temporary facilities by the project operator;
- Development of production infrastructure including:
    - Construction and Drilling;
    - Pre-commissioning; and
    - Commissioning.
- Operation and production; and
- Decommissioning.

Overall, the Project will comprise the following key components:

- 43 well-pads, each containing up to 25 wells, and with a total 457 wells (211 producers, 205 injectors, 41 observation wells). Each well-pad will be approximately 2 to 3 ha in size;
- A single Central Processing Facility (CPF) area, with the capacity to process approximately 190 thousand barrels of oil per day (MBOPD), located south of Victoria Nile River ('Nile'). The CPF will have a water treatment facility with an estimated capacity of about 830,000 barrels of water per day (bwpd), and will cover an estimated 170 ha. There will also be a power generating facility within the CPF designed to convert produced gas into electricity for internal consumption and excess exported to the national grid;
- A construction camp and two main operational centres and camps, one within the CPF located close to the production facility, and another north of Victoria Nile;
- A lake water abstraction facility located near the Lake Albert shore;
- A network of buried pipelines, approximately 305 km combined length, including:
    - Production pipelines with a combined length of approximately 120 km to transport the oil and produced gas;
    - The water abstraction line, bringing water from Lake Albert to the CPF, approximately 13.6 km in length;
    - Water injection pipelines, with a combined length of approximately 110 km to transport treated water from the CPF to the well pads; and
    - Polymer injection pipelines with a combined length of approximately 63 km to transport polymer from the CPF to certain wells.
- A Nile river crossing beneath the riverbed to connect the fields located in Murchison Falls National Park (MFNP) to the CPF (1 production pipeline, 1 water injection pipeline, 1 polymer injection pipeline, 1 spare pipeline and electrical and fibre optic cables); and
- Upgraded and new access roads and possibly waste management areas within the Project Area.

Additional information on the key components of the Project is described in Chapter 3 of this ESIA Scoping Report. Many aspects of the Project are currently in the preliminary planning phase. However, the main ESIA will be developed in conjunction with the front end engineering design (FEED). This will be ideal as it will allow some of the provisional results of the impact assessment to feedback into the FEED process, thus potentially avoiding any significant adverse impacts and also allowing for any design changes to also be assessed within the ESIA.

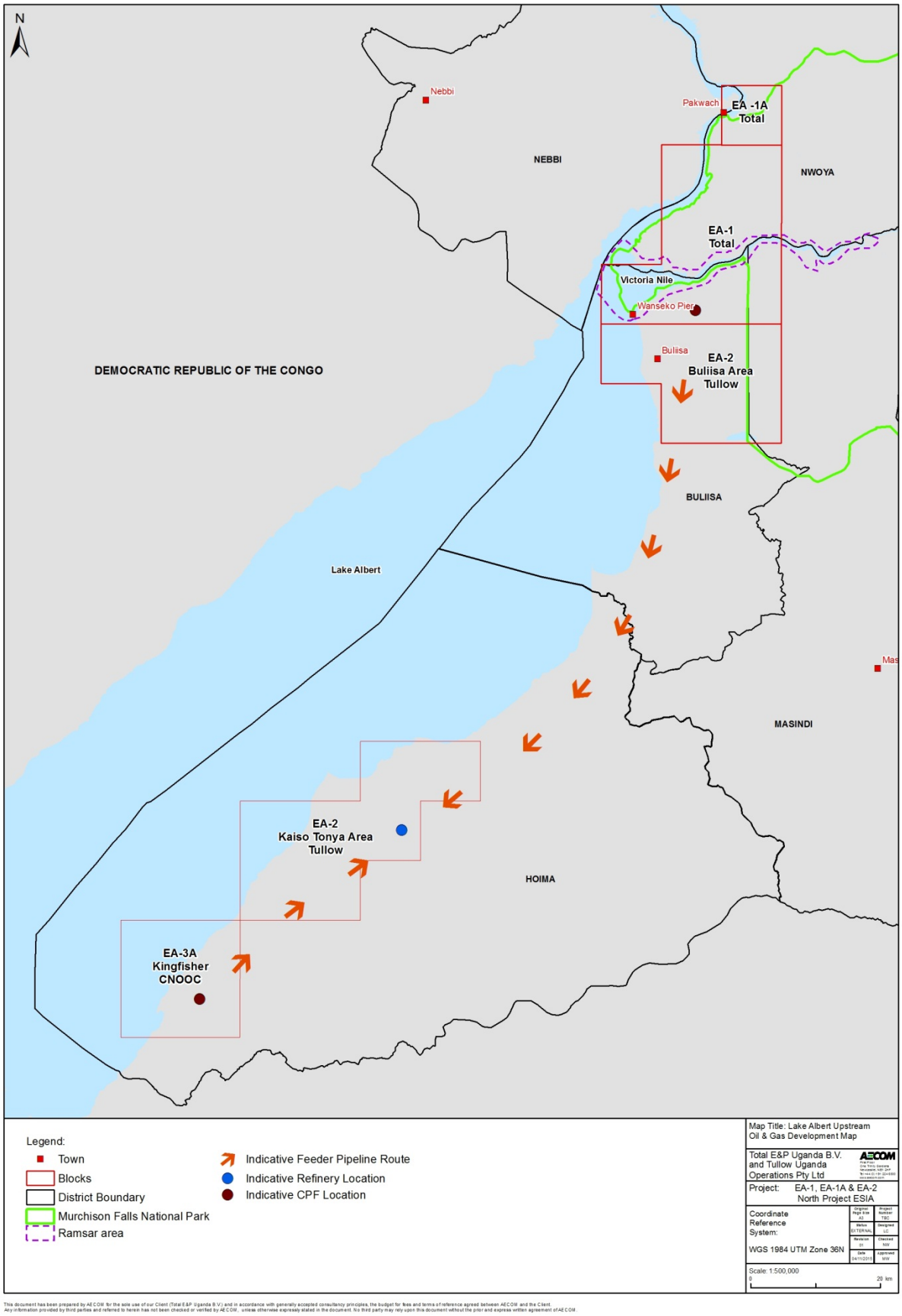


Figure 1-3: Lake Albert Development Map

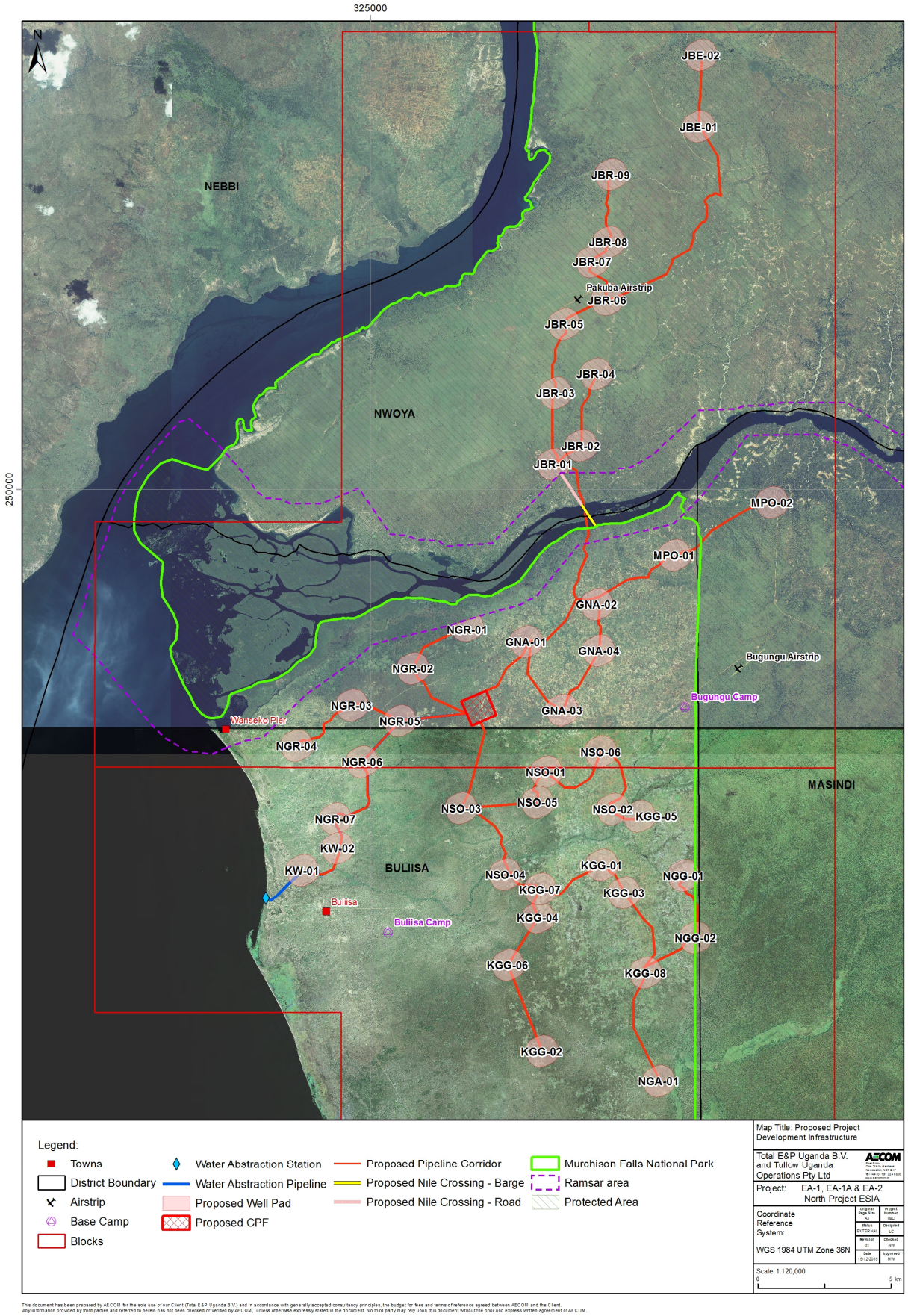


Figure 1-4: Proposed Project Development Infrastructure

1.4 THE ESIA SCOPING STUDY

1.4.1 The Purpose of the ESIA and Scoping Study

In accordance with Section 19 of the National Environment Act Cap 153 (Ref. 1-3) and Regulation 3 of the Environmental Impact Assessment Regulations, 1998 (Ref. 1-4), an ESIA is required before commencement of the Project. Therefore, the main purpose of the ESIA is to provide the relevant authorities with sufficient information on the Project to allow them to make an informed decision as to whether or not to approve the environmental and social aspects of the Project and, if satisfactory, issue a Certificate of Approval.

Regulation 10 of the Environmental Impact Assessment Regulations, 1998 requires that the *Terms of Reference* for ESIA shall be prepared by the proponent in consultation with NEMA and the lead agency (through a process known as 'Scoping').

Scoping is one of the preliminary steps of the ESIA process, and aims to ensure that the impact assessment process is focussed on the potentially significant environmental and social impacts which might arise from the Project. The ESIA Scoping study also serves to initiate early engagement with stakeholders and define the ESIA stakeholder engagement process going forward. Consequently, an overview of the *Terms of Reference* which outlines the scope of the main ESIA Report is included within Chapter 9 of this ESIA Scoping Report.

The subsequent ESIA will be conducted in accordance with the agreed *Terms of Reference*.

In summary, this ESIA Scoping Report provides:

- an overview of the Project;
- an outline of the spatial and temporal scope for the assessment;
- an initial review of available baseline data and identification of any data gaps;
- an Identification of suitable survey and research methodologies;
- details on the identified stakeholders and a summary on the consultation undertaken and the feedback received to date, the findings of which will serve to inform the ESIA;
- outline plans for future stakeholder engagement activities;
- initial details on other past, present or foreseeable future projects in the area that could be impacted upon by, or will impact on the Project;
- detail on how the Project conforms to existing laws, policies and regulations; and
- an initial overview of the key preliminary environmental and social impacts to be addressed in the ESIA.

1.4.2 Overview of ESIA Standards and Guidelines

The key national legislation and international standards and guidelines of relevance to the ESIA include:

- National policies;
- National laws;
- National regulations (and associated standards);
- National guidelines; and
- International Finance Corporation (IFC) Performance Standards (Ref. 1-5).

Legislation that is in draft form and not yet promulgated will also be reviewed during the ESIA process such that the ESIA and associated plans (i.e. Environmental and Social Management Plan) are responsive and meet the anticipated relevant standards and guidelines. A more detailed overview of the relevant national

legislation and international standards and guidelines is contained within Chapter 2 of this ESIA Scoping Report.

1.4.3 Content of this ESIA Scoping Report

This ESIA Scoping Report has been developed in accordance with the standards and guidelines listed above, and in line with good international industry practice. The ESIA process illustrates TEP Uganda's and TUOP's commitment to develop and operate the Project in an environmentally and socially responsible manner.

This ESIA Scoping Report includes the following chapters:

- **Chapter 1: Introduction** - provides the introduction and background of the Project, introduces the Proponent and Environmental Practitioner as well as the purpose of this ESIA Scoping Report;
- **Chapter 2: Policy, Regulatory and Administrative Framework** – provides a description of the legal and regulatory context and an overview of the Proponent's policies and standards;
- **Chapter 3: Project Description and Alternative Assessment** – provides an overview of the Project, including components, design features, proposed infrastructure and alternatives considered;
- **Chapter 4: ESIA Process** – provides a summary of the general approach and ESIA Methodology to be used during the ESIA Process;
- **Chapter 5: Environmental Baseline Conditions** – describes the environmental baseline conditions found within the Project area and surrounding area;
- **Chapter 6: Social and Health Baseline Conditions** – describes the social baseline conditions found within the Project area and surrounding area;
- **Chapter 7: Stakeholder Engagement** – provides a summary of the approach to stakeholder engagement including a summary of activities undertaken to date and those planned in the future;
- **Chapter 8: Identified Preliminary Potential Impacts** – presents preliminary identified potential impacts;
- **Chapter 9: ESIA Terms of Reference** – presents the proposed scope of the specialist studies to be undertaken, including, where necessary a definition of the ESIA study area(s);
- **Chapter 10: Cumulative Impact Assessment** – considers the scope of the cumulative impact assessment and provides a preliminary list of Valued Environmental Components (VEC's);
- **Chapter 11: Proposed Content of the ESIA Report** – identifies the structure of the forthcoming ESIA Report and provides an overview of the content of each chapter;
- **Chapter 12: Next Steps in the ESIA Process** – concludes and outlines the forthcoming steps to be taken in the ESIA process;
- **Chapter 13: References** – presents a list of the documents referred to in this ESIA Scoping Report; and
- **Appendices**: A range of supporting material is included within a number of documents provided within the appendices.

1.5 ESIA PROJECT TEAM

1.5.1 The Proponents

The Project is being developed by TEP Uganda and TUOP. TEP Uganda operates the EA-1 and EA-1A blocks, TUOP operates the EA-2 block (North and South), and both are partners in the EA-3 block. Further details are provided in Table 1-1.

1.5.1.1 Tullow Uganda Operation PTY (TUOP)

TUOP entered into three Ugandan exploration licences in 2004 following the acquisition of Energy Africa. The Group added further equity and operatorship to the licences in the Lake Albert Rift Basin when it acquired Hardman Resources in 2007.

The acreage presented Tullow with a great opportunity to explore across this vast, and relatively undrilled, onshore basin. In 2006, Tullow began to get encouraging exploration results and flow tests from some initial wells. Further significant discoveries and appraisal success in 2009 led to the basin development commercial volume threshold being exceeded. Following further success, contingent resources are now estimated to be around 1.7 billion barrels of oil. A series of transactions took place in 2010-2012 whereby Tullow acquired 100% of the three licences before farming down a third of the equity to both CNOOC and Total. The transaction effectively unitised the basin equally between all three parties ahead the basin development.

This ESIA Scoping Report relates specifically to the development of the EA-2 Northern fields (and the TEP Uganda EA-1 and EA-1A blocks).

1.5.1.2 TEP Uganda

In February 2012, Total announced the acquisition of a one-third interest in four Ugandan licenses held by an affiliate of Tullow Oil plc. TEP Uganda which operates the EA-1 and EA-1A licenses has since drilled a series of exploration wells in these blocks. Overall, Total has been active in retailing in Uganda since 1955 and has a market share of around 24%.

Table 1-1: Details of the Proponents

ITEM	*DESCRIPTION*	
Name of Proposed Project	EA-1 / EA-1A & EA-2 (North) Development Project	
Proponents (Operators)	Total E&P Uganda B.V. (TEP Uganda)	Tullow Uganda Operations Pty Ltd (TUOP)
Addresses	Course View Towers Plot 21, Yusuf Lule Road, P.O. Box 34867, Kampala, Uganda	Plot 15 Yusuf Lule Road PO Box 16644 Kampala, Uganda
Proposed Project Owner	TEP Uganda 33%, TUOP 33%, and CNOOC 33%	
Contact Person	Irene Nyakwezi	Philippe Bouzet

1.5.2 Details of the Environmental Assessment Practitioner

The Proponents have appointed an independent consultant and environmental assessment practitioner, AECOM Limited (hereafter referred to as AECOM) to undertake the ESIA for the Project in conjunction with the local Ugandan environmental specialist company Eco & Partner Consult. This partnership offers the perfect balance of personnel who have the necessary experience and knowledge of oil and gas projects, international standards and local Ugandan regulations.

1.5.2.1 AECOM

AECOM recently acquired URS to create the World's number 1-ranked engineering and environmental company. With nearly 100,000 employees globally and $19 billion revenue their skills, resources and capability are unrivalled in the Oil and Gas industry. AECOM have offices in more than 150 countries worldwide.

AECOM and their legacy companies have been serving the oil and gas industry for more than 60 years. AECOM provide design, construction and production services across the upstream, midstream and downstream supply chain, and have established long-term relationships with some of the world's largest oil and gas companies.

AECOM have a dedicated project leadership team that combines oil and gas ESIA specialists with in-country resources, including those from our local NEMA Registered consultants Eco & Partner Consult. This in-country support is considered crucial in understanding local issues and delivering a successful ESIA. Additionally, key members of the AECOM team are currently applying to become international registered consultants with NEMA in Uganda, with confirmation set to be given by December 2015.

AECOM offer a full range of environmental, health and social technical specialists in-house, with experience of working in a vast range of disciplines with a track record and strong willingness to work alongside in-country technical experts. AECOM also has experience in working with project engineers to ensure that environmental, health and social inputs are built into the Project design as appropriate.

1.5.2.2 Eco and Partner Consult

Eco & Partner Consult have been appointed as the local NEMA Registered consultants and will work closely with AECOM throughout all phases of the ESIA, providing both environmental and social expertise.

Eco & Partner Consult is a registered environmental management consulting firm specialising in ESIA and Environmental Auditing. They have a highly qualified and experienced team of professionals from diverse backgrounds. Over the past eight years, they have undertaken ESIAs for a number of high-profile clients in critical sectors such as telecommunications, petroleum supply and oil and gas exploration in Uganda.

1.5.3 Proposed Project Team

An overview of the key members of the Project Team is presented in Table 1-2. CVs for the Project Team's lead specialists are presented in Appendix C, of this ESIA Scoping Report.

Table 1-2: Key Project Team Members

NAME	*COMPANY*	*PROJECT ROLE*
Iain Bell	AECOM	Project Director and Cumulative Impact Assessment (CIA) Lead
Michael Williams	AECOM	Project Manager and ESIA Lead
Eddie Luyima	Eco & Partner Consult	In country ESIA Team Leader
Amos Mafigiri	Eco & Partner Consult	ESIA Quality Control
Gail Muirhead	AECOM	Deputy Project Manager
Brian Cuthbert	AECOM	Lead Terrestrial Flora and Fauna
Robert Kityo	Makerere University	Terrestrial Fauna
James Kalema	Makerere University	Terrestrial Flora
Derek Pomeroy	Makerere University	Bird Specialist

NAME	COMPANY	PROJECT ROLE
Timothy Twongo	Makerere University	Aquatic Biology
Neil Titley	AECOM	Project Description and Alternatives
Olga Shtepenko	AECOM	Lead Physical Environment
Gregg Somermeyer	AECOM	Geologist/ Soils
Carl Pelling	AECOM	Surface Water
Jane Sladen	AECOM	Groundwater
Colin O'Connor	AECOM	Noise Specialist
Michelle Hackman	AECOM	Air Quality Specialist
Sammy Ratemo	Eco & Partner Consult	Air Quality/Noise Specialist
Mike Bains	AECOM	Waste Specialist
Dr. Elizabeth Kyazike	Eco & Partner Consult	Lead Archaeologist
Leonora O'Brien	AECOM	Archaeology/Cultural Heritage Specialist
Syliver Wadamba	Eco & Partner Consult.	Hydrologist
Robert Naguyo	Eco & Partner Consult	Geologist/Hydrogeologist
Julius Opio	Eco & Partner Consult	Soil Specialist
Kat Nolan	AECOM	Lead Stakeholder Lead
Bhavin Vyas	AECOM	Lead Social/Socio Economic Lead
Frank Lugemwa	Eco & Partner Consult	Social/Stakeholder Support
Andrew Range	AECOM	GIS
Peter Nsiimire	Eco & Partner Consult	GIS Support

NAME	COMPANY	PROJECT ROLE
Usha Vedagiri	AECOM	Health Specialist
Anna Rouse	AECOM	Petroleum environmental engineer
Steve Baker	AECOM	Resettlement Action Plan support
Petrina Rowcroft	AECOM	Ecosystem Services Specialist
Ruth Mauritzen	AECOM	Landscape and Visual
Lara Martin	AECOM	ESMP and Commutment Register

1.6 ESIA STRATEGY

Discussions have been ongoing for more than a year between the Project Proponent and the key Ugandan Regulators including NEMA and Petroleum Exploration Development and Production Department (PEDPD) in relation to the development of the ESIA Strategy for the Project.

A variety of views and solutions have been proposed and considered over the past 12 months by all parties. However, following on from a meeting held on 14th July 2015 between TEP Uganda, TUOP, AECOM, Eco & Partner Consult, NEMA and PEDPD, an agreement was reached ensuring that the assessment of the Project would be undertaken within one integrated ESIA, covering all of the Project components. A list of the Project components is contained within section 3.3 of this ESIA Scoping Report, along with details of the corresponding supporting infrastructure and associated facilities.

However, in line with the fact that the Project Proponents operate the two separate concession blocks (EA1/1A and EA2 North), logistically it was also agreed with NEMA that two ESIA Scoping Reports and two Main ESIA Reports would be submitted covering each block, though the content of each document would be identical as it would need to cover the Project as a whole.

This decision was supported by the fact that the Project Proponents (TEP Uganda and TUOP) and the Government of Uganda have agreed one single integrated front end engineering design (FEED) for the Project. This approach will also provide a unified basis on which the cumulative impact assessment can be assessed. Additional benefits will include streamlined review process which supports comprehensiveness and coherence of mitigation measures and also ensures one single stakeholder engagement consultation process is implemented to remove the likelihood of stakeholder fatigue and confusion.

However it is important to note that the ESIA will only cover those elements of the Project which are covered by FEED and described in Chapter 3 of this ESIA Scoping Report. All future additional development will be assessed separately as required, including where necessary via the undertaking of individual ESIA's.

The Project Proponents have also listened to the concerns from the interested stakeholders on this approach, specifically in relation to the level of detail to be provided. As a result, the developed structure of the ESIA Report will ensure adequate detail is provided and assessed for all of the elements of the Project. Further details are provided in Chapters 3, 4 and 12 of this ESIA Scoping Report.

1.7 ENVIRONMENTAL AND SOCIAL MANAGEMENT SYSTEM

The construction and operation of the Project will be supported by the Environmental and Social Management System (ESMS) of the Operators. A series of Environmental and Social Management Plans (ESMPs) will be developed at the end of the ESIA process and integrated in the Operators ESMS.

The ESMPs are the key management tool through which the commitments to mitigation and management measures, many of which are made as part of the ESIA process, will be implemented. The ESMS will include a suite of management plans which will include details on the mitigation measures and monitoring measures that are needed to ensure that the identified environmental and social risks and impacts of the Project are addressed, and that environmental and social performance standards are achieved. A detailed list of the anticipated management plans will be included within the main ESIA Report. The management procedures, auditing requirements and corrective action procedures required to ensure continual improvement in environmental and social performance will be included within the ESMS, in line with the requirements of ISO 14001.

POLICY, REGULATORY and ADMINISTRATIVE FRAMEWORK

02

2 POLICY, REGULATORY AND ADMINISTRATIVE FRAMEWORK

This chapter outlines the policies, laws, regulations, standards and international conventions that apply to the environmental, health, human rights and social aspects of the Project. The requirements stipulated within this framework encompass all phases of the Project including project engineering; land acquisition and resettlement; development of early infrastructure and temporary facilities; and development of production infrastructure. The framework includes both national legislation and international treaties and agreements to which Uganda is a signatory.

National policies present the general principles that guide the Government in achieving its various strategic goals, and provide the basis for the formulation of a number of laws or Acts of Parliament. The Acts of Parliament in turn provide the background to regulations under which national environmental standards are prescribed.

An in-depth review of the regulatory framework will be presented in the main Environmental and Social impact Assessment (ESIA) report.

Specific objectives of the regulatory framework review are:

- to identify policies, laws and regulations applicable to the environmental, health, human rights and social aspects of the Project, and to the conduct of the ESIA;
- to identify environmental standards prescribed under national legislation that shall apply to the Project (waste, water discharge and air emissions, among others);
- to identify approvals, licenses and permits applicable to the Project as stipulated under national legislation; and
- to identify international conventions and agreements to which Uganda is a signatory that shall apply to the Project.

2.1 UGANDAN NATIONAL FRAMEWORK

2.1.1 National Policies, Laws and Regulations

Table 2-1 presents a summary of the principal policies, laws, and regulations applicable to the proposed project and its environmental aspects. A detailed analysis of national legislation will be presented in the main ESIA Report.

Table 2-1: National Policies, Laws and Regulations

INSTRUMENT / LEGISLATION	*OVERVIEW*	*RELEVANCE TO THE PROJECT*
National Policies		
The National Environment Management Policy (NEMP) (1994)	The National Environment Management Policy (1994) provides an enabling framework for management of environmental resources in all aspects of national planning including providing a system of environmental impact assessment so that the adverse impacts of development activities can be foreseen, avoided or mitigated.	Requirement for ESIA to be carried out prior to commencement of the project in line with relevant legislation.

INSTRUMENT / LEGISLATION	OVERVIEW	RELEVANCE TO THE PROJECT
The National Water Policy (1999)	The policy was developed to promote the proper planning, development and wise use of water resources. Its overall policy objective is to manage and develop the water resources of Uganda in an integrated and sustainable manner, with environmental impact assessment as one of the strategies for water resources management.	
The National Oil and Gas Policy (2008)	The policy seeks to establish and efficient manage the country's oil and gas resources. One of its objectives is to ensure that oil and gas activities are undertaken in a manner that conserves the environment and biodiversity by ensuring the availability of the necessary institutional and regulatory framework to address environment and biodiversity issues relevant to oil and gas activities.	
The National Energy Policy (2002)	The policy defines the long-term planning approach for energy development in Uganda, and outlines strategic interventions that include monitoring the implementation of environmental impact assessment of energy investments.	
The Uganda Wildlife Policy (2014)	The policy is an update of the Uganda Wildlife Policy (1999) which forms the basis of the Uganda Wildlife Act, Cap 200. One of the strategies to achieve the objectives of this policy include ensuring that all new developments and interventions within protected areas are subjected to appropriate environmental impact assessments.	
National Policy for the Conservation and Management of Wetland Resources (1995)	The policy implements the Ramsar Convention on Wetlands of International Importance, and provides for the requirement of ESIA for all planned developments in protected wetland areas.	
The Uganda National Land Policy (2013)	The Uganda National Land Policy provides a framework for having an efficient and effective land delivery system. Among its other objectives, the policy seeks to harmonize and streamline the complex tenure regimes in Uganda for equitable access to land, and to clarify the complex and ambiguous constitutional and legal framework for sustainable management and stewardship. It also aims to ensure sustainable utilisation, protection and management of environmental,	Paragraph 3.8 of the Policy outlines Government strategies for managing land resources with respect to minerals and petroleum development. Land Acquisition is a key factor for the Project, hence this policy is relevant to guiding the required actions.

INSTRUMENT / LEGISLATION	OVERVIEW	RELEVANCE TO THE PROJECT
	natural and cultural resources on land for socio-economic development.	
The National Policy for Disaster Preparedness and Management Policy (2011)	The policy defines the framework for management of disasters at national, regional and local levels.	Paragraph 4.15 stipulates that private sector organisations have a responsibility to ensure that their operations do not pose a risk to their workers, the general public, or the environment. It further states that the owners of installations are responsible for educating workers on safety measures and emergency response measures.
National Laws		
The Constitution of the Republic of Uganda, 1995 (as amended)	The Constitution, as the supreme law, provides the legal and regulatory framework in the country and provides for all aspects pertaining to land, to the environment and other related aspects.	Objective XXVII (iii) provides a duty for the state to promote and implement energy policies that ensure that people's basic needs and those of the environment are met, thus laying the foundation for sustainable energy development.
The National Environment Act, Cap. 153	The National Environment Act is the principal environmental law of Uganda and it establishes NEMA as the principal agency in Uganda for the management of the environment. Under Section 19, the Act states the criteria under which EIA shall be required.	In accordance with Section 19(1) (a) and the Third Schedule to the Act, the proposed project qualifies for EIA.
The Petroleum (Exploration, Development and Production) Act, 2013	The Petroleum (Exploration, Development and Production) Act gives effect to Act 244 of the Constitution, operationalises the National Oil and Gas Policy of Uganda. Among its other functions, the Act seeks to establish institutions to manage petroleum resources and regulate petroleum activities including licensing, exploration, development, production and decommissioning.	Section 3 outlines the environmental principles to which all licensees shall comply including the duty to comply with the principles of the National Environment Act, the duty to: manage waste arising out of petroleum activities in accordance with the National Environment Act and all applicable legislation; and contract a separate entity to manage the transportation, treatment and disposal of waste arising out of petroleum activities.
The Petroleum (Refining, Conversion, Transmission and Midstream Storage) act, 2013	The Act establishes the legal framework for sustainable management of the midstream oil and gas sector.	Section 3 outlines the duty of the Licensee to comply with environmental principles under the National Environment Act including management of transportation, storage, treatment and disposal of waste arising from midestream operatons.

INSTRUMENT / LEGISLATION	OVERVIEW	RELEVANCE TO THE PROJECT
The Physical Planning Act, 2010	The Physical Planning Act, 2010 repeals the Town and Country Planning Act, Cap 246 as the principal law pertaining to physical planning requirements, and makes it mandatory for any person undertaking a development within a designated planning area to obtain development permission. Section 24 (1) of the Act, however, stipulates that The Minister may, on the recommendation of the Board, by statutory instrument, declare an area with unique development potential or problems, a special planning area for the purposes of preparation of a physical development plan.	The Albertine Graben was earmarked as a special planning area by the Ministry of Lands, Housing and Urban Development. A physical development plan was subsequently prepared and it shall be the duty of the proponent to ensure the project is in harmony with this plan.
The Roads Act, Cap 358	The Act provides for the establishment of road reserves and for maintenance of roads.	Associated facilities described in Section 3 of this report include road upgrades that shall be subject to this Act.
The Access to Roads Act, Cap 350	The Act provides for the procedure by which a private landowner may access a public highway.	Requires the proponent to obtain leave from adjoining landowners for the construction of access roads to project facilities.
The Water Act, Cap 152	Objectives of the Act include, among others, the promotion of rational management and use of the waters of Uganda; and the control of pollution and promotion of the safe storage, treatment, discharge and disposal of waste.	The Act stipulates under Section 18 that the necessary permits shall be obtained prior to any abstraction of water from natural surface waters (lake, river or stream) and groundwater (aquifer, spring, etc.). Section 31 prohibits the discharge of waste into any natural waters unless authorised under the Act.
The Fish Act, Cap 197	The Act makes provision for the control of fishing, the conservation of fish, purchase , sale, marketing and processing of fish and matters connected therewith.'	Section 12, subsection (4) stipulates that 'except where otherwise expressly provided by any written law, no person shall divert the waters of any lake, river, stream, pond or private waters in which fish, their eggs or progeny have been introduced with the consent of the chief fisheries officer, unless the ditch, channel, canal or water pipe conducting the water is equipped at or near the entrance or intake with a screen or a filter of a design approved in writing by the chief fisheries officer, that is capable of preventing the passage of fish, their

INSTRUMENT / LEGISLATION	OVERVIEW	RELEVANCE TO THE PROJECT
		eggs or progeny into the ditch, channel, canal or water and where the chief fisheries officer so directs there is also provided a by-pass. The proponent is required to liaise with the Chief Fisheries Officer to obtain approval for the designs of proposed water abstraction facilities.
The Uganda Wildlife Act, Cap 200	The Act provides for sustainable management of wild life, consolidation of the laws relating to wildlife management, establishment of a coordinating, monitoring, and supervisory body for that purpose and all associated matters.	Section 15 of the Act requires that any project that may have a significant effect on any wildlife species or community will be subject to environmental impact assessment in accordance with the National Environment Act.
The National Forestry and Tree Planting Act, 2003	The Act prohibits the destruction, damage or disturbance of natural forests and forest reserves except in the course of carrying out activities for their sustainable management, or in accordance with a licence issued under this Act.	Section 38 also requires any person tending to undertake a project or activity, which may, or is likely to have a significant impact on a forest to undertake an environmental impact assessment. The Project Proponent will therefore be required to take steps to minimise adverse impacts on forest resources within the project area and area of influence.
The Prohibition of the Burning of Grass Act, Cap 33	The Act prohibits the unauthorised burning of grass within a forest reserve, national park, wildlife reserve or wildlife sanctuary.	Requires the proponent to take appropriate measures to prevent burning of grass within the project area as a consequence of project activities.
The Historical Monuments Act, Cap 46	Section 8 provides for the protection of objects declared to be preserved or protected under the Act and outlines activities that shall be prohibited where such objects are found.	Requires the proponent to identify objects or resources within the project area that are protected under this Act, and to take appropriate measures to preserve them.
	Section 11 of the Act requires that any person who discovers any object, which may reasonably be considered to be of archaeological, paleontological, ethnographical, historical or traditional interest shall, within fourteen days, report to the conservator of antiquities or a district commissioner or the curator of the museum.	Requires the proponent to report chance archaeological, paleontological, ethnographical, historical finds discovered in the project area to the relevant authorities.
The Local Governments Act, Cap 243	The Local Governments Act, Cap 243 establishes a decentralised form of government based on the District as the main unit of administration. The Districts are given	District Environment Committees established under Section 15 of the National Environment Act are supposed to guide the district

INSTRUMENT / LEGISLATION	OVERVIEW	RELEVANCE TO THE PROJECT
	legislative and planning powers under this Act. They also plan for the conservation of environment within their local area.	authorities in matters relating to conservation of the environment. District authorities must therefore be involved at an early stage of project implementation since they have a stake as overseers of environmental issues in their areas of jurisdiction.
The Land Act, Cap. 227 (1998) as well as the Land (Amendment) Act, 2010	The Land Act, Cap 227 provides for the ownership and management of land. It provides for four different types of land tenures (Customary, Leasehold, Mailo and Freehold) and the procedure for applying for grant of any of the tenures. The Land (Amendment) Act 2010 aims to enhance the security of occupancy of lawful and bona fide occupants on registered land in accordance with article 237 of the Constitution, and for related matters.	The Act stipulates that the developer of an energy project should seek to enter into mutual agreement with the occupier or owner of the affected land, and provides the valuation principles for compensation.
The Land Acquisition Act (Cap 229)	The Act makes provision for the compulsory acquisition of land for public purposes and for other matters incidental thereto.	The Act stipulates that in the case of compulsory land acquisition for the project, the project affected persons must be adequately compensated.
The Survey Act, Cap 232	The Act provides for and guides the survey of land in Uganda including aspects such as access to lands under survey, and compensation for injury caused during survey activities.	Requires the proponent to undertake land acquisition activities in accordance with the requirements of the Act including provision of prior notice and compensation for injury done by clearance among others.
The Registration of Titles Act, Cap 230	The Act stipulates the requirements relevant to the registration and issuance of titles to land transfer of registered land.	The proponent is required to comply with the requirements of the Act during any acquisition of land for establishment of project components.
The Illiterates Protection Act, Cap 78	The Act provides for the protection of illiterate persons in relation to writing and signing of documents on behalf of such persons.	Requires the proponent to ensure adherence to this Act during any writing, signing or endorsement of documents pertaining to land acquisition or compensation related to the project.
The Occupational Safety and Health Act, 2006	The Occupational Safety and Health Act consolidates, harmonizes, and updates the law relating to occupational safety and health; and repeals the Factories Act, Cap 220.	The Act lays out the general safety, health and environmental requirements for workplace safety to be applied during the construction and operational phases of the project including obligations to inspect statutory equipment and register workplaces.
The Public Health	The main objective of the Public Health Act is	Section 54 provides a general

INSTRUMENT / LEGISLATION	OVERVIEW	RELEVANCE TO THE PROJECT
Act, Cap 281	to safeguard and promote public health.	prohibition of nuisances or conditions liable to be hazardous to health on any land.
National Regulations		
The Environmental Impact Assessment Regulations, 1998	The EIA Regulations, 1998 specify the general requirements for good EIA practice in Uganda.	The proponent is required to undertake an ESIA in accordance with the regulations including, preparation and submission of Terms of Reference, and provision of all contents for an environmental impact statement outlined under Regulation 14.
		Public participation: Sub-regulation (1) of Regulation 12 requires the developer to take all measures necessary to seek the views of the people in the communities that may be affected by the project. Regulations 19, 20, 21, 22 and 23 outline further requirements for public participation.
The National Environment (Wetlands, River Banks and Lake Shores Management) Regulations, 2000	The regulations provide for the conservation and wise use of wetlands, riverbanks and lakeshores and their resources in Uganda.	The proponent is required to adhere to the provisions pertaining to activities carried out in wetlands and regulated lakeshores and riverbanks. Permits will be required where activities are likely to affect wetlands and riverbank/ lakeshore protection zones.
The National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations, 1999	The Regulations prescribe the requisite standards for effluent or wastewater that may be discharged from industries and establishments into water or on land.	All discharge related to the proposed project shall conform to the standards specified in these regulations. The proponent is also required to maintain records of discharge that will be periodically submitted to NEMA and relevant authorities.
The Water (Waste Discharge) Regulations, 1998	These regulations prescribe limits for the discharge of waste into water resources, specifying among others restricted activities for which waste discharge permits must be acquired.	The regulations stipulate that the proponent shall acquire a permit where the discharge of effluent or waste into water or on land is deemed necessary (Regulation 4 (1)).
The National Environment (Waste Management) Regulations, 1999	These regulations outline the requirements for the management of hazardous and non-hazardous waste in Uganda including transport, storage, treatment, disposal and licensing of waste contractors.	Among other requirements prescribed in these regulations, the proponent is required to hire licensed waste contractors to undertake transportation and disposal/treatment of hazardous waste, and obtain requisite permits for the temporary

INSTRUMENT / LEGISLATION	OVERVIEW	RELEVANCE TO THE PROJECT
		storage of waste where may be necessary.
The National Environment (Noise Standards and Control) Regulations, 2003	These regulations prescribe the maximum permissible noise levels from a facility or activity to which a person may be exposed, and set provisions for control of noise.	The proponent is required to implement appropriate measures to keep construction and operational noise within the prescribed limits, and, where excessive noise is deemed unavoidable to obtain a licence to permit noise in excess of permissible limits.
National Environment (Mountainous and Hilly Areas Management) Regulations, 2000	These provide for the sustainable management of mountainous and hilly areas, and prescribe rules for soil conservation. The regulations also prohibit the introduction of invasive alien species.	Requires the proponent to apply appropriate measures necessary to prevent soil erosion in hilly areas, and to prevent the introduction of invasive alien species.
The National Environment (Management of Ozone Depleting Substances and Products) Regulations 2001	The regulations operationalise Uganda's commitment to the Montreal Protocol, through restrictions on the trade of controlled substances and licencing of persons intending to import or export controlled substances.	Resourcing of goods and materials should not be from a country that is not a signatory of the Montreal Protocol. Additionally, any imports of controlled substances should be licenced by the relevant authority, and free of listed materials.
National Environment (Conduct and Certification of Environmental Practitioners) Regulations, 2003	The regulations establish the code of conduct for certification, registration of Environmental Practitioners and for the practice of environmental impact assessment in Uganda.	The proponent is required to engage a competent team of registered environmental practitioners to undertake the ESIA, and to adhere to the requirements of the regulations.
The Petroleum Exploration and Production (Conduct of Exploration Operations) Regulations, 1993	These outline the minimum standards governing the exploration and production activities in Uganda.	In accordance with Section 51 (1), proponent is required to implement all necessary measures to prevent pollution of the environment during development, production operations and transportation of petroleum.
The Civil Aviation (Aerodromes) Regulations, 2007	The regulations specify safety and design requirements that shall apply to all aerodromes operated by the Civil Aviation Authority in Uganda.	The proposed project area covers two airfields situated in the MFNP that could be affected by project activities.
Uganda Wildlife (Murchison falls National Park) Regulations-S.I 200-3	The regulations set out guidelines of how to conduct activities within the park ranging from entry fees, permissible tourism activity, waste management within the park, among others.	The proposed foot print of the project covers parts of Murchison Falls National park and therefore shall be subject to these regulations.

2.1.2 National Standards

All relevant environmental standards prescribed in accordance with the National Environment Act Cap 153 and national regulations shall apply to the Project. Wherever applicable, the national standards shall take precedence over international standards unless such relevant standards do not exist.

Standards currently in place include:

- Standards for Discharge of Effluent or Wastewater (National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations, 1999) (Ref. 2-1);
- Soil Quality Parameters – First Schedule to the National Environment (Minimum Standards For Management of Soil Quality) Regulations, 2001 (Ref. 2-2);
- Maximum Permissible Noise Levels – First Schedule to the National Environment (Noise Standards And Control) Regulations, 2003 (Ref. 2-3);
- Draft national air quality standards; and
- Uganda Standard for Drinking (Potable) Water (US201).

2.1.3 National Guidelines

In addition to national laws and regulations, further guidance on ESIA practice in Uganda is provided through a number of general and sector-specific guidelines that include:

- Guidelines for Environmental Impact Assessment in Uganda (NEMA 1997) (Ref. 2-4);
- Environmental Impact Assessment Guidelines for the Energy Sector (NEMA 2004) (Ref. 2-5);
- Environmental Impact Assessment Guidelines for Water Resources Related Projects in Uganda (MWE 2011) (Ref. 2-6);
- National Physical Planning Standards and Guidelines, 2011 (Ref. 2-7);
- Operational Waste Management Guidelines for Oil and Gas Operations (NEMA 2012) (Ref. 2-8);
- Environmental Impact Assessment Guidelines for Road Projects (Ministry of Works, Housing and Communications 2004) (Ref. 2-9); and
- Uganda Wildlife Authority Operational Guidelines for Oil and Gas Exploration and Production in Wildlife Protected Areas (2014).

The guidelines describe the recommended approach to all aspects of the ESIA including stakeholder engagement and public participation, report structure and presentation, baseline studies and mitigation measures. These guidelines will be considered during preparation of the ESIA Report.

2.1.4 Local Development Plans

The Physical Planning Act, 2010 (s.25) provides for the preparation of district physical development plans by district physical planning committees. Among its other functions, the development plan operationalises the district structure plan and indicates the present and future land use and development within the planning area. The following plans will be considered for the proposed Project:

- Nwoya District Development Plan 2015/16-2019/2020; and
- Buliisa District Development Plan 2015/16-2019/2020.

2.1.5 Upcoming Changes to National Legislation

NEMA is currently coordinating a review of the National Environment Management Policy (NEMP) (formulated in 1994). The main drivers behind this review are to:

- address the new and emerging environmental issues and challenges that the policy in its current form does not emphasise;
- integrate the ongoing post 2015 Sustainable Development Goals Agenda;
- take into account other national and regional commitments on the environment and natural resources management which among others include The National Vision, National Development Plan (NDP), East African Community Protocols, policies and strategies on environment and development;
- establish the institutional roles;
- listen to the opinions of the Private Sector and outline how they can feed into the process; and
- introduce requirement for biodiversity offset when residual impact is demonstrated.

The revised NEMP is still under review, and will be integrated into the framework of this ESIA once it is adopted.

In addition, the following policies, laws and regulations are under review and shall apply to the project upon enactment and adoption into the national legislative framework. Currently, however, all the relevant existing legislation and their associated requirements shall apply to the project.

A National Resettlement Policy is being drafted by the Ministry of Lands, Housing and Urban Development.

National legislation under review includes:

- The National Environment Act, Cap 153;
- The Environmental Impact Assessment Regulations, 1998;
- The National Environment (Audit) Regulations, 2006;
- The National Environment (Noise Standards and Control) Regulations, 2003;
- The National Environment (Waste Management) Regulations, 1999;
- The National Environment (Minimum Standards for Management of Soil Quality) Regulations, 2001;
- The National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations, 1999; and
- The Ugandan Wildlife Act.

The Government of Uganda is also drafting new regulations on:

- air quality;
- chemicals management;
- oil spills management;
- petroleum waste management;
- petroleum exploration, development and production;
- health, safety and environmental protection;
- national content; and
- metering and testing of petroleum.

2.1.6 Approvals, Licences and Permits

In addition to the ESIA, the national legislation of Uganda establishes a number of approvals, permits and licences required prior to commencement of the project or specific activities within the scope of the project. These are summarised in Table 2-2. A more detailed analysis will be provided in the final ESIA Report.

Table 2-2: Other Approvals, Permits and Licences

TYPE OF PERMIT/APPROVAL	SUPPORTING LEGISLATION	REQUIREMENT	APPLIES TO	APPROVING AUTHORITY	TYPE OF APPLICATION SUBMITTED	STAGE AT WHICH APPROVAL IS REQUIRED
Groundwater Abstraction Permit/Surface Water Abstraction Permit	The Water Act, Cap 152	Section 18: Subsection (1): No person shall construct or operate any works unless authorized to do so under this Part of the Act. Section 18: Subsection (2): A person wishing to construct any works or to take and use water may apply to the director in the prescribed form for a permit to do so.	Any abstraction of water from natural surface waters (lake, river or stream) and groundwater (aquifer, spring, etc.)	Directorate of Water Resource Management (DWRM)	Form A: Application for a Surface Water Permit Form B: Application for a Ground Water Permit.	Prior to any project-related surface or groundwater abstraction
	The Water Resources Regulations, 1998	Regulation 3, sub-regulation (1): A person who, (a) occupies or intends to occupy any land; (b) wishes to construct, own, occupy or control any works on or adjacent to the land referred to in Regulation 10; may apply to the Director for a water permit.				
		Regulation 3, Sub-regulation (2): An application referred to under sub-regulation (1) shall, (a) be in the form specified in the First Schedule to these regulations except that, i) Form A shall be used for surface water permits; and ii) Form B shall be used for ground water permits				
Construction Permit	The Water Act, Cap 152	Section 18: Subsection (1): No person shall construct or operate any works unless authorized to do so under this Part of the Act. Section 18: Subsection (2): A person wishing to construct any works or to take and use water may apply to the director in the prescribed form for a permit to do so.	Any works or structures constructed in or adjacent to natural waters (rivers or lakes) whether temporary or permanent Any abstraction of groundwater requiring construction of a borehole	DWRM	Form F1: Application for Construction Permit	Prior to any project-related water abstraction construction of works or structures in or adjacent to natural waters
	The Water Resources Regulations, 1998	Regulation 16, Sub-regulation (2): A person who wishes to engage a driller under sub-regulation (1) to construct a borehole on his or her land for the purpose of, (a) using water; (b) re-charging an aquifer; or (c) fitting a motorised pump to a borehole. May apply to the Director for a construction permit in Form F1 of the Sixth Schedule.					
Waste Water Discharge Permit	The Water (Waste Discharge) Regulations, 1998	Regulation 4, sub-regulation (1): No person shall discharge effluent or waste on land or into the aquatic environment contrary to the standards established under regulation 3 unless he or she has a permit in the format specified in the First Schedule issued by the Director.	Any project likely to result in the discharge of effluent or waste water (treated or untreated) onto land or into a water body	DWRM	Form A: Application for a Waste Discharge Permit	Prior to construction of project facilities (e.g. camps, well pads)

TYPE OF PERMIT/APPROVAL	SUPPORTING LEGISLATION	REQUIREMENT	APPLIES TO	APPROVING AUTHORITY	TYPE OF APPLICATION SUBMITTED	STAGE AT WHICH APPROVAL IS REQUIRED
Licence to Emit Noise in Excess of Permissible Noise Levels	The National Environment (Noise Standards And Control) Regulations, 2003	Regulation 12, Sub-regulation (1): An owner or occupier of premises whose works or activities are likely to emit noise in excess of the permissible noise levels shall apply to the Executive Director in the form prescribed in Part I of the Second Schedule, for a Licence to Emit Noise in Excess of the Permissible Levels.	Projects in which it is highly likely that noise levels generated by the proposed activity will exceed permissible levels and cause a significant nuisance effect (e.g. flaring and quarrying)	NEMA	Form NEMA/NC: Application For A Licence To Emit Noise In Excess Of Permissible Noise Levels	Prior to commencement of activities likely to emit noise in excess of permissible levels
Permit to Carry Out a Regulated Activity in a Wetland/River Bank/Lake Shore	The National Environment (Wetlands, River Banks and Lake Shores Management) Regulations, 2000	Regulation 12, Sub-regulation (1): Subject to the provisions of Regulations, a person shall not carry out any activity in a wetland without a permit issued by the Executive Director. Regulation 12, Sub-regulation (2): Any person intending to carry out an activity listed in the Second schedule to these Regulations shall apply to the Executive Director for a permit in Form A of the First Schedule. Regulation 23, Sub-regulation (1): A person who intends to carry out any of the following activities shall make an application to the executive Director in Form A set out in the First Schedule to these Regulations - (a) use, erect, reconstruct, place, alter, extend, remove or demolish any structure or part of any structure in, under, or over the river banks or lake shore; (b) excavate, drill, tunnel or otherwise disturb the river bank or lake shore; (c) introduce or plant any of a plant whether alien or indigenous on a river bank or lake shore; (d) introduce any animal or micro-organism, whether alien or indigenous in any river bank or lake shore; or (e) deposit any substance on a riverbank or lakeshore if that substance would or is likely to have adverse effects on the environment.	Any regulated activity (listed in the Second Schedule to the Regulations) undertaken in a wetland, or within the protection zone of a riverbank: 100m from the highest watermark of a river listed in the Sixth Schedule; 30m for a non-listed river 200m from the low watermark for a listed lake; 100m for a non-listed lake	NEMA	Form A: Application for a Permit to Carry Out a Regulated Activity in a Wetland/River Bank/Lake Shore	Prior to undertaking any project activities within wetlands, riverbanks or lake shores
Registration of a Workplace	The Occupational Safety and Health Act, 2006	Section 40, Subsection (2): a person shall not less than one month before he or she begins to occupy any premises as a workplace, serve on the Commissioner, a notice with the particulars prescribed in Schedule 3.	Any project requiring the establishment of a work place (e.g. drill site or camp)	Department of Occupational Safety and Health Ministry of Gender, Labour and Social Development	Particulars to be Submitted When Applying for the Registration of a Workplace or a Change in the Registered Occupier	Immediately upon (not later than one month) prior to undertaking any site works (construction, operation, pre-construction surveys)
Development Permission	The Planning Act, 2010	Section 33, Subsection (1): A person shall not carry out a development within a planning area without obtaining development permission from a physical planning committee.	Any development involving construction of permanent or semi-permanent structures or establishments such as base camps	District Technical Planning Committee	Form PPA 1: Application for Development Permission	Before commencement of any project activities
Licence for Storage of Hazardous /Non Hazardous Waste	The National Environment (Waste Management) Regulations, 1999	Regulation 6, Sub-regulation (1): A person intending to store waste on his or her premises shall apply to the Authority for a licence in Form III set out in the First Schedule.	Any project requiring construction or operation of a storage facility for hazardous or non-hazardous waste (e.g. drill cuttings)	NEMA	Form III: Application for a Licence for Storage of Hazardous Waste	Prior to commencement of any activity requiring temporary storage of hazardous waste

TYPE OF PERMIT/APPROVAL	SUPPORTING LEGISLATION	REQUIREMENT	APPLIES TO	APPROVING AUTHORITY	TYPE OF APPLICATION SUBMITTED	STAGE AT WHICH APPROVAL IS REQUIRED
Authorisation to use radioactive sources	The Atomic Energy Act, (Cap 143)	Section 32, Subsection (1): Subject to section 33, no person shall acquire, own, possess, operate, import, export, hire, loan, receive, use, install, commission, decommission, transport, store, sell, distribute, dispose of, transfer, modify, upgrade, process, manufacture or undertake any practice related to the application of atomic energy and regulated by this Act unless permitted by an authorisation issued under this Act.	Projects requiring the use of radioactive materials e.g. oil well drilling	Atomic Energy Council, Ministry of Energy and Mineral Development	Notification of Council (requirements listed in Section 34 (2)) Application for an Authorisation (required information listed in Section 35 (1) of the Act	Prior to commencement of project activities (specifically well drilling)
Licence to erect or carry on a magazine	The Explosives Act, (Cap 298)	Section 22, Subsection (1): Any person desiring to erect or carry on a magazine for the storage of explosives shall make application for a licence to erect or carry on a magazine.	Activities requiring the temporary storage of explosives	Ministry of Internal Affairs	Licence to erect or carry on a magazine	Prior to procurement and/or use of explosives
Lease Agreement	The Registration of Titles Act, (Cap 230)	Section 101: The proprietor of any freehold under the operation of this Act may, subject to any law or agreement for the time being in force, lease that land for any term exceeding three years by signing a lease of it in the form in the Eighth Schedule to this Act.	Access to or use of land for project activities	District Land Board	Application for Lease	Prior to temporary use of or access to land for project activities.
	The Land Act, (Cap 227)	Section 73: Where it is necessary to execute public works on any land, an authorised undertaker shall enter into mutual agreement with the occupier or owner of the land in accordance with this Act; and where no agreement is reached, the Minister may, compulsorily acquire land in accordance with section 42.				
	The Land Acquisition Act, (Cap 226)	Section 19: Nothing in this Act shall prevent the Government from entering into an agreement with a person having an interest in land by which— a) that person's interest in land is acquired by the Government; or that person's claim to compensation for land under this Act is settled by the grant of other land or in any other way.				

2.1.7 Strategic Environmental Assessment

In 2015, the Cabinet approved[2] the framework for implementation of Strategic Environmental Assessment (SEA) for the Albertine Graben (Ref. 2-10), which was meant to ensure that oil and gas activities are undertaken in a manner that conserves the environment and biodiversity. The Ministry of Energy and Mineral Development and that of Water and Environment jointly undertook the SEA of oil and gas operations in the Albertine Graben from April 2010 to September 2013. The Assessment involved various stakeholders, who included Government institutions (at national, regional and district levels), civil society (non-governmental organizations, faith-based organizations, community-based organizations), business and industry players (private enterprises) and cultural institutions.

The SEA states that *"if the Government decides to open up for petroleum activities in highly sensitive hotspot areas, both parties have a clear responsibility of doing whatever possible to minimize the impacts on the environment" to "take the opportunity to benefit biodiversity in and around project sites", "ensure maintenance of the status-quo of the ecosystem and the biodiversity or even improving it", "take a pro-active approach (...) strengthen creation and management of protected areas, support for scientific research/assessment, initiate and support campaigns to save endangered species (...), support capacity building in national/regional agencies, support for conservation easement and support to integrated conservation and development".*

Key Issues were divided into groupings for ease of management:

Group 1 – Petroleum Related Activities in Protected and Environmentally Sensitive Areas;

Group 2 - Co-existence with Local Communities;

Group 3 - Co-existence with Archaeology and Cultural Heritage;

Group 4 - Co-existence with Other Industries and Service Providers (i.e. Local Content and training);

Group 5 - Co-existence with Tourism;

Group 6 - Co-existence with Fisheries;

Group 8 – Discharge and Emissions for the Petroleum Industry;

Group 9 – Waste Management;

Group 10 – Water Management;

Group 11 – Oil Spill Preparedness on Land and Surface Waters;

Group 12 – LABSG LOGISTICS: Infrastructure Development in the Region and Transportation of Crude, Products and Construction Materials;

Group 17 – Trans-boundary and International Issues (i.e. surface water oil spill and fisheries);

Group 18 – Establishment of Transparent Baseline data and Scientific Basis; and

Annex 10 – Resettlement Policy Framework.

2.1.8 Institutional Framework

The following are the key institutional stakeholders at national and local levels that have an interest in the Project.

2.1.8.1 National Level

National Environment Management Authority

The NEMA is the principal agency in Uganda for the management of the environment, mandated to coordinate, monitor and supervise all activities in the field of the environment. In accordance with its

[2] *http://www.busiweek.com/index1.php*

functions stipulated under Section 6, Subsection (1) of the National Environment Act Cap 153, the authority is mandated to ensure observance of proper safeguards in the planning and execution of all development projects, including those already in existence that have or are likely to have significant impact on the environment.

Petroleum Exploration Development and Production Department

The Petroleum Exploration Development and Production Department (PEDPD) operates as one of the technical departments under the Ministry of Energy and Mineral Development (MEMD) and is mandated to establish the petroleum potential of the country, and is therefore the key lead agency for the Project. In accordance with Section 22 (1) of the National Environment Act, the authority (NEMA) shall in consultation with lead agency be responsible for carrying out audits of all activities that are likely to have significant effects on the environment.

Directorate of Water Resources Management

The Directorate of Water Resources Management (DWRM) is responsible for managing, monitoring and the regulation of water resources through issuing water use, abstraction and wastewater discharge permits.

Uganda Wildlife Authority

The Uganda Wildlife Authority (UWA) is the principal authority in charge of wildlife conservation and management in Uganda. Under Section 15 of the Uganda Wildlife Act (Cap 200), the authority is mandated to perform the functions required of a lead agency for purposes of an environmental impact assessment for any project that may have a significant effect on any wildlife species or community.

Directorate of Fisheries Resources

The Directorate of Fisheries Resources (DFR) operates under the Ministry of Agriculture, Animal Industry and Fisheries. Its mandate is to promote, support and guide the sector, and to retain responsibility for setting and enforcing the standards and regulations for practices pertaining to fisheries.

National Forestry Authority

The National Forestry Authority (NFA) was established in compliance with the National Forestry and Tree Planting Act, 2003. Its functions include the development and management of all central forest reserves; co-operation and co-ordination with NEMA and other lead agencies in the management of Uganda's forest resources; and control and monitoring of industrial and mining developments in central forest reserves in conjunction with other regulatory authorities.

Uganda National Roads Authority

The Uganda National Roads Authority (UNRA) was established in 2008 following the enactment of the Uganda National Authority Act, 2006. Its mandate is to develop and maintain the national roads network, advise Government on general roads policy and contribute to addressing of transport concerns, among others. Considering the substantial road development associated with the proposed Project, UNRA will be one of the key national authorities that shall have an interest in this Project.

Ministry of Lands, Housing and Urban Development

The Ministry of Lands, Housing and Urban Development are responsible for providing policy direction, national standards and coordination of all matters concerning lands, housing and urban development. They are responsible for putting in place policies and initiating laws that ensure sustainable land management promote sustainable housing for all and foster orderly urban development in the country.

Civil Aviation Authority

The Civil Aviation Authority (CAA) was established following the enactment of the Civil Aviation Authority Act, (Cap 354). Its objective is to promote the safe, regular, secure and efficient use and development of civil aviation inside and outside Uganda. The functions of the Authority include among others the establishment, maintenance, development, operation and ownership of aerodromes. These (aerodromes) include Pakuba Airfield located inside the Murchison Falls National Park, which has been identified as one of the components comprising supporting infrastructure for the project.

Wetlands Management Department

The Wetlands Management Department (WMD) is the agency responsible for the management of wetlands. Its functions include the evaluation of EIAs with a bearing on wetlands. The proposed Project could affect a number of wetlands that are under the Department's control.

Department of Museums and Monuments, Ministry of Tourism, Wildlife and Heritage

The Department of Museums and Monuments, Ministry of Tourism, Wildlife and Heritage (MTWH) is mandated to protect, promote and present the cultural and natural heritage of Uganda. Its key functions include the conservation and maintenance of important physical cultural resources or heritage collections.

Department of Occupational Safety and Health, Ministry of Gender Labour and Social Development

The Department of Occupational Safety and Health, Ministry of Gender Labour and Social Development (MGLSD) is responsible for administering the Occupational Safety and Health Act, 2006, and carries out regular statutory inspections to ensure proper management of health and safety in the work place including in oil and gas activities.

Uganda Land Commission

The Uganda Land Commission was established by the Constitution of the Republic of Uganda (1995) as amended. Its primary function is to hold and manage any land in Uganda vested in or acquired by the Government of Uganda in accordance with the provisions of the Constitution. The commission has an interest in the project given the existence of environmentally sensitive areas within the project that are held in trust by the Government under the Land Act, Cap 227.

National Physical Planning Board

The Physical Planning Act, 2010 establishes the National Physical Planning Board (NPPB) whose functions include, among others, advising on the declaration of special planning areas as prescribed by the Act; preparation of physical development plans; and formulation of draft planning policies, standards, guidelines and manuals. With respect to the project's location within a special planning area (the Albertine Graben), the NPPB will be a key stakeholder in the Project.

Uganda National Bureau of Standards

Uganda National Bureau of Standards (UNBS) is a statutory organization established by the Uganda National Bureau of Standards Act, Cap 327. Among its other roles, the mandate of the UNBS includes formulation and promotion of the use of standards and enforcement of standards in the interest of public health and safety and the environment. The Bureau is in the process of defining standards for the oil and gas industry that shall apply to the Project.

Uganda Electricity Transmission Company Limited

Uganda Electricity Transmission Company Limited (UETCL) was incorporated as a limited liability company in 2001 in accordance with the Companies Act Cap 110 (as repealed by the Companies Act, 2012) and the Public Enterprise Reform and Divestiture Act. The existence of UETCL is provided for in the Electricity Act Cap 145 that provided for un-bundling the vertically integrated Uganda Electricity Board (UEB) into successor Companies and establishment of the Electricity Regulatory Authority (UETCL 2015). Among its other licences, the UETCL is licenced to:

- construct, own and operate installations for high voltage transmission of electricity;
- coordinate the power supply system to obtain instantaneous balance between the generation and consumption of electricity; and
- purchase power to provide continuous and economic supply of electricity to meet the load requirement for customers served directly or indirectly from high voltage transmission grid facilities.

Uganda Human Rights Commission

The Uganda Human Rights Commission (UHRC) was established under the Constitution of the Republic of Uganda 1995 as amended (Article 51). The UHRC is responsible for combating the violation of human rights in Uganda and implementation of international human rights conventions. The Commission is to be engaged as one of the stakeholders of the ESIA.

2.1.8.2 Local Level

District Local Government

The District Local Government is defined as one of the lead agencies under the National Environment Act and is mandated to establish a District Environment Committee that coordinates with NEMA on all issues relating to environment management. The District Environment Officer in particular will play an active role in monitoring of environmental aspects, and liaise with the NEMA on all matters relating to the environment.

Lower Local Government

In accordance with the Local Governments Act, Cap 243, there shall be administrative units based on county, parish, and villages in the case of rural areas; and parishes or wards, and villages for urban areas. Each district shall also have lower local government councils, whose functions include among others presiding over executive committee meetings and monitoring the general administration of the area under their jurisdiction. The lower local government councils will comprise sub-county councils (LC III) that shall incorporate representatives from parishes (LC II), as well as youth, women and people with disabilities (s.23).

The National Environment Act provides for the establishment of Local Environment Committees that may be appointed to monitor all activities within their local jurisdiction to ensure that such activities do not have any significant impact on the environment, and to report any events or activities which have or are likely to have significant impacts on the environment to the District Environment Officer (s.16). The Act further assigns the local environment committee with roles such as identification of vulnerable riverbanks and lakeshores; assistance in identification of wetlands of local, national and international importance; and assistance in identification of hilly and mountainous areas. According to the Act, the local environment committee may be appointed at any of the lower levels of local government including municipal, town, division, county and sub-county councils.

Non-Governmental Organisations and Civil Society Organisations

These organisations play a role in oil and gas activities through advocacy, mobilisation and dialogue with communities. They may also be contracted in the delivery of various services, especially in the communities where oil and gas activities are to be undertaken. Non-governmental organisations (NGOs) and Civil Society Organisations (CSOs) can contribute to holding the different players accountable with regard to oil, gas issues, and participate in getting the voices of the poor into designing, monitoring and implementation of programmes in the oil and gas sector.

2.2 INTERNATIONAL GUIDELINES AND STANDARDS

The ESIA will be prepared in line with relevant standards and guidelines of the international oil and gas industry obtained from publications produced by the following organisations:

- International Finance Corporation (IFC) (particularly the Environmental, Health, and Safety Guidelines for Onshore Oil and Gas Development) (Ref. 2-11);
- International Union for Conservation of Nature (IUCN) (Oil exploration in the tropics: guidelines for environmental protection) (Ref. 2-12);
- The Energy and Biodiversity Initiative (Integrating Biodiversity Conservation into Oil and Gas Development) (Ref. 2-13);
- International Association of Oil and Gas Producers (OGP);
- Cross Sector Biodiversity Initiative (CSBI; and
- International Petroleum Industry Environment and Conservation Association (IPIECA).

2.2.1 International Finance Corporation

The ESIA will document the alignment of the Project with the standards and guidelines of International Financial Institutions (IFIs) such as the requirements of a Category A project under the Equator Principles (EPs) and the Organisation for Economic Cooperation and Development (OECD) Revised Council

Recommendation on Common Approaches on the Environment and Officially Supported Export Credits (hereafter referred to as the 'OECD Common Approaches'). Both the EPs and the OECD Common Approaches are underpinned by the IFC Performance Standards (PSs). The IFC PSs, EPs and OECD Common Approaches current as of 1st January 2012 are applicable to the Project.

The IFC PSs are directed towards project developers, providing guidance on how to identify risks and impacts, and are designed to help avoid, mitigate, and manage risks and impacts as a way of doing business in a sustainable way, including stakeholder engagement and disclosure obligations for the Project. There are eight performance standards, as follows:

- *IFC PS 1: Assessment and Management of Environmental and Social Risks and Impacts* - establishes requirements for social and environmental performance management throughout the life of a project.
- *IFC PS 2: Labour and Working Conditions* - highlights the need for workers' rights regarding income generation, employment creation, relationship management, commitment to staff, retention and staff benefits.
- *IFC PS 3: Resource Efficiency and Pollution Prevention* - defines an approach to pollution prevention and abatement in line with current internationally disseminated technologies and good practice.
- *IFC PS 4: Community Health, Safety and Security* - specific requirements for mitigating any potential for community exposure to risks and impacts arising from equipment accidents, structural failures and releases of hazardous materials.
- *IFC PS 5: Land Acquisition and Involuntary Resettlement* - recognises that project related land acquisition and restrictions could have adverse effect on communities or persons that use the land and outlines a policy to avoid or minimise involuntary physical resettlement as a consequence of development.
- *IFC PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources* - sets out an approach to protect and conserve biodiversity, including habitats, species and communities, ecosystem diversity, and genes and genomes, all of which have potential social, economic, cultural and scientific importance.
- *IFC PS 7: Indigenous Peoples* - recognises that Indigenous Peoples can be marginalised and vulnerable (e.g. if their lands and resources are encroached upon by or significantly degraded by a project).
- *IFC PS 8: Cultural Heritage* - aims to protect irreplaceable cultural heritage and to provide guidance for protecting cultural heritage throughout a project's life cycle.

Similarly, the EPs are a set of ten environmental and social standards adopted by a number of global financial institutions which must be adhered to prior to the provision of Project financing. Based on and in alignment with the IFC PS, the EPs focus on project environmental and social standards and responsibilities. In particular, they highlight the protection of indigenous peoples, labour standards, and the importance of consultation with local affected communities.

2.2.2 IFC Industry Specific Environmental Health and Safety Guidelines

Industry specific Environmental Health and Safety (EHS) guidelines have been developed by the World Bank Group and the IFC. The applicable industry sector guidelines for typical oil and gas projects include:

- Waste Water Management;
- EHS Guideline Onshore Oil and Gas Development;
- EHS Guideline on Hazardous Materials Management; and
- EHS General Guidelines, including but not limited to:
    - Hazardous Materials Management;
    - Noise;

- Waste Management;
- Occupational Health and Safety; and
- Community Health and Safety.

2.2.3 IFC Social and Stakeholder Engagement Guidelines

The ESIA will be prepared in line with best practices put forward in the IFC guidelines and in particular:

- 2002 Handbook for Preparing a Resettlement Action Plan (Ref. 2-14);
- 2007 Stakeholder Engagement Handbook (Ref. 2-15);
- 2009 Good Practice Note Addressing Grievances from Project-Affected Communities (Ref. 2-16);
- 2009 Handbook for Addressing Project-Induced In-Migration (Ref. 2-17); and
- 2009 Health Impact Assessment (Ref. 2-18).

2.3 INTERNATIONAL CONVENTIONS AND AGREEMENTS

Uganda is signatory to a number of international agreements that could be relevant to the project. These are outlined in Table 2-3.

Table 2-3: Summary of International Conventions and Agreements

TREATY, CONVENTION, AGREEMENT	*SUBJECT*	*SIGNED/ ACCEPTED*	*RATIFIED*	*APPLICATION TO PROPOSED PROJECT*
Bonn Convention, 1979	Convention on the Conservation of Migratory Species of Wild Animals	-	01/08/2000	The project area includes the MFNP and Ramsar site that contain globally vulnerable species of birds as well as others among which are migrant birds (Byaruhanga and Kigoolo, 2005). There are specific resolutions and instruments like species action plans under these conventions that apply to Uganda.
Convention on Biological Diversity, 1992	Conservation, sustainable and equitable use of biodiversity	-	08/09/1993	Requires, under Principle 17, that EIA shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority. At the ninth meeting of the Conference of Parties (COP9) in 2008, one of the decisions of the Conference was to consider biodiversity offset mechanisms where relevant and appropriate while ensuring that they are not used to undermine unique components of biodiversity. The biodiversity offsets are designed

TREATY, CONVENTION, AGREEMENT	SUBJECT	SIGNED/ ACCEPTED	RATIFIED	APPLICATION TO PROPOSED PROJECT
				to achieve no net loss (or a net gain) in the context of development projects (UNEP 2010[3]).
Nile Basin Initiative, 1999	Agreement between riparian countries of the Nile to develop and manage water resources in a sustainable and equitable manner.	-	08/2002	The NBI, through its Focal Point in the Ministry of Water and Environment, will be stakeholders in the public participation process.
UNCCD, 1994	United Nations Convention to Combat Desertification.	21/11/1994	25/06/1997	The Convention is supported by the following Acts that shall apply to the project: the National Environment Act, Cap 153; the Environmental Impact Assessment Regulation, 1998; the Land Act, Cap. 227 as amended; the Local Governments Act, Cap 243; the Water Act, Cap 152; the Uganda Wildlife Act, Cap 200; the National Forestry and Tree Planting Act, 2003; the Prohibition of the Burning of Grass Act, Cap 33; and the Physical Planning Act, 2010.
Kyoto Protocol, 1997	The Kyoto Protocol is a protocol to the United Nations Framework Convention on Climate Change (UNFCCC or FCCC), aimed at fighting global warming. The UNFCCC is an international environmental treaty with the goal of achieving the "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."	25/03/2002 acceptance	16/02/2005 entered into force	The proponent must demonstrate they have explored all alternatives and identified the least polluting solution according to best available techniques and best practical environmental option.
Montreal Protocol, 1987	The Montreal Protocol on Substances that Deplete the Ozone Layer	-	15/09/1988	In accordance with supporting local legislation, resourcing of goods and materials should not be from a country that is not a signatory of the Montreal

[3] *https://www.cbd.int/doc/meetings/cop/cop-10/information/cop-10-inf-27-en.pdf*

TREATY, CONVENTION, AGREEMENT	SUBJECT	SIGNED/ ACCEPTED	RATIFIED	APPLICATION TO PROPOSED PROJECT
				Protocol. Additionally, any imports of controlled substances should be licenced by the relevant authority, and free of listed materials.
POPS, 2001	Stockholm Convention on Persistent Organic Pollutants	20/07/2004 accession	-	The proponent should take appropriate steps to prevent the use of chemicals listed under this Convention.
Convention for the Safeguarding of the Intangible Cultural Heritage, 2003	Intangible Cultural Heritage	-	13/05/2009	The proponent should consider the potential impact of the project on intangible cultural heritage and implement measures to safeguard it where it exists.
Convention on International Trade in Endangered Species of Wild Fauna and Flora (1973) (CITES)	Trade in endangered species of wild fauna and flora	18/07/1991 accession	16/10/1991 entered into force	The MFPA, which comprises a part of the project area, is home to endangered species protected by this Convention.
Ramsar, 1971	Convention on Wetlands of International Importance especially as Waterfowl Habitat	-	04/03/1988	The project area includes a part of the Murchison Falls-Albert Delta Wetland System (a Ramsar site).
Convention on the Elimination of All Forms of Discrimination against Women (CEDAW)	United Nations Convention on discrimination against women	30/07/1980	22/07/1985	The Project area likely includes many women whom are single parents and others who are constantly being cheated out of their rights to property or discriminated against by men. The responsibility for implementation of CEDAW in Uganda lies with the Uganda Human Rights Commission (UHRC) which was established by the Constitution of the Republic of Uganda (Article 51). The Ministry of Gender Labour and Social Development provides the national machinery for gender mainstreaming (CEDAW 2015). The MGLSD, the UHRC and relevant departments within the

TREATY, CONVENTION, AGREEMENT	SUBJECT	SIGNED/ ACCEPTED	RATIFIED	APPLICATION TO PROPOSED PROJECT
				Ministry are to be engaged as part of the ESIA.
International Convention on the Elimination of All Forms of Racial Discrimination	United Nations Covenant on racial discrimination	21/10/1980	-	The Uganda Human Rights Commission (UHRC), established by the Constitution of the Republic of Uganda (Article 51), is responsible for combating the violation of human rights in Uganda and implementation of the international conventions. The Commission is to be engaged as one of the stakeholders of the ESIA. The Project proponent will engage in consultation with the UHRC as necessary.
International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families		14/10/1995	-	
Convention against Torture and Other Cruel Inhuman or Degrading Treatment or Punishment		03/10/1986	-	
Convention on the Rights of Persons with Disabilities		30/03/2007	25/09/2008	
International Covenant on Economic, Social and Cultural Rights	United Nations Covenant on equal economic, social, cultural, civil and political rights within State Parties	21/01/1987	-	The Uganda Human Rights Commission (UHRC), established by the Constitution of the Republic of Uganda (Article 51), is responsible for combating the violation of human rights in Uganda and implementation of the international conventions. The Commission is to be engaged as one of the stakeholders of the ESIA with respect to issues

TREATY, CONVENTION, AGREEMENT	SUBJECT	SIGNED/ ACCEPTED	RATIFIED	APPLICATION TO PROPOSED PROJECT
				related human rights violations.
International Covenant on Civil and Political Rights (including the First Optional Protocol on the ICCPR with reservations on Article 5)	United Nations Covenant on civil and political rights within State Parties	21/06/1995 (acceptance of Optional Protocol 14/11/1995)	-	
Convention on the Rights of the Child Optional Protocol to the Convention on the Rights of the Child on the involvement of children in armed conflict Optional Protocol to the Convention on the Rights of the Child on the sale of children child prostitution and child pornography	United Nations Convention on the rights of the child	17/08/1990 06/05/2002 30/11/2001	17/08/1990	
African Charter on Human and Peoples' Rights	International human rights instrument to promote and protect human rights and basic freedoms on the African continent	18/08/1986	10/05/1986	Chapter 4 of the 1995 Constitution of the Republic of Uganda fully domesticates the rights enshrined in the African Charter on Human and Peoples' Rights. The Constitution of the Republic of Uganda empowers the Uganda Human Rights Commission (UHRC) to carry out various human rights related functions including monitoring the Government's compliance with international treaties and conventions. The Commission

TREATY, CONVENTION, AGREEMENT	SUBJECT	SIGNED/ ACCEPTED	RATIFIED	APPLICATION TO PROPOSED PROJECT
				shall be engaged as part of this ESIA with respect to issues related to human rights violations (ACHPR 2015[4]).
African Charter on the Rights and Welfare of the Child	International human rights instrument on the rights and welfare of the child on the African continent	26/02/1992	17/08/1994	
Protocol to the African Charter on Human and Peoples' Rights on the Rights of Women in Africa	International human rights instrument on human rights and the rights of women on the African continent	18/12/2003	22/07/2010	
Labour Inspection Convention, 1947 (No. 81) (Excluding Part II)	ILO Convention concerning labour inspection in industry and commerce	-	04/06/1963	The Occupational Safety and Health Act, 2006 operationalises Uganda's commitments to the convention, the requirements of which shall apply to the project. The project shall also engage the Department of Occupational Safety and Health under the Ministry of Gender, Labour and Social Development –the lead Ministry responsible for labour administration.
Forced Labour Convention, 1930 (No. 29)	ILO Convention concerning forced or compulsory labour	-	04/07/1963	Local supporting legislation that shall apply to the project includes: the Employment Act, 2006; the Employment Regulations, 2011; the Employment (Employment of Children) Regulations, 2011; the Equal Opportunities Act, 2007; the Labour Disputes (Arbitration and Settlement) Act, 2006; the Labour Disputes (Arbitration and Settlement) (Mediation and Conciliation) Regulations, 2011; the Labour Unions Act, 2006; the Labour Unions (check - off) Regulations, 2011; the Labour Union (Access of Union Officials to a Workplace) Regulations, 2011; the Minimum Wages Boards and Wages Councils Act,

[4] *http://www.achpr.org/files/sessions/56th/state-reports/5-2010-2012/uganda_state_report_eng.pdf*

TREATY, CONVENTION, AGREEMENT	SUBJECT	SIGNED/ ACCEPTED	RATIFIED	APPLICATION TO PROPOSED PROJECT
				2000; Workers Compensation Act, 2000; and Workers' Compensation Regulations, 2011. The Project is going to be a labour intensive project with both local, foreign/ expatriate, skilled, semi-skilled and unskilled employees all of whose rights need to be effectively protected during the life of the project.
Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87)	ILO Convention concerning freedom of association and protection of the right to organise	-	02/06/2005	
Right to Organise and Collective Bargaining Convention, 1949 (No. 98)	ILO Convention concerning the application of the principles of the right to organise and to bargain collectively	-	04/06/1963	
Equal Remuneration Convention, 1951 (No. 100)	ILO Convention concerning equal remuneration for men and women workers for work of equal value	-	02/06/2005	
Abolition of Forced Labour Convention, 1957 (No. 105)	ILO Convention concerning the abolition of forced labour	-	04/06/1963	Local supporting legislation that shall apply to the project includes: the Employment Act, 2006; the Employment Regulations, 2011; the Employment (Recruitment of Uganda Migrant Workers Abroad) Regulations, 2005; the Employment (Employment of Children) Regulations, 2011; the Equal Opportunities Act, 2007; the Labour Disputes (Arbitration and Settlement) Act, 2006; the Labour Disputes (Arbitration and Settlement) (Mediation and Conciliation) Regulations, 2011; the Labour Unions Act, 2006; the Labour Unions (check - off) Regulations, 2011; the Labour Union (Access of Union Officials to a Workplace) Regulations,

TREATY, CONVENTION, AGREEMENT	SUBJECT	SIGNED/ ACCEPTED	RATIFIED	APPLICATION TO PROPOSED PROJECT
				2011; the Minimum Wages Boards and Wages Councils Act, 2000; Workers Compensation Act, 2000; and Workers' Compensation Regulations, 2011.
Discrimination (Employment and Occupation) Convention, 1958 (No. 111)	ILO Convention concerning discrimination in respect of employment and occupation	-	02/06/2005	
Minimum Age Convention, 1973 (No. 138)	ILO Convention concerning minimum age for admission to employment	-	25/03/2003	
Worst Forms of Child Labour Convention, 1999 (No. 182)	ILO Convention concerning the prohibition and immediate action for the elimination of the worst forms of child labour	-	21/06/2001	
Migrant Workers (Supplementary Provisions) Convention, 1975 (No. 143)	ILO Convention concerning migrations in abusive conditions and the promotion of equality of opportunity and treatment of migrant workers	-	31/03/1978	
Bamako Convention, 1991	Bamako Convention on the Ban on the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa	-	01/10/1998	NA
Basel Convention, 1989	Transboundary Transportation and Disposal of Hazardous Wastes	11/03/1999	- [1]	NA[2]
Cartagena Protocol, 2000	Protocol on Bio-safety to the Convention on Biological Diversity	-	11/9/2003	NA
World Heritage	World Heritage Sites	20/11/1987	-	NA

TREATY, CONVENTION, AGREEMENT	SUBJECT	SIGNED/ ACCEPTED	RATIFIED	APPLICATION TO PROPOSED PROJECT
Convention, 1972				
1951 Convention Relating to the Status of Refugees and the 1967 Protocol Relating to the Status of Refugees	United Nations Convention concerning the rights of international refugees	27/09/1976	27/09/1976	NA

[1] – No date specified

[2] – NA = Not applicable

The following conventions are of particular relevance to the Project and are considered in more detail below.

2.3.1 Convention on Biological Diversity (Rio Declaration), 1992[5]

Since its ratification of the convention in 1993, Uganda has established a number of enabling policies, laws and plans to support the protection of biodiversity, including:

- the Constitution of the Republic of Uganda;
- the National Environment Act, Cap 153;
- the Uganda Wildlife Act, Cap 200;
- the Water Act, Cap 152; and
- the National Environment Action Plan.

The National Environment Act is supported by a number of regulations outlined in Section 2.1.1 of this report. The regulations prescribe specific requirements aimed at making the principles established by the Act operational.

Some of the Convention activities that Uganda is required to undertake, and could apply to the project include:

- establishing protected areas to conserve biological diversity while promoting environmentally sound development around these areas;
- rehabilitating and restoring degraded ecosystems such as riverbanks, lakeshores, hilly and mountainous areas;
- promoting the recovery of threatened species in collaboration with local communities;
- promoting public participation, particularly in regard to assessing the environmental impacts of development projects that threaten biological diversity;

[5] *National Environment Management Authority, 2002*

- establishing biodiversity offsets (and the principle of No Net Loss) as a tool for management of impacts on biodiversity; and
- identifying and monitoring important components of biological diversity that need to be conserved and used sustainably.

Part of the project area falls within a protected area that is highly valued for its biodiversity resources. This area includes the Murchison Falls National Park and the Murchison Falls-Albert Delta Wetlands System (Ramsar site).

The Project footprint also includes riverbanks and lakeshore areas for which national legislation (National Environment (Wetlands; River Banks and Lake Shores Management) Regulations, 2000) are in place to control activities within such areas. Regulation 20 stipulates that EIA is mandatory for all major activities on riverbanks and lakeshores, and that special measures are essential for the protection of riverbanks and lakeshores such as preventing soil erosion, siltation and water pollution. Other threats to biodiversity such as the introduction and proliferation of exotic species are provided for in the National Environment (Hilly and Mountainous Area Management) Regulations, 2000 (Regulation 18) and the Plant Protection Act, Cap 31.

In addition to complying with national legislation, the Project Proponent should identify prevailing practices that lead to biodiversity loss in the project area, and identify measures to avoid compounding any adverse impacts that may have occurred. Some of the known practices that lead to biodiversity loss in Uganda include:

- Overgrazing in areas with high cattle populations;
- Land fragmentation in populated areas;
- Heavy dependence on biomass for energy and construction materials;
- Destructive fishing methods;
- Poaching of wildlife; and
- Discharge of chemicals into wetlands, rivers and lakes.

2.3.2 Ramsar Convention on Wetlands of International Importance

The 'Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ref. 2-19)', more commonly known as the Ramsar Convention, is an intergovernmental treaty adopted on 2nd February 1971 in the Iranian city of Ramsar. The Convention's mission is *"the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world"*. The convention was ratified by Uganda on 4th July 1988, at which time the country's first Ramsar site at Lake George was designated. Uganda now has 12 Ramsar sites (http://ramsar.wetlands.org).

Ramsar sites are designated based on their containing representative, rare or unique wetland types, and/or being sites of international importance for conserving biological diversity. Ramsar sites represent a sub-set of all wetlands, which are areas where water is the primary factor controlling the environment and the associated plant and animal life. Wetlands provide many values and benefits to human society, which may include those listed in Table 2-4.

Table 2-4: Wetland Values and Benefits

DIRECT VALUE	*INDIRECT VALUE*	*OPTION VALUE*	*NON-USE VALUE*
Production of goods and services for local communities, e.g.: • Fish • Fuel wood • Building materials • Sand, gravel, clay • Thatch • Water • Wild foods • Medicines • Agriculture / cultivation • Pasture / grazing • Transport / recreation	Ecosystem functions and services, e.g.: • Water flow • Water storage • Water purification • Water recharge • Flood control • Storm protection • Nutrient retention • Micro-climate regulation • Shore stabilisation	Possible future use and applications, e.g.: • Pharmaceutical • Agricultural • Industrial • Leisure • Water use	Intrinsic significance, e.g.: • Cultural value • Aesthetic value • Heritage value • Bequest value • Existence value

Under the terms of the Ramsar Convention, Uganda is committed to implementing the 'three pillars' of the Convention, which are:

1. to designate suitable wetlands for the List of Wetlands of International Importance ("Ramsar List") and ensure their effective management;
2. to work towards the wise use of all its wetlands through national land-use planning, appropriate policies and legislation, management actions, and public education; and
3. to cooperate internationally concerning trans-boundary wetlands, shared wetland systems, shared species, and development projects that may affect wetlands.

The concept of 'wise use' is fundamental to the Ramsar Convention, and is reflected in Uganda's National Environment (Wetlands, River Banks and Lake Shores Management) Regulations (2000) mentioned above, which aim to *"provide for the conservation and wise use of wetlands and their resources in Uganda"* (Regulation 4(a)).

Wise use of wetlands, as defined by the Ramsar Convention, is *"the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development"*. 'Ecological character' is *"the combination of the ecosystem components, processes and benefits/services that characterise the wetland at a given point in time"* (Ramsar Convention Secretariat, 2010a). Ecological character is essentially an indicator of the health of the wetland (Wetlands Management Department and Nature Uganda, 2008).

Article 3(2) of the Ramsar Convention requires a contracting party to *"arrange to be informed at the earliest possible time if the ecological character of any wetland in its territory and included in the List [of Wetlands of International Importance, i.e. Ramsar sites] has changed, is changing or is likely to change as the result of technological developments, pollution or other human interference"*. In this context, 'change in ecological

character' is defined as *"the human-induced adverse alteration of any ecosystem component, process, and/or ecosystem benefit/service"* (Ramsar Convention secretariat, 2010a).

This requirement to be aware of any change in the ecological character of a Ramsar site implies a need to have the ability to anticipate and predict the effects of actions on wetland ecosystems; i.e. the need to undertake EIA (Ramsar Convention Secretariat, 2010b). As noted in Regulation 5 (b), the National Environment (Wetlands, River Banks and Lake Shores Management) Regulations (2000) require EIA to be undertaken for any activity that may have an adverse impact on a wetland.

The Ramsar convention has developed guidance for the management of risks related to extractive industry development in wetlands.

One of these sites is the Murchison Falls-Albert Delta Wetland System (Ramsar site no. 1640). The Ramsar site was designated based on the following criteria:

- it supports rare, vulnerable and endangered species;
- it is important for maintaining biological diversity of the region;
- it support a number of indigenous fish species that are representative of wetland benefits and / or values that contributes to the Lake Albert fishery and global biological diversity; and
- it is an important spawning ground on which fish stocks depend.

Furthermore Ramsar calls for wise use of "*all… wetlands through national land-use planning, appropriate policies and legislation, management actions, and public education*". There are several other wetland habitats in the Project area.

2.3.3 Convention on International Trade in Endangered Species of Wild Fauna and Flora

The Convention on International Trade in Endangered Species of Wild Fauna and Flora is an international agreement between governments, whose aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival (CITES Secretariat, 2015). The Convention was acceded by Uganda on 18th July 1991, and entered into force on 16th October 1991.

The Convention works by subjecting the international trade in specimens of selected species to certain controls. It requires that all import, export, re-export and introduction from the sea of species covered by the Convention be authorised through a licensing system. It also requires that each party to the convention must designate one or more management authorities in charge of administering that licensing system and one or more scientific authorities to advise them on the effects of trade on the status of the species. The species covered by CITES are listed in three Appendices, according to the degree of protection they need (https://cites.org/eng/disc/species.php).

Uganda, as a party to the Convention, is obligated to adhere to the recommendations of the Conference of Parties with respect to trade in endangered species. The MFCA, which constitutes a part of the project area, is home to endangered species most notably elephants that are protected by the Convention (UWA, 2014).

2.3.4 The Convention on Migratory Species of Wild Animals

The Convention on Migratory Species of Wild Animals (CMS), also known as the Bonn Convention, brings together the states through which migratory animals pass (Range States) and lays the legal foundation for internationally coordinated conservation measures throughout a migratory range. Uganda ratified the Convention on 1st August 2000. The Convention aims to improve the status of all threatened migratory species through national action and international agreements between range states of a particular group of species. The CMS therefore acts as a framework Convention and the agreements may range from legally binding treaties (called Agreements, such as AEWA as described in section 2.3.5) to less formal instruments, such as Memoranda of Understanding, and can be adapted to the requirements of particular regions (UNEP/CMS Secretariat 2014).

The Convention has two appendices that list threatened migratory species (Appendix I) and species to the subject to agreements (Appendix II). The primary enabling legislation for the protection of migratory species

is the Uganda Wildlife Act, Cap 200, which stipulates under Section 27, (2) that "species which migrate to or through Uganda which are protected under any international convention or treaty to which Uganda is party and to which Section 90 applies shall be protected species under this Act". Classification as a 'protected species' prohibits any hunting or taking of plants or animals classified as such unless under conditions contained in a licence issued or wildlife use right granted under the Act.

2.3.5 Agreement on the Conservation of African-Eurasian Migratory Waterbirds

The Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA) is an intergovernmental treaty dedicated to the conservation of migratory waterbirds and their habitats across Africa, Europe, the Middle East, Central Asia, Greenland and the Canadian Archipelago.

Developed under the framework of the Convention on Migratory Species (CMS) and administered by the United Nations Environment Programme (UNEP), AEWA brings together countries and the wider international conservation community in an effort to establish coordinated conservation and management of migratory waterbirds throughout their entire migratory range. AEWA covers 255 species of birds ecologically dependent on wetlands for at least part of their annual cycle, including many species of divers, grebes, pelicans, cormorants, herons, storks, rails, ibises, spoonbills, flamingos, ducks, swans, geese, cranes, waders, gulls, terns, tropic birds, auks and frigate birds.

All AEWA species cross international boundaries during their migrations and require good quality habitat for breeding as well as a network of suitable sites to support their annual journeys. International cooperation across their entire migratory range, as provided by AEWA, is therefore essential for the conservation and management of migratory waterbird populations and the habitats on which they depend. The latest report for Uganda was issued in June 2015.

2.4 PROJECT POLICIES AND STANDARDS

In line with the Project Proponent directives on Hygiene-Health, Safety, Security, Social and Environment (HSE), the EA1&1A / EA2 North Development Project will strive to act and be recognized as:

- An industrial project with a strategy centred on respect, listening, dialogue and stakeholder engagement;
- An accountable operator exemplary in its management of social and environmental impacts related to the Project;
- A partner in the sustainable social and economic development of Uganda and the Project host communities;
- An industrial project that takes appropriate measures to limit and control any significant impact on the environment caused by activities in progress; and
- An industrial project that is efficient and limits: its energy consumption, its atmospheric emissions, its effluents, its ultimate waste production, its use of natural resources and its impact on biodiversity.

The Project will also:

- Reduce both direct and indirect environmental and social impacts at every stage of the project (from early construction work to field abandonment including operations);
- Follow the mitigation hierarchy approach (i.e. Avoid, Minimise, Restore and offset);
- Identify and minimize risks and to ensure prompt and effective response in case of any accidental pollution;
- Reduce any significant impact of the future activities on the natural and human environment. Mitigation measures shall be identified and selected according to the Best Available Technique (BAT);
- Continuously engage with all stakeholders including regulators, central government, local government, local communities and civil society; and

- Strive to achieve a Biodiversity Net Gain in MFNP and No Net Loss for the overall project.

Key Health, Safety, Environment, Security and Social design principles that have been adhered to in the pre-project phase are:

Emissions

- No operational flaring, with minimal natural gas flaring that may be required for emergency situations;
- No continuous venting of associated gas;
- Limitations for Greenhouse gas (GHG) emissions and intensity. The Operating Company's internal environmental objective is to achieve a GHG intensity below 20 kt/MMboe;
- Design shall minimize volatile organic carbon emissions;
- Odour emissions shall be minimized; and
- Noise emissions shall also be minimized.

Discharges and waste management

- No discharge of produced water to the environment;
- All surface run-off water from facilities will be subjected to analyses to determine the level of contamination and managed appropriately either by reinjection or appropriate treatment before discharge into the environment;
- Drains shall be segregated to avoid cross contamination of drain effluent;
- Chemicals storage areas (if existing) are not connected to open drains;
- Waste management activities will be performed in accordance with the waste management hierarchy principles; and
- Designated areas for waste management (temporary storage and segregation) shall be incorporated into the facility layout.

Energy efficiency

- Energy efficiency features shall be incorporated into the design.

Exclusion areas

- No production well pad in the Ramsar area; and
- CPF located outside the MFNP and Ramsar area.

Visual impact and footprint

- Facilities to be designed to minimize the visual impact; and
- Facilities footprint to be minimized and to be designed in order to avoid as much as possible sensitive ecological features as well as physical displacement of households.

2.4.1 TEP Uganda's Policies and Standards

2.4.1.1 TEP Uganda Health, Safety and Environmental Charter

TEP Uganda considers people's safety and health protection, safety in regards to operations, and respect for the environment as paramount priorities.

TEP Uganda is thus committed to adopting a non-compromising attitude towards the following principles:

- Comply with applicable Ugandan laws and regulations, as well as Total Group policies in the fields of health, safety and environment;
- Check that all risks associated with our operations are identified and controlled and that personnel working on our sites manage these risks;
- Ensure that our employees and contractors are trained and competent to meet the company's Health, Safety and Environment (HSE) requirements;
- Develop, maintain and test plans for emergency preparedness;
- Encourage a positive HSE culture through strong leadership from management and supervision, workforce involvement, personal responsibility, and learning from incident feedback in a spirit of openness and dialogue; and
- Strive to achieve continuous improvement by setting measurable HSE objectives, measuring progress and reviewing performance through statistical analysis and audits.

Compliance with this Charter is an important element in the performance evaluation of all employees, particularly those with line management responsibilities, as well as in the selection of industrial and business partners.

2.4.1.2 TEP Uganda Biodiversity Charter

TEP Uganda applies the Code of Conduct of Total and conducts its operations in compliance with the Safety Health Environment Quality Charter and the principles of the Biodiversity Policy of the Group.

In particular, in its work within Murchison Falls National Park (MFNP) and the surrounding landscape, TEP Uganda is fully committed to carrying out all of its activities:

- avoiding any unnecessary damage to the ecosystem and the biodiversity;
- minimising any unavoidable damage to the ecosystem and the biodiversity;
- identifying damages to the ecosystem and the biodiversity and managing restoration operations; and
- considering offsetting for any residual damage that might still be outstanding.

By applying this mitigation hierarchy, as described above, TEP Uganda will seek to achieve net positive gains to biodiversity and endeavour not to undermine the ecological value of MFNP. It will facilitate all of the above in accordance with the applicable laws and regulations and in full transparency, through studying and monitoring biodiversity where it operates, using Total's best practices and leveraging partnerships with experts.

2.4.2 TUOP'S Policies and Standards

2.4.2.1 Tullow Safety Rules

The Tullow Safety Rules are a set of requirements designed to manage high risk activities that have the potential to adversely affect our personnel, the environment and surrounding communities.

Tullow Safety Rules apply to all parts of Tullow's operations and to all employees and contractors, involved in those activities. Tullow's Businesses are required to manage EHS risks by developing and implementing procedures that define the relevant standards and processes intended to support the implementation of these rules.

Contractors working under the Tullow management system must comply with these Tullow Safety Rules. Contractors working under their own management system should be encouraged to implement the intent of these rules.

Where conflict exists between these rules and the applicable host country regulatory requirements, the more stringent will apply.

The Tullow Safety Rules cover the following activities:

- Rule 1: Permit to Work;
- Rule 2: Energy Isolation;
- Rule 3: Working at Heights;
- Rule 4: Lifting Operations;
- Rule 5: Excavation Work;
- Rule 6: Confined Space Entry;
- Rule 7: Process Safety Management;
- Rule 8: Management of Change;
- Rule 9: Driving Safety;
- Rule 10: Hazardous Materials;
- Rule 11: Contractor Management;
- Rule 12: Environmental Management; and
- Rule13: Health and Hygiene.

2.4.2.2 The Tullow Environmental and Social Performance Standard

The Environment and Social Performance Standard sets out a framework to support sustainable business delivery by ensuring consistent, proactive and integrated management of environmental and social risks across our operations. Tullow is committed to continuously improving its environmental and social performance in alignment with internationally recognized best practice standards through the implementation of this Standard.

The Environment and Social Performance Standard presents the Tullow minimum requirements for environmental and social management across the Company. They should be read and adhered to in addition to any land all legal or regulatory requirements governing our operations in the jurisdictions where we work.

The Environment and Social Performance Standard shall be applied to all Tullow operations (including offices) except when a conflict exists between the requirements and local regulatory laws. In this instance, the applicable law must be adhered to. If the requirements of this Standard are more stringent than local laws, or accepted local practices, then the requirements of this Standard shall be applied.

Tullow expects that all staff, including contractors and partners (i.e. Joint Venture companies), will adhere to the Environment and Social Performance Standard and apply it accordingly in their work.

PROJECT DESCRIPTION AND ALTERNATIVE ASSESSMENT

03

3 PROJECT DESCRIPTION AND ALTERNATIVE ASSESSMENT

3.1 INTRODUCTION

The EA-1/EA-1A and EA-2 North Development Project (hereafter referred to as the 'Project') is located to the north-west of Lake Albert, near Buliisa town. The Project is being developed by TEP Uganda and TUOP and comprises the upstream development of twelve fields, six in Exploration Block EA-1/1A, operated by TEP Uganda and six in Block EA-2, operated by TUOP. The Project area is approximately 92,000 ha (40 km by 23 km), as illustrated in Figure 3-1.

This chapter describes the Project and its supporting infrastructure in sufficient detail to inform the scoping process and approach to the ESIA. Environmental and social considerations have been implicit in each element of the Project's development and evolution. Further detail on the Project will be presented in the main ESIA Report to enable the assessment of potential impacts and following the front-end engineering design.

The description of the Project has been broken down into the following phases:

- Project engineering;
- Land acquisition and resettlement;
- Early works: development of early infrastructure and the temporary facilities by the project operator;
- Development of production infrastructure including:
    - Construction and Drilling;
    - Pre-commissioning; and
    - Commissioning.
- Operation and production; and
- Decommissioning.

3.2 PROJECT BACKGROUND

In February 2012, TEP Uganda and CNOOC Uganda were each granted the acquisition of a one-third interest in Exploration Area EA-1 and 1A, EA-2 and EA-3 in Uganda, previously held by subsidiaries of Tullow. TUOP retained the remaining one-third interest. Located in the Lake Albert region, these four licenses cover a total area of close to 1,000,000 ha, as illustrated in Figure 3-1.

The integrated development of the Lake Albert fields covers three blocks and four license areas, operated from north to south respectively, by TEP Uganda (EA-1/1A), TUOP (EA-2) and CNOOC (now known as Kingfisher; formerly EA-3). These can be sub-divided into:

- the Buliisa-Nwoya area (TEP Uganda EA-1/1A and the north part of TUOP's EA-2);
- the Kaiso-Tonya area (TUOP – EA-2); and
- the Kingfisher area (CNOOC's EA-3) (see Figure 3-1).

Sixty two test wells (of which 58 are within the Project area) were drilled in these three blocks between 2008 and 2014, as part of the exploration activities to confirm the reservoir potential.

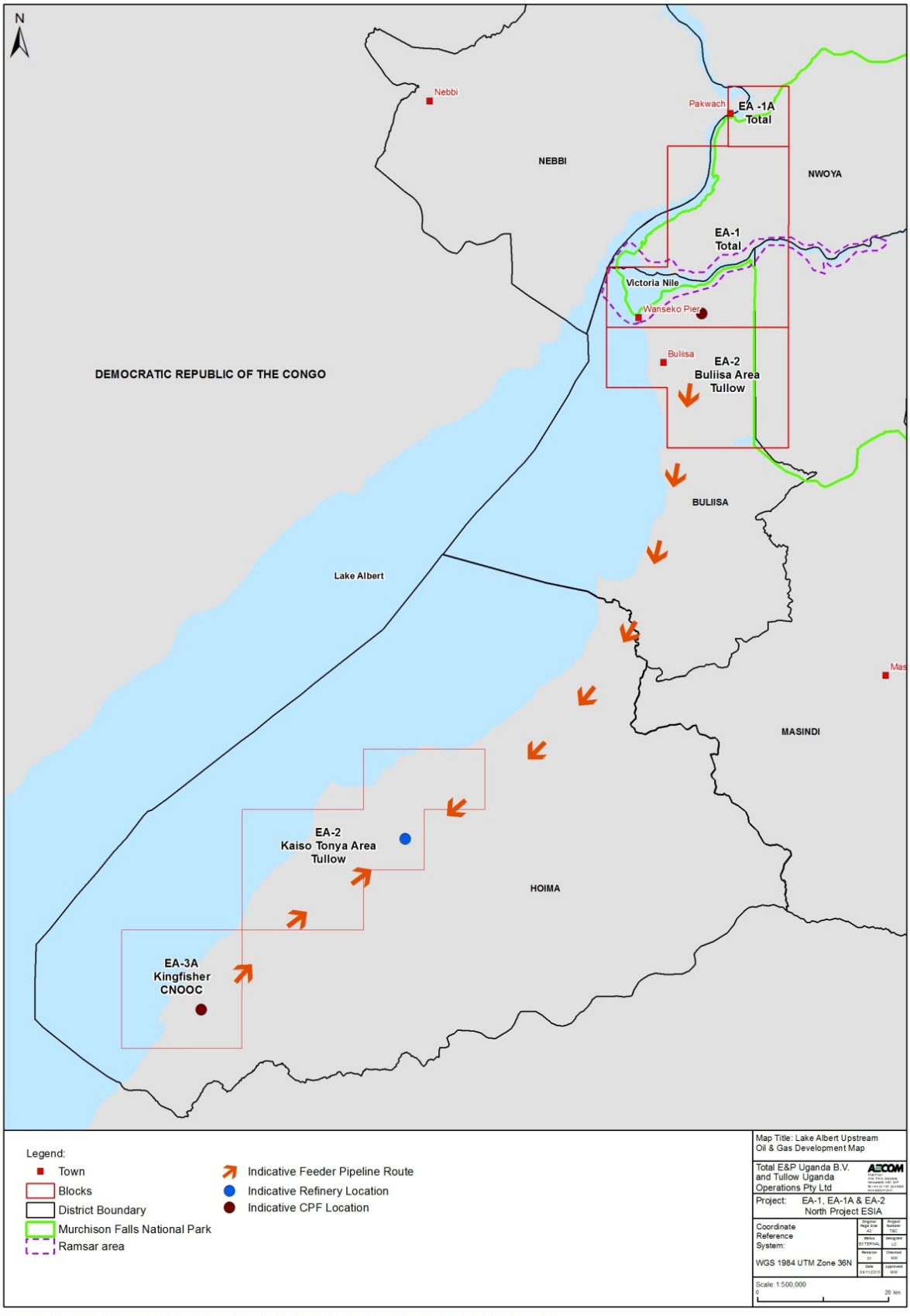


Figure 3-1: Lake Albert Exploration Blocks

3.3 DEFINITION OF THE PROJECT

Table 3-1 below lists the different categories of development which will be referred to in the ESIA. This includes 'the Project', Associated Facilities, and Other Developments Encompassed in the cumulative impact assessment (CIA). The table includes a definition of each type along with a description of which components fall within each category.

Table 3-1: Definition of the Project and Other Developments Considered in the ESIA

COMPONENT	*DEFINITION*	*DESCRIPTION*
The 'Project'	This is the activities and components subject to the approval application(s) for the field development within EA1/EA-1A and EA2 North. This is the primary focus of the ESIA.	Includes the following facilities within the EA1 and EA2 North blocks: • Central Processing Facility (CPF) area; • Well pads, each with multiple wells; • A network of flow-lines; • Pipeline crossing of the Nile; • Water abstraction from Lake Albert; • Waste management storage areas; • Upgraded and new access roads within EA1 and EA2 North; • Operational centres, camps, and laydown areas; • Borrow pits; and • Barge.
Associated Facilities	As defined by the IFC these are: *facilities that are not funded as part of the project and that would not have been constructed or expanded if the project did not exist and without which the project would not be viable.*	Includes: • The refinery at Kabaale; • The export pipeline; • Waste management facilities; • Major road and rail upgrades for the purpose of transporting materials to the EA1 and EA2 North oil fields; • A feeder pipeline linking the CPF to the delivery point, near the refinery project in Kabaale; and • Airstrip upgrades at Pakuba and Bugungu.
Other developments encompassed within the CIA	These are other projects that will be considered by the CIA (in addition to those listed above). These are not part of the Project, are not necessary to support the EA1/EA-1A and EA2 North development, and are not 'associated facilities'.	Includes: • Kingfisher field development and feeder pipeline; • Kaiso Tonya field development; • Other major transport infrastructure upgrades promoted by the Government; • Transmission line upgrades promoted by the Government ; • Hydro power projects on the Nile; • Thermal power project near Hoima; and • Geothermal energy projects.

The Kingfisher field and Kaiso Tonya development are separate projects where TEP Uganda and TUOP are working in partnership with the developer and have thus have greater potential to help influence the final design. These Projects will, however, be assessed under separate ESIA's.

3.4 PROJECT OVERVIEW

In summary, the Project consists of the following components, the location of which is illustrated in Figure 3-2:

- 43 well-pads, each containing up to 25 wells, and with a total 457 wells (211 producers, 205 injectors, 41 observation wells). Each well-pad will be approximately 2 to 3 ha in size;
- A single Central Processing Facility (CPF) area, with the capacity to process approximately 190 thousand barrels of oil per day (MBOPD), located south of Victoria Nile River ('Nile'). The CPF will have a water treatment facility with an estimated capacity of about 830,000 barrels of water per day (bwpd), and will cover an estimated 170 ha. There will also be a power generating facility within the CPF designed to convert produced gas into electricity for internal consumption and excess exported to the national grid;
- A construction camp and two main operational centres and camps, one within the CPF located close to the production facility, and another north of Nile;
- A lake water abstraction facility located near the Lake Albert shore;
- A network of buried pipelines, approximately 305 km combined length, including:
    - Production pipelines with a combined length of approximately 120 km to transport the oil and produced gas;
    - The water abstraction line, bringing water from Lake Albert to the CPF, approximately 14 km in length (exact location to be confirmed);
    - Water injection pipelines, with a combined length of approximately 110 km to transport treated water from the CPF to the well pads; and
    - Polymer injection pipelines with a combined length of approximately 63 km to transport polymer from the CPF to certain wells, these will transport water when the fields are being produced under waterflood regimen.
- A Nile river crossing beneath the riverbed to connect the fields in MFNP to the CPF (1 production pipeline, 1 water injection pipeline, 1 polymer injection pipeline, and electrical and fibre optic cables); and
- Upgraded and new access roads and possibly waste management areas within the Project Area.

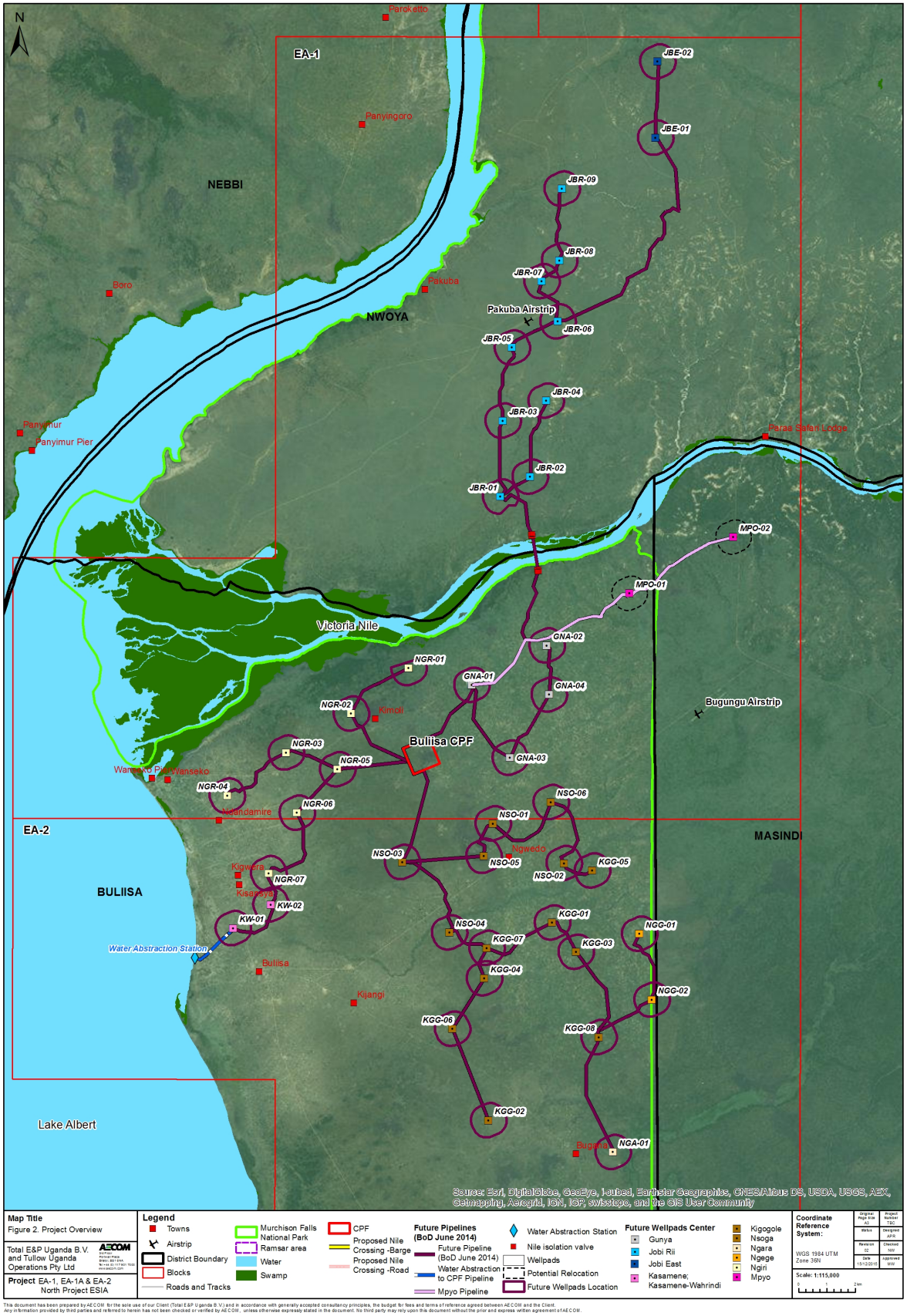


Figure 3-2: Project Overview

3.5 OIL CHARACTERISTICS

The oil characteristics within the Project area are listed in Table 3-2. In summary, these include:

- Light and waxy oil to the south of the Nile with a relatively high pour point at 36-45°C and a high wax appearance temperature (WAT) of 46-58°C; and
- Heavy and viscous oil (within MFNP) to the north of the Nile with a low pour point of 9-15°C, and a WAT of 23-34°C. Viscosities reach 200-1,200 centipoise (cP) within the eastern fields.

Table 3-2: Oil Characteristics, North and South of the Nile

	Waxy Oil (south of the Nile)			*Heavy and Viscous Oil (North of the Nile)*		
Field	Ngiri	Kigogole	Gunya	Jobi-Rii Main	Jobi-Rii North	Jobi East
Oil viscosity (min-ref-max (@Pres & Tres in cp)	5	3-**10**-60	8-**20**-60	10-100-170	20-**140**-440	50-**200**-350
Pour Point (°C)	45	36	39	15	15	9
WAT (°C)	58	56	46	34	28	23

The waxy oil to the south of the Nile will need viscosity correction to ensure it can flow. Both thermal insulation and electrical heat tracing of the pipelines have been proposed to keep the production above the WAT.

3.6 ENABLING WORKS AND CONSTRUCTION

3.6.1 Well Pads

The Project will include 43 well pads containing an expected 457 wells, located over 6 oil fields within EA1 and 6 oil fields within EA2, as indicated in Figure 3-2. The number of well pads in each oil field is presented in Table 3-3.

Table 3-3: Number of Well Pads

BLOCK	*LOCATION (OIL FIELD)*	*WELL PAD NAME(S)*
EA1	Ngiri	*NGR-01* *NGR-02* *NGR-03* *NGR-04* *NGR-05* *NGR-06* *NGR-07*
EA1	Jobi-Rii	*JBR-01* *JBR-02* *JBR-03* *JBR-04* *JBR-05* *JBR-06* *JBR-07*

BLOCK	LOCATION (OIL FIELD)	WELL PAD NAME(S)
		JBR-08 *JBR-09*
EA1	Gunya	*GNA-01* *GNA-02* *GNA-03* *GNA-04*
EA1	Jobi-East	*JBE-01* *JBE-02*
EA2	Kasamene-Wahrindi	*KW-01* *KW-02*
EA2	Nsoga	*NSO-01* *NSO-02* *NSO-03* *NSO-04* *NSO-05* *NSO 06*
EA2	Kikogole	*KGG-01* *KGG-02* *KGG-03* *KGG-04* *KGG-05* *KGG-06* *KGG-07* *KGG-08*
EA2	Ngege	*NGG 01* *NGG 02*
EA2	Ngara	*NGA 01*

3.6.2 Well Pad Design

Each well pad will constitute an area of hardstanding approximately 2 to 3 ha in size (120 - 140 m wide by 160 - 220 m in length), varying depending on the well pad location and design, as illustrated in Figure 3-3.

Each well pad will have one main entrance and one emergency exit gate on the opposite side which can be used for rig access. Most of the well pad area will use compacted ungraded material in order to limit concrete area. Concrete areas have been considered only around wellheads for rig support and to improve effluent drainage during drilling operation and below equipment for supporting and drainage considerations. Figure 3-3 gives an indicative view of a standard well pad.

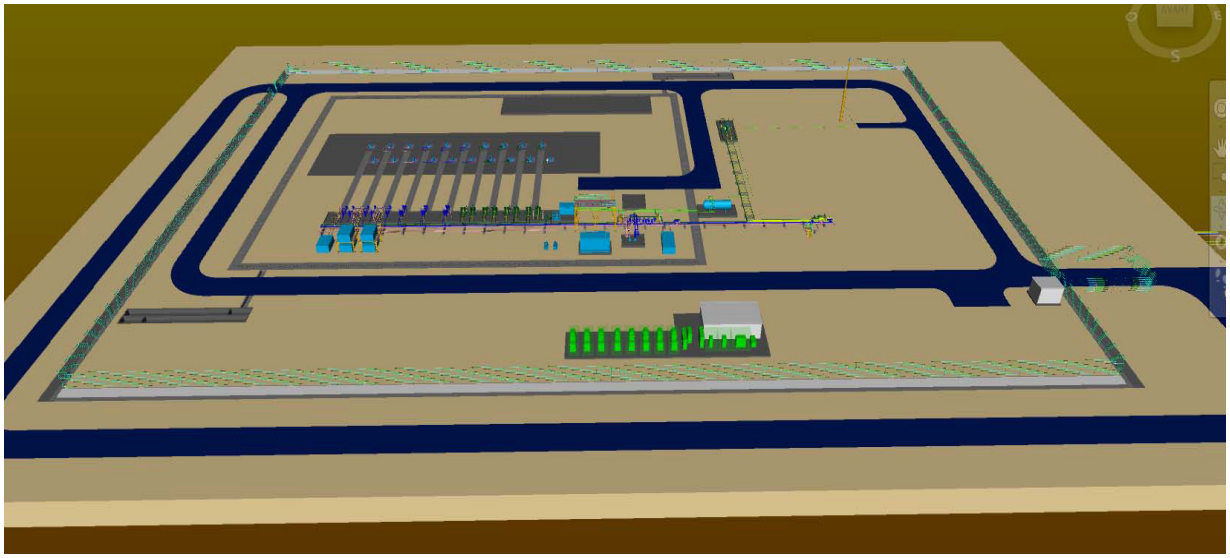


Figure 3-3: Well Pad 3D Model View

The wellpads will be surrounded by a fence, with an area of 15 m around the fence cleared and left free of vegetation to limit the potential for bush fire. An earth bund wall will be installed around well pads located inside the National Park. This is to prevent wild animals entering the well pads, as well as to minimise the visual/noise impact.

Each of the well pads will be orientated by 23° from geographical North in order to have the prevailing winds blowing from South to North. This improves air ventilation and limit hazard escalation from one wellhead to the other.

Each well pad is estimated to weigh approximately 6,090 tons (t), and the volume of earth and concrete required is in the order of 1,935,787 m^3 and 66,146 m^3 respectively, as presented in Table 3-4. In addition it is estimated that up to 10 000 tons of murram will be required depending on size.

Table 3-4: Well Pad Weights and Quantities Estimation

NET DRY WEIGHT (t)	*GROSS DRY WEIGHT (t)*	*EARTH VOLUME (M^3)*	*CONCRETE VOLUME (M^3)*
~6,090 t	~7,623 t	~1,935,787	~66,146

The final well pad layout will be dictated by the drilling facilities and design requirements; consequently the well pad design may be modified when the type of drilling rig is selected.

3.6.3 Drilling Process

The choice of drilling rig will be influenced by the following criteria:

- The ability to optimise drilling performance, like fast rig up/down, tripping automation etc.;
- A preference for fast moving between well pads, and compact modular type;
- Fast skidding between slot will facilitate batch drilling when there are additional skidding to be performed; and
- Environmental considerations such as enclosed system, sound proofing, camouflage etc.

There will be 3 drilling rigs mobilised during construction: 1 north of the Nile, and 2 south of the Nile. A slanted rig may be required to drill very shallow wells such as at Jobi East and Nsoga; the final decision will be taken during the FEED stage and during the preparation of the ESIA. The rig and associated equipment will be transported to the site by low bed and flatbed trailers.

A rotary drilling technique will be used to drill the 457 wells. The drilling process will use drill bits of different sizes to drill a series of concentric holes from the ground surface to the planned well maximum depth of 1.7 km.

Well control issues will focus on the work-over operations, particularly with progressive cavity pump (PCP) completions and before water cut starts building up. Brine solution is used to 'kill' an eruptive well, pumping a solution into the well to stabilise the pressure. A 'xmas' tree (valve arrangement) will be installed to control each well, providing a double barrier and sealant to prevent well eruption.

3.6.3.1 Drilling Fluids and Chemicals

A drilling fluid (mud) is circulated through the inside of the drill string to the bit during drilling. The primary function of the drilling mud system is to remove cuttings (waste) from a well and to control formation pressures. Other functions of the mud system include:

- Sealing permeable formations;
- Maintaining well bore stability;
- Cooling, lubricating and supporting the drill bit and assembly; and
- Transmitting hydraulic energy to tools and the drill bit.

Two types of mud are typically used for drilling:

- Water based drilling fluids (WBDFs) – water mixed with bentonite and barium sulphate (barite) forms the continuous phase of the mud (up to 90% by volume); and
- Non-aqueous drilling fluids (NADFs) – base oils refined from crude oil or synthetically derived from the continuous phase of the mud. NADFs offer better well stability, particularly when drilling through water-sensitive formations. They also offer better lubricity and high temperature stability and reduce the formation of gas hydrates (which is a particular issue for deep water wells).

The Project will generally use NADFs, as it improves drilling performances and minimises the risk of potential drilling issues occurring. The exception will be the top sections (e.g. upper hole, drilled through the groundwater aquifer). The top section will be drilled with "spud mud", which is basically clay and water, because of the greater sensitivity of these layers.

Two 400 m^3 mud pits equipped with liners will be excavated on the platform for storage of drilling fluid. Water used for mud fabrication will be sourced from ground or surface water depandent on location and pending assesment of any associated potential impact.

The fluid is pumped into the drill pipe and returns to the surface on the rig via the annulus between the drill pipe and well bore. The casing in each well will provide a seal between the drilling fluids and the formations to prevent fluid losses into the formation. On the surface, cuttings are mechanically removed from the drilling

fluid; cuttings will be separated from the drilling fluid by solids control equipment. The drilling fluid and cuttings will be re-circulated to the rig for treatment and, in the case of the fluids, potential reuse.

Well clean-up will occur after well completion and will involve the removal of drilling fluids. The residual well fluids will be transported directly to the CPF with production through flow lines and recovered from the separator as wastes.

3.6.4 Pipeline Design and Construction

A series of pipelines will need to be installed to connect the CPF to the wells and to the lake water abstraction facility.

3.6.4.1 Pipeline Network

Indicative pipeline routes are illustrated in Figure 3-2. The precise pipeline routes will be confirmed during the FEED process and final route alignments will be presented and assessed in the ESIA. It is estimated that the total combined pipeline network will be around 305 km in length.

The pipeline network will comprise of:

- Production pipelines (aka flowlines) (from 4 to 24-inch ID) with a combined length of approximately 120 km to transport the oil and produced gas;
- The water abstraction line (24-inch ID), bringing water from Lake Albert to the CPF, approximately 13.6 km in length;
- Water injection pipelines (from 4 to 20-inch ID) with a combined length of approximately 110 km to transport treated water from the CPF to the well pads for injection; and
- Polymer injection pipelines (from 4 to 16-inch ID) with a combined length of approximately 63 km in length to transport polymer from the CPF to certain wells, these will transport water when the fields are being produced under waterflood regimen.

The oil characteristics vary within the Project area, with different levels of viscosity (as discussed earlier). North of the Nile, the higher viscosity of the oil does not necessitate electrical heating within the production pipelines. However heat insulation is likely to be required to guaranty a minimum arrival temperature of fluid at the CPF. South of the Nile, the high wax content is a risk (of solidification in the pipeline and facilities), and both thermal insulation and electrical heat tracing of the pipelines are required to keep the production above the WAT.

The pipelines will generally be installed using open-cut trench methods, using excavators, welding units, side-booms and dozers. The general process for open-cut technique is shown in Figure 3-4.The open-cut pipeline construction activities will normally be undertaken within a strip of land known as the construction ‘corridor’ (or ‘Right of Way’). The construction corridor will have a general width of 30 m and is designed to accommodate the pipeline trench(s), stockpile areas, laydown, welding, and the movement of construction equipment alongside the trench(s). Where multiple pipelines follow the same route they will be grouped together in the same trench, with a separation distance of at least 0.40 m (or one diameter of the largest pipeline, if greater). Where there are 4 pipes or more, and depending on the installation contractor and type of side boom to be used, certain sections may require two separate trenches within in the same construction corridor.

The topsoil will be stripped across the construction corridor and stored appropriately for reinstatement of the construction corridor after construction works are complete. Pipelines will be buried with at least 0.8 m cover on the top of the pipeline for non-export lines and with 1 m cover for the exportation lines. A fibre optic cable will be installed to detect abnormal movement around the pipeline and will monitor pipeline integrity.

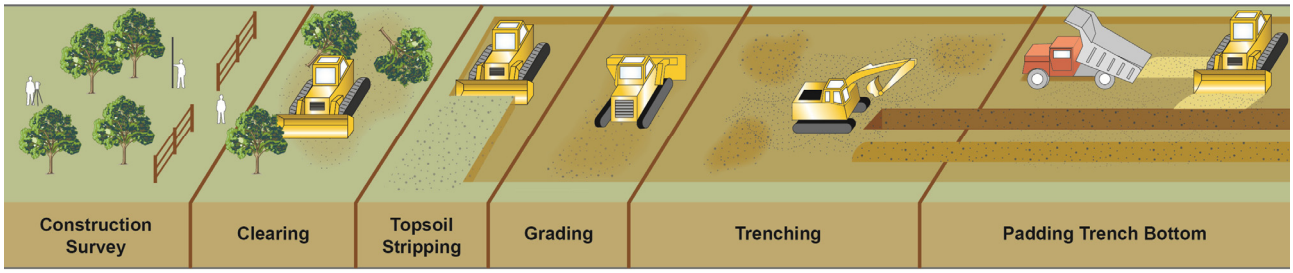
Known commonly as ‘stringing’, the pipe sections will be placed end to end alongside the trench in preparation for welding and then lowered into the trench in a continuous operation. Once in place, hydraulic testing of the pipelines will be undertaken, as described in Section 3.7.1. The pipeline trench will then be backfilled with the stored topsoil and any surplus or unsuitable backfilling material (such as inert waste) will be removed from site and taken for disposal to an approved waste handling facility.

The construction corridor will be restored and in some areas a permanent service track will be maintained in driveable conditions to allow surveillance and access to the well-pads. Following construction and backfill restoration of the pipeline corridor will be undertaken following the recommendation of an approved restoration plan. Induced access management controls will be left in place along the pipeline land easement and ownership transferred to the government, as appropriate.

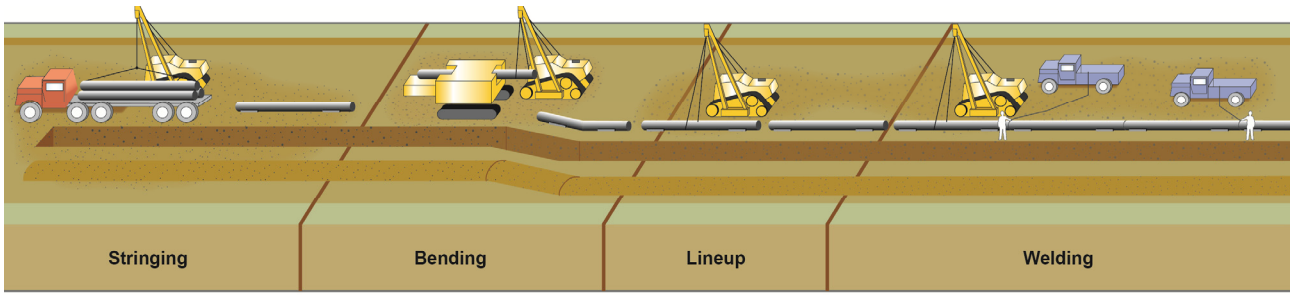
Some particular points (for example a section in MFNP, road and river crossings, and other environmentally sensitive areas) will be the subject of a specific construction analysis during the FEED and ESIA processes to determine the optimum construction method to avoid significant adverse impacts.

Figure 3-4: Typical Open-cut Pipeline Construction Technique

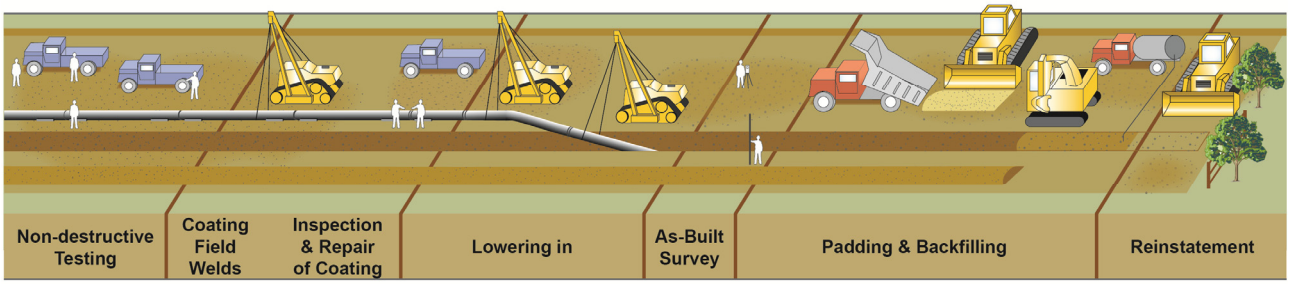
Part 1



Part 2



Part 3



3.6.4.2 Nile Crossing

To connect the fields in MFNP to the CPF, there will a pipeline crossing under the Nile. A crossing point is currently being investigated and will be determined during the FEED and ESIA process, although an indicative location is illustrated in Figure 3-2.

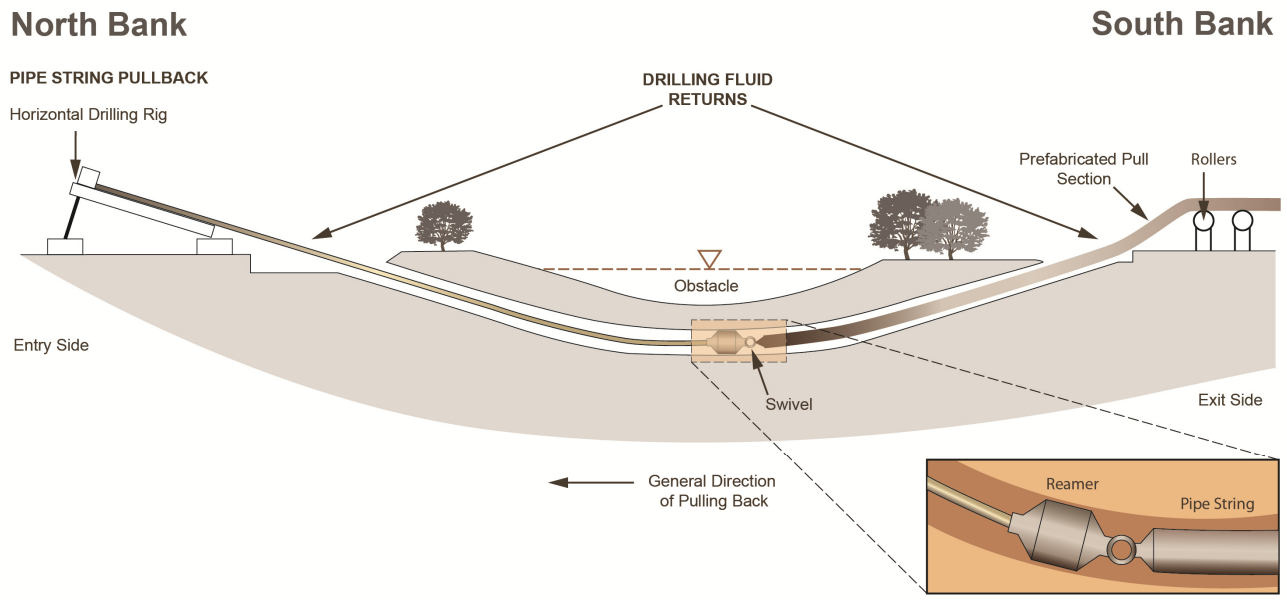
The Nile crossing will include three pipelines (a 24-inch Internal Diameter (ID) oil production, 20-inch ID water injection and 16-inch ID polymer injection, as well as electrical and fibre optic cables). A 20 m minimum burial depth below the river bed is currently planned. Isolation valve stations will be incorporated into the pipeline design either side of the Nile (below ground) to assist maintenance during operation and minimise potential environmental impacts.

Horizontal Directional Drilling (HDD) is the current preferred option for the 1.4 km crossing, although other options such as micro tunnelling may also be considered.

HDD is a trenchless method of installing underground pipes, conduits and cables in a shallow arc along a prescribed bore path by using a surface-launched drilling rig, with minimal impact on the surrounding area. This drilling technique is illustrated in Figure 3-5.

If chosen, HDD will require work areas of approximately 75 m x 60 m north of the Nile and 60 m x 50 m to the south for laydown, machine, oil tanks, drilling mud storage, pipe extension and welding, as illustrated in Figure 3-5. Where necessary, pipe stringing may extend outside of this work area and shall make use of the Right of Way (RoW), in order to bend, line-up and weld the 1.4 km of pipe to be pulled under the Nile.

Figure 3-5: Horizontal Directional Drilling (HDD) Technique



3.6.5 Central Processing Facility

A single CPF area will be constructed south of the Nile covering approximately 170 ha, with a processing capacity of 190 MBOPD. The expected location of the CPF is illustrated in Figure 3-2. The CPF has been orientated by 23° from geographical North in order to have the prevailing winds blowing from south to north.

It is important to note that the global restricted area which includes the CPF, camps, tank farm and buffer zones will require a total land take of approximately 290 Ha at a single location.

An indicative layout of the CPF is illustrated in Figure 3-6. It will include several diesel generators, a polymer unit, water injection unit and heaters, water treatment trains, an enclosed ground flare, a power generation facility, oil processing trains, pigging[6] station, and associated pipelines. The CPF also includes a number of water and oil tanks, as well as an administration area which will also contain a warehouse, workshop and control room.

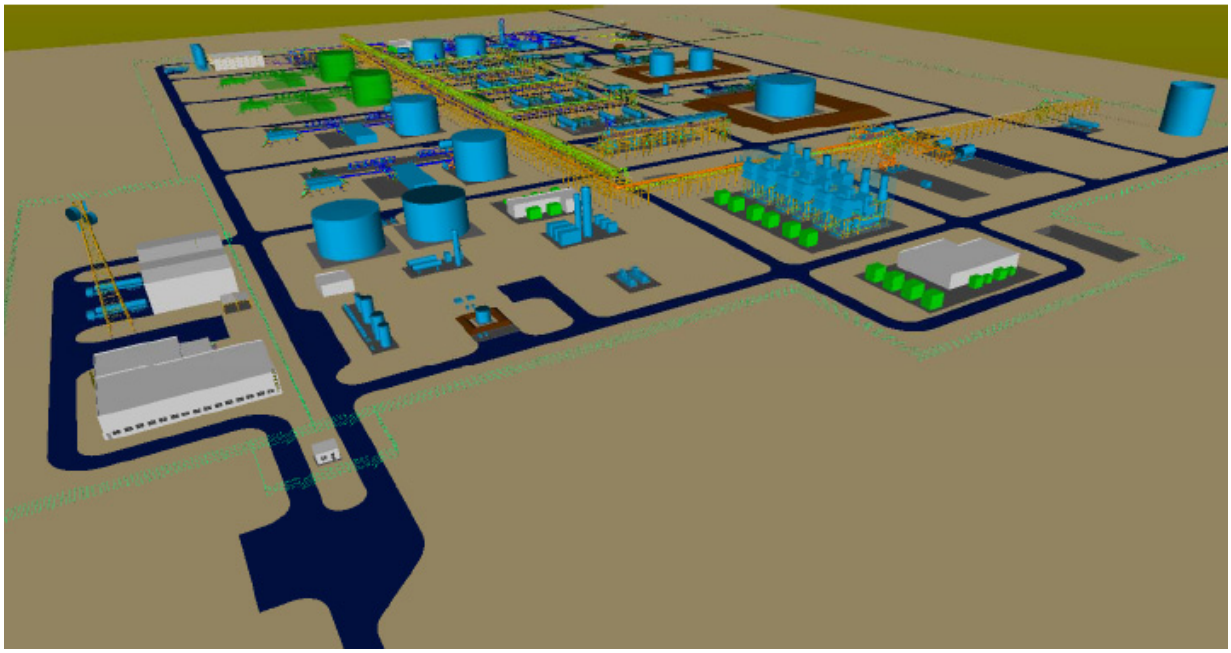
After treatment the produced oil will be transferred to a tank farm to be located in an area adjacent to the CPF. The oil tank farm, CPF and associated camps will be grouped and fenced together in one global restricted industrial area, taking into account inner safety zone around each component and in particular around crude oil storage tank.

For the outside community an outer safety zone must also be determined. With regard to future developments in the area, the local planning authorities in Buliisa District will have to define the restricted planning zone around the fenced global restricted industrial area. Within the restricted planning zone only

[6] Pigging refers to the practice of using devices known as "pigs" - pipeline inspection gauges, to perform various maintenance operations on a pipeline. These operations include but are not limited to cleaning and inspecting the pipeline. This is usually done without stopping the flow of the product in the pipeline.

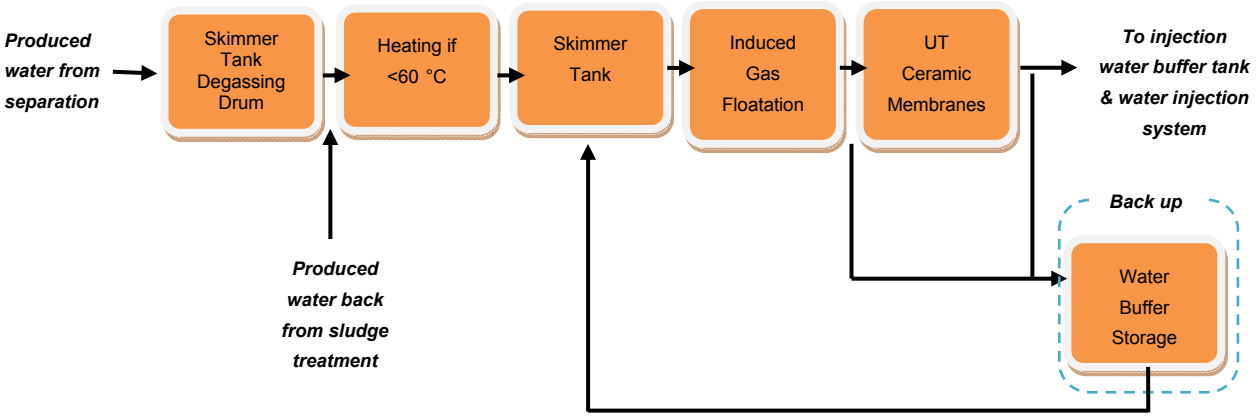
certain kinds of developments would be accepted by the planning authorities. The size of the restricted planning zone will be determined during the ESIA process in close cooperation with the local authorities, physical planning and emergency response teams.

Figure 3-6: An Indicative 3D Illustration of the CPF



The oil processing facility will include 4 oil treatment trains (2 waxy and 2 heavy oil trains) and a gas compression train. There will be a stage produced water treatment process, including the primary treatment of the water within a skimmer tank and degassing drum, and a secondary treatment of induced gas floatation, as illustrated in Figure 3-7.

Figure 3-7: Produced Water Treatment and Reinjection Flow Diagram



3.6.6 Power Generation

3.6.6.1 Main Power Generators

A common central power generation system shall be installed within the CPF boundary. Six generators shall be driven by aero-derivative gas turbines fuelled by the associated gas from the Project fields.

Under normal operating conditions, the power generation system shall be designed to provide power to the Project facilities, including the CPF, well pads, Operation Support Bases (OSB), Operator Camps (OC), tank farm and to convert the excess associated gas in electrical power to be exported through the National Grid.

The main power generation system will be designed to provide 60 MW electrical power to the Project facilities and up to an additional 110 MW to the National Grid.

3.6.6.2 Emergency Generators

Some turbo generators shall be equipped with dual fuel gas turbines type (gas and diesel) to allow restarting of the power generation when the CPF is down and gas is not available, also known as 'black start'. The emergency power generation consists of:

- 2 x 50% diesel generators at the CPF (each emergency power generator is 2,800 kVA);
- 1 x 100% diesel generator at OC South (Estimated emergency power generator rated power is 1,600 kVA); and
- 1 x 100% diesel generator at OC North (Estimated emergency power generator rated power is 1,000k VA).

Under normal operating conditions, the emergency diesel generators shall be in stand-by mode.

The export system shall also be designed to import 6 MW. This may be required to import power to supply the emergency and essential loads plus the necessary power to restart one generator.

3.6.6.3 Well Pad Power Distribution Network

All well pads shall be supplied with electrical power from the CPF. High Voltage (HV) power cables will be laid in the pipeline trench (providing the mechanical constraints are acceptable for the cables), or within a dedicated trench within the construction corridor if the pipeline trench is constrained. The final design will be progressed during FEED.

The HV connection will comprise a 33 kV network to supply all the well pads to the north of the Nile and one branch on the wellpads south of the Nile, and a 22 kV network connecting the other wellpads south of the Nile.

3.6.7 Water Abstraction and Enhanced Oil Recovery

3.6.7.1 Water Abstraction, Treatment and Injection

A water abstraction facility will be built to enable water to be abstracted from Lake Albert for injection into chosen wells during production, as well as providing fire water.

Water injection is a common method utilised in oil production to maintain or increase underground reservoir pressure throughout the production phase. It is expected that certain wells will be designed or converted to accommodate injection; it is unlikely water injection will be needed at every well pad.

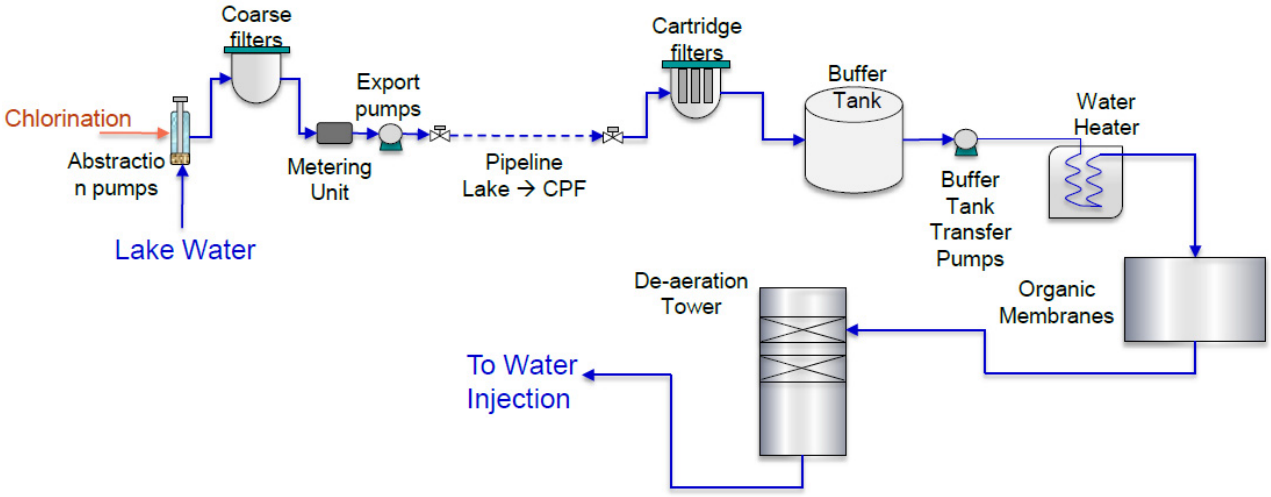
A 24-inch diameter ID High Density Polyethylene (HDPE) pipeline will be installed to transport the water from the abstraction facility (approximately 3 km west of Buliisa town, as illustrated in Figure 3-2) to the CPF, approximately 13.6 km in length. An additional 2 km intake pipeline will be installed from the abstraction facility into the lake itself.

The intake pipeline(s) would connect with a pumping station on the lakeshore, with an above ground control building, which will contain the pumping control, monitoring equipment and telementry plant, and will be fitted with all necessary lighting and other building services all situated above the high water level. The water will then undergo filtration and will be pumped by multiple export pumps to the CPF. At the CPF, the water will be filtered again, heated, and treated with organic membranes, and then de-aerated to be injected. This process is illustrated in Figure 3-8.

Information on water abstraction facilities offshore are to be defined during FEED/ ESIA stage, and exact locations of water abstraction points are yet to be determined.

The FEED study will define the water intake design, including operation and maintenance requirements.

Figure 3-8: Water Abstraction and Treatment Process Diagram



3.6.7.2 Enhanced Oil Recovery (EOR) Facilities

Water injection heating and pumping will be centralised at the CPF. A network of pipelines approximately 110 km in length (total combined length) and ranging from 4 to 20-inch ID) will connect the CPF to the wells.

The need for water injection will be determined during the FEED process and assessed continuously during construction; the facilities will be installed at the onset of the Project but the need for water injection may not occur until later phases of production.

The EOR facility within the CPF will also include polymer facilities, including a storage warehouse, Polymer Dissolution Unit (PDU), (including trains, dilution, pumps and a skid) and a diluted solution pressure reduction at the well head through LPR. Approximately 63 km (from 4 to 16-inch ID) of polymer pipelines will be installed to transport the polymer to certain wells, for injection along with the water. Polymers increase the viscosity of the oil in the reservoir, therefore enhancing oil recovery. Polymer injection will be implemented three years after first oil, if the pilot to be done at first oil has a successful result.

3.6.8 Construction Camp and Support Base

A construction camp will be located adjacent to the CPF, covering approximately 24 ha. The camp will have a maximum capacity of 2,500 workers. The construction camp will include living facilities such as accommodation, kitchen/dinning, healthcare, offices, leisure activities etc. A construction support base will be located directly north of the construction camp, covering approximately 27 ha.

3.6.9 Access to the Site

Road transport will be the principle mode of transport within the MFNP between well-pads, camps and the CPF. The Project will require the upgrade of some existing roads and may also require the construction of some new roads for access and construction. There are 3 main local access roads to the CPF, Bugungu airstrip and main arteries to the Development well pad location south of the Nile, as illustrated in Figure 3-9.

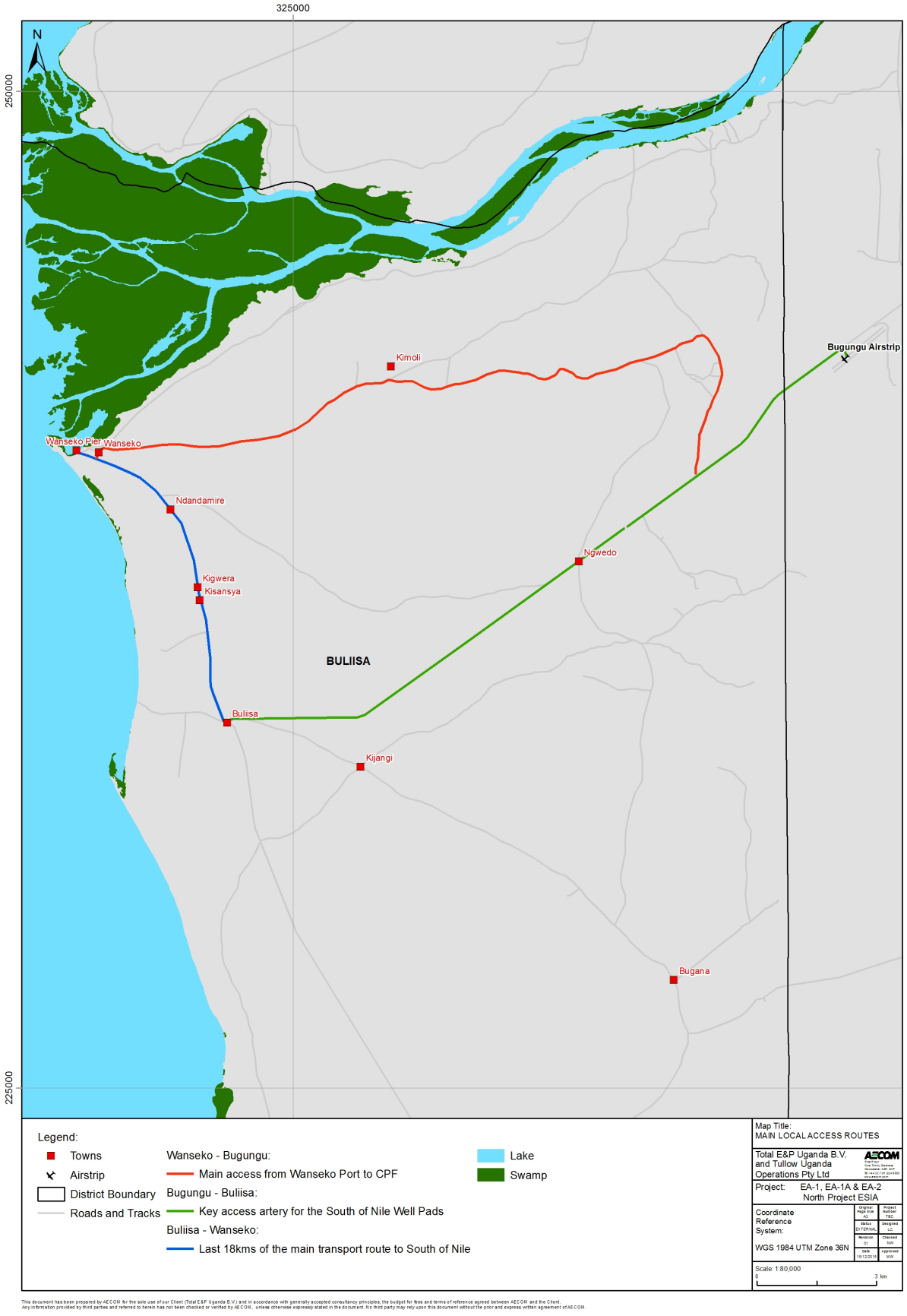


Figure 3-9: Main Local Access Roads

Roads and bridges will be upgraded to accommodate maximum cargo sizes of 5 m wide x 4.5 m high x 20 m and 100 t. Size and maximum tonnage will be confirmed following road and rail studies being launched early 2016. The roads to be upgraded and alignment of new roads are currently being investigated.

The main equipment will be imported through Mombasa Port, then road or rail transport to the Project area. Solid bulk (mainly construction materials) will be delivered using trucks within Uganda and neighbouring countries. Back up ports include Dar-es-Salaam and Tanga.

It is expected that a peak of 2,000 truck deliveries will be required per month during the peak of the construction phase. Approximately 90,000 m^3 of fuel is to be imported, approximately 200 kt of bulk materials and 485,000 t of equipment[7].

The FEED will also consider transporting materials and equipment on the Lake Albert or on the Victoria Nile to a barging port close to the CPF site. The marine transport requirement would supplement the rail and road transport system (if roads are not yet available) or allow for avoidance of any disruption in the National Park.

Currently, there are two barging routes under consideration, both leading to a barging port close to Wanseko, that are deemed suitable for excessive freight movement.

3.6.10 Waste

Waste streams generated by the Project will include general waste (food residues, sludge from septic tanks, packaging materials, plastics, metal, construction debris) and hazardous waste (oil residues on drilling mud and cuttings, sand recovered from sand jetting operation, maintenance waste including oil filters, tyres, batteries, hydraulic fluids).

It is estimated that 200,000 tons (t) to 300,000 t of cuttings will be generated. Although it is expected that fluids will be recycled in the drilling process, waste fluids will also be generated. These estimated volumes will be reviewed during the FEED phase.

As illustrated in Figure 3-10, three methods for NADFs disposal have been proposed during development drilling including (in order of preference):

- thermal treatment on-site and then re-use the cutting as berm to build the bunded wall around the well pad;
- thermal treatment combined with Cuttings Re-injection (CRI); or
- thermal treatment onsite and the put to landfill for cutting disposal.

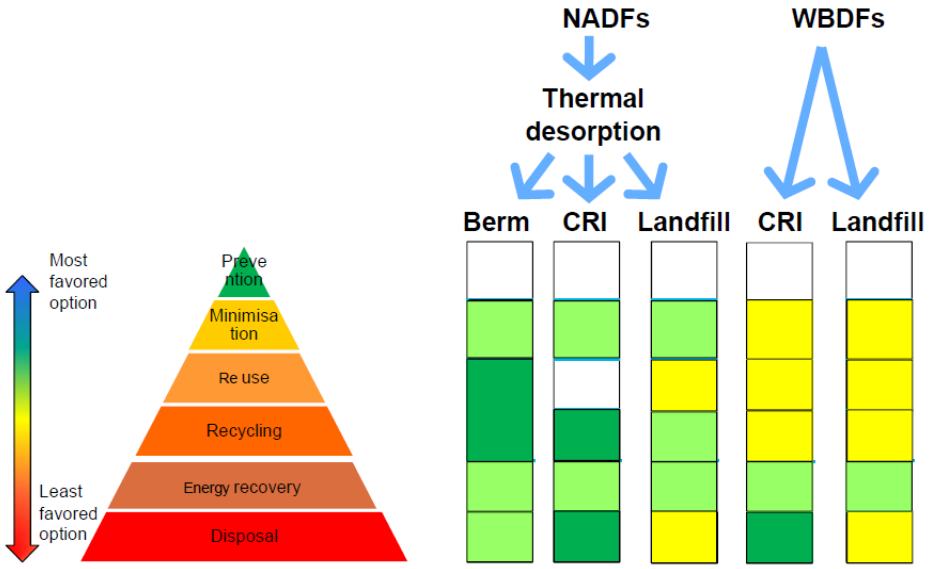
3.6.11 Chemical Usage

Chemicals will be used throughout the construction, drilling and production cycles. During construction, hydrotesting of installations involves the use of biocides and corrosion inhibitors, drilling mud whether water or oil based mud contain certain chemicals necessary to maintain the mud integrity and function during the drilling process. Chemicals will be used in the production process to prevent the proliferation of bacteria or the corrosion of production installation.

The ESIA will identify the chemical products used during construction, drilling and the production. A Chemical Management Plan will describe the selection, transport and usage processes as well as mitigation measures against releases or toxic effects. As part of the selection process, it is expected that a Chemical Risk Assessment will be applied to all chemicals of the Development and Production Cycle during the FEED. The CRA will be designed as a functional tool for assessing the potential human health and ecological risks based on potential release scenarios.

[7] *Pre-FEED Estimated to be confirmed during the Define Phase*

Figure 3-10: Waste Management Hierarchy for Drill Cuttings



The Project will utilise third party waste management contractors for the management of wastes. All wastes to the north of the Nile will be transferred outside the MFNP limits for storage and bulking/treatment and onwards transport to Waste Contractors' premises. There will be dedicated waste management areas, one to the north of the Nile, and one to the south within the development footprint to allow consolidation of wastes from camps and drill sites. Further information on waste infrastructure will be developed during the FEED and within the ESIA.

Re-injection of drill cuttings is being considered as a possible option for management of drilling waste. This option will be investigated and decided upon during the FEED phase.

3.6.12 Borrow Pits

Borrow pits (areas where material has been dug/taken for use at another location) will be required for the Project. An estimated 12,000 m^3 of murram and gravel will be required for each well pad, in addition to material for tracks and camp foundations.

The location, quantities and volumes will be determined at FEED /ESIA phase.

3.6.13 Land Acquisition and Resettlement

It is estimated that up to 1000 ha will be acquired, leased or secured by way of an easement as a result of the Project.

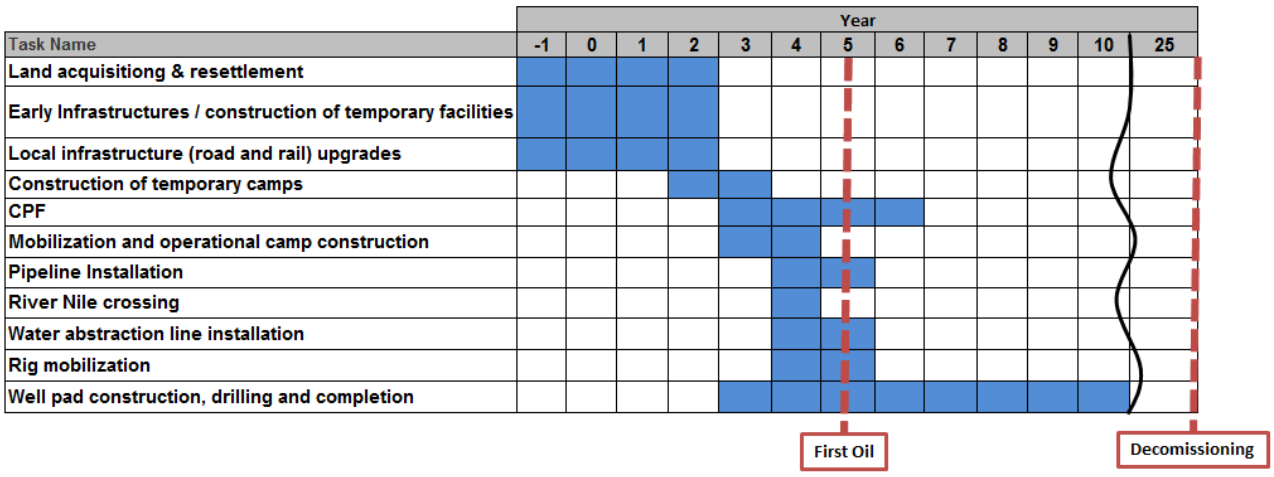
During the project engineering phase, a Land Acquisition and Resettlement Framework (LARF) was prepared by the Project Proponents in collaboration with representatives from MEMD, MLHUD, MLoG and NEMA. The LARF describes the legal and administrative framework, the land-use and land tenure of the project area, and provides guiding principles on valuation methodology, entitlements, resettlement action planning (RAP) and livelihood restoration. The LARF is aimed at standardising the way in which land acquisition and resettlement planning is conducted across the Albertine Graben, and to assure a consistent approach in line with the IFC PS (particularly PS5 on Involuntary Resettlement and Land Acquisition). Resettlement Action Plans (RAP), including Livelihood Restoration Plans (LRP), will be prepared in compliance with the LARF and developed as part of the ESMP.

3.6.14 Programme

Although indicative at this stage and dependent on approvals, construction is expected to take over 7 years, to complete, as illustrated in Figure 3-11. The time taken to drill each well is dependent on the location and specification. The drilling development period is expected to be undertaken at a rate of approximately 10 to 20 new well pads per year. The water treatment area will be built to 50% capacity at first oil.

The Project has a planned operational lifespan of 25 years.

Figure 3-11: Indicative Programme



3.6.15 Employee Numbers

There will be a gradual build-up of workers during construction as well as an eventual reduction and stabilisation of these numbers for the remaining production cycle. During the drilling and construction phase the number of workers is expected to increase from approximately 100 to 2,000 people per month.

At the peak of construction the Project will employ between 4,000 and 5,000 people per month. Many of these employees will be local contractors, and the construction camps and support bases will be built to support at least 2,500 workers, as described in Section 3.6.8.

3.7 PRE-COMMISSIONING AND COMMISSIONING

3.7.1 Pipeline Testing

After the pipelines have been installed a number of activities, known as pre-commissioning activities, will be undertaken to ensure that the pipelines meet operational requirements. The primary objective of these activities is to verify that the pipeline has been laid without significant defects, and that it is in a suitable condition. The equipment required for the pre-commissioning activities will be used for cleaning, gauging, hydro testing (if required) and drying of the installed pipeline.

Hydrotesting (a hydrostatic test) is carried out to check that there are no leaks or deficiencies in the pipeline. The process involves filling the pipeline with an inert gas or liquid at a pre-determined pressure that exceeds the maximum operating pressure for a period of several hours or days, usually powered by temporary diesel generators. After the test pressure is reached, the pressure in the system is monitored to ensure that there are no deficiencies. In the event that deficiencies are identified, the pipeline will be repaired and retested, until a successful test is achieved. Hydrotesting will take place after the ground is backfilled and reinstated.

The Project hydrotesting approach and design are under development and will be finalised during the FEED process.

During the installation of the pipelines a temporary test head will have been welded to the ends of the pipelines to enable pre-commissioning tests to be undertaken. The temporary test head will be designed to contain and launch flooding, cleaning and gauging. A Pipeline Inspection Gauge (PIG) will be launched to dewater any pipelines flooded with water during hydrotesting and to inspect the pipeline prior to operation.

The pre-commissioning of each pipeline will be undertaken individually as each pipeline is completed. The pre-commissioning of each pipeline typically takes approximately a few days to a few weeks to complete, however the schedule will be determined during FEED / ESIA.

The chemicals and volumes of water required for hydrotesting will be confirmed during FEED / ESIA stage; however, the chemicals shall be selected according to the lowest toxicity, lowest bioaccumulation potential and highest biodegradation. A risk assessment will be carried out during the FEED to assess the potential toxicological effect of all chemicals.

The pipelines will undergo a process of dewatering, drying and cleaning prior to operation.

3.7.2 Well Ramp Up

Well testing will be undertaken on the installed wells, comprising flowing of formation fluids to the surface where pressure, temperature and flow rate measurements are made to evaluate well performance characteristics.

There is no flaring during well ramp up at the wellpad. Fluids are transported to CPF where flaring is done for safety only and volumes are constant throughout the life cycle. An enclosed ground flare will be used to reduce radiation and impact.

Volumes of solids produced per well during ramp up (comprised mostly of sand and rock) will be estimated during FEED/ ESIA stage, if deemed to be significant.

3.8 OPERATIONAL PHASE

The peak oil production is expected to be 190 MBOPD during the 25 year operational phase.

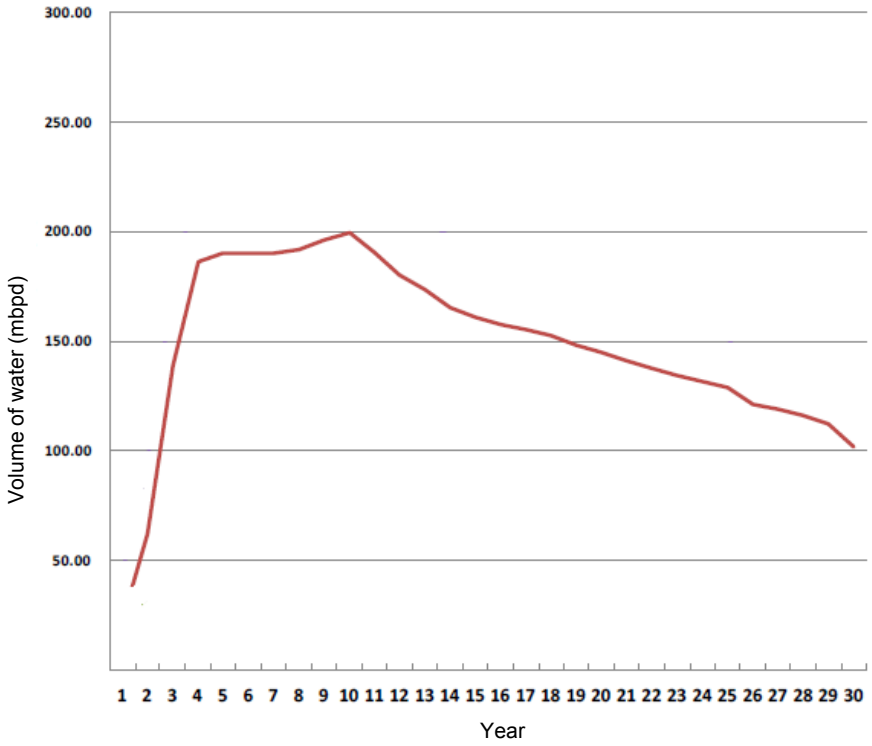
3.8.1 Water Injection

As mentioned above, water injection will be required to keep the reservoir pressure stable during operation. A water and polymer mix will be injected into the reservoir at chosen wells. Water injection and polymer will be lined with Polyethylene High-Density (PE-HD) liner, to limit the corrosion, therefore no corrosion inhibitor or bactericide injection will be required. All fields will start with water injection. A polymer pilot will be performed at first oil, and if results are positive, polymer will be implemented within three years in the selected fields.

Due to the need to inject the water and polymer at a temperature above the reservoir temperature, the water will be pumped from the CPF at about 80 - 90 °C, and the lines will be insulated to maintain the temperature.

The water will be delivered from the Lake Albert abstraction facility to the CPF and redistributed to the wells. The peak water abstraction rate is expected to be a maximum of 200 Mbpd (in year 10), as illustrated in Figure 3-12, to be confirmed during the FEED phase as it is dependent on the production profile. A similar amount will be injected into the underground reservoir. No pigging is normally required with PE lined pipelines, for either inspection or cleaning, but if needed, a cleaning pig can be run in a lined pipeline.

Figure 3-12: Water Abstraction Requirements



3.8.2 Produced Water

It is estimated that a peak of 774 Mbpd of water will be produced during the operational phase; this comprises water containing hydrocarbons collected along with the oil from the underground oil reservoir. This volume will be confirmed during FEED as it depends on the production profile.

The produced water will undergo treatment at the water treatment facility in the CPF, and then either recirculated into the system by mixing with the abstracted water for re-injection, or to be disposed of at a waste treatment facility.

3.8.3 Well Workover

3.8.3.1 Intervention

Changing reservoir conditions has the potential to render the well completion unsuitable; the tubing may need to be changed to keep the oil flow stable. Key well interventions that are expected include stimulation / clean-out, pump change-out, fall-off, production logging (ILT), downhole fluid sampling, and geophone maintenance. The frequency of the well interventions will differ depending on the intervention type, with some interventions required only once and others annually. Therefore a number of workover rigs and machinery will move accross the differrent fields throughout the production phase.

3.8.4 Fuel Gas System

A gas compression system will be provided to continuously recover low pressure gas from the production separators for routing to the gas export system.

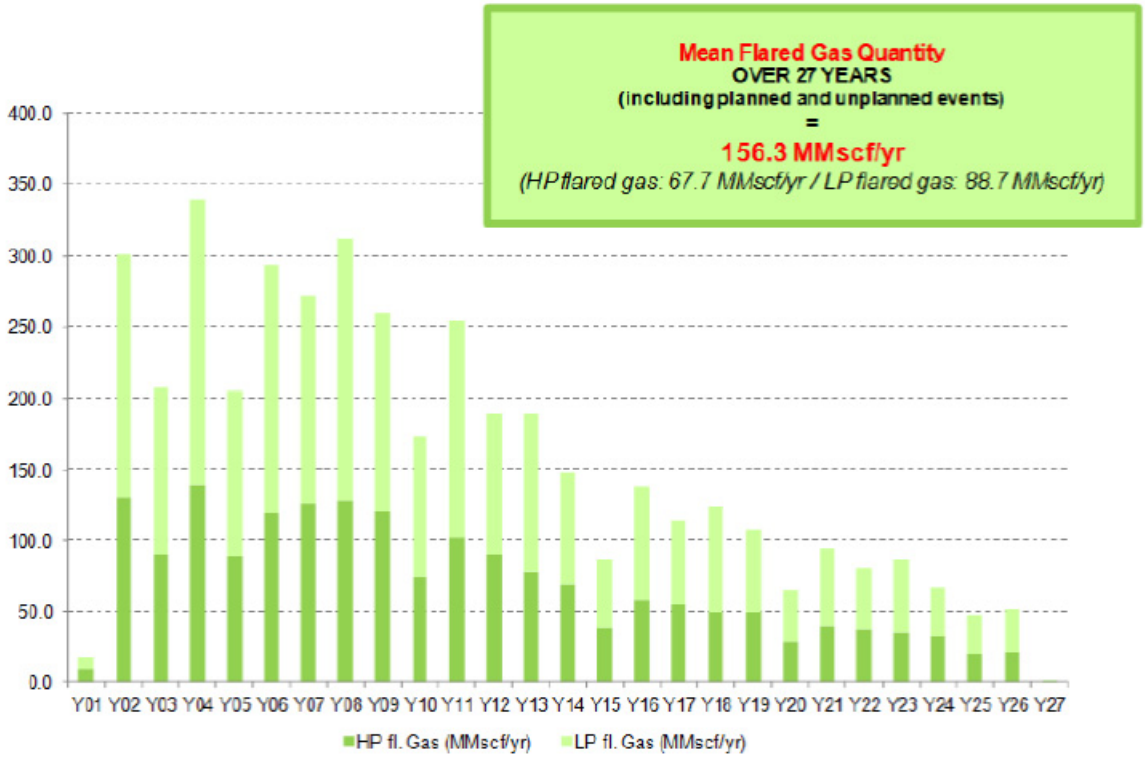
It is estimated that a peak of 31 Million Standard Cubic Feet per Day (MMSCFD) of associated gas will be produced during the operational phase. A power generating facility (described in section 3.6.6) will be designed to convert the produced gas into electricity, located within the CPF. The amount of available produced gas will gradually reduce during production, meaning an alternative power source may be required after 15-20 years.

3.8.5 Flaring

The CPF will be fitted with a flare system, designed to safely dispose of hydrocarbon gases released from the processing facilities during non-routine and emergency conditions during production. The flare will be enclosed therefore there will be no visible flame. No flaring should be required under routine operational conditions; the platform flare system is designed for purge and pilot flaring only.

The flared gas over the 1st year of commissioning and 25 year operation (including planned and unplanned event) is estimated at 157 MMSCF/yr, as illustrated in Figure 3-13.

Figure 3-13: Estimated Flared Gas Quantities



3.8.6 Pipeline Maintenance

There will be frequent operational pigging for sand and wax management, with pigging stations located at some well pads and within the CPF. The water injection pipelines and the abstraction pipeline should not require pigging. The chemicals and volumes of water required for maintenance will be confirmed during FEED / ESIA stage; however, the chemicals shall be selected according to the lowest toxicity, lowest bioaccumulation potential and highest biodegradation. A risk assessment will be carried out during the FEED to assess the potential toxicological effect of the chemicals.

3.8.7 Waste

Wastewater routinely generated during the project activities includes sewage and drainage water, equipment and vehicle wash water and general oily water. Other operational waste includes sludge's, pigging wastes, chemicals, and maintenance wastes.

Oily water will be treated within a skimmed oil recovery drum and sludge within a settling drum; mixing drum; heat exchanger and finally a triphase centrifuge. Recovered oil is directly exported, water is sent back to produced water treatment, and other solids have been considered as managed by a third party.

Effluent discharges from the base camps will include treated sewage and grey water. Retentate lake water (by-product effluent produced from the lake water abstraction treatment process) may also form part of this waste stream. The management options for this water will have to be assessed in Basic Engineering once

the lake water abstraction infrastructure design has developed. The possible disposal options will depend on whether the lake water will be inhibited with chemicals (e.g. chlorine).

The well pads operate on an open and closed drain system. Permanently oil-contaminated water will be re-injected or trucked to the CPF for treatment, while accidentally oil-contaminated water shall be drained to an oil water separator and oil boom before being discharged to the environment following treatment. Oil-free water will be discharged directly to the environment after testing. Chemicals storage will not be connected to open drains and the water will be collected by use of a vacuum pump.

3.8.8 Nile Road Crossing

A new road crossing will be required to enable road transportation across the Nile. A dedicated modular barge (Figure 3-14) with new jetty infrastructure will be built, as well as a landing site either side of the Nile. The crossing would not replace the existing Tourist Paraa ferry crossing which is an important feature of the MFNP tourist industry.

Figure 3-14: Illustrative Modular Barge for the Nile Crossing

3.8.9 Operational Support Base and Operational Camps

The Project will be supported by Operational Support Bases (OSB) and Operational Camps (OCs).

An OSB and OC will be located south of the Nile, adjacent to the CPF with an approximate footprint of 95 ha, as illustrated in Figure 3-15. Another OSB and OSC will be located to the north of the Nile, and its location and capacity will be determined during the FEED process, covering an area of approximately 79 ha.

These facilities have been designed for up to 650 people (400 people south of the Nile, and 250 to the north). Each OSB will contain various storage facilities, warehouses and workshops. OC's will include living facilities such as accommodation, restaurant, healthcare, offices, leisure activities etc. The capacity of both north and south camps is being reviewed and will be confirmed during the FEED phase.

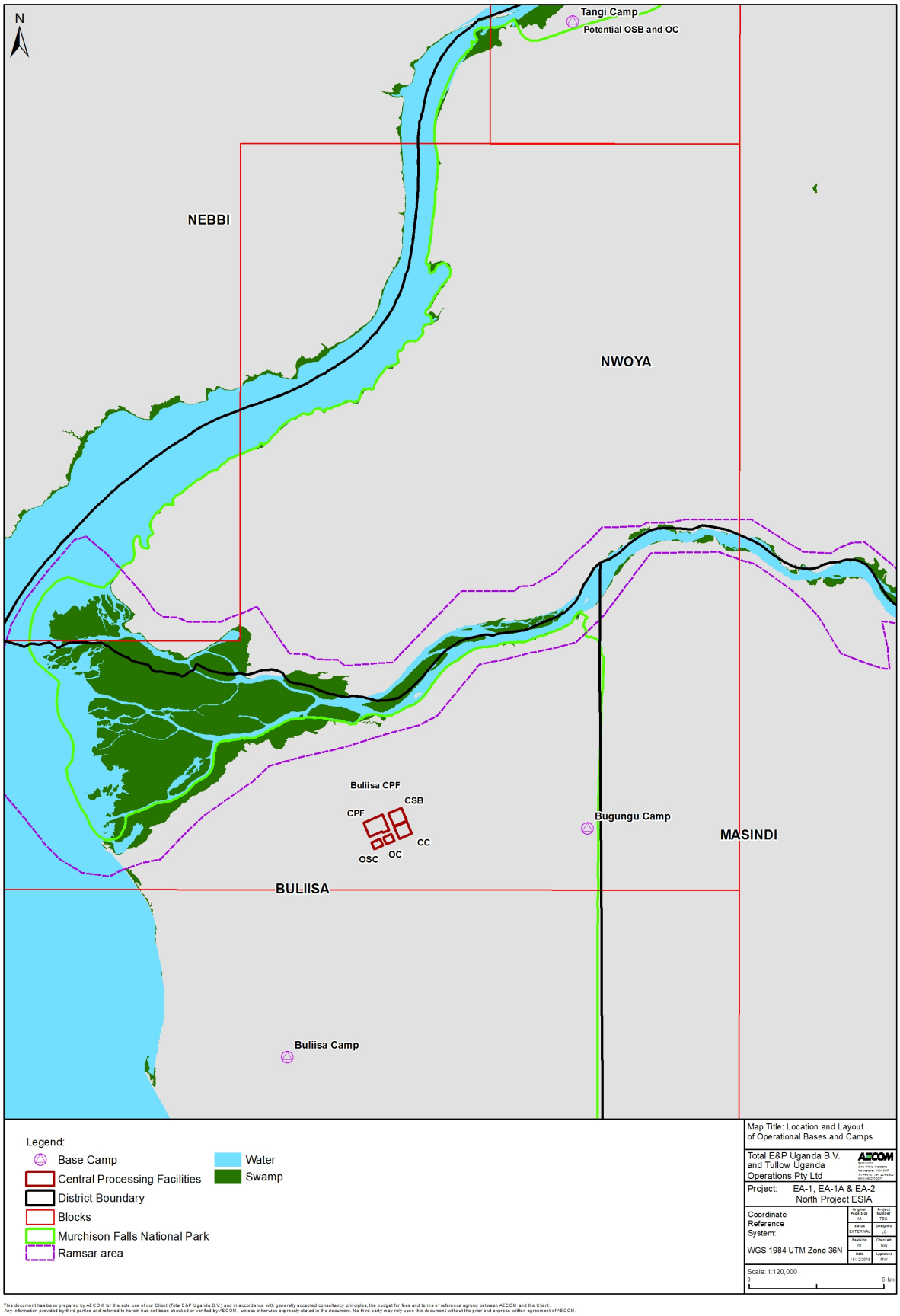


Figure 3-15: Camps and Support Bases

3.9 DECOMMISSIONING

The expected service lifetime of the Project is 25 years. Decommissioning of the wells, CPF and pipeline network will be undertaken in accordance with the legislation prevailing at that time, in liaison with the relevant regulatory authorities. The eventual decommissioning requirements will be taken into account in the design stage by ensuring that a range of possible options will be available.

Within the timeframe of 25 years there may be changes to statutory decommissioning requirements, as well as advances in technology and knowledge.

Generally however, it is expected that the pipelines would be pigged, cleaned, and then cut and capped at each end, and left in-situ. Above ground infrastructure is expected to be removed to 1 m below ground level and the ground reinstated.

A Reinstatement Plan and Abandonment & Decommissioning Plan will be prepared and submitted to and agreed with NEMA at least 6 months prior to abandonment.

3.10 ASSOCIATED FACILITIES

As defined by the IFC Performance Standards (PS) (Ref. 3-1) 'associated facilities' are: *facilities that are not funded as part of the project and that would not have been constructed or expanded if the project did not exist and without which the project would not be viable*.

The following are not directly under the control of the Project proponents, and it is assumed that they won't be funded by lenders as part of the EA1 and EA2 North Project.

3.10.1 Feeder Pipeline

A 107 km buried feeder pipeline will transport export crude from the CPF to the delivery point, near the refinery project in Kabaale, Hoima District. Although this feeder pipeline does not form part of the Project, it is an associated facility to the Project. The precise routing of the feeder pipeline has not yet been disclosed; a pipeline corridor should be available for consideration in the Project ESIA. Figure 3-16 illustrates the general route.

The feeder pipeline will also comprise a series Block Valve stations (BVS), typically spaced every 25 km or 30 km, and complemented by a series of two valves for each river crossing.

3.10.1 Kabaale Refinery

An oil refinery has been considered as one of the delivery points for the oil production coming from upstream. The refinery location has been fixed in Kabaale, Hoima District and would be designed with a starting production capacity of 30 Mbopd in a first phase and increasing to 60 Mbopd depending on market growth.

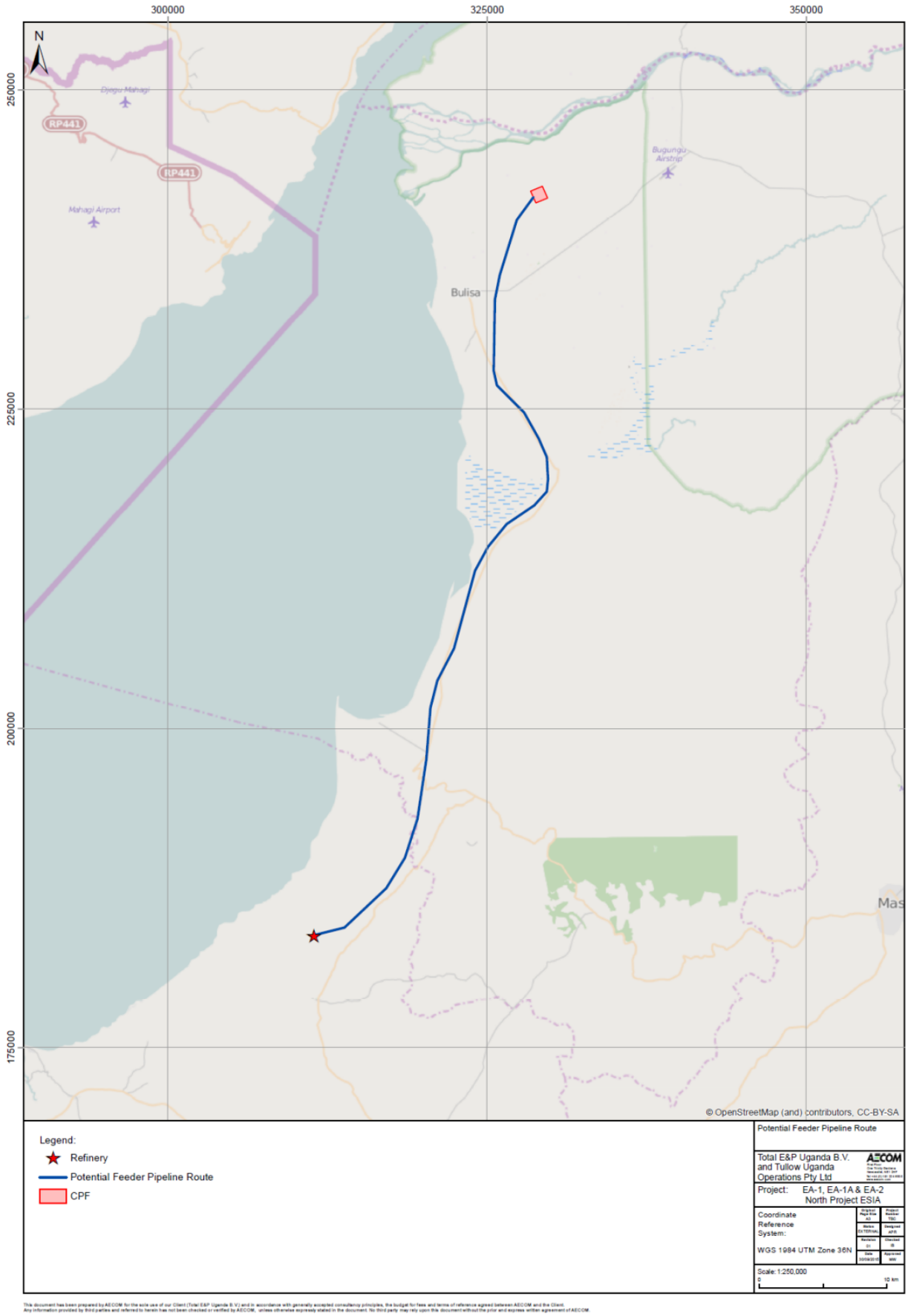


Figure 3-16: Potential Route of Feeder Pipeline

3.10.2 Export Pipeline to the coast of the Indian Ocean

The produced oil will be transported to Kabaale (near Hoima) where a portion will be taken by a refinery which the Government of Uganda is planning to construct and the rest routed for export via a connection to an export pipeline to the East African coast, as illustrated in Figure 3-17.

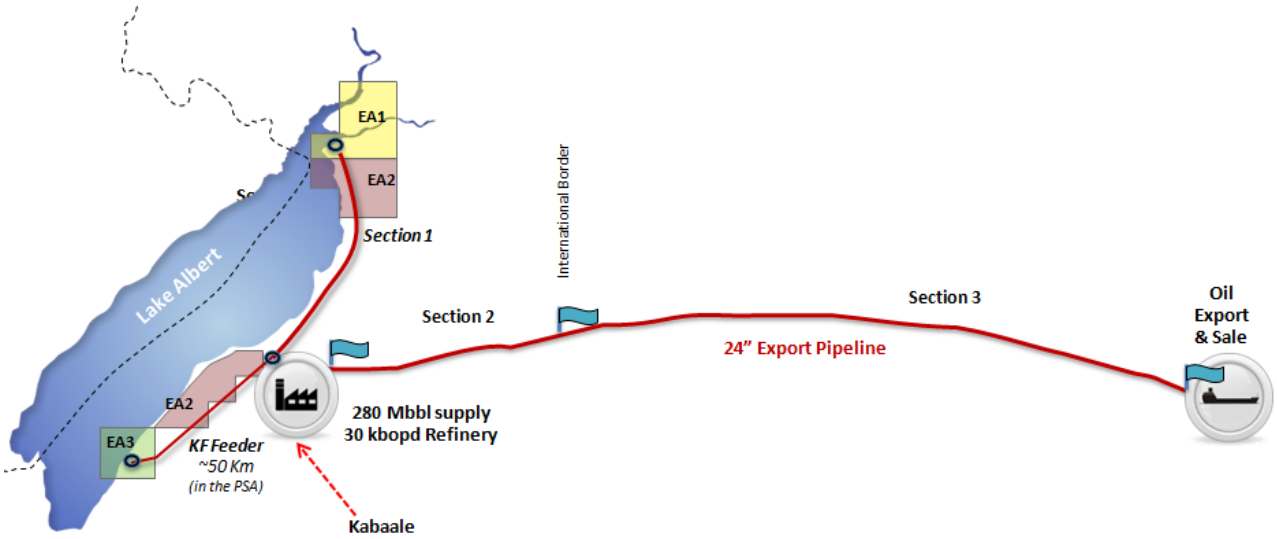


Figure 3-17: Downstream Schematic Development

3.10.3 Waste Management Facilities

Further studies will be commissioned to estimate waste streams associated with the Project and the need for any offsite facilities. It is likely there will be a requirement for offsite waste management facilities (handling or/and disposal). The nature, size and location of these will be determined at FEED stage and assessed in the ESIA.

3.10.4 Major Road and Rail Upgrades

For the purpose of transporting materials to the EA1 and EA2 North oil fields major road and rail upgrades will have to be undertaken.

To the south of the Nile, there are three road access routes that are currently under consideration. To connect the facilities to the north of the Nile routes between Gulu, Tangi, Purongo, Kuruma and Kampala the main roads are proposed. These road options are illustrated in Figure 3-19. It is worth noting that the development of this infrastructure is the responsibility of the Government of Uganda.

3.10.5 Airstrips

In order to support Project logistics and required crew changes, the upgrade of airstrips north and south of the Nile, Pakuba and Bugungu will be required as illustrated in Figure 3-2 and Figure 3-18. The runway length and width at each airstrip will be increased to accommodate larger aircrafts and surface upgrades from gravel to asphalt surface. There will be an extension of electrical power and lighting for day and night operation, and other onsite facilities to comply with international oil and gas standards, such as firefighting capability, helipad, offices etc.

During the construction phase there will be approximately 427 flights per year from Bungungu. The number of flights required to/from Pakuba will be determined at the FEED / ESIA stage. After construction is complete Bungungu is expected to become the preferred airstrip.

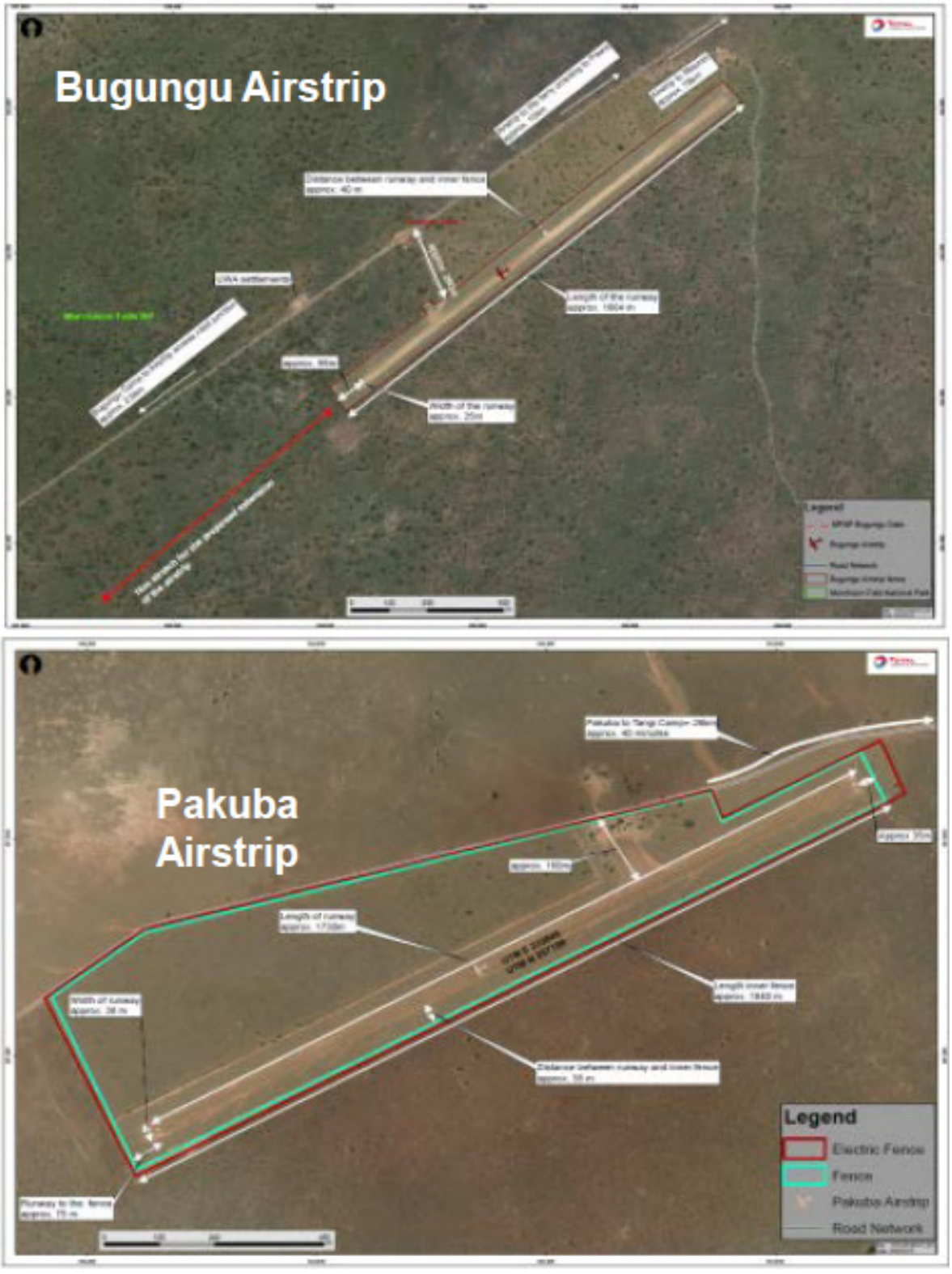


Figure 3-18: Bungungu and Pakuba Airstrip

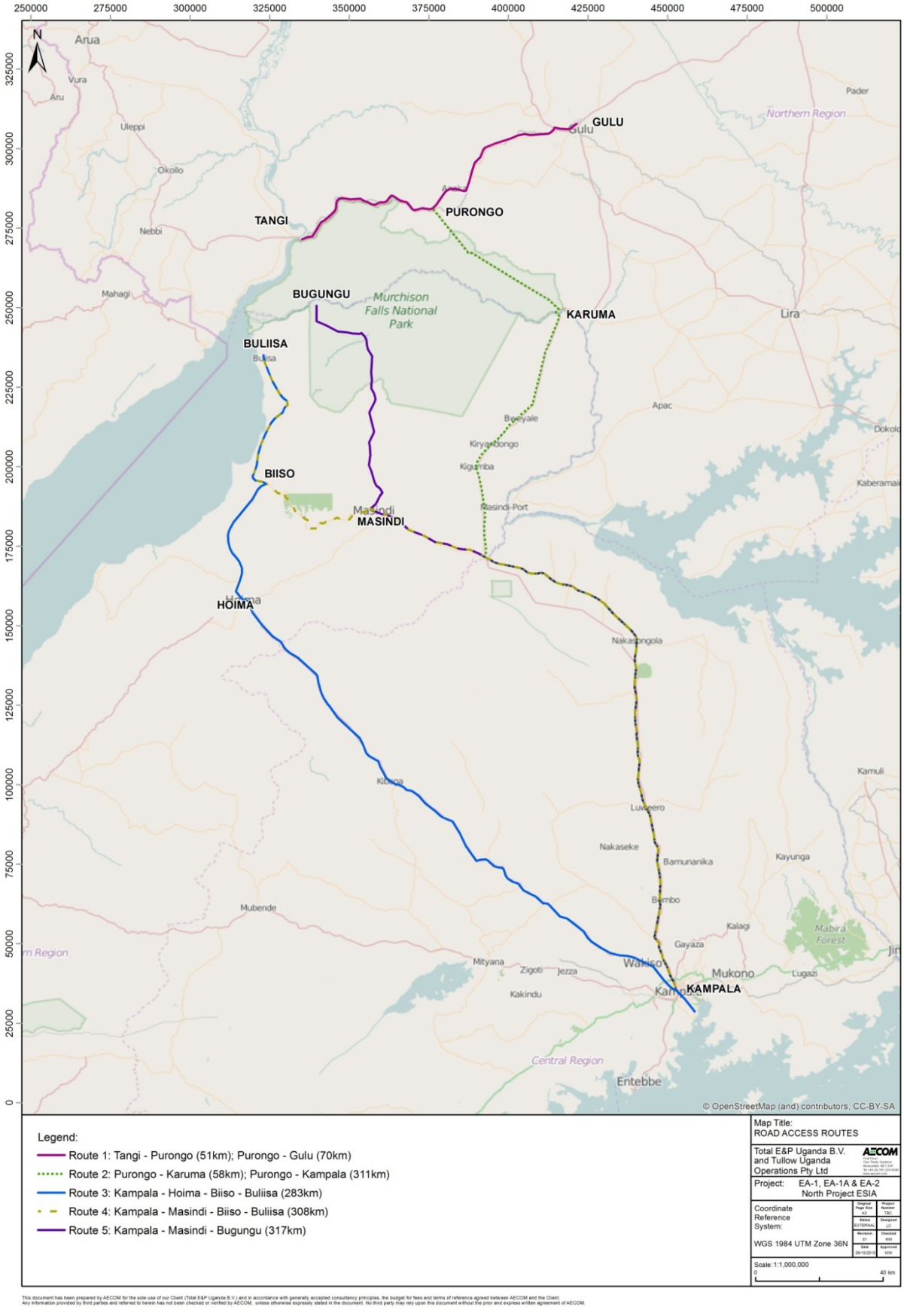


Figure 3-19: Road Access Routes to the South and North of the Nile Facilities

Railway lines will need to be upgraded and require other Infrastructure such as yards, warehouse, and lifting equipment. There is currently no railway line to feed the facilities to the south of the Nile facilities. The preferred option is rail from Mombasa to Kampala and from there road transportation to the facilities.

3.11 PROJECT ALTERNATIVES

This section provides an overview of the design alternatives that have been considered as part of project planning for the Project.

The current description of the Project as provided above is the result of a lengthy process of examining various alternatives, with the goal of developing a Project that is both technically and financially feasible, and which minimises environmental and social impacts. A number of options are still being considered at this early stage of the Project and will continue to be evaluated and refined during the preparation of the ESIA. A more detailed and comprehensive analysis of project alternatives will be presented in the ESIA Report following the finalisation of the Project description.

The design process started with consideration of high level strategic options and progressively focused in on more detailed alternatives. The following sections set out the key considerations during this process of refining design options.

3.11.1 The 'No Project' Alternative

The 'no project' alternative refers to the option of withholding (indefinitely) any plans for development of the Site and leaving it in its current state. This would mean that the Project would not be constructed, thus avoiding the Project's potential environmental and social impacts.

However, should the Project not proceed, the key objectives relating to establishing production of the known oil fields in an economically prudent manner using sound reservoir management principles would not be met, and it would eliminate any benefits that would otherwise have resulted from the establishment of the Project. Most noticeably, the Project will improve the availability of fuel products on a national level. It will also bring economic benefits such as employment, secondary business opportunities that will be required over time, as well as infrastructure improvements in the immediate vicinity of the Project Area. There will be new employment opportunities for both skilled and unskilled labour during the construction and operational phases of the project.

In order to achieve the Project objectives the Government of Uganda has deemed it necessary to construct and operate the Project, and hence the 'no project' alternative was discounted and will not be considered in any further detail in the ESIA.

3.11.2 Optioneering

A range of alternatives have already been examined at pre-Scoping, including alternative locations and routes, construction methods, technology, engineering, and design. The study of these alternatives, or options, is referred to as 'optioneering'.

Further optioneering during the FEED (and preparation of the ESIA) will take account of the following:

- The optimum locations for the proposed siting of various project components (e.g. well pads, CPF, pipeline routing, roads), taking into account the environmental and social sensitivities, such as the existence of important cultural and sensitive ecological systems and habitants in the Project area;
- Environmental and Health & Safety Risks associated with the alternative, including potential risks to human health and to endangered, rare and/or threatened species;
- Compliance with Ugandan laws, regulations, policy and lenders requirements and guidance documents;
- Construction practices for each alternative, including drilling techniques and approach;
- The availability of alternative technologies or designs during site preparation and construction and operational production activities; and

- Cost effectiveness, including associated environmental costs and benefits of each alternative.

3.11.3 Design and Layout Alternatives

In designing the preliminary facilities layout, minimisation of land requirements for aboveground permanent facilities has been a strong driver. The Project footprint has been minimized during the pre-project stage. Here are the key actions undertaken to reduce this footprint for well pads:

- The wells have been gathered in well pads and deviated wells architecture considered to reduce the overall number of hectares per /well;
- Multiphase Flow meter (MPFM), Chemical/Polymer skid and MPP were designed to be installed in the same fire zone as the wells, production and test headers, forming one main well pad fire zone. This allows a reduction in the well pad footprint (approximately 2,300 m^2 for from a typical well pad layout). Due to the large number of well pads (43), this has led to a substantial reduction in the overall project's footprint; and
- At the beginning of the pre project stage it was envisaged that there would be 75 well pads as part of the development. As the pre project stage progressed, the number of well pads required in order to develop the fields was reduced to 43 due to better definition of the fields (seismic interpretation) and optimization of well patterns. As such the overall footprint of the project development was reduced.

A preliminary site layout plan is presented in Figure 3-2. The layout will be optimized based on the outcomes of the ESIA and taking into account the environmental and social considerations. There are a number of alternatives for construction materials and methods that could be applied to this Project; these alternatives will be finalised during the FEED stage, and will be discussed in further detail within the ESIA Report.

In particular, the key layout considerations currently being considered comprise the road crossing over the Nile and road access.

ESIA PROCESS AND METHODOLOGY

04

4 ESIA PROCESS AND METHODOLOGY

4.1 GENERAL APPROACH

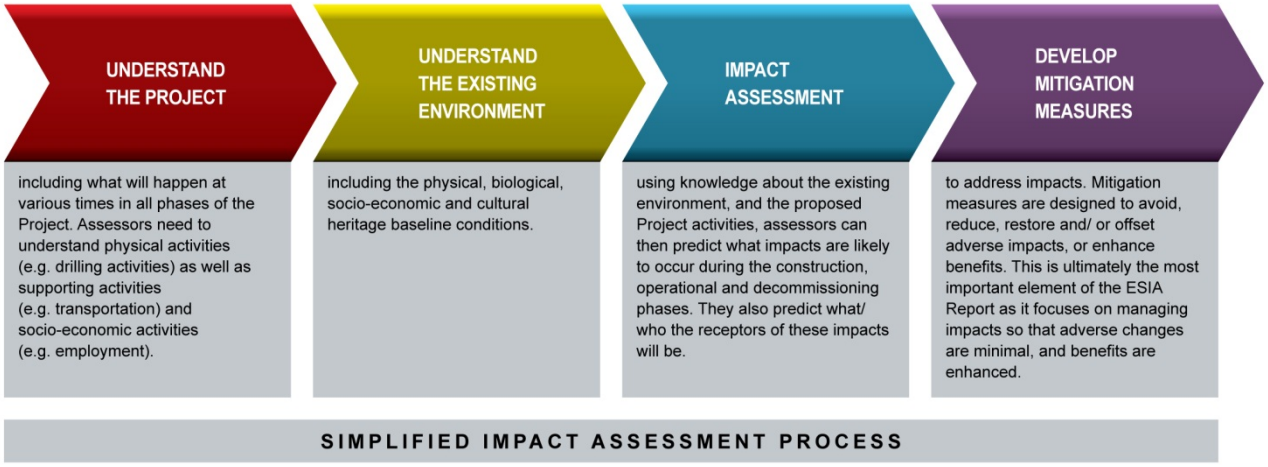
Environmental and Social Impact Assessment (ESIA) is a systematic approach to identifying the potential impacts of a project, and describing the mitigation, management and monitoring measures that will be implemented to address these impacts. Ultimately, the results of the ESIA will allow relevant organisations to make informed decisions about development proposals, and allow potentially affected stakeholders to participate in the process.

To ensure a robust and detailed impact assessment, the ESIA process will be structured over a series of progressive and iterative stages. Stakeholders, the Project team, and the assessment team will all provide input to these stages during the ESIA process.

Deciding whether impacts are within or outside of the scope of the ESIA is an important step towards ensuring that the impact assessment is relevant and properly tailored to the Project. Site-specific environmental and socio-economic factors influence the nature and scale of potential impacts and can vary substantially between projects, even when developments appear similar.

The impact assessment process has been summarised within Figure 4-1:

Figure 4-1: Simplified Impact Assessment Process



The steps identified in Figure 4-1 are much simplified but convey the general approach to an environmental and social impact assessment. Potential impacts during the Construction, Operational and Decommissioning phases of the Project will be considered separately in the ESIA.

A summary of the key stages of the ESIA process is provided here:

Screening: An early exercise to identify how the Project might interact with the environment. Screening focuses the ESIA on the most likely interactions and receptors and assists in incorporating environmental, social and cultural heritage considerations into Project planning and design.

Baseline Studies: A process to understand the existing environment through desk-based and field-based research so that impacts can be more accurately predicted, and to provide a baseline against which changes can be measured. It is important to note that baseline studies continue during the Scoping stage and beyond if necessary.

Scoping (the subject of this document): Utilises more detailed engineering data along with some preliminary baseline data and feedback from stakeholders. Scoping asks; what adverse impacts might occur? What benefits might the Project have? How significant might these impacts be? What can be done to mitigate them? The Scoping stage also identifies the topics and methodologies which will be included within the main ESIA Report. The output of this phase is this ESIA Scoping Report.

Impact Assessment and Production of ESIA Report: Predicts and assesses the expected impacts of the Project, based on the Project description, baseline studies, feedback from stakeholders, and professional expertise. The impact assessment categorises potential impacts based on their significance, which may be rated as either Not Significant, or of Low, Moderate or High significance. This also includes the development of mitigation and management measures and the re-evaluation of the impacts after measures are applied (i.e. residual impacts). The output of this phase is the main ESIA Report and the outline of the Environmental and Social Management Plan (ESMP).

Mitigation, Management, and Monitoring: Commitments relating to proposed mitigation measures in order to avoid, reduce, or offset adverse impacts, and enhance beneficial measures, will be contained in the ESIA Report and associated ESMP. The ESMP published with the ESIA will provide high level mitigation and monitoring measures and form the basis for the preparation of detailed management and implementation plans covering certain activities of the construction, drilling or production phases or potentially affected receptors.

The ESIA and associated technical studies will be undertaken in line with relevant Ugandan legislation, IFC standards and other applicable international standards (see Chapter 2 of this ESIA Scoping Report).

It is important to understand that the ESIA process is not just a way to minimise impacts, but also a tool for decision-making. In reality, it is rarely possible to avoid or reduce all adverse impacts of a Project. In the end, the ESIA process should clearly highlight what residual impacts of the Project will be beneficial and adverse, so that decision-makers can make an informed judgement about the future of the Project.

4.2 NATIONAL EIA PROCESS

The Ugandan EIA process (Ref. 4-1) includes a number of key stages as identified in Figure 4-2.

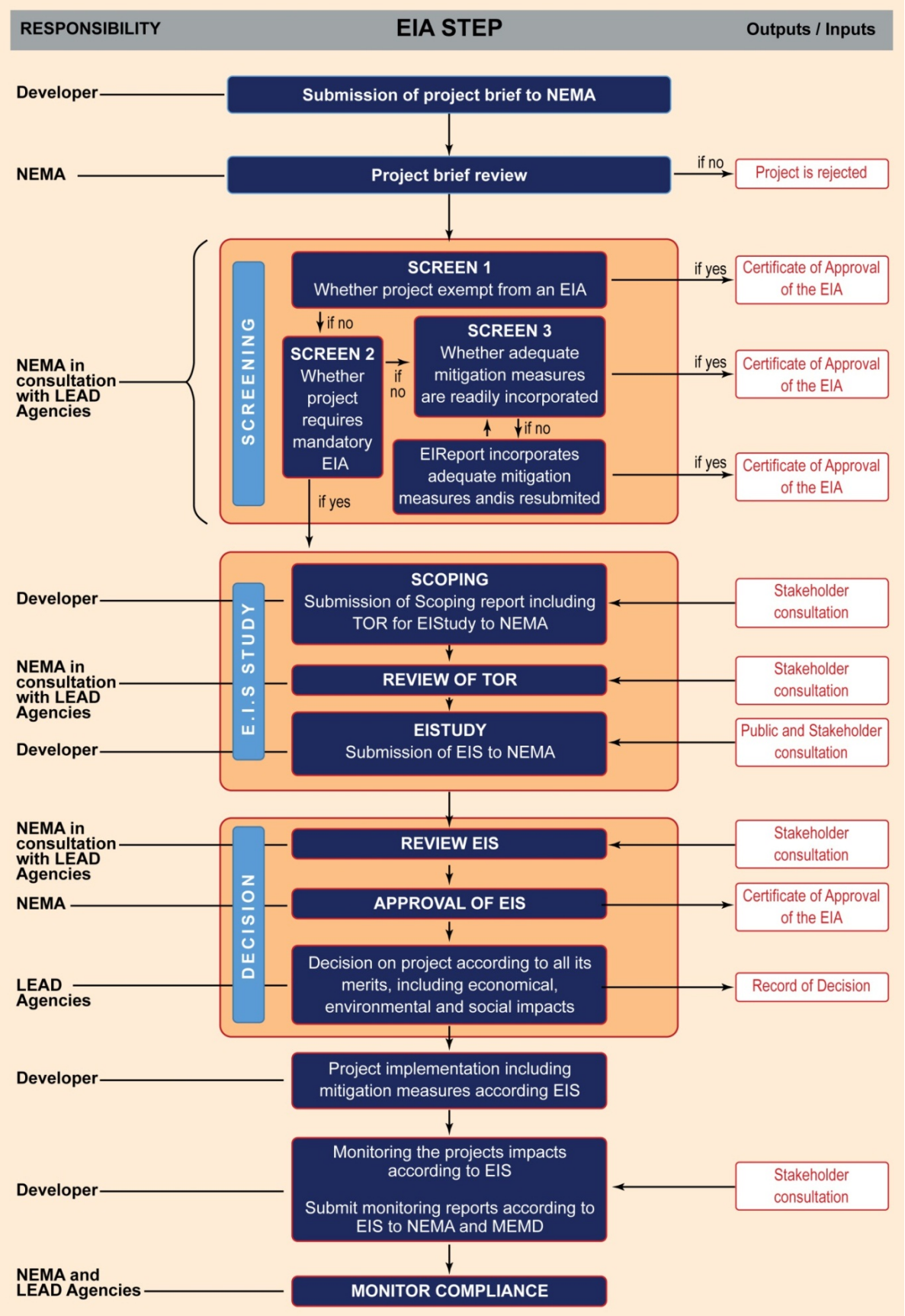


Figure reproduced from EIA Guidelines for the Energy Sector (NEMA 2004, Ref. 4-2)

Figure 4-2: Ugandan EIA Process

4.3 IMPACT ASSESSMENT METHODOLOGY

4.3.1 Introduction

This chapter summarizes the overall approach to be taken to identify and characterize the environmental, social and socioeconomic impacts associated with the Project, during each of the key Project phases including construction, commissioning, operation, and decommissioning.

An initial step in assessing potential changes to the baseline conditions resulting from the Project will be to identify environmental aspects. Environmental aspects are defined in ISO 14001 (Ref. 4-3) as:

- *"An element of an organization's activities, products or services which can interact with the environment."*

An impacts register will be developed taking into account the range of anticipated Project activities and related aspects. This will include aspects over the full life cycle of the development including those related to construction (e.g. clearing, terrain stabilization, camps), drilling (e.g., access roads, blow-out), operations (operations of wells, pipelines, and facilities), waste management, resource use and decommissioning (e.g. abandonment).

As part of this process, potential receptors within the study area that might be affected by any project activities will be identified. An environmental receptor can be defined as:

- *"An entity that receives a contaminant or pollutant and which can be subject to an environmental impact. It can be a body of water, air, parcel of land, community, ecosystem or individual organism, human being or property".*

Once the aspects and receptors are identified, the interactions occurring between the individual aspects and receptors that might lead to potential impacts of the proposed activities will be considered and evaluated.

4.3.2 Assessing Impact Significance

The impact assessment methodology takes into consideration an impact's nature (adverse or beneficial), type (direct, secondary or cumulative) and magnitude, and the sensitivity of the affected receptors, to yield a prediction of the impact's overall 'significance'.

Professional judgment and experience, data, models, and regulatory and industry standards can all contribute to the assessment of impacts, which ranges from technical analysis using quantitative criteria (such as quality standards for water or air) to more subjective measures, such as loss of visual amenity. Most impact assessments combine both quantitative and qualitative analysis. However, the criteria to be used to evaluate impacts will be clearly defined in the ESIA.

It should be noted that impact significance is assessed taking into account existing control measures that are incorporated into the project design such as the use of bunding for storage tanks or liners for drilling fluid retention. After the remaining potential impacts have been identified and a preliminary assessment has been conducted, strategies to further avoid or mitigate the impacts are then developed. This may also include measures to enhance or optimise potential benefits of the Project.

The significance of the impacts is then re-evaluated based on these mitigation measures. The resulting impact is known as the 'residual' impact, and represents the impact that will remain following the application of mitigation and management measures, and thus the ultimate level of impact associated with the Project.

The basic process which will be adopted for assessing potential Project impacts in the ESIA is illustrated in Figure 4-3.

The significance of the impacts is then re-evaluated based on these mitigation measures. The resulting impact is known as the 'residual' impact, and represents the impact that will remain following the application of mitigation and management measures, and thus the ultimate level of impact associated with the Project.

The basic process which will be adopted for assessing potential Project impacts in the ESIA is illustrated in Figure 4-3.

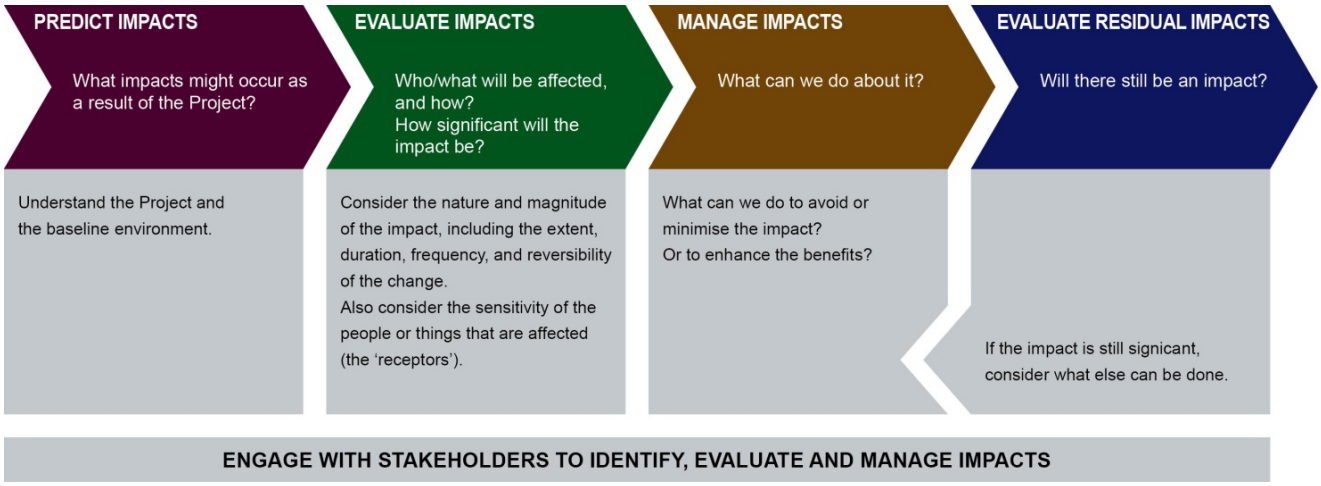


Figure 4-3: Impact Identification and Assessment Process

4.3.2.1 Impact Magnitude

The magnitude of a given impact is a measure of the degree of change from the baseline conditions, and is determined through the consideration of the following factors:

- **Extent:** the spatial extent (e.g. the area impacted) or population extent (e.g. proportion of the population/ community affected) of an impact;
- **Duration:** how long the impact will last (e.g. hours, weeks, months or years);
- **Frequency:** how often the impact will occur (e.g. a one-off event, periodic, or continuous); and
- **Reversibility:** the length of time and effort required for baseline conditions to return (e.g. reversible in the short-term or long-term, or irreversible).

The magnitude of an impact may be rated as **negligible**, **low**, **moderate**, or **high**. The criteria for each of these ratings are tailored for each study topic, and will be defined in the ESIA Report.

4.3.2.2 Receptor Sensitivity

Receptors may be people, ecological, biological and physical components of the environment, or cultural sites. Receptor sensitivity considers how a particular receptor may be more or less susceptible to a given impact. More sensitive receptors may experience a greater degree of change, or have less ability to deal with the change, compared with less sensitive receptors that may be more resilient or adaptable. As with magnitude, the concept of receptor sensitivity is based on multiple characteristics, namely:

- **Vulnerability:** the degree to which a receptor is vulnerable to change (i.e. higher or lower sensitivity);
- **Value:** the degree to which a receptor is valued or protected, with higher value receptors (based on ecological, cultural, social, economic, or other grounds) having a higher sensitivity; and
- **Resilience:** the degree to which a receptor is able to recover from an impact.

The sensitivity of a receptor may be rated as **negligible**, **low**, **moderate** or **high**. The criteria for each of these ratings are tailored for each study topic, and will be defined in the ESIA Report.

4.3.2.3 Impact Significance

Once the receptor sensitivity and impact magnitude have been rated, the overall significance of the impact is predicted. This is assisted by an impact assessment matrix (see Table 4-1) and the impact significance definitions (see Table 4-2), which ensure a consistent approach throughout the impact assessment.

The significance matrix provides basic guidance for the determination of impact significance. However, the resulting significance level is also interpreted based on professional judgement and expertise, and adjusted if necessary.

Table 4-1: Impact Significance Matrix

		Receptor Sensitivity (vulnerability and value)			
		Negligible	*Low*	*Moderate*	*High*
Impact Magnitude (extent, frequency, reversibility, duration)	*Negligible*	Not significant	Not significant	Not significant	Not significant / Low*
	Low	Not significant	Low	Low / Moderate*	Moderate
	Moderate	Not significant	Low / Moderate*	Moderate	High
	High	Not significant / Low*	Moderate	High	High

* Professional expertise will determine the impact significance

Table 4-2: Impact Significance Definitions (Adverse Impacts)

Significance	*Definitions*
High Significance	**Significant**. Impacts with a "**High**" significance are likely to have damaging and lasting changes to the functioning of a receptor, and may have broader consequences (e.g. on ecosystem health or community well-being). These impacts are a priority for mitigation in order to avoid or reduce their significance.
Moderate Significance	**Significant**. Impacts with a "**Moderate**" significance are likely to be noticeable and result in lasting changes to baseline conditions, which may cause hardship to or degradation of the receptor. Broader consequences for the ecosystem or community are not anticipated. These impacts are a priority for mitigation in order to avoid or reduce their significance.
Low Significance	Detectable but **Not Significant**. Impacts with a "**Low**" significance are expected to be noticeable changes to baseline conditions, beyond what would naturally occur, but are not expected to cause hardship or degradation. However, these impacts warrant the attention of decision-makers, and should be avoided or mitigated where practicable.
Not Significant	**Not Significant**. Any impacts are expected to be indistinguishable from the baseline or within the natural level of variation. These impacts do not require mitigation and are not a concern of the decision-making process.

The matrix and significance definitions will be used to assess adverse impacts of the Project. Significance ratings will not be determined for beneficial impacts; instead these will be described in qualitative terms and, where applicable, measures to maximise benefits will also be described. This is the approach that will be adopted for each of the technical topics unless clearly stated otherwise.

4.3.3 Cumulative, Unplanned Events and Transboundary Impact Assessment

In addition to the core assessment and management of the potential impacts of the Project, the ESIA Report will also assess a number of other types of potential impacts including:

- **In-Combination effects**: For the purpose of this ESIA, in-combination impacts are determined when we consider the joint impacts of both the Project and the Supporting Infrastructure;
- **Cumulative impacts:** While an impact may be relatively small when considering the Project on its own, the impact may be magnified in combination with impacts from other existing and/ or future

developments; these combined effects are known as 'cumulative' impacts. A cumulative impact is an impact that results from incremental changes caused by other past, present, or reasonably foreseeable actions by others outside of the Project scope together with those from the Project, for example the incremental noise from a number of separate developments. When assessing the overall acceptability of a project, it is important that potential cumulative impacts are considered. The significance of cumulative impacts is evaluated qualitatively using the same method as the impact assessment. The Cumulative Impact Assessment is discussed in more detail in Chapter 11 of this ESIA Scoping Report;

- **Impacts from Unplanned events:** Impacts may also arise as a result of unplanned events (i.e. activities or events that are not anticipated to occur in the normal course of operations of the Project, including accidents and malfunctions). These impacts are also assessed as part of the ESIA process, along with measures to manage risks and respond to unplanned incidents (more information is provided in the section below); and
- **Transboundary Impacts:** Transboundary impacts are those that may affect countries other than the country or countries in which a project will be constructed and operated. The potential transboundary impacts of the Project (e.g. on the Democratic Republic of the Congo or South Sudan) will, where appropriate, be assessed as part of the main ESIA and will include consideration of planned and unplanned events.

4.3.3.1 Unplanned Events

Unplanned events are incidents, such as accidents and malfunctions that are not expected to occur during the Project's normal activities during construction, operation and decommissioning. Some unplanned events have the potential to result in a number of adverse impacts, varying in nature and magnitude depending on the type of event. The potential environmental and socio-economic impacts resulting from a range of unplanned events will be assessed within the ESIA, under a separate chapter. A preliminary list of the potential unplanned incidents includes:

- Damage to a pipelines resulting in the release of oil or gas into the environment;
- Damage to wells or well pad's resulting in the release of oil or gas or other chemicals (including blow outs);
- Events and incidents at the CPF;
- Emergency flaring of gas;
- Transportation incidents (e.g. during transport of waste); and
- Accidents and incidents with members of the community or wildlife.

Although the likelihood of unplanned events is low, appropriate management plans will be developed and implemented to ensure that such impacts will be minimised and contained (e.g. development of a specific Oil Spill Response Plan). Appropriate unplanned event contingency planning therefore minimises the likelihood of remote probability events occurring, as well as minimising the consequences of such events.

4.3.4 Mitigation and Management

Where an adverse impact is identified, efforts will be made to develop strategies to primarily avoid (e.g. through the design process) or minimise the impact. The selection of mitigation measures has considered a standard mitigation hierarchy (Figure 4-4), in line with IFC PS1 (Ref. 4-4), whereby preference is given to avoiding impacts altogether and subsequently to minimising the impact, repairing its effects, and/ or offsetting the impact through actions in other areas.

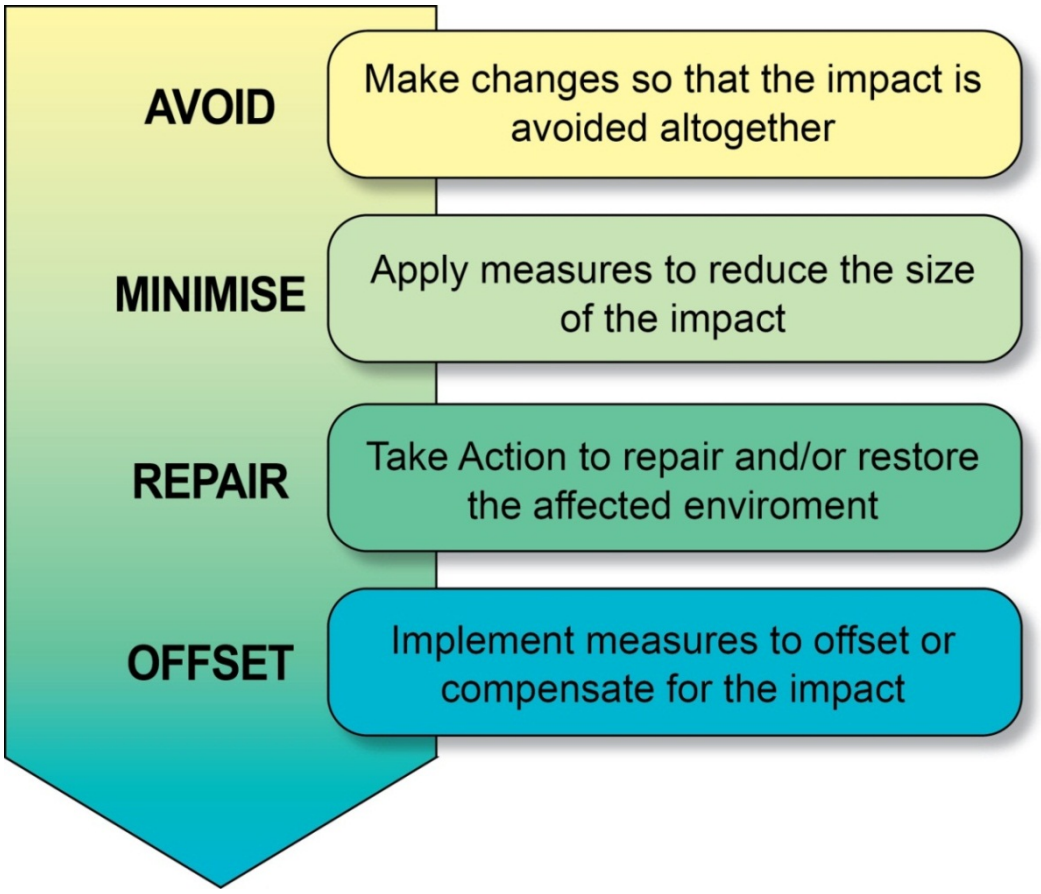


Figure 4-4: Mitigation Hierarchy

Mitigation and management measures will be captured in an Environmental and Social Management Plan (ESMP). The ESMP will outline all of the impact mitigation and management requirements to be implemented during the course of Project implementation, including, where necessary decommissioning.

4.3.5 Residual Impacts

After suitable mitigation measures have been identified, the significance of each impact will be re-evaluated to predict the post-mitigation ('residual') significance. It is this residual significance that is used to support decision making and conclusions about the Project. The mitigation measures developed during the ESIA process will feed into the Project's Environmental and Social Management System (ESMS). This will be managed through the development of a commitment register which would be developed in line with the completion of the ESIA Report. This commitment register would capture all of the mitigation measures, safeguards and environmental and social commitments listed within the ESIA and would feed not only into the overall ESMS, but also directly into a series of individual management plans which would be prepared in support of the Project (further information will be included within the main ESIA Report).

ENVIRONMENTAL BASELINE CONDITIONS

05

5 ENVIRONMENTAL BASELINE CONDITIONS

5.1 INTRODUCTION

This chapter describes the physical, biological and ecological characteristics (the baseline) of the Project Area. The existing characteristics of the Project Area have also been mapped so that any sensitive issues, or constraints, can be visualised in relation to the potential locations affected by the Project.

5.2 PROJECT AREA - ENVIRONMENTAL CONTEXT

The Project is located in the Albertine Graben, Western Uganda. The Albertine Graben is recognised as one of Africa's most important areas for biodiversity, and approximately 70% of blocks EA-1/1A, east of the Albert Nile, and part of EA-2, is within the Murchison Falls National Park (MFNP), which hosts a range of emblematic wildlife and attracts national and international tourism. MFNP is the largest and the second-most visited national park in Uganda and it is ecologically important for a number of globally and regionally threatened species. Together with the adjacent Bugungu Wildlife Reserve and the Karuma Wildlife Reserve, MFNP forms part of the Murchison Falls Conservation Area (MFCA).

There are also a number of forest reserves in the Proposed Area of influence such as Bugoma and Budongo Forest Reserves. MFCA plus the forest reserves form important animal corridors and are biodiversity hotspot areas of tourism and recreational importance. Based on preliminary evaluation, MFNP and the Budongu Forest Reserve are believed to constitute Critical Habitat as defined by the guidance notes to IFC's Performance Standards (Ref. 5-1). Parts of the development footprint are likely to qualify as Natural Habitat and in some case Critical Habitat.

The Project is naturally split between the north and south banks of the Victoria Nile River. This area includes the Murchison Falls-Albert Delta Wetland System Ramsar Site located along the Victoria River Nile; this is also an Important Bird Area (IBA) and is known to support rare, vulnerable and endangered species. The Ramsar site is important for maintaining biodiversity in the region, important as a spawning ground for fish and holds a number of indigenous fish species that are representative of wetland benefits and / or values that contribute to the Lake Albert fishery. Several new dam-developments are planned for the stretch of the river Nile upstream from the Murchison Falls.

5.3 KEY TECHNICAL TOPICS CONSIDERED WITHIN THE ESIA

The ESIA Scoping Report has considered the potential impacts of project activities over all phases of development, as associated with:

- ***Physical Environment***:
  - Air Quality (including greenhouse gases assessment);
  - Ambient Noise;
  - Geology & Soils;
  - Groundwater Resources;
  - Surface Water Resources;
  - Landscape and Topography; and
  - Waste (though no baseline information is required at this stage).
- ***Biological Environment:***
  - Terrestrial Fauna;
  - Terrestrial Vegetation; and
  - Aquatic Life (includes flora and fauna).
- ***Social Environment*** *– discussed in Chapter 6 of this ESIA Scoping Report;*

- ***Ecosystem Services*** *– discussed in Chapter 9 of this ESIA Scoping Report;*
- ***Evaluation of Alternatives*** *– discussed in Chapter 3 of this ESIA Scoping Report;*
- ***Cumulative Impacts*** *– discussed in Chapter 10 of this ESIA Scoping Report*; and
- ***Unplanned Events*** *– discussed in Chapter 4 of this Scoping Report.*

5.4 DATA GAP ANALYSIS

One of the first tasks undertaken by the ESIA Project Team was to gain a thorough understanding of the existing material, data and reports which have been developed in and around the Project Area in the last decade. In addition, there are number of studies (e.g. relating to Ecosystem Services, Biodiversity Studies, Vegetation Mapping and Critical Habitat Assessment) that are currently ongoing and others that are planned to start in the near future. Where possible, these were also taken into consideration as they can potentially fill in gaps in the existing information. The data gap analysis is an evolving process which will be updated following the completion of these numerous ongoing studies.

As a result, a specific data gap analysis task was undertaken in August/September 2015 (Ref. 5-2) in line with the requirements of the IFC Performance Standards. The gap analysis focused solely on the Project Area of Influence and the potential receptors which may be potentially impacted. A gap analysis is conducted to determine what information is available and what information remains to be obtained. The Project baseline is then developed which provides a record against which future changes can be assessed.

The first step was to collect, review and evaluate currently available data for relevancy and suitability for characterizing the existing baseline environmental, social and health conditions of the Project Area. Almost 150 separate Reports, GIS data and raw data sets were reviewed.

The sources of information used in the gap analysis included:

- TEP Uganda GIS datasets and reports;
- TUOP GIS datasets and reports;
- Other GIS data (USGS, NERA, UWA MIST etc.);
- Satellite images;
- Other readily available published books, reports and scientific literature; and
- Internet websites (IUCN, GBIF, NEMA, NBDB, UWA etc.).

The TEP Uganda and TUOP reports include many EIAs for the exploration phase activities in the Project Area as well as project briefs, interim reports and draft reports of ongoing studies as well as the scopes of work for planned studies not yet initiated. Furthermore, many of the reports held in the libraries of TEP Uganda and TUOP have been produced by a broad range of public and private organizations, institutions and government ministries and consulting firms. An indicative list of sources of information includes:

- Government departments, including NEMA, UWA, National Forestry Authority (NFA), Petroleum Exploration and Production Department (PEDPD), Directorate of Water Resource Management (DWRM), Department of Museums and Monuments DMM, Ministry of Lands, Housing and Urban Development (MHLUD);
- Non-government agencies such as Wildlife Conservation Society (WCS), Nature Uganda, Nile Basin Initiative (NBI) WWF; and
- Other sources such as United States Agency for International Development (USAID), NORPAK, World Health Organisation (WHO), Global Oil and Gas Industry Association for Environmental and Social Issues (IPIECA).

The GIS data sets provided by TEP Uganda and TUOP are comprehensive and have been developed over time to incorporate GIS data sets from completed studies such as the Environmental Baseline Studies for both EA-1/EA-1A and EA-2 amongst others. In addition, GIS data can be sourced from a number of

publically accessible sites. In some cases, reports contain maps with information that can be digitized if GIS files are not available.

Public books and scientific literature are held in multiple libraries (electronic and hard copy) maintained by various institutions such as Makerere University, WCS, AECOM and in some cases personal libraries of ESIA team members. Internet websites provide a wealth of information however they must be carefully vetted before use. The websites accessed are those which are maintained by reputable entities.

The available secondary sources of information have been screened for applicability to the Project Area based on how the proposed Project interacts with the natural and social environments. Furthermore, the locations of previous exploration activities in relation to the locations of the proposed Project infrastructure have been considered to allow the subject matter specialist to identify reports that have been completed in those areas that overlap and may therefore be useful to inform the ESIA. The proposed Project footprint has also been overlayed on a base map showing potential environmental and social receptors for the same reason.

The process of reviewing this information was then used to help identify the gaps to the existing baseline information which will need to be addressed in order to inform the ESIA in line with the requirements of the IFC Performance Standards. Ultimately, the available information about the Project area and receptors will be used to characterize the existing environmental and social conditions, along with any new baseline data activities we undertake specifically for the Project, as part of the main ESIA Phase. Additionally, a number of field reconnaissance site visits were undertaken between June to September 2015 to help inform this ESIA Scoping Report and also identify any requirements for additional baseline data collection.

Additional information outlining the identified baseline data gaps and the actions recommended to fill them is contained within both Chapter 9 and Appendix E of this ESIA Scoping Report.

5.5 PHYSICAL ENVIRONMENT - BASELINE

Baseline conditions of the physical environment associated with the Project are described below.

5.5.1 Climatic Conditions

5.5.1.1 EA-1/EA-1A and EA-2

At a regional level, the climate can be characterised as generally hot and humid, with average monthly temperatures varying between 27°C and 31°C. In northern Uganda, the rainy season is eight months long, from late March to late November, with the main peak from August to October and a secondary peak in April/May (Ref 5-3). The data on temperature, precipitation, wind and humidity is available from weather stations of Wadelai, Arua, Gulu (north of the Project Area) and Masindi, Kisinja and Mbegu in the south, which are located at different distances from the Project area (Figure 5-1). The analysis of the long term dataset available from the meteorological station of Wadelai confirms that the study area receives a mean annual rainfall of approximately 1,000 mm/year and has a bi-modal rainfall pattern. Temperature, atmospheric pressure and relative humidity was also recorded during the EA-1 baseline survey at the long-term air quality station (AQMesh-2) installed by AECOM approximately 1.5 km west from the proposed CPF site.

A detailed overview of the climate will be provided in the ESIA using meteorological datasets obtained from the above mentioned weather stations as well as future field measurements which would be taken near the proposed CPF location.

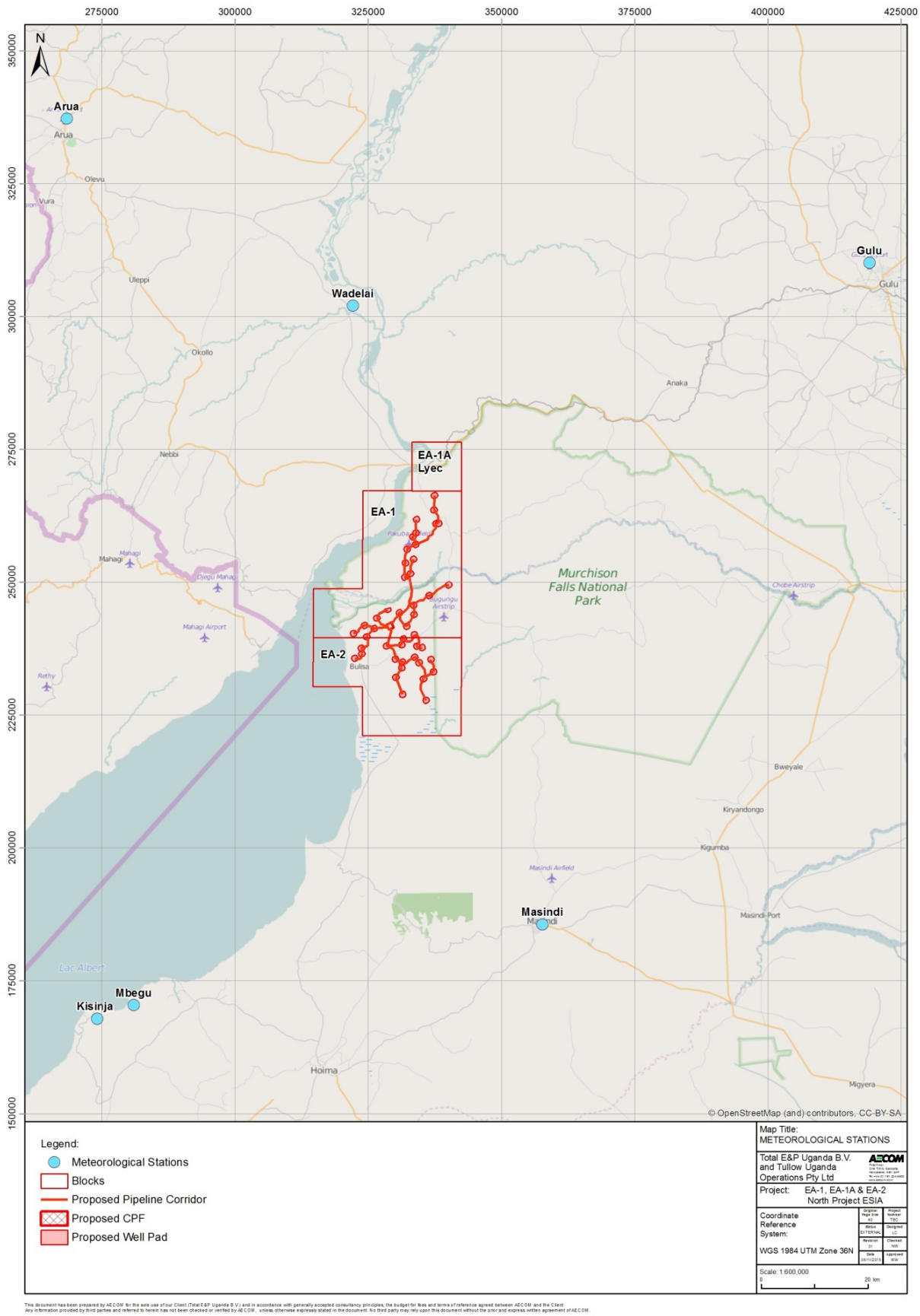


Figure 5-1: Meteorological Stations in relation to the Project Area

5.5.2 Air Quality

5.5.2.1 EA-1/EA-1A and EA-2

The purpose of climate and air quality survey activities undertaken to date within Block 1 were to collect a representative dataset to inform an understanding of air quality within the study area during different seasons of the year. Four field campaigns were undertaken throughout 2014 to cover both wet and dry seasons. The first two campaigns covered the North, South and West Nile areas, while the remaining two campaigns covered only the North and South Nile areas (identified as potential project areas).

The Air Quality surveys consisted of short term and long term data collection studies. The short term air quality measurement locations were located in areas identified as having sensitive receptors (residential areas, tourist facilities, schools), natural areas (virgin areas, MFNP and Ramsar Site), and areas with existing petroleum activities (field camps, storage areas). Air quality measurement locations were split as follows for each area:

- 7 measurement locations across the North Nile area (i.e. virgin areas (Ramsar, MFNP); Built up area (Tangi Camp, Paraa river crossing));
- 6 measurement locations across the South Nile area (i.e. built up area (Murchison River Lodge, Wanseko Town Council/Primary school); petroleum activities (Bugungu Camp, Ngiri – 2 well pad)); and
- 5 measurement locations across the West Nile area (i.e. virgin area (Panyimur); built up areas (Panyimur settlement centre, Pakwach Town Council and Police station); community area (Panyigoro village).

Two long-term air quality stations were installed in the North (Pakuba Lodge) and South Nile (Kasinyi village) areas to record ambient air quality and meteorological conditions.

According to the monitoring surveys conducted, air quality is considered to be generally good due to the absence of major industrial sources of air pollutants. Elevated levels of particulate matter (dust) were observed however during dry seasons in the areas surrounding roads or housing infrastructure. The primary sources of atmospheric emissions include traffic and combustion of wood, charcoal and kerosene for domestic needs.

Due to limited spatial and temporal scope of the monitoring (e.g. the exact location of the Project facilities were unknown at the time of the original baseline surveys) and often incomplete suite of air quality parameters tested at the exploration well sites, further primary data will be collected and discussed in the ESIA with an emphasis on the areas which contain sensitive receptors (i.e. settlements, schools etc.) which may be affected by the Project emissions. Further details are provided within section 9.2 of this ESIA Scoping Report.

5.5.3 Ambient Noise Characteristics

5.5.3.1 EA-1/EA-1A and EA-2

The existing ambient noise records provide a good general understanding of the acoustic landscape across the study area. The existing known noise monitoring locations are shown in Figure 5-3. In general, low noise levels (typically in the range of 30-45 dB (A) (LAeq)) were detected in virgin or isolated areas (within the MFNP or inside the Ramsar Site), and influenced mainly by natural sources (i.e. wildlife, wind). Higher noise levels (typically in the range of 50-70 dB (A) (Leq)) were detected in the vicinity of built-up areas and along main roads, and attributed to the operation of diesel generators, human presence and vehicle traffic.

The baseline noise levels at specific locations where project activities have the potential to create noise nuisance to sensitive receptors will be assessed in detail in the ESIA. Further details are provided within section 9.3 of this ESIA Scoping Report.

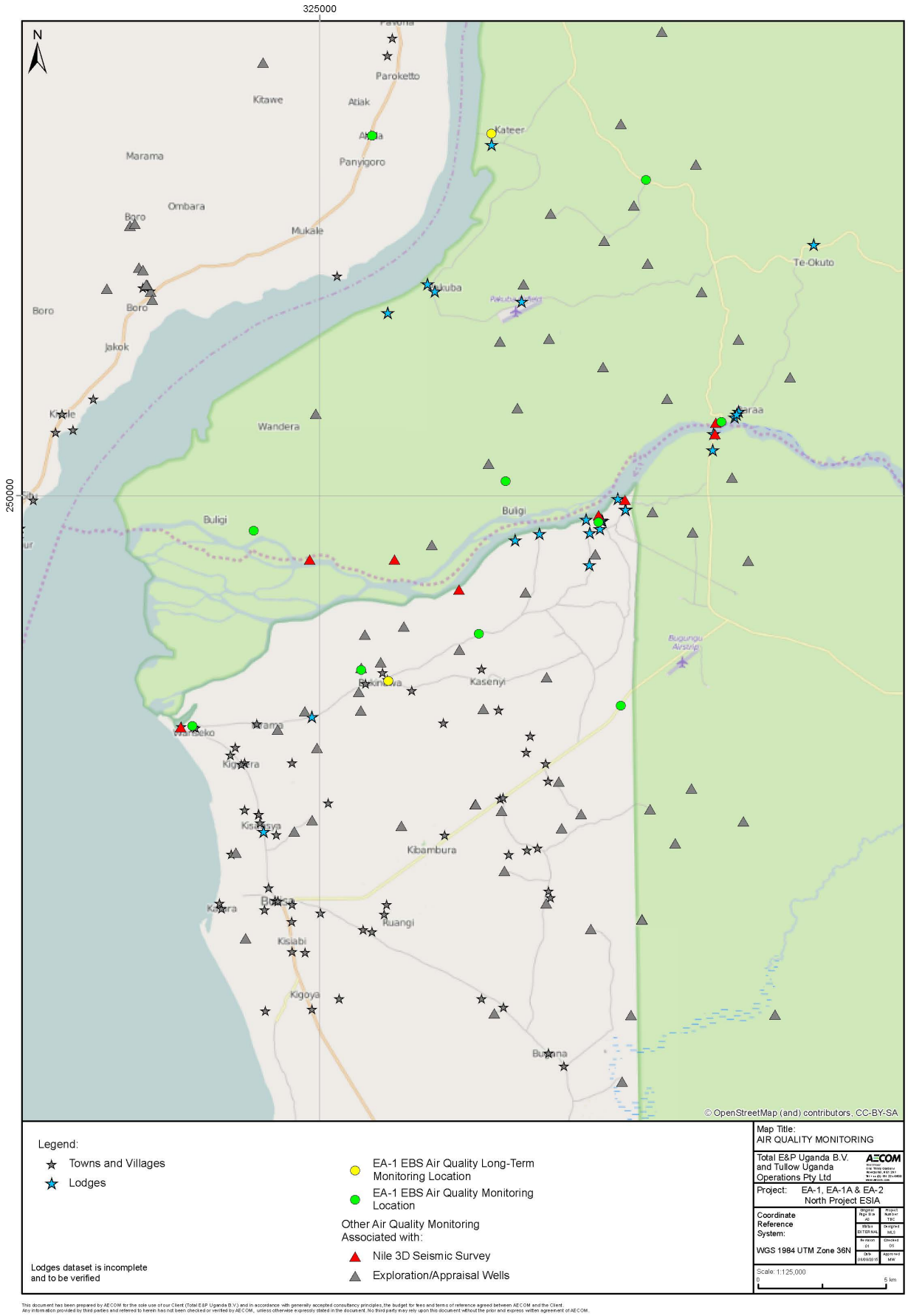


Figure 5-2: Known Air Quality Monitoring Locations

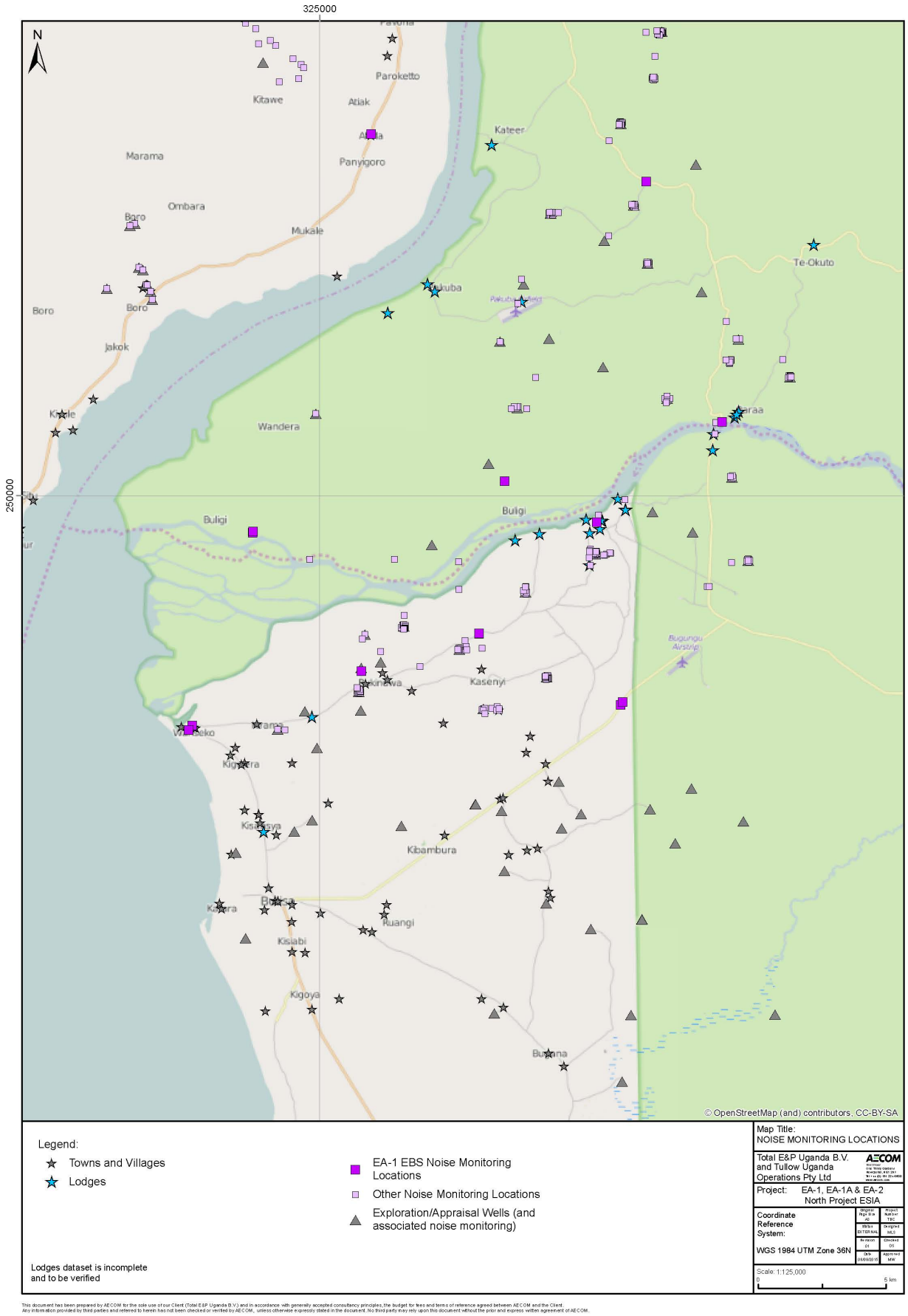


Figure 5-3: Known Noise Monitoring Locations

5.5.4 Geology & Soils

5.5.4.1 Geology - EA-1/EA-1A and EA-2

The Albertine Graben is the principal prospective area for petroleum in Uganda and forms the northern part of the western arm of the East African Rift System (EARS), stretching over 500 km from the border with Sudan in the north to Lake Edward in the south, covering an area of over 21,000 km². The Albertine Graben is a Cenozoic rift basin, started during the late Oligocene/Early Miocene and developed on the Precambrian orogenic belts of the African Craton. The Albertine Graben has undergone several tectonic episodes of both extensional and compression regimes; evidence of these movements are seen through the fault systems defining the basins (PEDPD, 2011).

5.5.4.2 Soils - EA-1/EA-1A and EA-2

EA-1/EA-1A and EA-2 are located within the Pakwach Basin which is composed of rift sediments with a north-south trend. The old age and acidic nature of the rocks help to explain the relative nutrient poverty of the soils and relative flatness of the region.

The Albertine Graben region is prone to soil erosion due to the combination of high intensity rainfall, sandy soils with high rates of water infiltration and a relatively impervious underlying clay layer. This, along with the high levels of herbivore grazing, has resulted in serious gully erosion. One of the significant consequences of soil erosion is the increased sediment loading on lakes and rivers; according to the Lake Albert Management Plan (2010-1015), around 1,000,000m^3 of sediment accumulated in the lake since the mid 1970's.

Previous soil surveys confirmed the presence of mainly fine acidic, loam sand-silty soils with variable permeability and, in some cases, severe signs of erosion in the EA-1/EA-1A block (see Figure 5-4). Within EA-2 soils are fairly similar, comprising mainly sands and clays. The sands are mostly unconsolidated, and are coarse to medium grained while clays, intercalated with the sands, are of varying composition. Ferralitic soils are known cover a significant part of the South Nile area. Soils and sediments within river valleys comprise peaty sands and clays as well as reddish brown clay loams overlaying murram and ironstone.

Given the scale of the proposed Project, targeted soil sampling will be conducted in key areas of the Project Area to complement the existing data collected during EA-1 EBS and exploration ESIA studies. Further details are provided within section 9.4 of this ESIA Scoping Report.

5.5.5 Surface Water Resources

5.5.5.1 EA-1/EA-1A and EA-2

The Project is located on the northern end of Lake Albert including both the Victoria Nile inlet and the Albert Nile outlet which represent the primary water resources within the study area, as shown in Figure 5-5. Lake Albert is considered as Africa's seventh largest lake and is the most prominent drainage feature on the border between Uganda and the Democratic Republic of the Congo. The lake receives inflow from two major rivers: the Victoria Nile, originating from Lake Victoria and entering Lake Albert at its northern tip, and the Semliki River, which issues from Lake Edward and joins southern part of the lake. Other rivers that drain into Lake Albert from the East include the Muzizi, Kifu, Wambabya, Waki, Sonso, Waisoke, Waiga and the Sambiye rivers. The Albert Nile outflows from the north end of Lake Albert, and divides the West Nile sub-region of Uganda from the rest of the country. The Tangi River, with three main tributaries, flows westwards and drains most of the eastern catchment of the Albert Nile within the North Nile area.

Lakes' Edward and Albert Fisheries (LEAF) pilot project (Ref. 5-5), EA-1 EBS and EA-2 Kasamene studies (Ref. 5-6) provide information on the aquatic environment of Lake Albert, including characteristics of the catchment area and its degradation, hydrological regime and water resources, water quality and pollution.

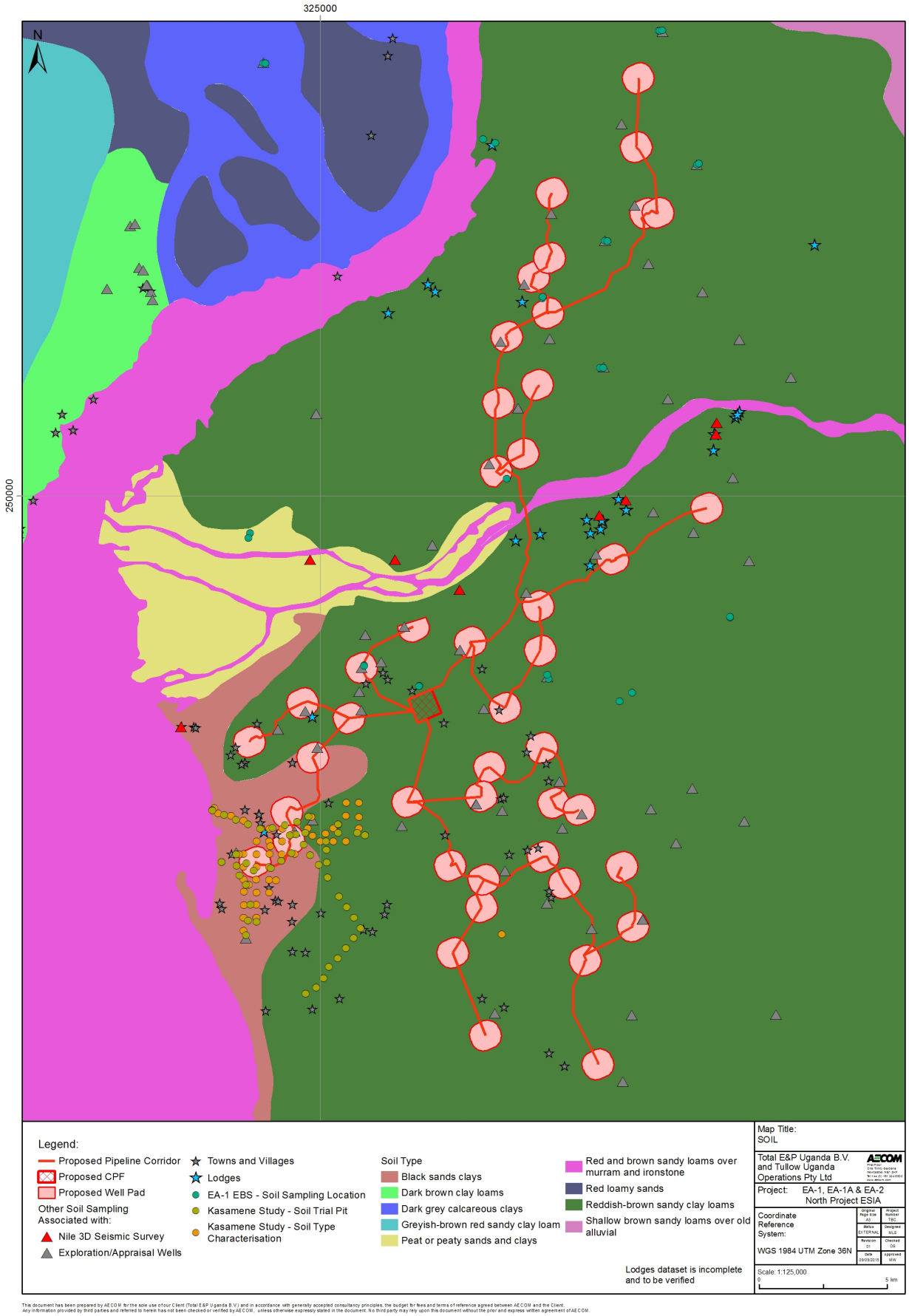


Figure 5-4: Soil Type Classification and Known Soil Sampling Locations

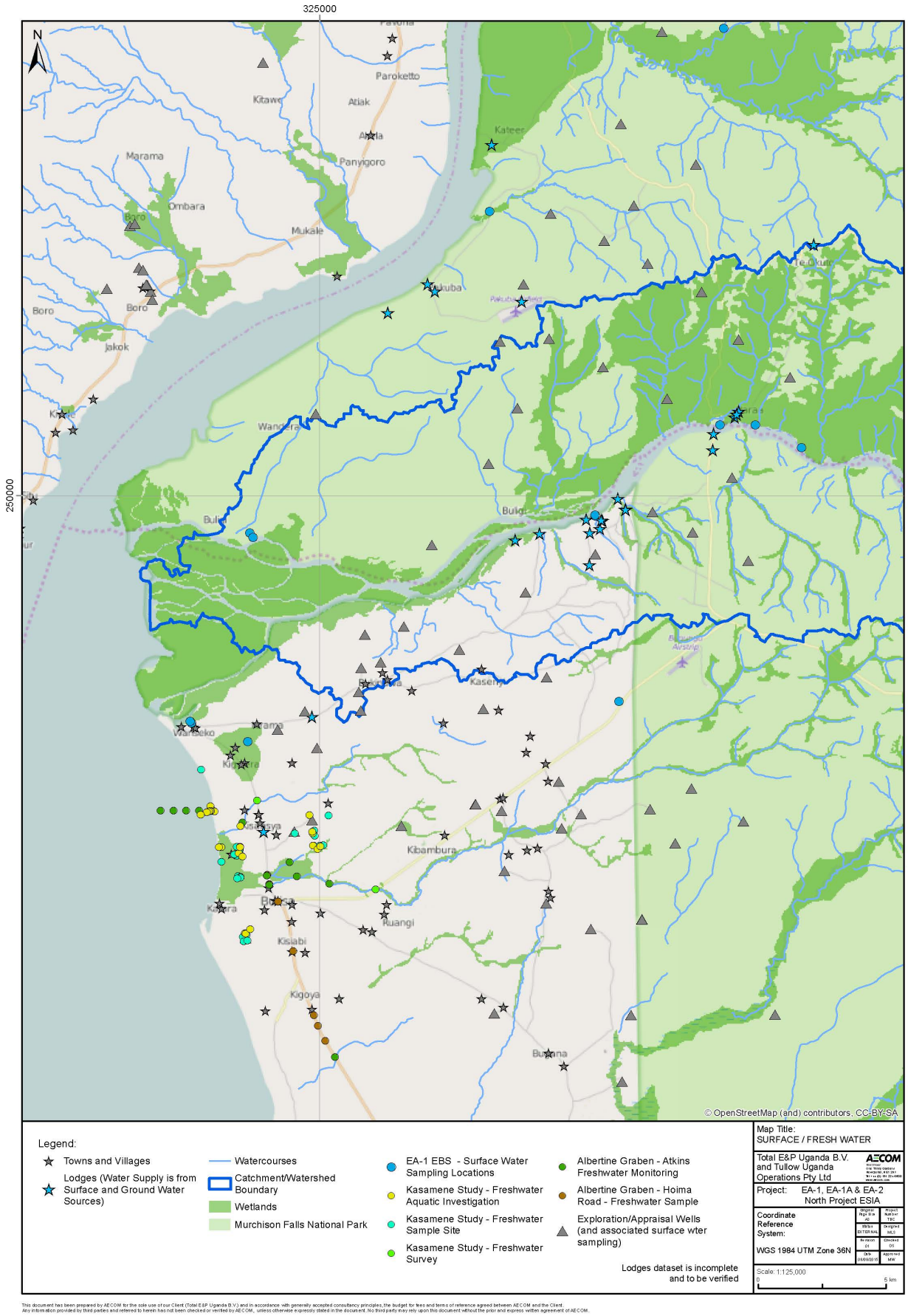


Figure 5-5: Hydrology and Known Surface Water Sampling Locations

The study area also includes the Murchison Falls-Albert Delta Wetland System Ramsar Site (no. 1640), most of which lies within MFNP. It stretches from the top of Murchison Falls to the Victoria Nile delta at its confluence with Lake Albert. This area, which has been proposed for UNESCO World Heritage status (http://www.ramsar.org/murchison-falls-albert-delta-wetland-system) has been cited for its importance as a spawning ground for Lake Albert fisheries, its support to globally threatened bird species, and its support to biodiversity conservation during the dry seasons. Water quality is of critical importance to the Ramsar ecosystem.

There are other permanent and seasonal water courses and various pond features (mostly comprising perched water) present within the Study Area (Figure 5-6). The area north of the Nile is characterised by low hills and wider seasonal drainage channels. The management of the catchment areas for the Lake Albert and key rivers across the study area is regulated by the Ministry of Water and Environment in collaboration with the regional and district water authorities.

A strategic study of Lake Albert ecology was also completed in 2012 on behalf of TUOP (Ref. 5-20). Based largely on the review of secondary data this report provided valuable baseline information on the limnology of the lake, its socio-economic resources, aquatic species richness, sensitive habitats, and fisheries. The study area included the Lake Albert catchment from the Semliki basin in the south to the Nebbi district in the north.

The existing water quality data indicates that some physical, bacteriological and chemical parameters exceed the Ugandan potable water standards, especially along the Nile, the Albert Nile and near the Tangi River. The gap analysis identified that the available surface water quality information is limited in area and coverage, and insufficient to fully characterise Block EA 1. Consequently the planned field surveys will allow for the collection of additional information to provide a more comprehensive overview of hydrology and water quality within the study area, targeting surface water resources that can be potentially affected by the Project and are sensitive or considered as valued ecosystem components. Further details are provided within section 9.5 of this ESIA Scoping Report.

Figure 5-6: Water Features Observed during Reconnaissance visit

5.5.6 Groundwater Resources

5.5.6.1 EA-1/EA-1A and EA-2

Groundwater resources in the Albertine Graben are limited due to the absence of regional aquifers. The groundwater reserves are mainly contained in rock fractures and fissures and localised unconfined aquifers. Evidence from a number of boreholes and shallow wells in the study area indicate relatively high water table conditions (from zero to tens of meters below the ground). However the groundwater data collected by DWRM (Ref. 5-8) from various groundwater sources was processed and analyzed in Buliisa and Hoima to identify the various lithological units by aquifer units in the two districts of Hoima and Bullisa. This analysis indicates that there are generally two major discrete aquifer units in the Albertine Graben composed of sands and clayey sands. The aquifer units that is rather extensive is formed of sands while the one that is limited in extent is composed of sandy clay formation. These conditions vary the vulnerability of groundwater to potential contamination. Approximately 80% of Albertine Graben groundwater is ranked as having high sensitivity, 8% has medium sensitivity and 12% has low sensitivity.

Groundwater is the primary source of potable water and meets 80% or more of the water supply, but its availability is strongly influenced by seasonal variations. Within the MFNP part of the Study Area groundwater abstraction is mainly associated with the safari lodges, whereas south of the Victoria Nile (Buliisa and Masindi districts) groundwater is used throughout the populated areas (Figures 5-7 and 5-8). The main sources of water supply for Buliisa district are shallow wells and deep boreholes; 20% of Buliisa district population is served by two groundwater pumped/piped water supply systems, while 80% relies on point water sources. The primary sources of water supply in the Masindi district are deep boreholes and shallow wells, with 5 groundwater pumped/ piped water supply systems serving approximately 12% of the population, while 88% of the population is served by point water sources.

In 2012, the Directorate of Water Resources Management assessed the groundwater resources in Uganda and calculated the sustainable exploitable groundwater resources per district evaluating the proportion of the resource that can be exploited on a sustained basis without resulting in unacceptable consequences for the environment. The estimated availability of groundwater resources for the entire country has been classified as medium-high, with a groundwater recharge rate ranging between 25 and 100 mm/year. However, the Study Area has low to medium groundwater recharge rates between 19.1 to 39.9 mm/year (Ref. 5-7).

The groundwater quality data from the previous surveys conducted within EA-1/EA-1A and EA-2 (including the Groundwater Resources report of Buliisa and Hoima, Ref. 5-8) is useful to provide a picture of the overall status of the quality of the groundwater, but it does not cover all of the Study Area. In general, groundwater is free of contamination although in some cases physical parameters in the area north of the Nile and chemical parameters south of the Nile area were found to exceed the Ugandan potable water quality standards in EA-1/EA-1A. The planned field surveys will build on the information providded in the earlier reports and focus on the groundwater resources that can be potentially affected by the development and are sensitive or considered as valued ecosystem components. Further details are provided within section 9.6 of this ESIA Scoping Report.

Figure 5-7: Groundwater Supply Sources Observed During Reconnaissance Visit

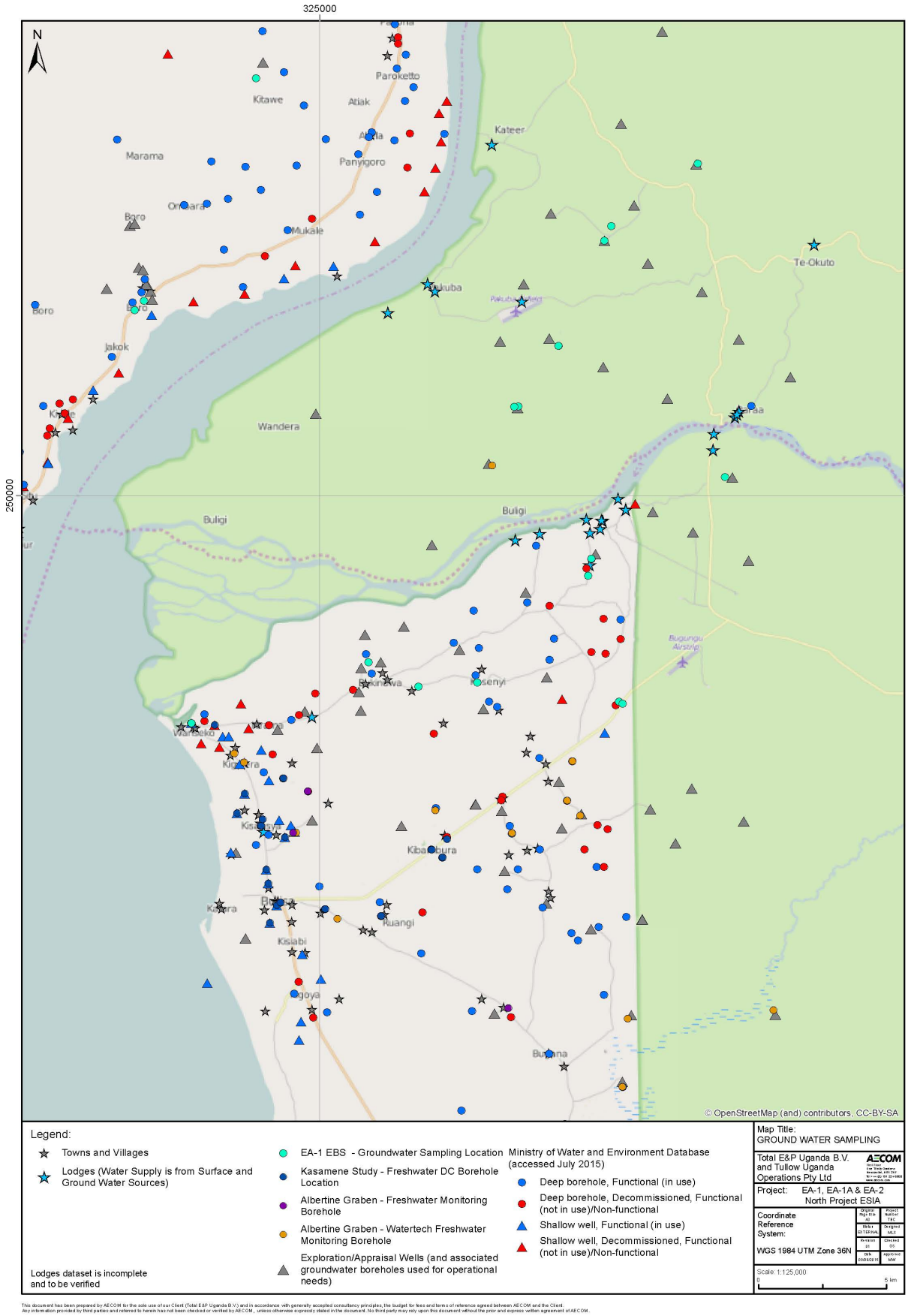


Figure 5-8: Public Groundwater Supply Sources and Known Groundwater Sampling Locations

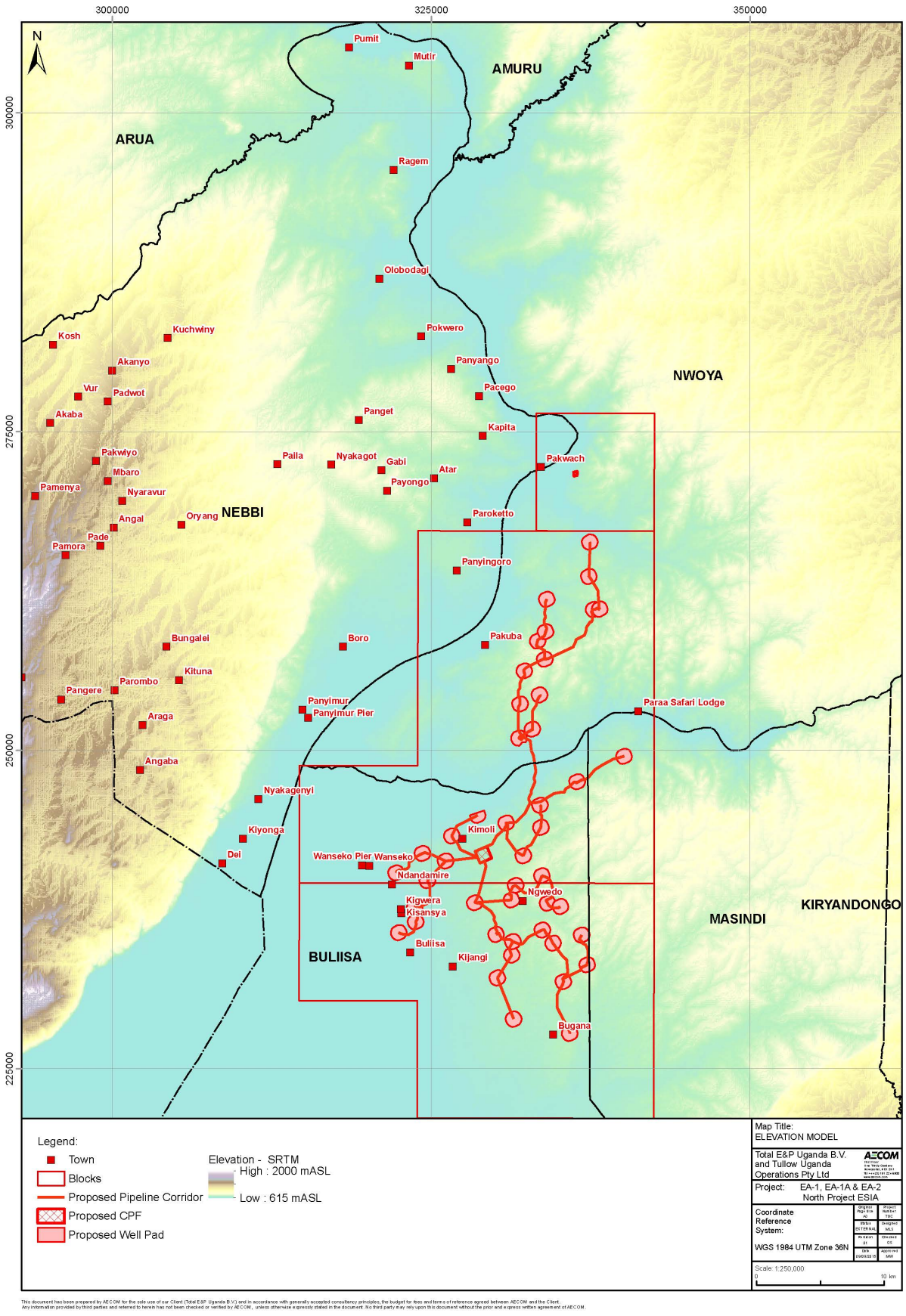


Figure 5-9: Topography

5.5.7 Landscape and Visual

5.5.7.1 Landscape and Visual Resource

Landscape and visual resources are interrelated but will be considered separately. The following baseline is a desk based study established from available data, aerial photographs and mapping supplemented by site visits undertaken by AECOM staff in July 2015.

The landscape of the Albertine Graben of the Western Rift Valley in Uganda comprises various major features including Murchison Falls National Park, Lake Albert, the wetlands of the Nile Delta and the rift escarpment rising abruptly to the flat central plateau in the east. This is a dramatic landscape which includes extensive protected areas with both local and international recognition and is a valued resource for tourism. Of particular relevance to the study area is Murchison Falls National Park, as shown in Figure 5-10. The National Park covers 3,893 km^2 and is managed by the UWA. The Uganda Wildlife Act (Ref 5.9), 1996 states that: *A national park declared under subsection (2)(a) shall be an area of international and national importance because of its biological diversity, landscape or national heritage and in which the following activities may be permitted—biodiversity conservation; recreation; scenic viewing; scientific research; and any other economic activity.*

5.5.7.2 Landscape Character

'Landscape resource', is concerned with the distinctive character of areas EA-1/EA-1A and EA-2. The character of an area is the result of a culmination of factors which, when viewed as a whole, result in distinct units of land each of which is recognisable and distinct from its surroundings. The following is a brief description of the existing landscape character and features. A detailed landscape character analysis will be undertaken as part of the ESIA.

The topography across EA-1/EA-1A and EA-2 is predominantly flat to gently rolling and its elevations range from approximately 600 m Above Sea Level (ASL), near Lake Albert, to 850-1,000 m ASL close to the eastern and western EA-1/EA-1A boundaries, as shown in Figure 5-9. More specifically, the greater elevations (1,000 m ASL) are near the south-western border of the west Nile area within EA-1/EA-1A, and are characterised by steep slopes and a more pronounced rift escarpment. From this hilly zone the elevations gently decrease eastward to the west bank of the Albert Nile River and Lake Albert in EA-2 at the lowest heights (600 – 650 m ASL).

Starting from the south east of the study area, the landscape character is a narrow corridor running north to south along the Lake Albert coastline, south of the Victoria Nile. Reaching inland from the coastline, the arid landscape is a patchwork of dry grassland and bare ground with intermittent areas of thicket and scrub vegetation. The area's eastern boundary sits just beyond the Buliisa - Wanseko road which stretches south to north, joining the two named settlements. The road runs parallel to the coastline set between 1.5 to 3 km inland before turning westwards and terminating at Wanseko. A concentration of settlements including, Ndandamire, Kigwera, Kisansya and Buliisa flank the road, making up the most densely populated corridor in the area.

Continuing eastwards, south of the Victoria Nile, the plateaued landscape is largely characterised by overgrazed grassland with sporadic areas of thicket and scrub. An informal road network spurs off the Buliisa-Wanseko road supporting a scattered pattern of dwellings which decreases in concentration to the east.

Vegetation cover continues to increase inland as areas of more dense vegetation increase in size and frequency. This change in vegetation coincides with more rolling topography and then gives way to a large area of farming land further east. The agricultural fields are mostly small, rectilinear and although with trees and other vegetation between them. Infrastructure is limited to informal tracks other than the Buliisa – Paraa road which cuts north-east across the rolling landscape for 21 km in a straight line from Buliisa, across the National Park boundary, past Bugungu Airstrip before joining the Sambiya-te-Okuto road which leads north to the Victoria Nile crossing at Paraa. The landscape, characterised by farm land, ends abruptly at the National Park boundary which is informally marked as miles of field boundaries.

The Park boundary, south of the Nile, is characterised by a series of valleys and ridges containing numerous seasonal rivers, wetlands and tributaries. The most notable topographic feature associated with the project area is the Bunyoro escarpment located in the east.

Moving south within the National Park toward the Bugungu airstrip, the landscape becomes more open as the topography becomes less dramatic. The vegetation is also of a more open structure comprising wooded

grassland. Still further south into EA-2 North, the topography of the Park continues to level off and grassland gives way to open and dense woodland that forms a thick buffer to tributaries, rivers and wetlands.

The Victoria Nile river flows freely, although at times dramatically. The western section of the river is different in character largely flanked to the north (particularly) but also in some areas to the south by dense thicket and riverine forest that follows the river all the way to Lake Albert.

The area to the north of the Victoria Nile can be split into two broad landscape areas. The topography in the west is gently undulating with some small local plateaus, whereas the eastern side is more dramatic. The savanna grassland and grassland with trees in the west is occasionally interrupted by safari tracks and seasonal watercourses flowing toward the basin forming areas of wetland intermittently along the coastline. In contrast, the eastern side is more fragmented by numerous rivers running down toward the Victoria Nile and is generally less open comprising wooded grassland dominated by Acacia and Borassus.

5.5.7.3 Visual Resource

The relevance of visual receptors will depend on the location, scale and character of Project components including well pads, flow lines, road works, camps and transport routes, river crossing options etc. A number of potential visual receptors have consequently been identified and are discussed below.

Paraa has been identified as a tourism hub of the area due to the presence of the Victoria Nile crossing point and visitor attractions. Other than the crossing point itself, there is a concentration of potential receptors within the locality including the Murchison Falls National Park Visitors Centre, the Red Chilli Rest Camp and the Paraa Safari Lodge.

Other receptors in the area include a number of other lodges including Bakers Lodge, Shoebill Camp Site, Nile River Lodge, Murchison River Lodge, Nile Safari Lodge, Yebo Tours Safari Lodge, Neul Lodge, Africana Safari Lodge, Water View Lodge, Mubako Community (a remote community offering tourists a cultural experience) and Kabalega Lodge. Lodges located within block EA-1A are clustered around the sharp bend in the river where the land west of the White Nile river protrudes east, just north of the Gulu-Arua road bridge. The lodges are: Fort Murchison, Bwana Tembo, Albert Nile Cotteges and Heritage Safari. The Pakuba Lodge is approximately 6km north of Pakuba. Global Village Lodge is located on the western side of the White Nile, south east of Kapit.

Key visual receptors in the National Park include popular roads and tracks used by tourists such as the Buligi circuit which is strategic to provide access to several proposed project locations. A popular way to explore the National Park is on the river, making it a visual receptor for tourists.

The Buliisa – Wanseko road and associated towns and villages, cultural and heritage assets including meeting places and places of religious and spiritual importance. It is expected that these assets will be identified and their social significance assessed in the social assessment which will in turn inform the visual resource baseline. Lodges associated with the road include the Albert Nile Cottages situated in Kisansya and Resort Tarmarin, due east of Wanseko.

The high ground in the east towards the escarpment provides open and panoramic views of the Project.

5.6 ECOLOGICAL AND BIOLOGICAL ENVIRONMENT – BASELINE

5.6.1 Protected Areas

5.6.1.1 EA-1/EA-1A

EA-1/EA-1A includes part of the MFNP and the whole Murchison Falls-Albert Delta Wetland System Ramsar Site, as well as a number of small Central Forest Reserves (CFRs), although the latter are located on the west side of Lake Albert and the Albert Nile.

MFNP: This is the largest National Park in Uganda (nearly 3,480 km^2) and was initially gazetted in 1926 as a game reserve and subsequently as a National Park in 1952, based on its animal conservation status[8]. The park is recognised by the International Union for the Conservation of Nature (IUCN) as a Category II Protected Area. The MFNP is bisected by the Victoria Nile for 80 km flowing in an east to west direction. The MFNP supports rich and varied habitat types including grassland savannas, wooded grassland, bushlands,

[8] *http://www.ugandawildlife.org*

woodlands, forests and wetlands that provide varied ecosystems that in turn support a high diversity of both flora and fauna. The MFNP is of ecological importance for a number of globally and regionally endangered species including plants, reptiles, mammals and birds. The park is notable for its large population of mammals, particularly the largest proportion of the Rothschild's giraffe population in Uganda (and indeed, the world). The park has a rich level of biodiversity for which information on mammals (around 100 species) and birds (up to 476 species) (see Plumptre *et al*., 2003 Ref. 5-10) is fairly well known, although data for other species groups such as amphibians, reptiles and invertebrates in terms of total species present are incomplete.

Murchison Falls-Albert Delta Wetland System Ramsar Site: Designated in 2006, the Murchison Falls-Albert Delta Wetland System Ramsar Site covers an area of 17,293 ha, stretching from the top of Murchison Falls to the Albert Delta. It lies predominantly within the MFNP, although a small area along the southern edge is outside the park (see Figure 5-10). The site was designated as it supports rare, vulnerable and endangered species, including the Shoebill (*Balaeniceps rex*, a globally vulnerable species) and grey crowned cranes, an Endangered species. It also supports the largest know population of the Nile crocodile in Uganda, and a number of indigenous fish species and is a spawning ground on which fish stocks depend (Byaruhanga & Kigoolo, 2005) (Ref. 5-11). The river contains several sandbanks and Papyrus islands. The delta area of the Ramsar site has not been surveyed yet and data about its importance for fish and birds are incomplete. This a priority data gap to be filled with additional biodiversity survey work (proposed for 2016).

Central Forest Reserves (CFRs): CFRs are managed by the National Forestry Authority (NFA), are defined by the National Forestry and Tree Planting Act (2003) (Ref. 5-12) and comprise two main categories: those for production and those for protection (although there may be an overlap between actual activities in some forests). Production forests, which may include patches of savanna bushland and grassland areas, are defined for the supply of forest products and future development of industrial plantations. The protected forests include all forests deemed to comprise a site of special scientific interest for the purpose of:

i. protecting nature and scenic areas of national or international importance;

ii. enhancing biological genetic resources in an undisturbed, dynamic and evolutionary state;

iii. maintaining animal and plant indicator species; or

iv. preserving rare, endangered or vulnerable species, or high biological diversity.

In addition, other CFR may be designed as a strict nature reserve for the purpose of:

i. protecting streams, rivers, lakes, lakeshores, riverbanks or wetlands;

ii. soil, slope and environment protection; or

iii. protecting the ecosystem.

Within EA-1, four CFRs have been identified: Alui, Lul Opio, Lul Kayonga and Lul Oming. These are all located in the West Nile area, i.e. to the west of the Albert Nile and are not located directly within the Project Area.

5.6.1.2 EA-2

EA-2 includes part of the MFNP, part of the Budongo Central Forest Reserve (an Important Bird Area (IBA)), most of the Bugungu Wildlife Reserve, and, in the southern part of the Block, the Kabwoya Wildlife Reserve (WR) and Kaiso-Tonya Community Wildlife Area (CWA). In addition, at the southern end of the Block it also includes a small part of the Bugoma CFR and Bujawe CFR. A brief description of each protected site is given in the following paragraphs.

MFNP: The south-western portion of the MFNP is located within EA-2. As mentioned above in section 5.6.1.1, this is the largest National Park in Uganda (nearly 3,480 km^2) and was gazetted in 1952 based on its large mammal populations. The portion of the MFNP within the EA2 block is generally more wooded and enclosed than the MFNP north of the Victoria Nile and consists mainly of woodland and wooded grassland with areas of thickets. There are some areas of wetland associated with the Waiga River in addition to other seasonal wetlands which generally drain either northwards towards the Victoria Nile, or westwards toward Lake Albert.

CFRs: As noted above in Uganda these forests fall in two main categories: those for production and those for protection, as discussed above in section 5.6.1.1. In the northern part of EA-2 two CFRs are present: Maseege CFR and a small part of Budongo CFR, which is also and IBA:

- Maseege CFR forms part of the corridor between Lake Albert and Murchison Falls National Park (NFA, 2002) and, although somewhat degraded is an remnant feature in the area; and
- Budongo CFR is a very important area of forest and represents the largest block of medium altitude, semi-deciduous forest type in the region. It also supports a well-studied proportion of the population of the Chimpanzee (*Pan troglodytes*), a species listed as Endangered by IUCN and for which the IUCN Red List (IUCN, 2015) (Ref. 5-13) notes a decreasing trend in its global population.

Bugungu WR: This reserve covers an area of 520 km^2 and is located immediately southwest of MFNP. The escarpment of the Albertine Rift runs in a southwest to northeast direction through the reserve and divides it into two distinct sections, which differ in terms of their dominant vegetation. The top of the escarpment supports dense, closed canopy woodland interspersed with tall grassland, while the valley floor supports more open savanna woodland and grassland. Various large mammals have previously been recorded within the reserve and on-going surveys as part of this study will provide information on the status of current animal populations and habitats present within the reserve.

Kabwoya WR and Kaiso-Tonya CWA: The Kabwoya WR (established in 2003) and the Kaiso-Tonya CWA together comprise approximately 200 km^2 of land between the Albertine Rift escarpment and Lake Albert. Kabwoya WR, an IUCN Category III protected area is managed as a private concession, while the Kaiso-Tonya CWA is managed by the community and has grazing by domestic livestock. Both, however, constitute one ecological unit and together comprise the Kabwoya-Kaiso Game Management Area (KKGMA). These areas are located quite far to the south and do not fall within the proposed EA-1/EA-2 Project area, although they do form part of the wider study area.

The coastline of Lake Albert from the delta of the Victoria Nile South towards the river Semliki: constitutes an important area for migratory waterbirds. A census of this shoreline has not been performed yet (proposed for 2016).

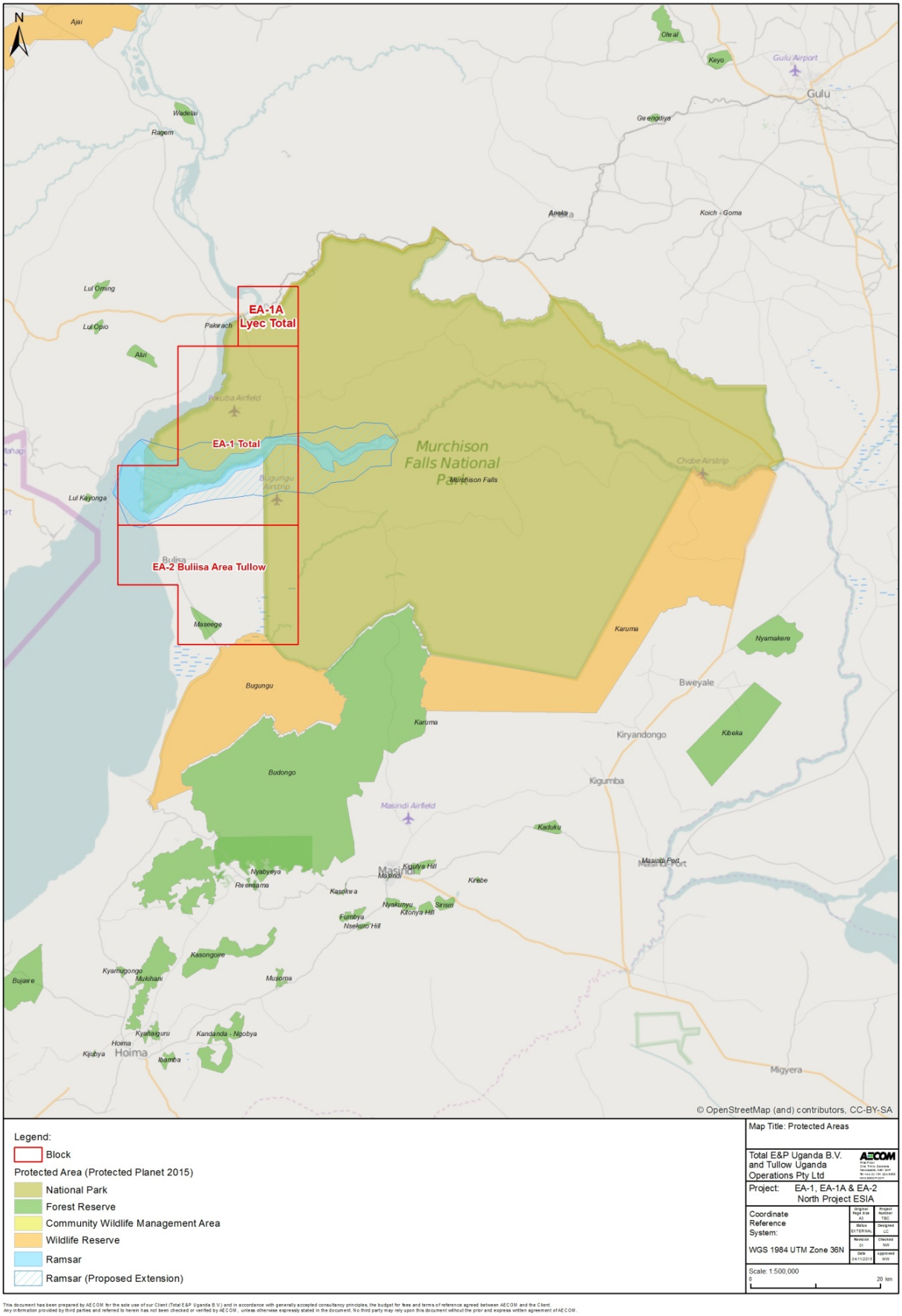


Figure 5-10: Protected Areas

5.6.2 Terrestrial Flora

5.6.2.1 EA-1/EA-1A

EA-1/EA-1A supports rich and varied habitat types including grassland savannas, wooded grassland, bushlands, woodlands, thicket, forests and wetlands that provide varied ecosystems that in turn support a high diversity of both flora and fauna. Representative photographs of land cover within EA-1/EA-1A block (and EA2) are presented in Figure 5-11.

To the north east corner of EA-1, within the MFNP, land cover is dominated by woodland, thicket, and wooded grasslands. To the west, towards Lake Albert, there are large areas of cultivation and burnt ground. Grassland is mostly dominant along the shoreline with significant areas of permanent wetland. The dominant species of grasses are dry thatching grass (*Hyperthelia dissoluta*) and fine thatching or fine hood grass (*Hyparrhenia filipendula*). In wooded grassland the dominant trees are generally *Acacia* or *Borassus* palm dominated areas (particularly within the MFNP), although many other species of tree may be present.

The Nile delta area is characterised by wetlands and the presence of mixed herbaceous vegetation which is composed of papyrus, reeds, hydrophilic grasses, sedges and aquatic plants. The borders of the delta consist of papyrus-dominated swamps and riverine forest, particularly on the northern bank within the MFNP and on both banks from around Paraa.

IUCN near threatened flora recorded within EA-1/EA-1A include afzelia (*Afzelia africana*), vitellaria (*Vitellaria paradoxa*), iroko or African teak *(Milicia excelsa) and* African blackwood *(Dalbergia melanoxylon).*

Additional survey activities will be undertaken to collect additional baseline data and information as part of the main ESIA. As part of the Block EA-1/EA-1A baseline studies undertaken by AECOM, extensive vegetation mapping were carried out. The focus of this mapping was to define the main vegetation types and sub-types present in the study area, based on a phytosociological analysis of dominant and sub-dominant plant species. Having established vegetation types and therefore likely habitats, this mapping would then form the basis of subsequent targeted ecological surveys.

This built on mapping of vegetation within Block EA-1 undertaken by WCS on behalf of TEP Uganda in 2013. The map combined vegetation with land use and land cover. The vegetation classes recognised in the TEP Uganda mapping exercise were Swamp, Floodplain, Grassland, Wooded Grassland, Open Scrub, Dense Scrub, Open Woodland, Closed Woodland, Borassus ('Young' and 'Dense'), Riverine Forest, Low Stature Forest. Areas of the Block outside protected areas, i.e. West Nile area and part of the South Nile area, are mapped as predominantly farmland with scrub; the North Nile area with Open Grassland and Borassus; while the South Nile area inside MFNP as predominantly Open Woodland. The mapping was useful in giving insights about the vegetation communities within Block 1. Most of the mapping was, however, not ground-truthed to verify the descriptions but was based on analysis of satellite imagery.

The purpose of vegetation mapping subsequently undertaken by AECOM was to extend the survey area covered previously and to define, based on phytosociological characteristics (rather than interpretation of satellite imagery), the main vegetation types present within the block, with the intention of defining habitats and therefore potential for presence of receptor species (plant and animal). However, detailed surveys for protected, endemic or other important plant species was not undertaken systematically as part of that study as that was not the agreed objective. Nevertheless, there are a number of other data from recent though very localised surveys, based on various ESIAs within the block that have surveyed for species in this manner.

Further vegetation (and general land cover) mapping is currently (2015/2016) being taken forward by TEP and will form an important resource for describing land cover, vegetation types as well as trends and changes in the region. It is likely that the vegetation types defined during the EA-1/EA-1A Block study will be refined by the on-going studies.

5.6.2.2 EA-2

The EA2 block is rather large when compared to the EA1 block and vegetation types present within it vary greatly. Landcover types were initially defined in the EA2 EBS (Ref. 5-14) based on remote sensing and ground truthing. This assessment provided an overview of the broad-scale distribution of land cover types across the study area (rather than fine-scale feature definition) with a number of objectives including: providing initial mapping of modified and natural habitats; analysing habitat and land use change; indicating areas of potentially important biodiversity (potential Critical Habitats and sites suitable for off-setting); and indicating what further studies could be done.

The main landcover types identified within EA2 via the remote sensing/ground-truthing method used for the EBS comprised grassland, small-scale farming, large-scale farming, mixed herbaceous vegetation, wooded grassland, woodland, mixed forest, riverine forests, thicket and wetland plus area defined as developed/bare ground, water and burnt areas.

This study confirmed that the land cover patterns reflected effective management controls particularly within the MFNP and Budongo and Bugoma CFAs). Other CFAs appeared to be compromised in various ways through encroachment of small scale farming and fallow land.

Apart from within the protected areas described above, the principal land uses within the northern part of EA-2 (as confirmed by AECOM's reconnaissance visit in July 2015) comprise scattered settlements, small scale farming, burnt areas and heavily grazed grassland. The farming consists of small fields or 'gardens' generally planted with cassava and maize but may include cotton and banana. Grazing land generally comprises heavily grazed degraded grassland with bare ground, trees and thicket. However, there are patches of wetland and riverine forest appearing as linear features, where seasonally flooded river channels drain water from the base of the escarpment towards the lake shore and towards the Victoria Nile. The MFNP boundary clearly defines the limit of cultivation in this area, extending southwards through the Bugungu WR. There is no large scale farming in this area.

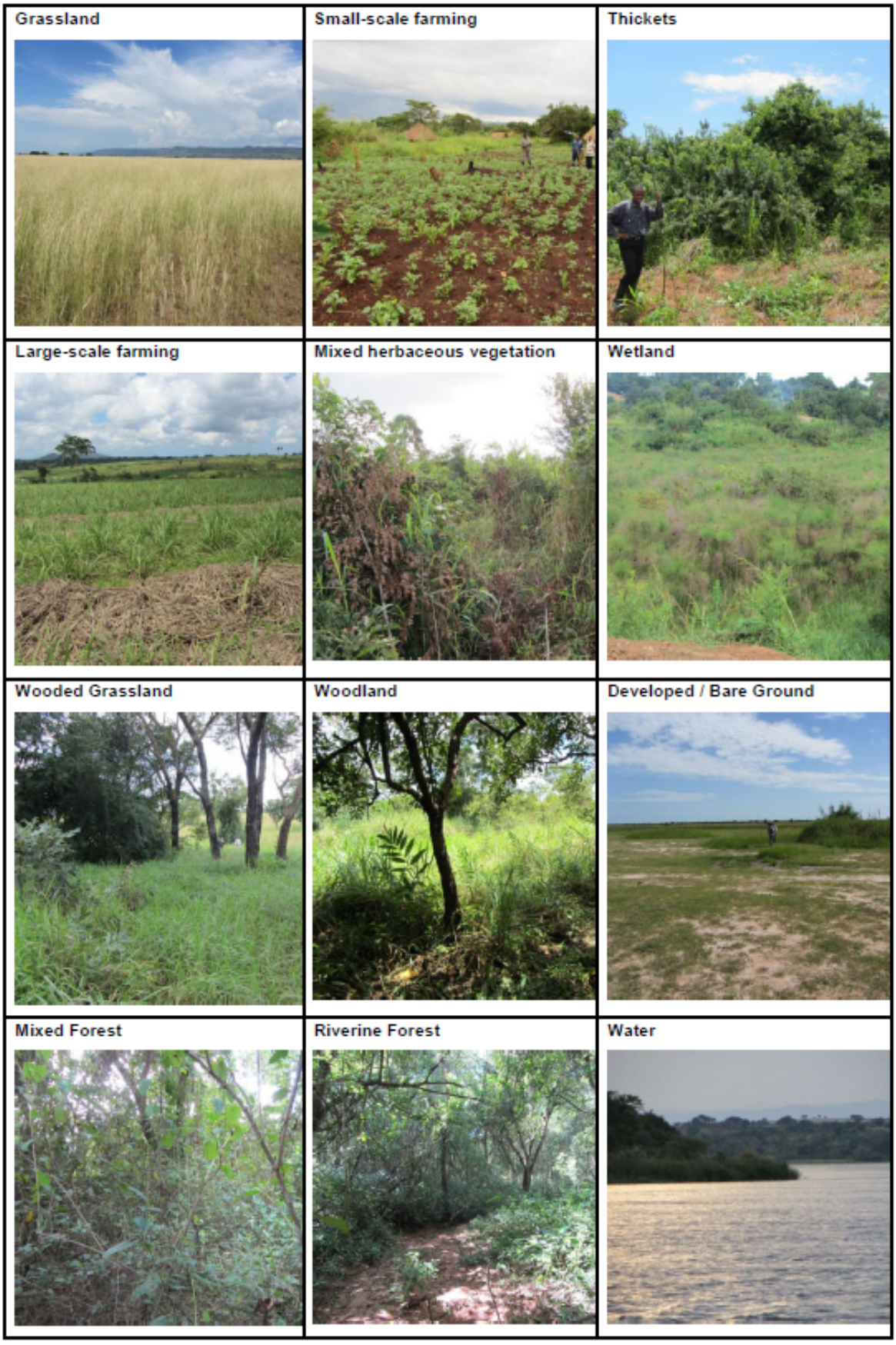
These areas of seasonal wetland outside of protected areas that may have local ecological importance, creating connectivity between less disturbed areas, as well as being important ecological reserves in their own right. Larger settlements in the northern portion of the EA-2 block include Buliisa and Wanseko, as well as a number of smaller villages. Vegetation types fringing Lake Albert comprise stands of papyrus and *Typha* reeds.

The landcover studies indicated that the majority of the natural habitat both within and outside of the EA2 core area is largely associated with the MFNP and the Murchison Falls – Albert Delta Wetland System Ramsar Site and the associated contiguous areas of the Karuma WR, Bugungu WR and the Budongo CFR. Outside the protected areas there is also however a substantial extent of natural habitat particularly within EA2, comprising some 31% of the land outside sites protected for biodiversity (Ref. 5-14). This includes an area of natural habitat comprising thickets and wooded grassland surrounding the Maseege CFR (located south of the actual Project area) as well as the areas of seasonal wetland and riverine forest mentioned above.IUCN near threatened flora recorded within EA2 include African teak *(Milicia excelsa) and* African blackwood *(Dalbergia melanoxylon).*

On-going studies within EA-2 will refine and update the vegetation mapping and also identify trends and changes that will provide important baseline information for the ESIA. These studies also include an assessment of Critical Habitat features and trigger species and the definition of Discrete Management Units (DMU) in alignment with the requirements of IFS PS6.

Ultimately the studies in EA1 and in EA2 will be used to build a detailed coherent habitat mapping accross the Project Area of influence allowing an ecologically coherent assessment of impact on biodiversity.

Figure 5-11: Photographs of Land Cover



5.6.2.3 Baseline Surveys for Flora

Going forward, and as part of the baseline surveys, our intention will be to undertake detailed vegetation surveys at the defined wellpad sites, roads, pipelines, the CPF and other committed infrastructure sites forming part of the project. Such surveys will extend to a suitable buffer around the proposed infrastructure.

In addition, surveys will be undertaken at areas outwith the development footprint where other potentially sensitive habitats such as Critical Habitat or other important areas for biodiversity may be present that may be directly or indirectly affected by the development. Such surveys would include recording the presence of Critical Habitat trigger species and alien invasive species.

These surveys will therefore build on and serve to confirm at the Project footprint the landscape level vegetation studies that have been undertaken in EA1 and are on-going in EA2 and in EA1. Combined, these studies will provide the context of vegetation types in the general area and will inform what vegetation types and species are likely to be present in the sites that will be directly (and indirectly) impacted by the development.

It should be noted that for the purposes of the ESIA (and in accordance with PS6) internationally/nationally defined areas (e.g. the MFNP, Ramsar site, IBAs, etc.) will be treated as *de facto* Critical Habitat. Other areas outwith these designated sites that on-going studies identify as Critical Habitat, which may be directly or indirectly impacted by the Project, will also need to be surveyed for the ESIA, focussing on the Critical Habitat criteria species but possibly other features of biodiversity importance. This is in conformance with the requirements of IFC PS6 because it requires assessment and consideration of all important biodiversity that may comprise sensitive receptors for impacts from the development, and not just Critical Habitats and associated trigger species.

The objective will therefore be to map vegetation/habitats more precisely at a localised level and to survey for and identify plant species that are rare, endemic or otherwise important so that the subsequent impact assessment can be fully informed. Surveys would include recording the presence of Critical Habitat trigger species and alien invasive species. As a minimum surveys should cover the footprint of the development areas; however, there is significant value in understanding the distribution and trends associated with important, sensitive and endemic species that may require survey outside the Project footprint. Further details are provided in Section 9.9 of this ESIA Scoping Report.

5.6.3 Terrestrial Fauna

5.6.3.1 EA-1/EA-1A and EA-2

EA-1/EA-1A and EA-2 are located within the Albertine Graben, defined as a global biodiversity hotspot, and is one of the most important areas for bird endemism in Africa. The area comprises a mosaic of habitats which support a complex ecosystem of high biodiversity and species richness and that are important for supporting a number of globally threatened and restricted-range animal and plant species.

The Albertine Graben is not only important for its biodiversity, but also for its ecological processes and ecosystem services. Of particular ecological importance is the MFNP and the wider Murchison Falls Conservation Area (MFCA) of which it forms the major part, where there is a significant number of endangered and threatened species.

Survey data on fauna distribution are scarce for many of Uganda's protected areas, although inventories and detailed scientific research have been conducted for a few groups such as birds, mammals (mostly large mammals and to a lesser extent small mammals), amphibians and reptiles.

From a consolidation of data from various sources, Plumptre *et al*. (2003) (Ref. 5-10) reported species richness counts for the MFNP as follows:

- Birds - 480 species;
- Mammals - 109 species;
- Amphibians - 32 species; and
- Reptiles - 14 species.

Those data emphasise the importance of MFNP in supporting a rich diversity of several groups of animals. In addition, data from the Uganda Wildlife Authority (UWA) and aerial surveys show that observations of

large fauna are widespread within the northern parts of the study area particularly (EA-1), but that the highest densities are concentrated in areas towards the banks of the Victoria Nile and Lake Albert.

Birds

The MFNP is considered one of the most important areas for birds in Uganda, with approximately 480 resident and migratory species recorded. Of these: about 100 are water birds, and around 370 are associated with terrestrial habitats (Bimco, Ref. 5-15). Byaruhanga, *et al.* (2001), Ref. 5-16) note that the MFNP has such a large range of birds due to its large size and wide range of habitats and states that the list of species known is certain to be incomplete. Byaruhanga, *et al.* (2001), note that eight globally threatened bird species have been regularly recorded in the MFNP, three of which are Palaearctic migrants (see also BirdLife International Datazone for IBA UG020 Ref. 5-17).

Bird abundance and diversity is high across the study area. The majority of species previously recorded are resident within Uganda, probably moving only relatively short distances, seasonally, especially in response to fire. At times when burning is extensive – mainly December to February – the unburnt areas form essential sanctuaries for the birds (and other fauna). Areas with trees are important to a number of species, which use them for roosting and nesting, and in many cases the birds also feed in the trees. Studies such as (Ref. 5-15) indicate that there is a good correlation between vegetation types and abundance of bird species.

Grassland habitats support a diverse assemblage of raptor species, including large eagles and vultures which hunt or scavenge over the grasslands. The grasslands also support a wide range of specialist species such as nightjars, bustards and Abyssinian ground hornbills (*Bucorvus abyssinicus*) as well as numerous small grassland passerines. The more scrubby areas of bushed grassland/thickets support a range of species which nest amongst the thicket vegetation such as common bulbul (*Pycnonotus barbatus*), spotted morning thrush (*Cichladusa guttata*), as well as a number of bushland cisticolas.

Wooded grasslands, especially where the tree cover is relatively sparse, support a range of species similar to the more open grassland, but with the addition of more species which rely on trees for food, perches or nest sites such as doves, palm swift (*Cypsiurus parvus*), tinkerbirds and grey hornbill (*Tockus nasutus*).

Three species particularly associated with Borassus palms were recorded on a number of occasions: the red-necked falcon (*Falco chicquera*), piapiac (*Ptilostomus afer*) and palm swift. Both of the latter two species are common and widespread.

Woodland sites support more tree dependent species such as barbets and woodland warblers such as grey-backed camaroptera (*Camaroptera brachyura*), although there is also a large degree of overlap between the species recorded in wooded grasslands and bushed grasslands/thickets.

The small pockets of riverine forests support a distinct group of species, with species associated with the river such as hadada ibis (*Bostrychia hagedash*) recorded together with forest species such as paradise flycatcher (*Terpsiphone viridis*).

Migrants from different areas, either within Africa (Afrotropical migrants) or from further north (Palearctic migrants), are present in the North Nile area at different times, but the majority of Palearctic migrants occur from October to March during the northern hemisphere winter.


Shoebill *(Baleiniceps rex)*

A number of globally threatened bird species have been identified in the area (according to Byaruhanga, *et al.* (2001), including the lappet faced vulture (*Torgos tracheliotos*), the lesser kestrel (*Falco naumanni*), the shoebill (*Baleiniceps rex*), the pallid harrier (*Circus macrourus*), the African skimmer (*Rhynochops flavirostris*), Denham's bustard (*Neotis denhami*), the papyrus gonolek (*Laniarius mufumbiri*) and black winged pratincole (*Glareola nordmanni*). The crested crane (*Balearica regulorum gibbericeps*) (a subspecies of the grey crowned crane (*B. regolurum))* is found within the MFNP and in areas outside of the park (AECOM, pers. obs) and is defined as Endangered. This species has particular emblematic significance in Uganda being the national bird. In addition smaller numbers of the black crowned crane (*Balearica pavonina*) occur in the area and this species has been defined by the IUCN as

Vulnerable. It is noted that the IBA assessment dates to 2001 and we understand that this is currently being updated and in addition, a draft Ugandan Red Data List has been developed which will be referred to in the ESIA.

Other species of conservation concern which were found within the North Nile area are vultures, all of which are now Red-Listed, feeding off large predator kills and carrion; they were predominantly recorded within the grassland and wooded grassland habitats.

A number of the species of conservation concern are migrants, either from within Africa or from Eurasia. The latter category includes the Vulnerable great snipe (*Gallinago media*) as well as the Near Threatened pallid harrier (*Circus macrourus*), records of which are mainly from between October and March for Uganda.

Mammals

The area supports a high abundance and diversity of large mammal species, including large herds of game species and associated predators. Previous studies indicate that bushed grassland/thicket areas have the highest species richness while the riverine habitats the lowest (Ref. 5-4). This may be a factor of visibility, but could possibly also indicate a less favourable habitat for the grazers or an element of temporal area use, i.e. that species are present in certain areas at certain times of day.

Previous surveys indicate that ungulates represented the major component of the biomass in savanna parks such as the MFNP.

Mammal species recorded during the AECOM EBS 2015 (Ref. 5-4) surveys include: Patas monkey (LC); olive baboon (LC); leopard (NT); lion (VU); serval cat (LC); spotted hyena (LC); side-striped jackal (LC); African civet (LC); Genet (LC); Jackson's mongoose (DD); banded mongoose (LC); large grey mongoose (LC); white tailed mongoose (LC); bohor reedbuck (LC); buffalo (LC); bush pig (LC); bushbuck (LC); common bush duiker (LC); giraffe (EN); hippopotamus (VU); Jackson's hartebeest (LC); oribi (LC); Uganda kob (LC); warthog (LC); waterbuck (LC); elephant (VU); aardvark (LC); brush tailed porcupine (LC); crested porcupine (LC); grass rabbit (LC) and various species of bats, rodents and shrews (all LC).

The on-going biodiversity baseline survey in EA2 includes comprehensive field sampling to provide a detailed habitat mapping and uses species location records and field biodiversity survey to identify where Critical Habitat occur in the landscape. Comprehensive sampling across the landscape in EA2 in each defined habitat support the identification of both Habitat dependent and landscap species which migth be impacted by the Project. The analysis will establish Critical Habitat from estimating the likely distribution of trigger species bassed on distribution from field records, suitable habitats and other relevant variables. Distribution modelling will be possible for trigger species with sufficient records.

Survey results in EA1 and EA2 clearly do not include all possible mammal species that could be present, or have been recorded previously. This is why it is important to understand the ecology and habitat preferences for these important species in order to determine where potentially they may be, even if not directly observed. Where a lack of record prevent reasonable assumption, the need for follow up species specific surveys will be identified. The ongoing survey in EA1 on the Rothschild's giraffe (*Giraffa camelopardalis rothschildi*) will provide valuable habitat information for this unique species

Figure 5-12: Rothschild's giraffe within Murchison Falls National Park

Amphibians and Reptiles

Until recently there has been little published literature on amphibian and reptilian fauna of the region or in the MFNP.

The most recently completed surveys (Ref. 5-4) recorded 25 species of amphibians and 22 species of reptiles, with highest concentrations being location north of the Victoria Nile. However, further detailed surveys are nearing completion in the EA2 area and these are likely to demonstrate even more species. All species of amphibians and reptiles encountered in the EA1 surveys have been defined as Least Concern (LC), including the Nile crocodile (*Crocdylus niloticus*) or Data Deficient (DD), such as the regionally restricted Lake Victoria toad (*Amietophrynus vittatus*) and Anchieta's ridged frog (*Ptychadena anchietae*) which are IUCN Data Deficient (DD). Many species of reptiles are currently defined as Not Evaluated (NE) by the IUCN.

Previous studies such as the EA2 Environmental Baseline Surveys (EBS) Ref. 5-14) summarised locations of wetlands and other less disturbed habitat areas with which amphibians and reptiles are likely to be associated. As noted, further detailed surveys for herpetiles (and all other taxa), which build on the EA2 EBS, are on-going in the EA2 area and these will be reported in full shortly. It is anticipated that these studies will provide further and much more detailed baseline information in the region.

In addition, the Draft Uganda Red Data List is being developed and, from those species evaluated, currently lists two critically endangered (CR) species, the African softshell turtle (*Trionyx triunguis*) and African dwarf crocodile (*Osteolaemus tetraspis*), as well as seven species defined as Vulnerable (VU) and four described as Endangered (EN). However, many reptile species are still listed as DD. From amphibians evaluated for the draft Ugandan Red List, one species is currently defined as CR, the Du Toit's torrent frog (*Arthroleptides dutoiti*), with more than ten VU species, one EN and three as NT, again with numerous species defined as DD.

The EA1 EBS (Ref. 5-4) anticipated that the highest amphibian diversity was found in permanent or seasonal wetlands, located in valleys and as expected these appeared to be the preferred amphibian locations. Species poor locations for amphibians were recorded on higher and drier ground with grassland and/or with open/wooded grassland or thickets. The most species-rich survey location for amphibians was also the most species poor for reptiles, which in this case was an area comprising open woodland with some seasonally flooded grassland.

Invertebrates

There are thousands of insect species in Africa and most of these insect groups are generally not well characterised and little is known about their ecology or significance in relation to site condition or potential impacts. Butterflies are probably the most studied and previous field surveys in the area have emphasised *Lepidoptera* as an indicator group (e.g. Ref. 5-15).

Other studies however, (Ref 5-4), covered a wider selection of insect groups that included butterflies (mainly as indicators for terrestrial ecosystems), dragonflies (mainly for aquatic ecosystems) and dung beetles (for dung/large mammal ecosystems). Counts of termite mounds were included as a measure of presence of termites in association with specific vegetation types. In addition, currently in progress are extensive ecological studies being undertaken in EA2 that cover various invertebrate taxa.

The EA1 surveys demonstrated that there was high species richness for all the insect groups across the different survey locations, although there are marked seasonal variations (Ref. 5-4). The draft Uganda Red Lists concentrate on the insect Orders *Lepidoptera* and *Odonata,* because these are the Orders about which the most is currently known. However, other insect Orders (and indeed many other invertebrate groups entirely) can have an important impact on the landscape and biodiversity of the region.

Most of the butterfly species that were recorded have not yet been evaluated by the IUCN for their Red List status. Typical species and vegetation type preferences have been observed, for example dense woodland/thickets survey locations registered forest dependent species (*Belenois victoria*), which had previously only been recorded in five forest reserves in Uganda and was considered to have a restricted range. However, the majority of the butterfly species recorded is known to be widespread.

All the dragonflies recorded in EA1 have been assessed by the IUCN for the Red List and the majority were categorised as being of least concern (LC). Nonetheless, the presence of many morpho species (i.e. species that look similar but are in fact different species) could mean unearthing some of the species that may need urgent attention. Species presence and abundance of dragonflies was greatly dependent on availability of suitable habitats, mainly wet areas that included wetlands, streams, wallows and seasonally flooded areas. One species of dragonfly new to Uganda, *Neurogomphus featheri* was recorded in the EA1 survey.

There was marked variation in the number of species as well as individual abundances of dung beetles across the different survey locations and none of the species recorded has been assessed by the IUCN for the Red List. High numbers and species of beetles were found mainly in elephant and buffalo dung and are therefore associated with the vegetation preferences and seasonal variations exhibited by those mammal species.

Subterranean invertebrates including termite mounds and other below ground species are also present throughout the whole Project area and further investigatory work will be undertaken as part of the additional baseline studies which will be undertaken as part of the ESIA.

As noted above, many invertebrate groups are not well characterized and there can therefore be difficulties in identifying some taxa (many species will be unknown to science). However, for the purposes of the ESIA the abundance and distribution of termite mounds within the habitats surveyed will be recorded as incidental data. For other species, soil samples will be retrieved from a limited number of shallow test pits in differing habitat types within the infrastructure footprint. Samples will be preserved and the invertebrate species extracted from them identified in the laboratory to the appropriate taxonomic level (Family, Genus and if possible, Species).

5.6.3.2 Baseline Surveys for Fauna

Further activities will be undertaken to collect further baseline data and information as part of the main ESIA. Based on the data gathered as part of the EBS, updated vegetation/habitat characterisation and the recent Reconnaissance visit, survey sites will be selected to cover in detail those areas that will be developed within designated protected areas (i.e. the MFNP). In addition, buillding on the results of completed or on going surveys in EA1 and EA2 other areas outside of the MFNP will be surveyed where the preliminary

assessment has determined that there species of conservation concern may be present or where these wellpads, roads, pipeline routes or other facilities may intersect area of potential importance for biodiversity. The surveys will include a buffer zone around the proposed infrastructure and also cover habitats of conservation importance that may be directly or indirectly impacted by the development, including candidate Critical Habitat and other areas of potentially important habitat such as seasonal wetlands, wildlife corridors and remnant forests. Surveys would include recording the presence of Critical Habitat trigger species and alien invasive species. Further details of the intended approach to further fauna surveys are provided in section 9.9 of this ESIA Scoping Report.

5.6.4 Land Cover and Trends

Significant work is currently being undertaken on behalf of TUOP regarding current land cover with the Albertine Graben covering a study area wider than the Project area. This is based on interpretation of specifically aquired satellite imagery with extensive ground truthing in the landscape. The objectives of this study are to update and develop comprehensive land cover mapping across the region and to analyse land cover changes based on these data. The land cover map is designed to assist in the delineation of Critical Habitat and understand the biodiversity associated with different landcover types, provide a basis for mapping modified and natural habitat, informing both placement of infrastructure and identification of opportunities for conservation gain and for monitoring landcover change.

This study is of particularly importance in terms of understanding land cover changes within the immediate project area due to human and other influences, for example due to management within the MFNP and other protected areas as well as the spread of farming and grazing in other areas.

In addition, the analysis of existing land cover being undertaken as part of the EA2 survey work, in combination with review of records for endangered species, which comprise Critical Habitat trigger criteria, will assist in defining areas that may be determined to be Critical Habitat. Furthermore, identifying areas that may comprise less disturbed areas of remnant habitats outside protected areas may indicate where ecologically sensitive areas are still present, such as seasonal wetlands and remnant forest/woodlands areas. Such areas would be important for providing mitigation for the Project, though improving connectivity or by identifying areas suitable for offsetting.

Finally, a wider understanding of land cover changes and trends including where these result from unsustainable reliance on natural capital for livelihood, which will be generated by the EA2 studies, will be able to inform the CIA as this looks wider than the immediate project area and provides a contextual background to assessing cumulative effects.

5.6.5 Natural and Critical Habitat

Under the requirements of IFC PS6 it is important to characterise natural and modified habitats and to identify areas of Critical Habitat, particularly where these have not already been defined. From the point of view of the ESIA it is essential to identify receptors that may be impacted by the Project (which include areas defined as Critical Habitat, the trigger or criteria species and the DMU where they may be present). Biodiversity receptors occupy a hierarchy of sensitivity and for an IFC compliant ESIA, Critical Habitat, and the trigger criteria which define the Critical Habitat (whether inside the Critical Habitat or not), comprise the most sensitive type of biodiversity receptor.

Previous studies, including the EA2 EBS, and studies currently being undertaken on behalf of TUOP, combine land cover mapping (discussed above) with development of approaches to screening and determining the metrics required to define Critical Habitat within the region.

Metrics for Critical Habitat distinguish between Tier 1 and Tier 2 Critical Habitat, where these are based on the quantitative thresholds of three criteria comprising thresholds based on relative global percentages of: a) numbers CR or EN species on the IUCN Red List of Threatened Species (which may also include species identified as CR or EN on the Uganda Red Data List, where these differ from the IUCN listing) within a given area; b) species of endemic/restricted range; and c) migratory/congregatory species.

It should be noted from PS6 that these species metrics relate to those species present within given areas called Discrete Management Unit (DMU), which "*may or may not have an actual management boundary [...] but could also be defined by some other sensible ecological boundary [...]. The delineation of the [DMU] will depend on the species [...] of concern*." (Ref. 5-18).

Based on the requirements of PS6 with regard to Critical Habitat the stages therefore in determining this are:

1. Identifying the 'trigger' species the presence of which may determine the existence of Critical Habitat (e.g. Criterion 1 globally CR / EN species, etc.).
2. Using land cover mapping, analysis of species records, stakeholder consultation and ground-truthing to identify potential areas of Critical Habitat within the landscape which may support these species, taking into account records and the ecology of these species.
3. Surveying these 'candidate' Critical Habitat areas for the species previously determined to comprise the 'trigger' species for Critical Habitat.
4. Determine species abundance within the defined habitat thereby concluding whether the 'candidate' areas can be conclusively defined as Critical Habitat.
5. Defining DMU which may or may not coincide with the boundaries of the Critical Habitat. These are geographical areas (defined by management, geographical or catchment constraints) where the trigger species for Critical Habitat may be present but at levels not sufficient to constitute Critical Habitat *per se*.

It is expected that the studies currently on-going and referred to above will make a significant contribution to identifying Critical Habitat within the region and particularly within the Project Area. Please refer to the report *Biodiversity Risk Profile and Critical Habitat Screening for Total E&P Uganda Block EA1, EA1a and EA2 North* (TBC 2015) (Ref. 5-19). This includes a detailed description of the Critical Habitat screening process and defines the trigger species.

5.6.6 Aquatic Flora and Fauna

5.6.6.1 EA-1/EA-1A and EA-2

The principal aquatic habitats within EA-1/EA-1A and EA2 comprise Lake Albert and the Victoria Nile including the Nile Delta and the Albert Nile. In addition, there are a number of seasonal wetland systems including the Tangi River in the north of the MFNP and the Sambiye River in the northern part of Block EA-2 near Buliisa. An extensive permanent wetland system combining the floodplains of River Waiga and River Waisoke lies along the shores of Lake Albert. The Victoria and Albert Niles maintain a constant (and substantial) flow of water and are therefore considerably different from the seasonal rivers and wetlands elsewhere in the blocks. This means that the ecology of these water bodies is quite different as the seasonal rivers and upstream floodplain water bodies often have no water in them (at least at the surface).

Some of the seasonal water bodies are discernible in the dry seasons due to the different vegetation that grows along their courses. These features are important for amphibians during the wet seasons. However, none of such features have been well studied, although it is known that seasonal watercourses are important for habitat connectivity and within the MFNP are used as migration/hunting routes for larger predators such as crocodiles which will move up these routes to access water holes and wallows quite far inland.

Generally, however, the aquatic environment is not well studied and it is only in recent years, as a result of the opportunities for oil exploration, that sustained studies have started to be done. Previous studies do indicate the importance of the crocodile and hippopotamus populations, particularly in the Victoria Nile. Improved access to Lake Albert seems to have put the fish populations under pressure there.

It is likely that there are many endemic and threatened species of fish and other taxa in the lake that are not well studied. Important freshwater species on the IUCN Red List include *Rhabdalestes leleupi*, a fish only recorded from Lake Albert, the Albert lates - *Lates macrophthalmus* and *Neobola bredoi* as well as the snails *Gabbiella candida* and *Bellamya rubicund*.

5.6.6.2 Baseline Surveys for Aquatic Flora and Fauna

Additional activities will be undertaken to collect further baseline data and information as part of the main ESIA. Further details are provided in section 9.10 of this ESIA Scoping Report.

SOCIAL AND HEALTH BASELINE CONDITIONS

06

6 SOCIAL AND HEALTH BASELINE CONDITIONS

6.1 INTRODUCTION

This chapter provides an overview of the socio-economic and health conditions for the Project based on currently available information from secondary and primary sources including the recent social and health baseline survey (SHBS) data collected by Artelia Eau et Environment (Artelia) between 2013 and 2015 (Ref. 6-1)[9]. Additional baseline data will be gathered during the main ESIA phase to complete a more comprehensive assessment of existing socioeconomic conditions within Project affected communities.

6.2 PROJECT STUDY AREA

The social and health Study Area is primarily defined by the Project's physical footprint, the boundaries of EA-1, EA-1A and EA-2 as well as a wider area of influence over which impacts may be experienced. It encompasses all sensitive receptors, including settlements, natural resources and existing infrastructure.

The information presented in this section refers mainly to Buliisa and Nwoya district, across which the proposed Project will be developed. Regional and national level data is also given to provide context and reference for the local level data. Figure 6-1 shows the Project footprint and Project area by district, parish and village. The ESIA social and health baseline will provide more detailed data and for a wider study area using additional information gathered during the baseline data collection phase.

For the ease of presenting data at the Project level and to minimise duplication, data relevant to Buliisa and Nwoya districts is presented under separate headings.

6.3 PROJECT AREA SOCIAL CONTEXT

The Project is located in the Albertine Graben, Western Uganda. Environmental, health, human rights and social studies and reports available for the Albertine Graben indicate that the Project is taking place in a context of rapid changes affecting the viability of important environmental and social features. The Albertine Graben is recognised as one of Africa's most important areas for biodiversity, and approximately 70% of blocks EA-1/1A, east of the Albert Nile, and part of EA-2, is within the Murchison Falls National Park (MFNP), which hosts a range of emblematic wildlife and attracts national and international tourism. MFNP is the largest and the second-most visited national park in Uganda.

There are a number of forest reserves in the Project area of influence such as Bugoma and Budongo Forest Reserves. Murchison Falls Conservation Area (MFCA) plus the forest reserves form important animal corridors and are biodiversity hotspot areas of tourism and recreational importance.

Lake Albert is an international waterway supporting a range of different livelihood activities, including fisheries and tourism. The Albert Delta, at the divergence of the Victoria Nile into Lake Albert, is an extremely sensitive ecosystem being an important spawning and breeding ground for the Lake Albert fisheries as well as inhabiting threatened species of birds.

The fields in the development area located North of Victoria Nile are entirely located within the Murchison Falls National Park. Most of the fields south of the Victoria Nile (except for part of the Mpyo, Ngege and Ngara fields) are located in a highly populated area with dispersed dwelling, grazing land and crops.

[9] *At the time of writing, only draft versions of Artelia's SHBS were available.*

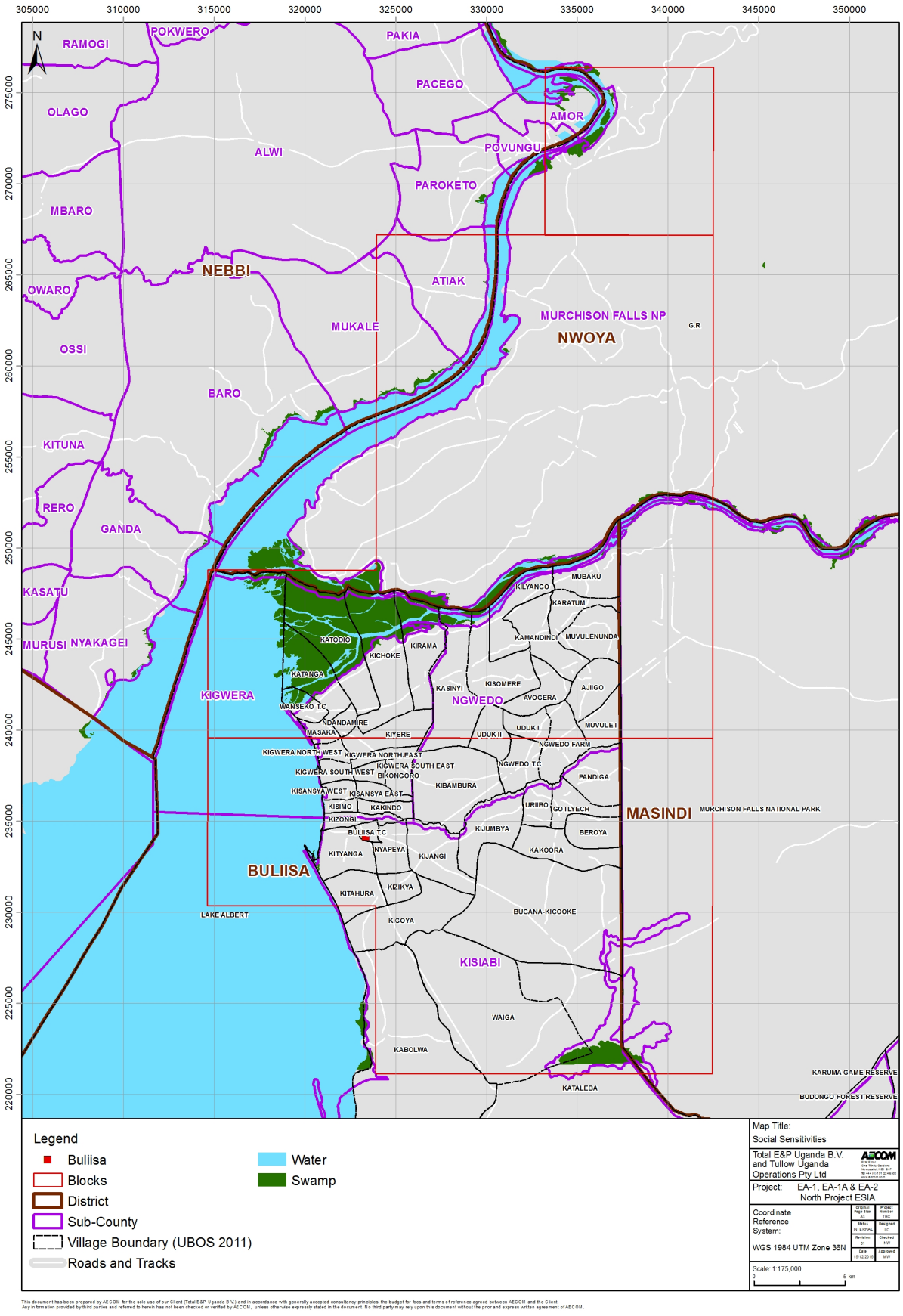


Figure 6-1: Project Area by district, parish and village level

6.4 DATA GAP ANALYSIS

One of the first tasks undertaken by the ESIA Project Team was to gain a thorough understanding of the vast amount of existing material, data and reports that have been developed in and around the Project Area in the last decade. A specific data gap analysis task was undertaken in June/July 2015 to determine what information is available and what information remains to be obtained. The Project baseline is then developed which provides a record against which future changes can be assessed. The gap analysis focused solely on the Project Area and the potential receptors that may be potentially impacted. Further information on the data gap analysis is contained within section 5.4 of this ESIA Scoping Report.

In order to establish the social and health baseline conditions, 82 separate reports, GIS data and raw data sets were reviewed. These came from a variety of sources, including:

- TEP Uganda;
- TUOP;
- Government Agencies including NEMA, Ministry of Lands, Housing and Urban Development;
- National and international Non-Governmental Organisations (NGOs) and Civil Society Organisations (CSOs);
- National research bodies and institutes; and
- Other ESIAs, environmental and social baselines undertaken in the region in the last five years.

A field reconnaissance site visits undertaken in June 2015 and the scoping phase stakeholder consultations undertaken in August 2015 helped to further inform this ESIA Scoping Report and to identify requirements for additional baseline data collection. Further information on the need for additional baseline data collection activities is contained within Chapter 9 and Appendix E of this ESIA Scoping Report.

6.5 SOCIO-ECONOMIC CONTEXT

6.5.1 Overview

The Project is located within the two historical socio-political regions of Bunyoro (Buliisa district) and Acholi (Nwoya district) in the Western and Northern regions of Uganda respectively. The local communities in the Project area are characterised by high levels of poverty with inadequate access to basic services and infrastructure, low levels of education and low incomes. Communities depend heavily on natural resources (land for cultivation and grazing livestock, and Lake Albert for fishing, amongst other resource use) and are therefore very sensitive to changes in land use and impacts related to Lake Albert.

A number of impacts were experienced by local communities in the Project area during the Exploration and Appraisal Phase of the Project. These impacts continue to influence the perceptions and attitudes of local stakeholders towards the Project Proponents and should be taken into consideration when assessing the current socioeconomic context. A summary of the key legacy issues is provided in Section 7.2.

6.5.2 Governance and Administration

6.5.2.1 Central Government

The Government of Uganda is made up of three branches: Executive, Legislature, and Judiciary. The Executive includes the heads of state, including the President and the Prime Minister. Ministries are headed by Permanent Secretaries, ministry departments are headed by Commissioners, and authorities are headed by Executive Directors.

6.5.2.2 Regional and Local Government and Administration

The local government unit is the local council (LC). The local government is based on a four tier structure comprised of village council (LC1); parish council (LC2 – not very active), sub-county council (LC3), and the district council (LC5) at the top. LC1 and LC2 are administrative units only, not local governments. The terminology for urban areas is slightly different, with village council (LC1) at the bottom, then ward or parish

council (LC2), municipal or town division (LC3), municipality (LC4), and at the top the district council or city council (LC5).

The district council is comprised of elected members and led by an elected (LC5) chairman. It is made up of representatives from the sub-counties and technical staff in the district. Village chairpersons are elected by residents of the village. LC1 chairpersons and councils maintain an important and active role in handling civic matters at the village level including dispute resolution.

Local government is responsible for the delivery of public services through technical heads of the various government departments (e.g. education, health, roads). The Chief Administrative Officer (CAO) is responsible for overseeing public service delivery and is appointed by the national public service commission. The District Environmental Officer is appointed by the National Environmental Management Authority (NEMA) and is responsible for environment matters including monitoring and review of the ESIA process at the district level.

The District Land Office (DLO) provides technical services to the district administration and the District Land Board (DLB). Under the Land Act a DLO should comprise a Physical Planner, Land Officer, Valuer, Surveyor and Registrar of Titles). The DLB is comprised of a minimum of five members who are appointed for a five year period, and a chairperson. The DLB is responsible for: holding and allocating land in the district which is not owned by any person or authority; facilitating the registration and transfer of interests in land; and compiling and maintaining rates of compensation payable (e.g. crops, non-permanent buildings). The DLB can also acquire rights or interests in land.

At the district level, health service delivery is implemented by a District Health Management Team (DHMT) which is led by a District Health Officer (DHO). The DHMT is responsible for implementing health policies and programmes and planning and overseeing service delivery. The District Community Development Officer (DCDO) plays a key role in stakeholder engagement and community projects. Their responsibilities include:

- Planning and budgeting for development programmes at the community level;
- Supervising staff involved in promoting the social and economic welfare of local communities;
- Organising local communities to effectively participate in development initiatives;
- Sensitising communities on gender issues, social rights, roles and obligations;
- Monitoring, evaluating and reporting on community development programmes and projects;
- Promoting the equal participation of all communities in development programmes;
- Promoting the creation and growth of functional groups for the improved welfare of the population;
- Training communities in literacy programmes and income generating activities;
- Providing advice on the effective mobilisation of the community for development; and
- Sensitising communities to adhere to existing legislation on gender and child rights.

Nwoya District and Buliisa District

Buliisa and Nwoya districts are new districts created from Masindi and Amuru in 2006 and 2010 respectively. As new districts, the local government still has limited capacity, limited infrastructure, and they remain relatively underdeveloped. This presents challenges when trying to access land-related information as important files and documents (such as legal land titles, leases, etc.) linger for years in former headquarters before they are sent along to the new district headquarters. As far as Nwoya District is concerned, a large amount of the available information remains in Gulu and Amuru district headquarters (Ref. 6-1).

Both Buliisa and Nwoya districts have DLBs. The Buliisa DLB was formed in 2007 and has so far received 177 applications for land registration. However, the Buliisa DLB has reported that they lack resources of both staff and funds to carry out their work. Nwoya DLB was recently formed following the separation of Nwoya from Amuru District in 2010. The Nwoya DLB was initially delayed following doubts by the District Council over the credibility and qualifications of the initial Board, but it was eventually approved for a five year tenure in 2013 (Artelia, 2015).

Nwoya and Buliisa districts do not have functioning land offices: they rely on a Physical Planner who also assumes functions of the land officer and natural resources officer. District Land Tribunals have never been created as they should have according to the Land Act. Land issues are handled through the judiciary system instead (Ref. 6-1). Further information about the land administration in Buliisa and Nwoya districts is provided in Section 6.6.2.1.

The District Production and Marketing Department (DPMD), which is the main institution responsible for supervising the livestock, agriculture and fisheries sectors, is similarly hampered by a lack of means and resources including:

- Inadequate staffing: only 8 staff members;
- Lack of logistic support: DPMD has 3 motorbikes which are 9 years old and no vehicle;
- Lack of office spaces: this is a general issue for the whole Buliisa District Local Government; and
- Reduced funding: The DPMD budget was halved between 2013/2014 and 2014/2015 following a general drop in the district budget due to reduced government grant transfers (Ref. 6-1).

Recruitment and deployment of technical and administrative staff in the tourism sector also remains a challenge. Tourism issues at the district level are supposed to be managed by District Tourism Officers but until now none have been appointed and District Commercial Officers (DCOs) remain in charge (DCOs were responsible for local tourism under the old structure when tourism fell under the Ministry for Tourism, Trade and Industry). According to the Uganda Wildlife Act 1996, the district councils are expected to create District Wildlife Committees (DWC). Their objective is to advise the district councils, in liaison with UWA, on the management and utilisation of wildlife within the local jurisdiction. So far, only 12 DWC have been constituted, but none in Buliisa or Nwoya (Ref. 6-1).

During stakeholder consultations with local government requests were made for support for the District Environmental Officers in Buliisa District and Nebbi District. It was suggested that at present they do not have sufficient funds or resources to effectively fulfil their roles including monitoring of oil and gas activities and sensitisation of communities about the potential environmental impacts of oil and gas development.

In both Buliisa and Nwoya, District Councils have set up Task Forces on Oil and Gas comprised of both technical and political representatives as well as the security operatives and CSO leaders among others (TEP Uganda and TUOP, 2015, Ref. 6-2). LC II leaders have not yet been elected since the creation of parishes in Buliisa in 2010 due to a lack of resources to organise elections.

6.5.2.3 Traditional Authority

The traditional systems of leadership include the council of elders and the clan leaders who continue to have an important role in shaping attitudes and in dispute resolutions, particularly for land disputes. Clan leaders are elected by clan members and the council of elders are elected by residents of the village. These systems of traditional leadership continue to be recognised and respected by community residents. Women can also hold leadership positions on the council of elders, although this is rare; however, they are not clan leaders (Ref. 6-1).

The Institution of Traditional or Cultural Leaders Act 2010 (Ref. 6-3) recognises the Bunyoro Kitara Kingdom as one of 13 traditional systems. Represented by a traditional ruler (King), the Bunyoro Kitara Kingdom includes Lake Albert and the districts of Buliisa, Hoima, Kibaale, Kiryandongo and Masindi. The structure of the Kingdom is similar to the Local Councils, with a county chief, sub-county chief, parish chief, sub-parish chief, and several clan committees. The Bunyoro traditional governance is responsible for cultural matters, such as funeral rites and marriage ceremonies and are involved in other matters including community development programs for health and education (Worley Parsons, 2013 (Ref. 6-4).

6.5.3 Population and Demographics

6.5.3.1 National Population

Data from the UBOS 2014 National Population and Housing Census records the population of Uganda as 34.8 million in 2014, compared to approximately 30.7 million estimated in 2009/2010 (UBOS, 2011, 2014a) (Ref. 6-5). Approximately 1.5 million people live in the capital, Kampala, with a further 6.4 million people living in urban areas; however, the majority of the population, 28.4 million, live in rural areas. Of the total

population, there are more women (17.9 million) compared to men (16.9 million). The annual population growth rate has decreased from 3.20 for the period 1991-2002, to 3.03 for the period 2002-2014. The projected population for 2025 is 46.7 million.

6.5.3.2 Regional and Project Level Population

Population data at the regional and Project level is difficult to obtain, especially at village level. Household registers are reportedly maintained but access was not provided during the SHBS conducted by Artelia. Although UBOS conducted a National Population and Housing Census between August and September 2014, only provisional results have been made available with final results due to be released in December 2015.

Nwoya District

Northern facilities of the Project are mostly located in Purongo sub-county; population data for Purongo and other sub-counties in Nwoya District is shown in Table 6-1 below. At the time of writing, population data at the parish or village level was unavailable.

Table 6-1: Population by sub-county in Nwoya District

DISTRICT	*SUB-COUNTY*	*POPULATION (2014 CENSUS)*	*% OF DISTRICT POPULATION*
Nwoya District	**Purongo**	**27,302**	**21.3%**
	Alero	40,357	31.5%
	Koch Goma	35,649	27.8%
	Anaka Town Council	13,489	10.5%
	Anaka	11,297	8.8%
	District Population (5 sub-counties)	**128,094**	**100%**

Source: (UBOS, 2014 Ref. 6-5)

Buliisa District

Project facilities will also be located within the sub-counties of Buliisa, Ngwedo and Kigwera as well as Buliisa Town Council. Table 6-2 below shows the population for these key sub-counties as well as other sub-counties in Buliisa District.

Table 6-2: Population by sub-county in Buliisa District

SUB-COUNTY	POPULATION (2014 CENSUS)	% OF DISTRICT
Buliisa sub-county	17 088 (17,03010)	15%
Buliisa Town Council	7,696 (7,28510)	7%
Kigwera sub-county	14,024 (14,01210)	12%
Ngwedo sub-county	17,250 (17,15510)	15%
Biiso sub-county	16,595	15%
Butiaba sub-county	29,181	26%
Kihungya sub-county	12,311	11%
Total District Population (7 sub-counties)	**113,569**	100%

Source: (UBOS, 2014 Buliisa District Statistics Office 2014, Ref. 6-5)[10]

6.5.3.3 Population Change

The Rift Valley area of Africa has experienced a number of violent conflicts over the past few decades, which has resulted in migration across the region, including into the Project area from DRC, Rwanda and northern Uganda. This conflict-induced migration has also taken place alongside traditional migration movements. It is reported that there has been recent population influx into the area due to development of the petroleum sector (Ref. 6-4). The extent of Project induced migration will be fully assessed in the ESIA.

In and surrounding the Project Area, the population growth rate of Nwoya and Buliisa are currently above the national average of 3.03% (Nwoya has seen a substantial rise in the population since 2002). The increase in population in the region has resulted in increased pressures on existing resources and had an impact on the current extent of different types of land use. This will be investigated further within the main ESIA Report.

6.5.3.4 Ethnicity & Religion

Ethnic Groups

The majority of the population in Buliisa belongs to two main ethnic groups: the Bagungu (who speak Lugungu) and the Alur (who speak Alur). The Bagungu are a Bantu ethnic group that originate from the Bunyoro Kitara Kingdom (refer to Section 6.5.2.3) and are considered indigenous to the region. The Bagungu are traditionally pastoralists and fishermen (Ref. 6-1). The Alur are a Luo ethnic group that originate from the Nilotes from the West Nile Region or from DRC. The Luo are found across eastern and central Africa. The Alur are traditionally agriculturalists and settled in areas close to the Murchison Falls National Park (MFNP) where land was suitable for agriculture.

Although Alur and Bagungu are the dominant ethnic groups, people from most of Uganda's tribes and ethnic groups, as well as other nationalities, can be found in Buliisa district (i.e. Bunyoro (speaking Runyoro), Bankyankore, (speaking Runyankole), Rwandese (speaking Kinyarwanda), and, Congolese Congolese (mainly speaking French and Swahili) (Ref. 6-1). A small population of herdsmen also live in Buliisa. The Balaalo normally come to the region as single men for the purpose of cattle herding for the Bagungu. They are reported to have little social interaction with other ethnic groups and do not intermarry (Ref. 6-1).

[10] *There is a difference in data provided by the District (to UBOS) and the provisional results published in the 2014 census (Artelia, 2015c)*

In Nwoya district the dominant ethnic group is the Acholi (speaking Acholi). Acholi is also a Luo ethnic group.

IFC Performance Standard 7 recognises that indigenous peoples may be more vulnerable to the adverse impacts of a project than other communities (or non-indigenous communities). The term indigenous people refers to a distinct social and cultural group possessing the following characteristics in varying degrees:

- Self-identification as members of a distinct indigenous cultural group and recognition of this identity by others;
- Collective attachment, i.e., whose identity as a group or community is linked, to geographically distinct habitats or ancestral territories in the Project area and to the natural resources in these habitats and territories;
- Customary cultural, economic, social, or political institutions that are separate from those of the dominant society or culture; and
- An indigenous language, often different from the official language of the country or Region. (IFC PS, 2012 Ref. 6-6).

Performance Standard 7 contains a set of requirements associated with consultation with indigenous people. Notably these engagement requirements include the need to achieve Free, Prior and Informed Consent (FPIC) where a Project causes impacts to lands and natural resources subject to traditional ownership or customary use by indigenous people. A more intensive and rigorous engagement process is required to achieve consent than otherwise required for an ESIA.

Indigenous groups in Uganda include the traditional hunter/gatherer Batwa communities, also known as Twa and the Benet, and pastoralist groups such as the Karamojong and the Ik. The government does not officially recognise these groups as indigenous. The Benet, who number around 20,000 people, live in the north-eastern part of Uganda. The 6,700 or so Batwa live primarily in the south-western region of Uganda. The Ik number about 1,600 people and live on the edge of the Karamoja/Turkana region along the Uganda/Kenya border. The Karamojong people live in the north-east of Uganda and number around 260,117 people. (IWGIA Ref. 6–7).

The Project is not located on lands traditionally owned by, or under the customary use of any of Uganda's indigenous groups.

Religion

Religious affiliations in the Project area include Roman Catholic, Protestant (including the Church of Uganda and Full Gospel Church), and Muslim. Relationships between the different religious groups have been peaceful but the existence of competition between churches was raised by local residents during the SHBS undertaken by Artelia (Ref. 6-1).

6.6 LAND USE & LAND TENURE

6.6.1 Land Use

Land-related sensitivities are high in the Project area and have been increasing, with land (as property and a resource) one of the most important assets in the area (Ref. 6-1). Most of the local communities in the Project area in Buliisa and Nwoya Districts depend on land for subsistence farming and grazing of animals.

The Project area can be divided into key agro-ecological zones with specific characteristics:

- Shores of Lake Albert;
- River banks (Nile, Zolia, Waiga);
- Sloped area of Ngwedo; and
- Grazing land between Buliisa centre and Ngwedo.

Other types of land use in the Project area are associated with tourism activities in the MFNP.

Shores of Lake Albert: The land from Lake Albert includes the beach, a temporary wetland, permanent wetland, and settlements. The shores of Lake Albert are primarily used for fishing activities and some settlements are located directly on the lake shore (e.g. Kalolo landing site). The wetland is used for free range animal grazing and as a drinking area for cattle (with animals coming from grazing land between Buliisa and Ngwedo). Goats and sheep belonging to the settlements also graze in this area.

The land here is also used for sand mining for construction (as the roads allow access for trucks) and for small scale shell collection, done primarily by women who sell the shells in the animal food industry. The land in this area belongs to the community, but is under the authority of the Local Council (LC1).

Settlements include grouped households with few spaces, resulting from a focus on fishing activities and ongoing immigration. As a result, gardens are grown at the periphery of the settlements when pressure from animal grazing is not too high.

River Banks: The river banks, including those of the Nile, Zolia, and Waiga Rivers, are mainly used for cash crops such as cotton, cassava, and maize. These gardens are grouped together and are quite a distance from the river banks. The landing point at Wanseko on the Nile is not used for cash crops as pressure from animal grazing is too great.

In the area before the Nile enters the MFNP, most of the land has been bought by private investors to build lodges for tourists visiting the national park.

Sloped Area of Ngwedo: With low hills (between 610 m to 670 m) and valleys (which flood during the rainy seasons), this Alur dominated area is dedicated to crop cultivation. The area has a high population with settlements concentrated on higher land and trading centres located along the main roads and tracks. Households are grouped by ancestral ties and land belongs to the family.

Grazing Land: The grazing land between the shores of Lake Albert and Ngwedo is dedicated to livestock grazing for cattle, sheep and goats.

Murchison Falls National Park: Part of the Murchison Falls Conservation Area, MFNP occupies 3,893 km^2. The Nile River transects the Park from east to west, and includes a 43 m high waterfall.

6.6.1.1 Nwoya District

In the northern area of Nwoya District, land used to be dedicated to communal grazing by pastoral communities but this activity was abandoned as a result of war and conflict in northern Uganda, which had an impact on traditional livestock systems. Since the end of conflict, private investors have developed semi-intensive cattle ranching projects on large areas of land for international export (Ref. 6-1).

A significant proportion of land is also given over to the MFNP, Uganda's largest and second most visited national park. MFNP covers 65 % (387 km^2) of EA-1 and 61% (52 km^2) EA-1A.

6.6.1.2 Buliisa District

Since 1986, the expansion of cultivated lands into natural vegetation cover (grassland, bushland, wetland, forest) has altered the dynamics of pastoralism and cattle herding. The decline in grassland as a result of increased cultivation (driven by the increased population and demand for food) has reduced livestock grazing resources. In turn, concentration of animals in specific areas has resulted in overgrazing and grassland degradation.

The western and central parts of Buliisa district (Kigwera sub-county and the western and central part of Buliisa sub-county) are dedicated to free-range cattle herding. The eastern part (Ngwedo sub-county and the eastern part of Buliisa sub-county) is primarily agricultural and therefore only small types of livestock such as goats, sheep and chickens are kept tethered so that they do not damage crops. Rangelands for cattle grazing are managed by the traditional system where grazers have open access to resources, such as grassland and water; although changes in the traditional system are being observed as a result of an increase in land ownership, changes in land use (i.e. expansion of cultivation), population pressure (particularly along the shore of Lake Albert), and population movements as a result of conflict (Artelia, 2015a). Few crops are grown in the villages within the rangeland to allow animals to move freely and avoid crop destruction (which could create conflict).

The MFNP occupies a smaller proportion of land (98 km^2) in EA-2; in addition, the Bugungu Wildlife Reserve, part of the wider Murchison Falls Conservation Area, is located on the southern border of EA-2.

6.6.2 Land Tenure

6.6.2.1 Overview

There are four types of tenure recognised in Uganda under the Constitution (Article 246) and the Land Act (Cap 227) (Ref. 6-8): customary tenure, freehold, mailo (a customary form of freehold tenure not thought to be found in the Project area), and leasehold. Over 70% of land in Uganda falls under customary land tenure, including in Buliisa and Nwoya Districts.

In Buliisa and Nwoya district land is either held by customary tenure and managed by different ethnic groups (Bagungu, Alur, Acholi), or is customary tenure which is unregistered. Data on land tenure is limited at the district level but land registration is reportedly low in Buliisa District. High costs for registering land act as a hindrance to local residents.

The majority of the population surveyed during the SHBS undertaken by Artelia reportedly had a low level of understanding about land rights. Some local NGOs such as the Buliisa Initiative for Rural Development Organisation (BIRUDO) have implemented sensitisation programs about land rights, raising awareness among community members about the importance of land demarcation, land registration and the risks of land grabbing.

6.6.2.1 Land Administration

At the national level, the Uganda Land Commission (ULC) holds and manages land acquired by the government. According to the Land Act, a District Land Office, responsible for providing technical services to the district administration and District Land Board (DLB), should be composed of a Physical Planner, a Land Officer, a Valuer, a Surveyor and a Registrar of Titles. The DLB holds and allocates land in the district. A DLB can acquire rights or interests in land. The DLB is responsible for administration of public land and is mandated to receive applications for registration of both customary and freehold. The DLB is also responsible for compiling and maintaining “a list of rates of compensation payable in respect of crops, buildings of a non-permanent nature and any other thing that may be prescribed”. The compensation rates set by the Buliisa District Land Board have been a major source of contention with citizens who feel that the set rates are far below the market value of the developments affected by oil activities in the area (Ref. 6-1).

At the sub-county level, the Area Land Committee (ALC) advises the DLB on land issues, such as proof of right to land. ALC is the first institution to intervene in the land registration process for both customary and freehold titles. Its role is to visit the land under question and supervise the verification of boundaries and proof of ownership. ALC issues a Demarcation form and makes recommendations to the DLB for the processing of land application. The ALC only carries out its functions on land that has no contending ownership claims. In the presence of such claims, the ALC waits until the matter has been resolved before intervening. It is reported that ALCs in the study area (for sub-counties of Buliisa, Kigwera, Ngwedo and Purongo) are not properly empowered or competent. In Nwoya district it is reported that In Nwoya District land applications are frequently turned down by the District Land Board because ALCs lack proper training on land administration and submit poorly documented files.

At the lowest level, the parish local council courts resolve land disputes; however, they face challenges as they are not considered effective in resolving land disputes. The ALC work closely with the DLB in inspecting land before a title can be issued or processed by the DLB.

The list of applications for land ownership is displayed at the District Headquarters in Buliisa Town Council and as of August 2015, shows 177 applications, with most of the applications concerning freehold land titles.

A lack of resources, staff, and experience is reported as a factor in the difficulties over land tenure at the district level. In addition, District Land Tribunals were never created as directed in the Land Act, with land issues instead being handled by the judiciary system.

There is reportedly some overlap in responsibilities and competition between different departments involved in land governance, creating confusion. The failure to respond to challenges such as land grabbing and land speculation is considered a result of weak land governance and failure of the current land tenure systems.

In the Restitution of Assets and Properties Act, 1993, the Government committed to “restore to traditional rulers assets and properties previously owned by them or connected with or attached to their offices but which were confiscated by the State”. There is a progressive legal recognition of the role traditional institutions might play in managing land assets which fall under their kingdoms. Several kingdoms have

already created their own Land Boards to manage future recovered assets. Bunyoro-Kitara Kingdom (within which the southern part of the Project area is located) is in negotiation with the Government over the return of its former assets and estates. The kingdom's officials have already submitted a list of these assets to the Government. Bunyoro-Kitara Kingdom has constituted a Land Board that will be in charge of managing the retrieved assets. The jurisdiction of Bunyoro Land Board remains restricted to returned assets. Its relationship with other land administration institutions in the area remains unclear. The legitimacy of Bunyoro-Kitara Kingdom over Buliisa is contested by the Bagungu who are the historical inhabitants of the area and a sub-tribe of the kingdom. Bagungu activists propose the creation of a separate Bagungu Traditional institution.

Acholiland is a region governed by a traditional institution (Ker Kwaro Acholi or Acholi Cultural Institution) whose organisation rests on groups of clans (chiefdoms) presided by a paramount chief. On the contrary to the Bunyoro-Kitara Kingdom, the institution does not own land as an entity and do not claim for a return of lost land assets (Ref. 6-1).

6.6.2.2 Customary Tenure

Individual and communal customary tenures are recognised by the law. Customary land holders can formalize their land rights through the establishment of certificates of customary ownership (CCO) or of freehold titles. CCO can be transformed into freehold titles. Most of the community members holding customary land under individual or communal tenure do not hold certificates of customary ownership (neither do they hold freehold titles) (Ref. 6-1).

The Bagungu and Alur have different systems of customary ownership. The Bagungu, who are mainly livestock owners, own land communally on a clan basis (primarily grazing land); while the Alur, who are mainly cultivators, recognise individual land ownership and use more prominent demarcations of land parcels. Figure 6-2 shows land demarcation using Sisal plants. Land inheritance follows the male lineage and under customary law a son does not have access to land from his parents until he marries. Under the Bagungu tenure system, land can be reclaimed by the clan if the head of household passes away without having a male heir. A widow can however claim her husband's land if she takes care of all her husband's children. Under the Alur and Acholi system, if a household does not have heirs and the husband passes away, his close male relatives inherit the land (land is not returned to the clan). Dispute resolution for land matters is based on mediation by local leaders.

Figure 6-2: Land demarcation using Sisal plants

Nwoya District

The leasehold tenure system is prevalent in Nwoya District; land is leased for a set period, up to 99 years (Ref. 6-1). In 1972 Idi Amin de-gazetted the Aswa-Lolim Game Reserve with part of the land in the Project area remaining in control of the Land Commission, which granted a large parcel to the Ministry of Agriculture for development of a livestock breeding centre. In Latoro parish (Purongo sub-county) a few individuals or

companies own large tracts of land dedicated to cattle ranches. Acholi ethnic groups consider land in Got Apwoyo (Latoro parish, Nwoya District) as their ancestral land.

Buliisa District

The Bugungu ethnic group and its various clans claim ancestral ownership of land within the rangeland situated across most of Kigwera Sub-County as well as the lower parts of Buliisa Sub-County Land is seen as clan property over which the community has user rights, tacitly agreed by different families of the clan in a communal land management scheme, for grazing livestock and collecting natural resources. These user rights are multi-layered, with primary right holders able to distribute land rights to community members, and secondary right holders who have control over land administration, and tertiary right holders who are allocated a plot of land to cultivate or rent.For residential land, clan elders are responsible to allocate user rights on dedicated land parcels to the different families of the clan (Ref. 6-1).

Traditionally there are no land transactions over customary land to prevent outsiders acquiring land. Land demarcation of residential or grazing land is not common in communal land systems. Clan land boundaries are materialised discontinuously by natural elements (trees, rivers, cattle corridors).

In Ngwedo sub-county and parts of Buliisa Sub-County, most of the cultivated land is under individual ownership at the individual, family or household level. Rights to this land were originally based on the right of primary occupant: The Alur settled in Buliisa District in the 1980s and started to cultivate the land which was not used by the Bugungu ethnic group. Building their houses on the land and putting it into cultivation allowed them to claim property over it. Land transactions (selling/buying/renting) are common in this area and occur between community members and outsiders, such as Bagungu pastoralists and fishermen who come and cultivate in this area.

6.6.2.3 Formal Land Ownership

Although customary land tenure is still predominant in the Project area, there is a move towards converting or trying to convert customary land into freehold or leasehold tenure. Individual ownership has been encouraged by the national government and in anticipation of the compensation process conducted by oil companies.

Freehold and leasehold tenures are found in Buliisa District in areas of public buildings and business infrastructure; as well as private businesses, such as the safari lodges along the banks of the Victoria Nile River which are built on land leased by the Buliisa District Land Board (Artelia, 2015). Religious institutions are also key landowners in the Project area, especially the Catholic Church and Church of Uganda, and are held under freehold (most granted during the colonial era). Large acres of land under leasehold tenure are also managed by private and foreign investors developing large-scale farming products. These large scale farming developments include the Oola Lolim Farm (a partnership with a British investor) and Amatheon AGRI Uganda Limited (a partnership with German investors); together they cover over 4,000 acres of land located in Wii Anaka (Ref. 6-x Artelia, 2015).

Some landowners have sales agreements for proof of ownership, but it appears that land registration is often not properly documented. In Buliisa District one individual has filed land registration applications for 42% (approximately 9,560 acres) of the total area (approximately 23,000 acres). In urban areas, such as Buliisa Town Council, the Town Council allocates plots of land through leases (Ref. 6-1). The list of applications for land titles to the Buliisa District Land Board is legally required to be displayed at the Buliisa Town Council District Headquarters. For 2015, of the total 177 applications displayed, 90% are for freehold titles. Figure 6-3 below shows the applications for registration by land tenure type for Buliisa District.

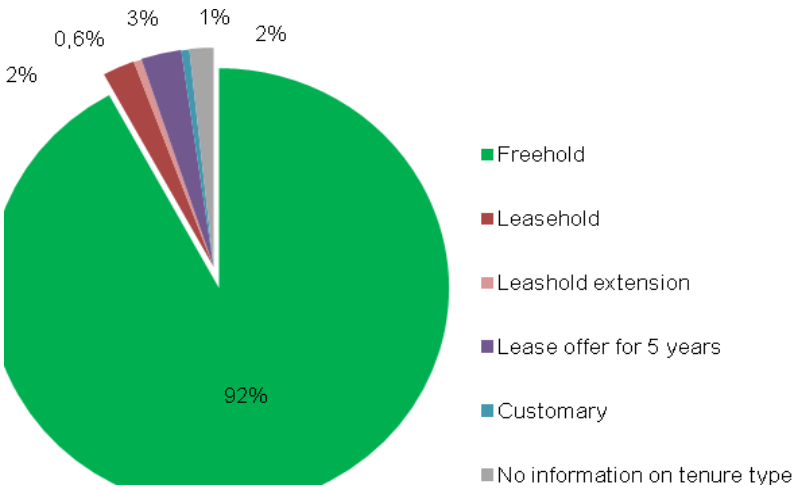


Figure 6-3: Applications for Registration by Land Tenure Type, Buliisa District

The cost of registering land is reported to be high, in part because of the cost of private surveyors who need to demarcate the land under freehold tenure. Local residents reported that the cost of surveying a piece of land is twice as much as the cost of the smallest unit of land to be surveyed Ref. 6-1).

Individual or household land holdings range from less than one acre to 100 acres, with the average land holding size 5 acres. In Ngwedo sub-county there is a large amount of land fragmentation.

Inheritance is one of the main ways through which the community members in the study area acquire, maintain and pass on family assets through family or clans. Inheritance generally discriminates against women and girls and women's access to land rights is therefore limited. In addition, if a husband or husband's family deny land rights to the woman, there are few means available for her to defend her interests and rights. Women and girls also do not participate in taking land-related decisions. To date, only 8% of land applications registered at Buliisa District have been carried out by women. The Alur ethnic group practices matrilineal land inheritance and cases of women having inherited land from their fathers have been encountered and seem to be increasing (e.g. in Mubako, Got Apwoyo, Ajigo) (Ref. 6-1).

Compensation for land access during seismic campaigns is reported to have negatively affected the relationship of women with their male counterparts. Cases are reported where women received compensation money because they were working in their crop fields during the valuation process and were recorded as the recipient of compensation but were then requested, sometimes by threats and force, to hand over the money to their husbands.

6.6.2.4 Land Disputes

Dysfunctions in the land legal framework have created a vacuum prone to land conflicts and have exposed customary landowners to forceful evictions and land grabbing on a national and local scale. The land sector, in addition of having weak and dysfunctional governance, is also affected by several dynamics within the Ugandan society.

In a context of rapid economic changes and demographic growth, land uses evolve to accommodate new trends such as private sector development or urbanization, creating competition between land users. The end of the protracted war in 2006 brought a new challenge with the resettlement of Internally-Displaced Persons (IDPs) on their original lands in the Northern region.

These trends caused a surge in land conflicts, land grabbing cases and evictions of local communities from their customary land. The Government consequently launched a reform process of the land legal and institutional framework.

Land disputes occur in the Project area between neighbours, ethnic groups, and clans. Boundaries are contested at sub-county, parish and village levels, as well as at the individual, household and clan levels. Disputes also occur over multiple claims to ownership of land.Oil and gas operations, and in particular

compensations for land access during seismic campaigns, are reported to have exacerbated land speculation and related conflicts over land (Ref. 6-1).

Disputes between large herders and cultivators have been reported, especially in areas where these two livelihoods border each other. Some cultivators have had crops destroyed (e.g. Waiga Village) as a result of cattle driven through crop fields, and argue that it is a deliberate tactic by herders to force out crop farmers. There are also reports that oil exploration is resulting in land speculation.

Land ownership in Nwoya, and in particular in Got Apwoyo, is a source of conflict (see section 7.2.3) due to the overlapping of two types of tenures:

- The individual customary tenure of the Acholi community members; and
- Leaseholds and freeholds which spans over customary land and whose legitimacy is contested by local communities (accusations of land grabbing).

Under customary tenure, dispute resolution is based on mediation by local leaders (village council leaders, elders). Formal institutions, such as the Court of Law, are perceived by the local communities as weak and working towards the interests of the rich and elite, whereas traditional institutions are perceived to work in pursuit of broader community interests (Ref. 6-1).

Nwoya District

In the Acholi region (Nwoya District) the Chief is responsible for verifying land boundaries and these leaders are highly respected in the community. Although the Chief's influence is widely recognised, in practice, the endorsement of decisions lies with the local council leaders.

Buliisa District

In Buliisa District the elders have a role of mediation and dispute resolution. The village councils and LC1 Chairman also play a role in conflict resolution (Ref. 6-1).

6.7 ECONOMY

6.7.1 Economic Development Context

In 2014, Uganda's Gross Domestic Product (GDP) was USD 26.3 billion with a Gross National Income (GNI) per capita of USD 660. Uganda's GDP has been steadily growing; in 2014 growth was estimated to be 5.9% compared to 4.7% in 2013 (World Bank, 2015 Ref. 6-9). This growth is primarily due to growth in services and construction (AfDB, OECD, & UNDP, 2015). Primary exports include coffee, tobacco and refined petroleum. Non-traditional exports make up most of Uganda's export earnings. These include fish and fish products, flowers, maize, cocoa beans, gold and gold compounds, and beans and other legumes. Coffee, fish and fish products are the highest value export (The Observatory of Economic Complexity, 2015; Uganda High Commission, 2015 Ref. 6-10).

There are significant regional disparities in economic development. Uganda's Central and Western regions have undergone considerable development when compared to the rest of the country. Poverty in the Western and Central regions is estimated to be 9% and 5% respectively, whereas in the Eastern and Northern regions it is much higher, at 25% and 44% respectively.

The National Development Plan 2010/11 – 2014/15 and Vision 2040 place considerable emphasis on the envisaged contribution of the oil and gas sector towards economic development and poverty reduction. The local economy is based primarily on subsistence activities. Up to date information about the local development context including poverty levels and household income and expenditure patterns will be provided in the main ESIA Report.

Local Government Development Plans (LGDPs) have been developed at sub-county level within the Project area. The LGDPs discuss the status of health and education at the local level as well as the main livelihood activities crop farming and livestock herding. They outline steps for poverty alleviation at the sub county level.

Village saving and credit groups exist in most of the villages in the Project area. Saving and credit groups collect villagers' savings as a source for lending to other community members, with interest. The groups

normally comprise 15 to 30 members and will meet on a regular basis. Funds obtained through these loans are spent on agriculture spending, covering costs of land titling process, health and education, business investments, livestock, fishing boats, etc.

A number of women's groups were also reported at the village level, with cooperatives for cultivation of crops, joint goat rearing, etc.

6.7.2 Education & Skills Level

Approximately 73% of the national population aged 15 and above are literate (Ref. 6-5). The majority of the working population have only attained primary education and only 6.5% of the working population has attained some form of specialised training (Ref. 6-4).

In the Western region, approximately 71% of the population, specifically in Buliisa and Nwoya districts, are considered to be literate.

The working population in Buliisa district are generally unskilled; however, some of the population (mostly males) report skills in construction, carpentry and in weaving of fishing nets as well as in arts and crafts (mostly women). Men also report skills as lumberjacks, drivers of light and heavy vehicles, hunters, canoe and boat builders, mechanics and welders (Ref. 6-4). The cost of attendance (both financially and in terms of reduced numbers of family members to help with agricultural activities and/or livestock rearing) is the main limitation to attaining a secondary or even tertiary education.

6.7.3 Employment and Livelihoods

In Uganda, anyone aged 14-64 years is considered of working age. In 2013 the working population was made up of an estimated 13.9 million people; women made up 51% of the working population (women made up 80% of those engaged in the hospitality sector whereas only 55% of those in agriculture, forestry and fisheries). Overall unemployment was approximately 9% in 2013 (Ref. 6-5).

The agricultural sector in Uganda is the primary employer, engaging approximately 72 % of the working population. In 2013, 43% of the working population were involved in subsistence farming (Ref. 6-5).

Livestock rearing is also an important source of livelihood, with 71% of households reporting that they rear at least one type of livestock. The services sector engages 16% of the working population (Ref. 6-1).

In the Project area, livelihoods are mainly subsistence based and are primarily centred on agricultural activities, livestock rearing and fishing, with some employment generated by the tourism industry. Oil and gas activities provided casual, unskilled labour during the exploration phase.

6.7.3.1 Agriculture

Nationally, farmers mainly grow food crops such as cassava, sweet potatoes, beans, groundnuts, sesame, sorghum and millet. The main cash crops include groundnuts, rice, maize, beans, sesame, and to a lesser extent cassava and millet. Due to decreasing market prices and land access, the farming of cotton and tobacco is becoming less common.

Multiple factors constrain the development of agricultural livelihoods in the Project area; these include climatic variation, stray elephants, disease, the high cost of labour, inadequate storage facilities for harvested crops, lack of irrigation, low market value of produce and lack of market access resulting from inadequate transport infrastructure (Ref. 6-1). Human-Wildlife Conflict is an important issue and one that will be investigated further as part of the main ESIA Report.

Nwoya District

Agricultural activities represent the most significant economic activity in Nwoya District with approximately 90% of the population dependent on agriculture-based livelihoods (Ref. 6-1). Although 90% of the land in Nwoya district is regarded as fertile, only 10% is cultivated. This is the result of 20 years of conflict and the displacement of the population as well as a lack of capacity (mechanised equipment and technical knowledge) to cultivate large areas of land.

In Nwoya district there is reportedly a trend amongst youths to move away from agricultural areas and activities towards urban areas where they seek waged employment and become involved in small business ventures (e.g. motorcycle or 'boda boda' transportation) (Ref. 6-1).

Buliisa District

Agricultural activity in Buliisa District is primarily located within Ngwedo sub-county away from the main livestock grazing zones (refer to Figure 6-2). Agriculture-based livelihoods are primarily carried out by the Bagungu people (Ref. 6-4).

Agricultural activity in Ngwedo sub-county is limited to a small variety of crops (cassava, maize and sweet potatoes) due to the dry climate and sandy soil and increasing competition for land with cattle herders. Most small-scale farmers cultivate approximately 1 to 2 acres of land ('gardens') for subsistence and cash crops. Women and children generally labour in the gardens all year round. Men typically engage in supplementary income generating activities such as fishing on Lake Albert and/or labouring in other gardens for a cash or in-kind wage. Men support the family with ploughing during the months of March and July.

6.7.3.2 Livestock Rearing

Livestock rearing is an important livelihood activity for rural households throughout Uganda. Cattle farming is mainly undertaken by men whereas women and children care for smaller livestock such as sheep, goats and chickens.

At a district level, the revenue gained from livestock is limited as products are mostly sold informally. At the Project level, the local economy benefits from the sale of livestock and livestock products such as meat, milk, skins and hides, although this is more in form of value-add for local communities and businesses. Milk is the main cattle product, but live animals and meat are also sold at local and national markets and as far as Sudan (Ref. 6-1).

Nwoya District

The conflict in the Acholi region disrupted the traditional livestock production system in Nwoya district. While crop farming is now the main livelihood for the Alur and Acholi in Nwoya District, there are reportedly a few hundred cattle farmers left in the district. Other main types of livestock that are kept by subsistence farmers include goats, sheep, chickens and pigs; some households report keeping ducks, rabbits and pigeons, but this is less commonly practiced.

There is a large-scale cattle ranch in Nwoya District (owned by Amida Investment Limited) that aims to develop large-scale ranching operations with the purpose of producing export-quality beef (Ref. 6-1).

Buliisa District

Owning cattle is a considered a sign of wealth and elevated social status by the Bagungu people; cattle are kept as a capital asset (typically valued at approximately UGX 577,000) that enable owners to quickly source cash for ongoing (e.g. school fees) or unexpected expenses (e.g. funerals). Livestock are also used to pay the dowry of daughters. Alur people use smaller livestock for dowries and for ritual sacrifices at sacred sites. Goats and chickens are also considered a good asset as they can be sold quickly and easily and are low maintenance; they are used to pay for the costs of additional labour requirements during times of harvest, household expenses and social functions; and they are also useful as a quick cash source during poor harvest years. 68% and 84% of households reportedly own goats and chickens respectively. On average, households own 11 free-range chickens and 7 goats (Ref. 6-1).

Cattle are sold directly at the farm gate or at livestock markets that are held monthly (every Tuesday of the first week of the month) in Buliisa. Price is variable depending on the season, the quality of the animal and regional demand. Cattle products (milk, meat and hides) are reportedly sold locally first (e.g. to neighbours) then regionally and nationally. Buyers also visit the district to purchase live cattle stock. Limited processing facilities for cattle products exist in Buliisa, with two slaughterhouses and one dairy centre.

According to the SHBS conducted in Buliisa by Artelia in 2015, 27.5% of respondent households own cattle, with an average herd of 19 animals (households reported between 3 and 130 animals). While not the norm, Artelia's SHBS also reported instances of cattle herds over 1,000 heads (e.g. in Kibambura village). The distribution of cattle is largest in Kigwera sub-county (18,401 heads of cattle), followed by Buliisa Town Council (5,000 heads), Buliisa sub-county (2,282 heads) and Ngwedo sub-county (1,293 heads) (Ref. 6-1).

Large herds of cattle are managed by Balaalo (herdsmen), mostly from Banyankole, in Western Uganda. Cattle graze on Angolo grass during the wet season, but during the dry season the availability and quality of the grass reduces, such that herdsmen may travel up to 12 km in search of suitable grazing land.

Balaalo are typically paid in milk (during the wet season) or in cash (during dry season when milk is less plentiful). As such, they are sensitive to variations in market prices for milk. Cash payments to herdsmen can vary between UGX 60,000 – 100,000 per month.

The limited availability of grazing areas reportedly often leads to disagreements between livestock owners and crop farmers over land encroachment and the destruction of property by cattle. Livestock-based livelihoods in the Project area are also sensitive to drought as well as to stock theft, disease and a lack of veterinary services (there is reportedly only one senior veterinary officer in Buliisa district) (Ref. 6-1).

6.7.3.3 Fishing

Nwoya District and Buliisa District

In 2011, 20% of households in Buliisa district undertook fishing for subsistence and income generation (Ref. 6-5). Fishing takes place in Lake Albert and along the River Nile and other small rivers in the districts. In Buliisa district, key landing sites include Wanseko, Katara and Karakaba.

Fishing in Nwoya district is more restricted due to the MFNP. Fishing within the boundary of the Park is illegal, however some households report fishing in this area.

Certain fish stocks in Lake Albert have been affected by overfishing, particularly in the last decade, due to infrastructure improvements in the region (for the emerging petroleum industry) connecting it with the rest of the country and export markets. In response, the government enforced restrictions on fishing in the area to reduce the pressure on fish stocks. As a consequence of this it is reported that some fishermen have had to shift their livelihood to agricultural activities to generate sufficient income. The importance of Lake Albert in terms of ecosystem services was reported by the National Fisheries Resource Research Institute to have been little studied. However, the ongoing ecosystem services study being undertaken on behalf of TUOP considers fisheries as a priority ecosystem service and will identify the need for any additional assessment work.

Men coming from Ngwedo sub-county that supplement household incomes with fishing temporarily live away from their family at the fishing landing sites along Lake Albert, sending part of the fishing catch home (as a dried product) and selling the rest at local markets. Income generated from fishing activities is typically used to pay any labourers that were hired by the family in the man's absence and to pay for the basic needs of the family such as children's education and medical supplies.

6.7.3.4 Apiculture

Buliisa District

Apiculture (bee-keeping) has recently become a more popular income generating activity due to support from the National Agricultural Advisory Services in the form of provision of hives. As a complementary income generating activity, several male farmers, organised in production groups, reportedly practice apiculture in eastern Buliisa (Ngwedo Town Council, Beroya, Uribo, Muvule 1, Uduk 2, etc.). Apiculture does not require large areas of land so it is well-suited to farmers with smaller plots. Honey is harvested twice a year. A good harvest can provide 10 litres of honey per harvest, an average harvest can provide 7 litres and a poor harvest provides approximately 5 litres. A litre of honey is valued between UGX 10,000 – 15,000.

6.7.3.5 Tourism

Historically tourism was Uganda's second largest export after coffee. Today, however, the tourism industry is slowly recovering from the effects of regional instability and civil war. Since the end of conflict in 2006, tourist numbers have doubled with 1.2 million tourist arrivals in 2013 (Ref. 6-1).

There are 40 protected areas in Uganda including 10 national parks. In 2014, tourism (direct and indirect expenditure) made up 9.9% of the total GDP and its direct contribution to GDP was 4.3%. In the same year, the industry also contributed 590,000 jobs nationwide (direct and indirect) and directly provided 247,000 jobs (Artelia, 2015d Ref. 6-1).

According to the Ministry of Tourism, Wildlife and Antiquities (MoTWA), the western region of Uganda is home to 42% of the country's tourist attractions (lakes, hot springs, monuments and national parks) (MoTWA, 2014 Ref. 6-11).

Nwoya District and EA-2 – Buliisa District

Located in the north eastern part of Buliisa district and the south western part of Nwoya district, MFNP is one of Uganda's largest national parks and since 2012 it has been the most visited national park in Uganda, with more than 70,000 visitors in 2013. Most visitors to MFNP are foreigners, originating from the UK, USA, Germany and the Netherlands. Resident expatriates also visit the park for short stays. Peak tourist season in MFNP is considered to be from mid-June to mid-September and from December to February.

Tourism activities are concentrated in three main areas in the western part of MFNP (90% of tourists): the Delta (game drive), top of the Falls, and the Falls (boat cruise).

Figure 6-4: Top of the Falls

Figure 6-5: Boat cruises

A small percentage of total revenue in Nwoya and Buliisa districts is derived from tourist activities in the region. Using the revenue derived from the mandatory 20% of park entrance fee paid by visitors, a revenue sharing scheme exists that aims to support poverty reduction and provide an incentive for participating communities to support conservation. The Uganda Wildlife Association (UWA) is charged with disbursing the revenue sharing funds (RSV) between neighbouring communities from parishes that border the MFNP. In Nwoya District, the UWA disbursed UGX 423,500,000 (USD 118,630) during the 2014/2015 financial year. This equates to 3% of the total revenue received by Nwoya district for that financial year. This benefited three sub-counties bordering MFNP (Purongo, Anaka and Koch Goma). Similarly, in Buliisa District, the UWA disbursed UGX 635,400,000 (USD 177,990), which benefited two sub-counties (Buliisa and Ngwedo), and represents 5% of the District's total revenue (Ref. 6-1).

Some of the Park's lodges also contribute to the local economy by sourcing supplies (20-30% of required supplies, mostly fruit and seasonal products) from local producers; however, most of the lodges reportedly source 90+% of their supplies from Kampala and transport them by road to the Park. It is reported that local agricultural producers do not have the capacity (human, technical and financial) to supply the tourism industry with the required quantities of supplies (Ref. 6-1).

The tourism sector is also a source of employment in Buliisa and Nwoya districts. Reportedly 10-20% of people employed by lodges are from the local community. However, the majority of employees (managers, waiter and cooks) come from Kampala and elsewhere in Uganda. The local workforce is usually casual employees, undertaking building work, janitorial work and general maintenance (Ref. 6-1).

Other income-generating activity related to tourism includes the sale of local craft (pottery, baskets). Targeted community involvement in tourism is limited but there are organisations working to promote this. Boomu's Women's Group, for example, is involved in making honey and baskets as well as conducting walking tours and basket weaving demonstrations, doing laundry for the lodges (e.g. Budongo Eco Lodge) and provision of accommodation. The Albert Nile Conservation and Tourism Association undertakes tree planting, village and cultural tours, and cruises to see the Shoebill Stork (Artelia, 2015d Ref. 6-1).

6.7.3.6 Natural Resource Use

Nwoya and Buliisa district - Communities in the Project area use natural resources as part of their livelihood strategies including Lake Albert, areas bordering the Nile and MFNP, streams, swamps, bushes and grassland. These resources are becoming increasingly sensitive as a result of increasing pressure from population growth, poverty, and lack of employment opportunities (Ref. 6-1).

Typical natural resource-based livelihoods in Buliisa and Nwoya Districts include firewood collection and charcoal burning. Other uses of natural resources in the Project area include:

- Wild fruits, such as tamarind and jatropha fruits used to produce cooking oil and generally collected by women and children;
- Water shells from shores of Lake Albert processed (dried, grinded) and sold as poultry feed;
- Papyrus in wetlands in Lake Albert and Nile used to make sleeping and cassava drying mats;
- Reeds from wetlands used for building material;
- Elephant grass used for thatching of traditional huts;
- Plants, such as Sisal, used for land demarcation and ropes (building material);
- Medicinal plants, such as shrubs, trees and herbs;
- Wood and charcoal used as fuel and poles for construction generally collected by women;
- Ant hills collected from low lying areas, such as Kigwera, used to extract clay for building materials;
- Sand extracted along shores of Lake Albert and sold for building material; and
- Murram pits.

A review of Ecoystem Services usage in the development area was started in 2015 and its findings will be integrated into the main ESIA. Impacts on ecosystem services are a particular concern in the Project Area because the existing level of dependance from communities are reaching critical sustainability levels for key natural resources. Drivers for degradation inlcudes land clearance for subsststence farming, logging, collection of firewood, charcoal production, and poaching. When sustainability levels are exceeded, biodiversity will be impacted and the supply / demand relationship is an important factor of an effective and equitable biodiversity conservation strategy.

Although population growth associated with in-migration pre-dates oil exploration, infrastructure investments linked to oil and gas exploration have opened access to new markets and increased demand for natural resources.

Based on the review of a Panel of Expert selected from relevant stakeholder, the following 10 priority Ecoystem Services were selected for futher assesment:

- Crops;
- Livestock;
- capture fisheries;
- biological raw material;
- recreation and ecotourisms;
- Freshwater;
- access to open grazing land;
- wild food;
- biomass fuel; and
- Ethical and spiritual.

6.8 EXISTING INFRASTRUCTURE AND SERVICES

6.8.1 Transport

In 2013, Uganda had a national road network of 3,490 km of sealed roads. National roads fall under the jurisdiction of the Uganda National Roads Authority (UNRA) affiliated to the Ministry of Works and Transport (MoWT) (Ref. 6-3) and district roads fall under the jurisdiction of Districts.

The Uganda Railways Corporation (also reporting to the MoWT) manages the country's 1,266 km of railway, although only 330 km is operational (MoWT, n.d.) i.e. the main line from Malaba to Kampala (250 km), Tororo-Mbale (55km), Kampala-Port Bell (9km), Kampala-Nalukolongo (6 km) and Jinja-Kakira (12 km).

There is one international airport, Entebbe International Airport, in Entebbe, to the south of Kampala and 12 regional airfields (Civil Aviation Authority, 2015 Ref. 6-12).

The roads in the Project Area are generally in poor condition. The majority of roads are surfaced with murram and there are no tarmacked roads. Seasonal changes affect the road conditions, and potholes make access difficult during rainy seasons. Public transportation is reported to be poor to non-existent in some areas. Walking, bicycles and local motorcycle taxis ('boda-boda') are the more common means of transport.

There are two unpaved airstrips in Bugungu (Masindi district) and Pakuba (Nwoya district), both are located within the boundaries of MFNP. These are only suitable for light aircraft. There is no rail access within the area.

There is a ferry crossing for vehicles and foot passengers to cross the Nile at Paraa.

6.8.2 Utilities

6.8.2.1 Water and Sanitation

Access to improved water sources is steadily increasing in Uganda; 72.8% of the population had access to improved water sources in 2012 compared to 68% in 2010 (Ref. 6-10). Urban areas generally have better access to safe water than rural areas (73% compared to 64% in 2013). Similarly, in 2013 access to improved sanitation was higher in urban areas, with 84% of people accessing improved sanitation 74% of people from rural areas.

Nwoya District

In Nwoya District 95% of the population is reported to have access to safe water in 2014 (Artelia, 2014b). In Got Apwoyo for example, it is reported that there is no borehole and that women must retrieve water from a borehole approximately 3 km away from the settlement. According to UBOS, 63% of the population in Nwoya had access to a (pit) latrine in 2013 (Ref. 6-4).

Further information about water and sanitation resources in Nwoya District was not available at the time of writing but will be provided in the ESIA report.

Buliisa District

In Buliisa district 79% of the population has access to potable water. Buliisa district has 259 domestic water supply points; these are either shallow wells or deep boreholes. 20% of Buliisa district has access to piped water while 80% access water via communal water points. Figure 6-6 and Figure 6-7 below show the types of water sources found in Buliisa district and the distribution of piped water supplies.

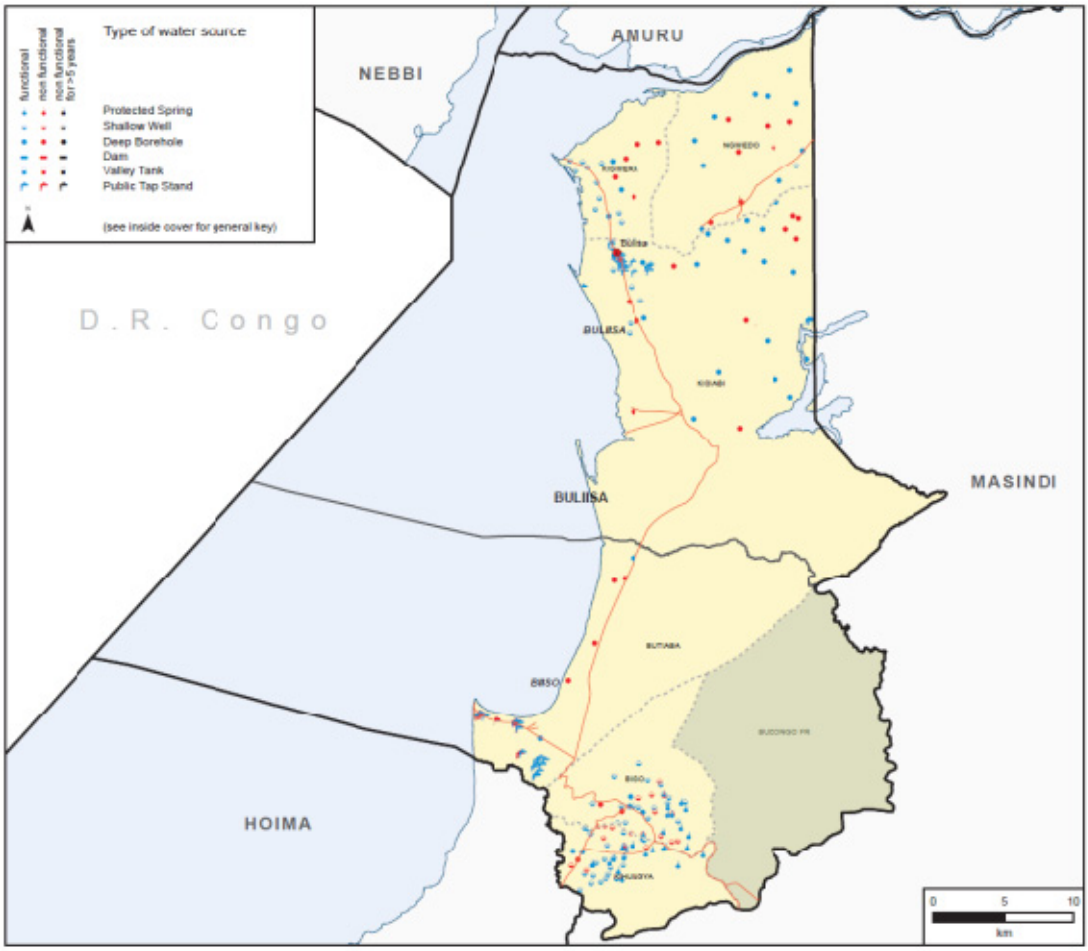


Figure 6-6: Types of water sources in Buliisa district

On average, there are 2-3 boreholes per village; the dry season can affect the level of water at some boreholes, meaning the pumps cannot work properly. As a result women and children who collect water are required to walk farther in order to find potable water, sometimes up to 7 km away. Water collection can take up to 5 hours due to the distances travelled and queues at the borehole itself. Some households report using unprotected springs or wells, which usually have reduced quality water, consumption of which is likely to result in sickness (Ref. 6-1).

Most villages have latrines (although these often collapse during wet seasons). It was reported that 61% of the population in Buliisa has access to a latrine in 2012. Along the shores of Lake Albert, however, the sandy soils are not suitable for pit latrine. As a result of poor sanitation and hygiene practices, cholera and water-borne diseases are common.

6.8.2.2 Access to Energy

Access to the national grid is not widespread, with only an estimated 18 % of the national population reported to have access to electricity; access is generally higher in urban areas than in rural areas (Ref. 6-11).

Nwoya District

There is reportedly no access to the national grid in Nwoya district, although many households have solar panel systems (bought in Buliisa Town).

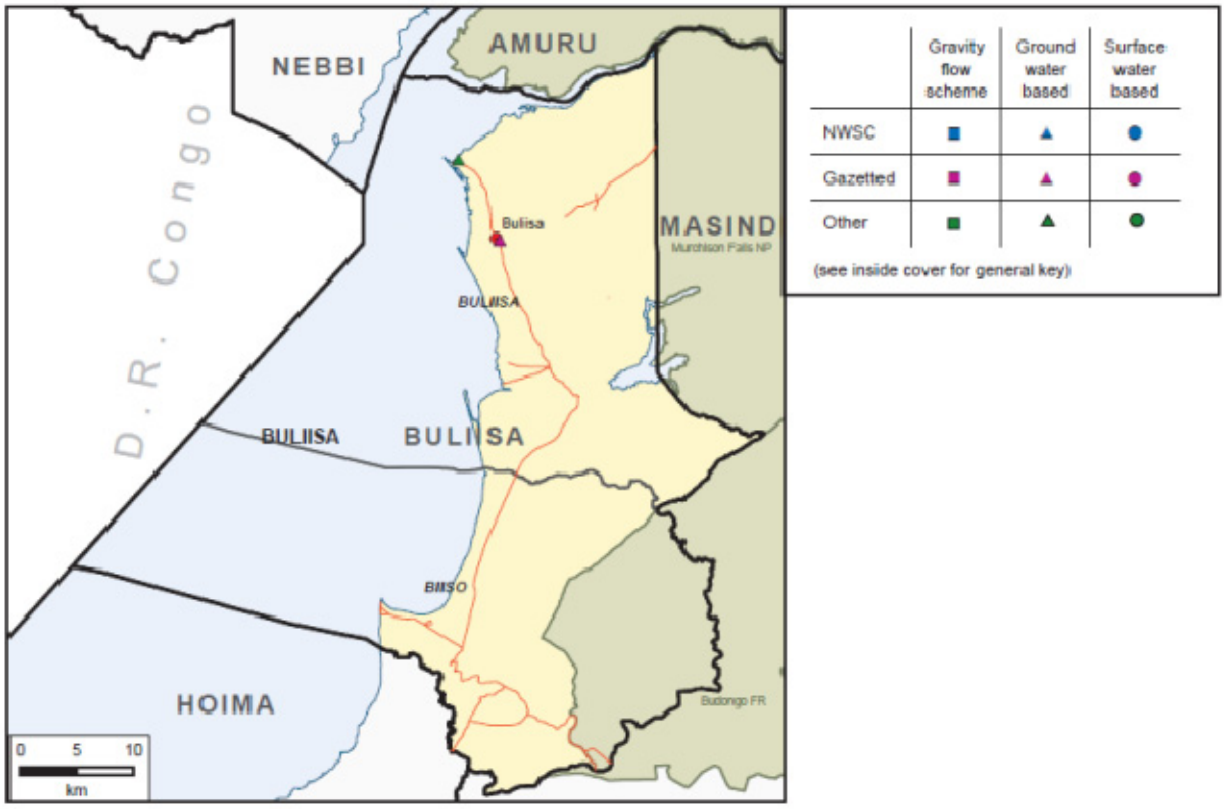


Figure 6-7: Distribution of piped water supplies

Wood is reported to be the primary source of fuel for cooking; charcoal is also used but to a lesser extent. Wood is typically collected by women near the River Nile or on communal grazing grounds. It is reported that in allowing wood collection on their private land, land owners charge between UGX 3,000-5,000 per load of wood. Concerns have been expressed about the environmental impact of indiscriminate cutting of trees and burning of charcoal in the district (Ref. 6-1).

Buliisa District

No one in Buliisa district reports use of the national grid electricity supply for lighting; 86% of households report using kerosene for lighting, while 8% use a torch and 2% use a battery powered lamp.

Use of wood fuel for cooking is most prevalent followed by charcoal. Wood fuel is used for stone fires and charcoal is used in traditional stoves; the latter is more common in households located along the shores of Lake Albert whereas wood fuel is used by households located further inland. Reportedly, the majority of households (women) in Buliisa have to travel between 1 km and 5 km in order to collect or buy wood for fuel (Ref. 6-4).

6.8.3 Waste

Most waste is reportedly burnt or simply discarded outdoors. Some households bury their waste and a few feed it to animals. In Buliisa district, 1% of households report dumping waste in waterways (river or stream). There are free and fee-charging waste disposal sites available.

6.8.4 Telecommunications

There are numerous radio stations covering the country. There are reportedly no radio stations in the Project area; radio waves can be picked up from neighbouring Gulu district (Mega FM, Choicera, King FM and Rupiny FM) and from Pakwach town (Radio Puchane). In 2012, 67% of households in the Project area owned a radio.

In the Project area, mobile phone coverage is regarded as relatively good, with coverage provided by MTN, UTL, Airtel and Orange. Mobile phone use is more widespread and is increasing, with 52 % of the population reporting mobile phone subscriptions in 2014 compared to 38 % in 2010 (Ref. 6-5).

Internet use is low in Uganda; in 2014 there were an estimated 18 internet users per 100 people, a slight increase from 16 and 13 in 2010 and 2013 respectively (Ref. 6-5). At time of writing, no data existed to demonstrate internet access and use at the Project level.

6.8.5 Educational Infrastructure

According to the Ministry of Education, Science, Technology and Sports (MoESTS), 58% of GDP is spent on education, with only 2% spent on primary education.

Education services within the Project area are hindered by inadequate educational infrastructure and poor quality and numbers of teachers. In 2011 there were reportedly only 20,589 teachers working in the Western region, compared to over 45,000 registered in the Central and Eastern regions (MoETS, 2011).

Access to school and transport costs make school attendance difficult and unaffordable for many families, with schools typically between 2-8 km away and the only means of access being on foot, by bicycle or by vehicle (a one-way bus ticket costs approximately UGX 4000 [USD 1.5]) (Ref. 6-5).

There are reportedly 42 primary schools in Nwoya district; 8 are located in Purongo sub-county (Artelia, 2014b).There are five secondary schools located in Buliisa district (one in Buliisa Town Council, one in Kigwera parish and three in Biiso parish) (Buliisa District Local Government, 2009).

There are no tertiary education institutions in the Project area, though some are located within the region at places such as Hoima, Masindi or Gulu. In order to attend university or technical college, students have to travel to larger urban areas such as Kampala. There are 46 primary schools and 7 secondary schools in Buliisa district (2012) (Ref. 6-1).

6.8.6 Housing

Different types of housing have been observed in the Project area. Traditional grass-thatched houses with mud walls are the primary type of houses, especially in rural areas. There are differences between Alur and Bagungu traditional grass-thatched houses, with differences in laying grass (see Figure 6-8).

Alur traditional thatched-house, Gotlyech

Bagungu traditional thatched-house, Masaka

Bagungu grass-thached house, Uribo

Alur grass-thatched house, Got Apwoyo

Figure 6-8: Grass thatched houses

Iron roofing and brick walls are less frequent (Figure 6-9). These types of houses can be considered a primary indicator of wealth (though exceptions remain).

Iron-roof house in construction, Bugana-Kichoke

Iron-roof house, Kijangi

Brick house in construction
(for a Taxi Operator), Masaka

Iron-Roof House, Bugana-Kataleba

Figure 6-9: Iron Roof and Brick Wall Houses

6.8.7 Tourism & Recreation Facilities

Tourist accommodation is located in two tourism 'hotspots': 1) the south shore of the Delta, close to Paraa and 2) the northern part of MFNP, along the Nile and close to Tangi Gate. Accommodation is made up of high-end lodges and budget camps. Transit hotels are also located in Masindi town. There are 17 lodges within close proximity to MNFP: 5 lodges (concessions) are found within MNFP (Paraa Safari Lodge, Chobe Safari Lodge, Pakuba Safari Lodge, Sambiya River Lodge and Red Chilli Rest Camp) and 12 are located close to the Park's borders (11 privately own the land and property and one, Budongo Eco Lodge, has a concession from the National Forest Authority).

Activities within MFNP include game viewing, sport fishing, bird viewing and safaris.

6.9 COMMUNITY HEALTH AND WELL-BEING

6.9.1 Health Infrastructure and Emergency Services

Healthcare facilities in Uganda are primarily governement owned (55%); 28% are privately owned and 17% are funded by NGOs (Ref. 6-5). There is no inventory of privately owned facilities at national or district level.

There are five levels of health centres (HC) in Uganda. HC I being the most basic and local type, typically headed by Village Health Teams, and HC V being the district hospital. 6-4 below shows the levels of HCs in Uganda.

Table 6-3: Types of health centre in Uganda

HC LEVEL	*SERVICE*	*FACILITIES IN PROJECT AREA*
HC I	Basic and locally available service; headed by Village Health Teams (VHT)	
HC II	Serving 1000+ people. Immunisation and family planning advice; can treat common diseases such as Malaria.	Kigwera HC Bugoigo HC Kihungya HC
HC III	As above, but also offer child delivery, HIV counselling and testing. Staffed with laboratory analyst and lead by senior clinical officer.	Avogera HC Biiso HC
HC IV	Mini hospitals, providing same service as HC III but also include laboratory assistant, medical doctor and an operating room for emergency operations.	Buliisa HC Packwach
HC V	District hospital. Same service as HC IV but should have facilities for blood transfusion, laboratory and ultrasound equipment. Staffed with 4-5 medical doctors and a laboratory technologist.	
	District Hospital	Buliisa Hospital
	Regional Referral Hospital	Hoima Hospital

The delivery of an adequate health service is hindered by poor retention of staff and poor facilities; lack of dedicated hospital transportation, especially for emergencies; and lack of medical supplies and basic equipment, such as stethoscopes, blood pressure monitors and thermometers (Ref. 6-1). While the Ministry of Health recommends one Village Health Team per 25-30 households, there are notable deficiencies in health coverage; there are insufficient VHTs and HCIs in the Project Area per population ratio so the basic health requirements of the population are not being adequately met.

6.9.1.1 Nwoya District

In Nwoya District, there is insufficient health infrastructure (e.g. including issues relating to staff availability). According to Ministry of Health guidelines, Health Centre III are supposed to cater for a population of 20,000, while Health Centre II are supposed to cater for a population size of 5,000 (Artelia, 2015). There are 17 health facilities in total, 13 of which are government owned and the remainder are run by NGOs (Ref. 6-5).

Health facilities in Nwoya District include a HC III in Purongo, Anaka General Hospital (120 beds) and Gulu Regional Reference Hospital (359 beds). There is also a HC IV in Pakwach town, in Nebbi District, which is also used by residents from Nwoya.

6.9.1.2 Buliisa District

There are a total of 11 public health facilities in the district comprising ten Health Centres (7 HC II, 2 Health HC III and 1 HC IV) and a newly built district hospital constructed in 2012 by TUOP as part of a Corporate Social Responsibility project (Buliisa District Local Government, 2015).

Buliisa's HC IV (located within Buliisa Town Council) services a population of just over 14,000 people. Out of all HC listed in the District, Kigwera HC II (located in Kigwera sub-county) services the largest number of people (14,024 people).

All health facilities are able to treat cases of malaria and provide oral antibiotics as well as oral rehydration medicine for cases of diarrhoea. However, without the district hospital in full operation, at present it is reported that in the District there is no capacity to perform blood transfusions or any type of major surgical procedure (e.g. Caesarean sections) nor manage serious burns or infections patients (such as those with Tuberculosis).

HIV testing is regularly offered and there are two dedicated HIV/AIDS clinics in the District (Buliisa HC IV and Biiso HC III), both offering antiretroviral therapy (ART); Buliisa HC IV hosts the larger of the two ART clinics.

The maximum distance a person has to travel to access an HC II is estimated to be 8 km. There is one ambulance available to service the whole District; it is located at Buliisa HC IV. When medical staff at Buliisa HC IV cannot adequately manage a patient, they are referred to the next nearest hospital, Hoima Regional Referred Hospital, which is located 80 km away.

6.9.2 Community Health Status

6.9.2.1 Availability of Health Data

No new primary quantitative data was collected in the 2015 SHBS undertaken by Artelia. The majority of the population in the Study Area remains outside of any kind of systematic health surveillance. The results of the 2015 SHBS baseline survey identifies key health issues of interest, in view of conducting deeper research on community health and filling information gaps (Ref. 6-1).

The 2015 SHBS by Artelia reports that the only source of routine disease data for district and sub-district level is the Health Management Information System (HMIS), which is reported to be limited by a number of factors:

- *Incomplete reporting* - disease data captured in the HMIS are from health facility reports submitted monthly. Reporting from private sector facilities, which contribute substantially to health service provision, is lacking while not all public health facilities submit disease reports consistently;
- *Limited by disease coverage* - The HMIS captures disease data that are deemed of most importance at the national level. As a result there is no or very limited data on diseases that may be important at a local level (for example Neglected Tropical Diseases) and others that are not yet prioritised nationally (for example there is insufficient data on Non-Communicable Diseases (NCDs)); and

- *Suboptimal data quality* - the quality of HMIS data is suboptimal. As such it is not possible to give current and specific estimates of the prevalence or incidence of important diseases at the local or district level and what is presented may have sizable margins of error. However, recent unpublished assessments suggest that HMIS trends and overall disease rankings are reasonably reliable.

6.9.2.2 Community Health Status in Buliisa and Nwoya Districts

According to the routine HMIS system, the top diseases diagnosed in 2013/2014 in Buliisa were malaria (47%), non-pneumonia-cough (33.7%), intestinal worms (6.7%), acute diarrhoea (4.8%), Sexually Transmitted Infections (2.9%), skin infections (2.8%), eye infections (2.1%), gastrointestinal disorders (1.9%), pneumonia (1.4%) and ear, nose and throat Infections (1.2%). The disease epidemiology in Nwoya is generally similar to Buliisa however, according to HMIS statistics, a notable difference is the malaria burden. Although malaria is a major cause of disease in Nwoya, in 2014 it accounted for between 14% - 24% of monthly out-patient visits (average 17%) compared to 35% - 56% (average 47%) in Buliisa. Sexually Transmitted Infections appear to be less prevalent in Nwoya accounting for only 1% of health facility visits while skin conditions appear more prevalent accounting for 5% of facility visits (Ref. 6-1).

While these are the most common diseases diagnosed and reported district-wide, villages bordering Lake Albert and the White Nile also experience a high burden of neglected tropical diseases, such as schistosomiasis and onchocerciasis. The burdens of HIV and HIV-related conditions are also high, although not captured as such within the HMIS system. Information from health workers suggests that NCDs are becoming increasingly common in the district, although data on NCDs are not adequately captured in the routine national HMIS surveillance system or periodic national surveys (Ref. 6-1).

During the SHBS, local health care workers reported an increase in the number of confirmed HIV patients and an increase in patients attending the Antiretroviral Therapy (ART) clinic at the Packwach Health Centre IV. This anecdotal evidence is backed by data from the most recent comprehensive national health surveys, which show that the prevalence of HIV/AIDS in the western as well as six other regions has increased over the recent past. According to the most current statistics, the prevalence of HIV in the western and mid-northern regions region is higher than the national average (8.2 and 8.3% compared to 7.3%), and trending higher compared to six years prior. It is thought that the relatively high HIV prevalence in this region is at least in part due to the presence of the vibrant fishing industry along Lake Albert (Ref. 6-1).

Anecdotal evidence from health worker interviews undertaken by Artelia as part of the 2015 SHBS suggests that NCDs are becoming an increasingly important public health concern in the study area. This includes reported increases in cases of hypertension, diabetes, cancer (cervix, stomach, liver and prostate). The increased NCD burden is likely a result of changes in lifestyle such as increased alcohol intake in the community as well as population aging associated with increased life expectancy (Ref. 6-1).

Alcoholism is a major issue in the Project area, particularly for villages bordering Lake Albert including peri-urban areas and fishermen villages. Domestic violence and commercial sex have also been identified as issues in the Project area. Fish landing sites are the primary areas known for commercial sex and high rates of HIV (Ref. 6-1).

Uganda has historically had one of the highest maternal death rates in sub-Saharan Africa. Maternal Mortality Rates expressed as the number of deaths per 100,000 live births was 438/100,000 in 2011 and was estimated to be 360/100,000 in 2013. By contrast, France was estimated to have maternal mortality rate of 9/100,000 in 2013 by the WHO. It has been estimated that for every maternal death at least six other women survive with chronic and debilitating ill health (Ref. 6-1).

Accurate maternal mortality statistics for the Project area are not. Artelia note, however, that given that health services within Buliisa are still not able to offer caesarean section or blood transfusion it is reasonable to assume that the risks associated with child birth in the district are likely to remain very high. Blood transfusions are available for those who may need it In Nwoya. Pakwach Health Centre IV in Nebbi District is a key referral point for people in Purongo sub-county as it has capacity to provide comprehensive maternity services including blood transfusions.

6.9.2.3 Health Constraints

Health workers in Buliisa identified the following challenges to the local communities' health status:

- Overcrowding and poor sanitation, such as inadequate latrines, resulting in high risk of respiratory infections and diarrheal diseases;

- High rates of under-age pregnancies in Buliisa (due to family poverty, child labour demand, cultural practices) resulting in high rate of school drop-outs; and
- Increased commercial sex activities leading to increased risk of STIs and HIV/AIDS, with the highest concentration around fishing landing sites.

The types of latrines in the area are shown in Figure 6-10.

Figure 6-10: Type of Latrines in the Project Area

6.9.3 Safety and Security

6.9.3.1 Crime

There are police stations in Avogera, Nwgedo and Katanga (rural areas) and Buliisa Town. The most reported cases for police officers in Buliisa and Nwoya districts relate to petty crime, cattle raid and minor livestock theft land related disputes, and domestic violence. There is a national approach of 'Community Policing' which emphasises community members in crime prevention and importance of ensuring partnership between community members and village councils (Ref. 6-1).

6.9.3.2 Road Safety and Traffic Accidents

National data shows a high rate of traffic accidents and fatalities in Uganda. The Annual Traffic and Road Safety Report for 2013 states that of every 100,000 people eight were killed in road accidents; and that the percentage of fatal road accidents rose from 13% to 14% between 2012 and 2013.Pedestrians and passengers are the most vulnerable, constituting 66.8% of the total number of persons killed in 2013; compared to 69.8% in 2012 (Uganda Police, 2013 Ref. 6-13). The main causes of accidents are careless driving, speeding, and careless use of roads by pedestrians with pedestrians in urban areas reportedly not using pedestrian crossings or observing traffic lights.

World Health Organisation data for 2010 suggests the incidence of road traffic accidents may actually be higher. The WHO reports that in 2010 Uganda had a road fatality rate of 28.9 deaths per annum per 100,000 population, as compared with France at 6.839. This is a massive difference and points to both the unsafe road conditions in Uganda, poor pedestrian awareness of road safety, along with poor medical emergency response and emergency care. The poor emergency response and medical care results in many people with potentially non-fatal injuries dying or suffering permanent disability due to inadequate and delayed medical care (Ref. 6-1).

Table 6-4: Nature of Road Traffic Crashes for 2012-2013

NATURE	2012	2013
Fatal	2,611	2,616
Serious	9,030	8,874
Minor	8,220	6,878
Total	19,861	18,368

Source: Uganda Police, 2013 Ref. 6-13

Table 6-5: Road Accident Casualties 2012-2013

NATURE	2012	2013
Killed	3,124	2,937
Seriously injured	13,137	12,754
Slightly injured	1,755	1,592
Total	18,016	17,283

Source: Uganda Police, 2013 Ref. 6-13

Road Traffic Accidents were not listed among the common causes of health facility visits in Buliisa except at Biiso HC III, which is close to a main road (Buliisa – Hoima highway), and Packwach HC IV, commonly as a result of accidents involving animals in Murchison Falls Game Reserve. There is no active surveillance system to track cases of non-accidental injuries and there were mixed responses about how common these are in Buliisa Social organisation has traditionally consisted of the clan, with several clans in each village. Some villages are still organised by clan structure, but most villages have a mixed settlement pattern as a result of in-migration (Ref. 6-1).

6.9.3.3 Women and Gender Relations

Although women's representation in local councils has increased, women report that their issues are not heard as seriously as men's and the resolution of issues is normally decided in favour of men (Ref. 6-1).

Women are traditionally responsible for domestic tasks, such as collecting water and firewood, child care, children's education, cleaning the compound, taking care of small livestock (goat, sheep, chicken), producing crops for family consumption. Women living along the Lake Albert shore are mainly involved in fish processing (salting, smoking, drying) and selling. Men are traditionally involved in cash crops (i.e. cotton), livestock keeping, and fishing. Men are traditionally in charge of household finances, and women are dependent on men for access to land. It is reported that widows can only claim and keep family land if they care for all their husband's children (Artelia, 2013 Ref. 6-1).

In general, women have low levels of education and illiteracy is frequency. Marriage is traditionally recognised by the clan and formalised with a wedding ceremony at church. Women are often married at a young age and will move to settle in her husband's clan. Polygamy is common in Buliisa District; when men

get additional income they will seek a new wife. However, separation and remarriage is also a common practice. Women on average have between six to eight children (Ref. 6-1).

Women have different livelihood activities to men, based on natural resource collection and processing, such as papyrus (made into mats or doors), grass-thatch (to make roofs), firewood collection, and charcoal making (Artelia, 2015). Women who live in villages with no crop farming areas (Lake Albert shore, up to Ngwedo sub-county in the north, Kijumbya in the east, and Bugana Kataleba in the south) will temporarily settle in the eastern part of Buliisa District during the rainy season to grow crops (from March to May). Children will visit on the weekends and bring food back to their homes (Ref. 6-1).

Women's access to land is primarily through marriage but marriage does not protect women's land rights. Customary norms are male dominated with the son inheriting the father's land, and if the father does not have male children, then the land moves to the next male relative (i.e. uncle, extended male family members). The Bagungu customary norms are seen to be more discriminatory than the Alur in regards to women's land rights.

Women's vulnerability to losing land (i.e. when a husband dies, and land grabbing by male relatives) also impacts on household food security and wellbeing as women are often responsible farming activities and caring activities of the family. For these reasons, it is reported that women also frequently rent land which is considered to be more affordable and less at risk of land grabbing by male relatives (Artelia, 2015).

6.9.3.4 Conflict

National

The conflict between the Lord's Resistance Army (LRA) and the Government of Uganda lasted for 23 years and affected nearly 2 million civilians. The conflict affected the Acholiland region (including Nwoya District), and after 2002 affected other areas such as Bunyoro sub-region, which includes Buliisa District. Over 90% of the population in Acholiland were displaced and spent over a decade in Internally Displace Person (IDP) camps. Bunyoro sub-region was host to large numbers of refugees and IDPs (Ref. 6-1).

Regional and Local

The Bagungu and Alur have lived together peacefully as a result of strong kinship ties and intermarriage, as well as mutual dependence. However, there have been incidents and disputes between these two groups in the past. There was an outbreak of violence against the Alur in the 1990s over a dispute at Kabolwa landing site, with local residents reporting that a parish chairman tried to evict Alur communities from the area. There have been a few reports of similar attempts at eviction of the Alur by the Rugungu but these were reported to have been stopped by national government on the request of a local MP Fred Lukumu (Ref. 6-1).

In another incident, in 2006 and 2007 the Bagungu accused the Balaalo of illegal land grabbing after the Balaalo arrived in the area with large herds of cattle. The Balaalo drove their cattle across Buliisa District into Ngwedo sub-county, which led to violent clashes. The national government intervened and the Balaalo moved their cattle to Buliisa sub-county. There have been no reported retaliatory attacks since (Ref. 6-1).

It is reported that there has been a degree of tension between the Acholi and Alur (Jonam) in Nwoya district with some reported skirmishes in the Tangi area. The cause of the tension relates to competing claims over land ownership (Ref. 6-1).

6.10 HUMAN RIGHTS

6.10.1 Human Rights Context

Key human rights issues in Uganda identified in the Human Rights Watch (HRW) 2015 World Report (Ref. 6-9) are:

- curtailment of freedom of expression, assembly and association;
- discrimination and abuse against lesbian, gay, bisexual and transgender (LGBT) people;
- corruption; and
- lack of accountability for violence against civilians by the military and police.

The Uganda Human Rights Commission (UHRC) review of human rights in the Albertine Graben area reported a number of human rights allegations in regards to oil and gas activities, including from Buliisa, Nwoya and Hoima districts. These include: irregularities in the valuation and disclosure of compensation rates; coercion of affected residents to accept unfair compensation packages; delayed payment of compensation packages; lack of information on resettlement plans; lack of participation in choosing between compensation or resettlement; and threats by some government officials towards civil society organisation (CSO) leaders who were advocating for fair compensation (UHRC , 2013). In addition, complaints were received that burial sites had not been adequately addressed and that residents had not been consulted during the determination of compensation rates or the valuation of their properties (UHRC, 2013).

A number of complaints relate to land use and land rights; in Buliisa District, there have been allegations of people selling communal land but not following proper procedures and not holding land titles (UHRC, 2013).

Residents along Hoima-Kaiso Tonya road alleged that despite a ban by the government on acquisition of land titles in Albertine Graben, people were continuing to acquire land titles. However, the Hoima Lands Officer and the RDC stated that no official communication had been received stopping the issue of land documents (UHRC, 2013).

6.10.2 Civil Society Organisations and Non-Governmental Organisations

There are a variety of civil society organisations (CSOs) working in Uganda. These organisations are required to commit to non-sectarian and non-political programmes. There are several organisations that focus on oil and gas activities in the Albertine Region. The focus of these organisations is environmental matters, community engagement, and information dissemination. CSOs also focus on transparency in the sector and the local Civil Society Coalition on Oil and Gas (CSCO) is a network that organises activities, and publishes report and press releases (Ref. 6-3).

The primary national level CSOs are: Water Governance Unit, International Alert, Uganda Wildlife Society, Pro-Biodiversity Conservationists in Uganda (PROBICU) and Africa Child Online Protection (ACOP) (Ref. 6-3).

In the Project Area the following organisations are of relevance:

- Lake Albert Children and Women's Development Organisation (LACWADO);
- Civic Response on Environment and Development (CRED);
- Buliisa Initiative for Rural Development Organisation (BIRUDO);
- International Alert;
- Uganda Red CrossSoft Power Education;
- Uganda Land Alliance (ULA);
- Buliisa Catholic Women's Association (BUCAWA);
- Global Rights Alert;
- UWS;
- Bugungu Community Association ;
- LACWADO;
- Buliisa Youth Oil and Gas Platform; and
- Nwoya: RICE, STRAIGHTALK, ZOA, ACTION AID, Refugee Law Project (Makerere University), Nwoya Farmers Association, VISO.

6.10.3 Vulnerable Groups

IFC PS 1 includes the requirement to consider disadvantaged and vulnerable stakeholders. Vulnerable stakeholders are defined as those who may be differently or disproportionately affected by the Project, or

whose situation may mean that are hard to reach, and/or that require differentiated measures in consultation and disclosure activities to allow their effective participation. The determination of vulnerability will be a key part of the ESIA and will consider both the vulnerability of the general population in the Project area as well as the identification of sub-groups within the population who may be differentially vulnerable. Information will also be included in the ESIA from an Ecosystem Services report which is currently being undertaken.

A range of variables can determine a stakeholder's vulnerability and affect or restrict their ability to actively participate in engagement activities, including age, gender, ethnicity, social status, livelihood and occupation (i.e. insecure, temporary, low wage employment), level of education, health status (including physical or mental disability), physical isolation (distance, lack of access to transportation), land rights and ownership and level of marginalisation.

Potentially vulnerable or disadvantaged individuals and groups identified in the affected communities, include:

- Children;
- Elderly;
- Disabled or chronically ill;
- Low income and female-headed households (with incomes below the subsistence level[11]);
- Minority ethnic groups and tribes;
- Immigrants and refugees;
- Landless households;
- Fishing communities;
- Sex workers; and
- Cattle Herders.

6.10.4 Labour and Working Conditions

The Ministry of Gender, Labour and Social Development (MoGLSD) is the lead Ministry responsible for labour administration in the country. The MoGLSD has three Directorates: the Directorate of Labour, Employment and Occupational Safety and Health, Directorate of Social Protection, and the Directorate of Labour, Employment and Occupational Safety and Health. The Directorate of Labour, Employment and Occupational Safety and Health performs most of the labour administration functions and is divided into three departments, each headed by a Commissioner: Department of Labour, Industrial Relations and Productivity, Department of Occupational Health and Safety, Department of Employment Services. The Department of Labour, Industrial Relations and Productivity is responsible for formulating, implementing, and enforcing labour policies and laws relating to working conditions (MoGLSD, 2004; ILO, undated)[12].

Labour Officers are required to register workplaces and use a standardised inspection report when visiting workplaces; however, this is not carried out in a systematic way and records are not completed that enables monitoring in compliance with the labour laws. The Department of Occupational Health and Safety keeps a register of all workplaces visited, under the authority of MGLSD. The Department of Occupational Health and Safety does receive information from NEMA on company environmental impact assessments. There is however widespread under-reporting of occupational accidents and diseases (ILO, undated).

6.11 ARCHAEOLOGY AND CULTURAL HERITAGE

6.11.1.1 Palaeontology

The lower reaches of the Victoria Nile, at Paraa and from Murchison Falls to Lake Albert, contain fluvial middle Pleistocene Semliki Series sediments. Lower Palaeolithic Acheulian stone tools known from the

[11] *As defined by the World Bank's poverty measure of less than $1.25 a day.*

[12] *Accessed at http://www.ilo.org/labadmin/info/WCMS_209370/lang--en/index.htm on 27/08/15*

Semliki terraces, with Middle Stone Age Levallois worked stone tool-making flakes in the Upper Semliki terraces also exist in Paraa and Karuma.

6.11.1.2 Archaeology

Previous studies of areas EA-1 and EA-1A include excavations at Chobi (Soper 1971 Ref. 6-14) as part of the Bantu Studies Programme of the British Institute and references in overviews of Ugandan archaeology (Fagan and Lofgren 1966 Ref. 6-15; Bishop and Posnansky 1960 Ref. 6-16). The Environmental Sensitivity Atlas for the Albertine Graben (NEMA 2009 and 2010 Ref. 6-17) provides a high-level overview of archaeology in the area.

Middle Palaeolithic sites have also been recorded at Mweya Peninsula, near Paraa, and at Chobi, along the Victoria Nile to the east of block EA-1. Stone tool scatters associated with hunter-gatherers and early farmers have been identified on raised beaches/lakeside terraces and cave systems. Iron Age pottery scatters have been recorded in the area and extensive Iron Age remains, including ironworking sites, are known from within Murchison Falls National Park. The Chobi sector is also known for a pottery tradition known as Chobe ware that is spread to as far as Rwanda and Burundi.

6.11.1.3 History

The southern part of EA-1, south of the Victoria Nile, lies within the Bunyoro Kitara Kingdom, one of the kingdoms of Uganda. Historically, the Bunyoro Kingdom controlled the salt deposits of Kibiro and Lake Katwe as well as the iron ore mining and production.

There are abandoned pre-colonial settlement sites at Pakuba, Tee-Bito, Tee-Okutua. There are pre-colonial and colonial period forts at Wadelai, East Waldelai, Magungo and Pajao. A number of caves in the area were used by the Banyoro in their resistance to the British colonial forces.

The population of the area now delineated as the Murchison Falls National Park was largely evacuated due to an epidemic of sleeping sickness (African trypanosomiasis) which began around 1896 and peaked in 1906. The area is also associated with the Luo migration, which is claimed to have peopled most parts of Northern Uganda. The Luo migrated from southern Sudan at Bahr el Ghazel and entered Uganda at present day Packwach. From there they split, one group (the Kenya Luo) entered the Nyanza province, some stayed in Uganda intermarried with the Lendu and Okebu giving birth to the Alur, the Acholi and Langi are also descendants while some went west wards and took over the Chwezi empire and established the Bito dynasty in Bunyoro and later Buganda under Kato Kimera. Thus the area can be considered historically significant in the peopling and settlement of Uganda.

6.11.1.4 Cultural Heritage including Sacred Sites and Intangible Heritage

Traditional sites in EA-1 and EA-1A have been subject to a community-led survey within the Bunyoro Kitara Kingdom (NAPE 2012 Ref. 6-18). They include culturally significant areas used for the performance of ceremonies, sacrifices and rituals; ancestral shrines of the of the Bapiina, Basingo/Batera and Bacobo clans; shrines including one at Wanseko and the Buliba shrine of the Basambo clan; and the spirit of the Sambiya River, revered by the Bagungu.

Additional sacred sites in the area may include sacred trees; sacred caves and water areas; memorials related to conflicts; burial grounds and clan cemeteries, isolated graves and family graves located within house plots. It will be important for the Project to respect local cultural practices, such as taboos and sacred paths/routes and other intangible heritage assets.

Ecosystem resources such as lakes and rivers, wild plants used in traditional medicines, and community hunting and fishing grounds are important cultural resources. The Project may impact upon both sacred natural sites and plant, animal and mineral resources. These may be used as firewood, timber, foods, crafts, fodder, charcoal and sources of herbal medicines, and would need to be identified through ecological, cultural heritage and social surveys.

Dominant populations living in the area include members of the Banyoro, Acholi, Bangungu, Lango, Alur, and the Baluli/Balalo tribes; there are also populations of migrants and refugees especially from the Congo and South Sudan wars and northern insurgence, and economic migrants.

6.11.1.5 Palaeontology

Area EA-2 has palaeontological potential since it is part of the Albert Graben the Paleontological hub of Uganda. A lot of palaeontological studies have been undertaken by Pickford. Northeastern Uganda is known for early Miocene volcano sedimentary unit (Bishop et.al 1969). Plio–Pleistocene fossil mammals are known from the Kaiso beds.

6.11.1.6 Archaeology

A previous study (Archaeological, Historical and Cultural Baseline Study in EA2 (Lake Albert Basin) Ref. 6-19) undertook a high-level survey of the EA-2 area. Archaeological sites noted in the area comprise an Iron Age settlement site at Ngara (Kataleebe Village), Buliisa District. However, several are scattered all over the MFNP as earlier stated and a number of ESIAs have been undertaken by Eco & Partner Consult in the area as well. Wayland (1934) (Ref. 6-20), O Briene (1939) Ref. 6-21 and Bishop (1960) Ref. 6-16 reported stone tools at Kaiso.

6.11.1.7 History

EA2 is located within the Bunyoro Kitara Kingdom. Forts such as the fort dating to 1890-1905 is known from the eastern extent of the area, south of the Waiga Swamp. However, the area has many potential historical sites.

6.11.1.8 Cultural heritage including sacred sites and intangible heritage

Sites identified in the community-led survey of the Bunyoro Kitara Kingdom include clan shrines of the Baliisa/Basyabi, Basimo and Bakindwa/Bahinda clans. Other sites include shrines at Wanseko and Katala. As noted above, the spirit of the Sambiya River is revered (Ref. 6-16).

A previous ESIA for EA-2 (Ref. 6-19) noted a number of sacred sites in EA-2, in the form of natural features (e.g. large trees, tree groves and streams) and graves. Traditional rituals are undertaken by the communities at these sites, and involve offering sacrifices of goats, roosters or eggs to appease spirits, promote healing, obtain protection from disease and injury, and for rain and fertility. Sites recorded in the ESIA comprise a sacred *Munonde/Mukoge* (Tamarine) tree near the Kichoke community, and sacrificial locations at Zuria and Kakora; eight sacred sites at or near Kibambura community including shrines and *Munonde*, *Msongi, Musisiye and Muhehwe* trees; and a further sacred site at Kibambura.

As noted above, the Project may impact upon sacred natural sites, cultural ecosystems and plant, animal and mineral resources.

6.11.2 Designated Cultural Heritage

Critical cultural heritage consists of one or both of the following types of cultural heritage: (i) the internationally recognized heritage of communities who use, or have used within living memory the cultural heritage for long-standing cultural purposes; or (ii) legally protected cultural heritage areas, including those proposed by host governments for such designation (IFC PS8 2012 Ref. 6-23). The study areas do not contain any World Heritage Sites or Tentative List World Heritage Sites.

The nearest Tentative List World Heritage Site is the Kibiro Salt producing village (1997), approximately 50 km away from the closest part of the project Area. It will be important to assess potential impacts of lake water abstraction facilities upon lakeside and submerged lacustrine archaeological deposits and culturally significant sites such as the Kibiro Salt Gardens and hot spring.

It is not currently known whether the areas contain nationally designated cultural heritage, i.e. historical monuments and objects of archaeological, palaeontological, ethnographic and traditional interests designated under the Historical Monuments Act 1967 and the Historical Monuments (Amendment) Decree (No.6) of 1977 (Ref. 6-24) but these could be identified.

There are two relevant entries on UNESCO's List of Intangible Cultural Heritage in Need of Urgent Safeguarding: the Empaako (child naming system) tradition of the Banyoro of western Uganda (2013) and the male-child cleansing ceremony of the Lango of central northern Uganda (2014). Although unlikely, it is important to establish if the Project may have some impact on these cultural heritage projects.

6.11.3 Project Use of Cultural Knowledge

The Project does not propose to use cultural knowledge or practices of local communities for commercial purposes. For this reason, cultural knowledge has been scoped out of the ESIA. However, existing knowledge linked to the use of medicinal plants will be investigated further.

6.11.4 Summary

Areas EA-1/EA-1A and EA-2 have the potential to contain significant stratified, multi-period archaeological sites which could be important in establishing a chronology for prehistoric farming and pastoralism, as well as the development of iron-working and iron and salt trading networks.

Existing studies have been high-level, synthetic overviews or have not used accurate geo-referencing. Predictive modelling and the systematic, targeted survey of palaeontology, archaeology, historic sites and cultural heritage (including sacred sites and intangible heritage) is required in areas EA-1/EA-1A and EA-2 to identify, locate and characterise cultural heritage receptors. Further details are contained within Chapter 9 of this ESIA Scoping Report.

STAKEHOLDER ENGAGEMENT

07

7 STAKEHOLDER ENGAGEMENT

7.1 OVERVIEW

This section outlines the approach that will be taken for stakeholder engagement during the main ESIA process including a summary of stakeholder engagement activities undertaken to date and an outline of the approach for future engagement. Consultation with stakeholders is a key aspect of the ESIA process and essential to building a longer term 'social licence to operate' to facilitate the successful implementation of the Project. Undertaking effective stakeholder engagement is a key requirement of national and international regulations. The ESIA consultation process will be designed to comply with the requirements for public consultation as prescribed in Uganda's Environmental Impact Assessment Regulations, No. 13 (1998) (Ref. 7-1) and the IFC Performance Standard 1 (Ref. 7-2) and guidelines for stakeholder engagement. The basic principles of the consultation will be to ensure that the ESIA and engagement process is inclusive, culturally sensitive and transparent.

The consultation process gives stakeholders an opportunity to comment on the proposed Project and share their apprehensions, ongoing grievances and concerns. Stakeholders will have the opportunity to comment on the reports that are produced during each phase of the ESIA and will be a part of the process of identifying real and perceived impacts. This enables the affected communities to be a part of the solutions when it comes to mitigating impacts and to enhance their socio-economic wellbeing through helping to identify and implement appropriate management measures.

Local communities, formal and traditional leaders, representatives of the communities, and potential vulnerable groups such as women and youth will all be consulted throughout the ESIA to understand their specific issues and concerns. This will enable meaningful participation of the affected sub-sections of the communities in the studies.

The Project Proponents have already made efforts towards stakeholder engagement within EA-1/1A and EA-2 as well as at national level. The Project Proponents have teams of Community and Tourism Liaison Officers (CTLOs) that are responsible for community engagement in the Project Area.

Over the years several stakeholder related activities have been conducted such as:

- Socio-economic Baseline Assessment, 2013 (Worley Parsons) Ref. 7-3;
- Social Screening, 2013 (Artelia Eau et Environnement) Ref. 7-4
- Social and Health Baseline Studies, 2015 (Artelia Eau et Environment) Ref. 7-5;
- Preliminary RAP, 2015 (Intersocial Consult and New Plan) Ref. 7-6;
- Hosting of quarterly stakeholder meetings in partnership with PEDPD and MEMD at national, regional and district levels;
- Ongoing communication about expectations and issues with the project through CTLOs;
- Management of grievances through a Grievance Mechanism; and
- Printing and distribution of leaflets to disclose Project information and answer frequently asked questions (FAQs).

The ESIA consultation process will build on the existing activities described above.

7.2 STAKEHOLDER ENGAGEMENT METHODOLOGY

A Stakeholder Engagement Plan (SEP) has been developed as part of the ESIA process (refer to Appendix F). The SEP will provide the overarching framework for all engagement relating to the ESIA. It is a live document that will be regularly updated throughout the ESIA process.

7.2.1 Stakeholder Identification and Analysis

A stakeholder is defined as any individual or group that is potentially affected by the Project, or who has an interest in the Project and its impacts. In order to develop an effective approach to engagement, it is

necessary to determine who the stakeholders are and to assess their needs and expectations for engagement based on their interest and influence in relation to the Project.

Particular consideration is given to identification of vulnerable or disadvantaged stakeholders who may be disproportionately affected by the Project or who may find it difficult to participate in standard engagement activities. Preliminary identification of vulnerable groups is provided in Chapter 6 of this ESIA Report (Section 6.5). Differentiated measures are developed to allow the effective participation of vulnerable groups in the stakeholder engagement process. This includes, for example, ensuring that targeted efforts are made to invite women and youth to participate in community meetings during the mobilisation process, as well as directly asking them for their questions or comments during the meetings. Smaller group meetings with particular groups, or meetings with organisations representing vulnerable groups will also be organised during the baseline studies and impact assessment phase.

Stakeholder analysis considers how a stakeholder or stakeholder group may be affected by the Project and what influence they may have on Project outcomes in order to understand their needs and expectations for engagement. Stakeholder analysis considers:

- Who is affected by the Project and how;
- Each stakeholders key interests and concerns in relation to the Project; and
- How different stakeholders can influence the Project and what risks or opportunities this presents to the Project.

A list of stakeholders identified to date and their interest in the Project is presented in Table 7-1. A complete analysis of stakeholders, including an assessment of their interest and influence on the Project and their associated need for engagement is provided in Appendix F.

Table 7-1: EA-1/1A and EA-2 North Development Project Stakeholder List

STAKEHOLDER GROUP	*STAKEHOLDERS*	*INTEREST IN THE PROJECT*
National government	• Ministry of Water and Environment - National Environmental Management Authority (NEMA) - National Forestry Authority (NFA) - Directorate of Water Resource Management (DWRM) - Wetlands Management Department (WMD) • Ministry of Energy and Mineral Development - Petroleum Exploration Development and Production Department (PEDPD) - Petroleum Authoriy of Uganda - National Oil Company (NOC) - Uganda Electricity Transmission Company Limited (UETCL) • Ministry of Tourism, Wildlife and Heritage - Uganda Wildlife Authority (UWA) - Department of Museums and Monuments (DoMM) • Ministry of Lands, Housing, and Urban Development - Directorate of Land Management ○ Department of Land Administration ○ Department of Land Registration ○ Office of the Chief Government Valuer ○ Department of surveys and mapping - Directorate of Physical Planning and Urban Development	• Permitting and authorisations (NEMA) • Development control – Production Licenses • Production Sharing Agreement • Environmental protection • Safeguard of protected areas and wildlife • Public health and safety • Road Safety • Occupational Health and safety • Land Acquisition, Resettlement and Compensation • Livelihood Restoration • Infrastructure and Development • National Content • Security of oil & gas infrastructure, conflict prevention

STAKEHOLDER GROUP	STAKEHOLDERS	INTEREST IN THE PROJECT
	- Uganda Land Commission (ULC) • Ministry of Health; • Ministry of Works and Transport - Uganda National Roads Authority - Civil Aviation Authority - Uganda Railways /Rift Valley Railways (RVR) • Ministry of Gender, Labour and Social Development - Department of Occupational Safety and Health • Ministry of Agriculture, Animal Industry and Fisheries - Department of Agriculture - Department of Animal Husbandry - Department of Fisheries Resources - NAFIRRI (independent research institute for fisheries) • Ministry of Local Government • Ministry of Education	
Partners	China National Offshore Oil Corporation (CNOOC)	• Ensure consistency in development of blocks • Coordination of activities
Local Government	• Buliisa District Local Government - Ngwedo Sub-County: ○ Villages: Avogera, Kamandindi, Muvule Nunda, Kibambura, Ngwedo TC, Uduk I, Kartoum, Mubako, Paraa, Ajigo, Muvule I, Ngwedo Farm, Uduk II, Kasinyi, Kilyango, Kisomere - Kigwera Sub-Country: ○ Villages: Kigwera NW, Kigwera SE, Kigwera SW, Kigwera NE, Kirama, Kiyere, Bikongoro, Kisansya East, Kisansya Wesy, Katodio, Ndandamire, Kichoke, Katanga, Masaka, Wanseko TC - Buliisa Sub-County: ○ Villages: Padinga, Gotlyech, Beroya, Kakoora, Uribo, Kijumbya; Kijangi; Bugana-Kicooke; Kigoya; Waiga, Kataleba; Kabolwa - Buliisa Town Council ○ Villages: Kizongi; Nyapeya; Kizikya; Kakindo; Kisimo; Kityanga; Kitahura; - Butiaba Sub-county ○ Villages: Serule A, Serule B, Mununde, Kigungu, Kekeya, Magale, Traingle, Booma A, Boomba B, Pida A, Tugumbiri, Wantembo, • Nwoya District Local Government - Purongo Sub-County ○ Villages: Pajengo, Ywaya, Pabali, Pangora Pabit East, Pabit West, Lagazi; Paminalongo v	• Impact on local amenities • Impact on lake users and fishermen • Impact on local tourism • Health and safety of community • Disturbance from noise/ vibration/ dust/ light pollution • Impact on livelihoods • Economic and physical displacement

STAKEHOLDER GROUP	STAKEHOLDERS	INTEREST IN THE PROJECT

	- Anaka Town Council
	- Koch Goma Sub-County
	  ○ Villages: Kal. Lii
	  ○ Walukuba, Kisingya, Nyakuta, Sonsyo
	• Nebbi District
	- Pakwach Town Council
	- Panyimur Sub-County
	- Alwi Sub-County
	- Pakwach Sub-County
	• Hoima District Local Government
	- Buseruka Sub-County
	  ○ Nyamasoga Villages
	• Masindi District Local Government
	- Pakanyi Sub-county
	  ○ Mpyo Village
	• Kiryandongo District
	- Kiryandongo Town Council	

Traditional authorities	• Council of Elders, Bunyoro Kingdom • Alur Paramount Chief • Acholi Paramount Chief and Council of Elders (Rwodi)	• Impact on local amenities • Impact on livelihoods • Economic and physical displacement
Trade Unions	• National Organisation of Trade Unions (NOTU), Minerals and Oil Workers Union	• Advocacy for oil workers' rights • Labour conflicts resolution

Vulnerable groups	• Local community based organisations representing:
	  ○ welfare of children, elderly, Disabled or chronically ill
	  ○ low income and female-headed households (with incomes below the subsistence level)
	  ○ minority ethnic groups and tribes, immigrants and refugees
	  ○ landless households
		• Disturbance from noise/ vibration/ dust/ light pollution
		• Impact on livelihoods
		• Impact on local amenities
		• Health and safety of community
		• Economic and physical displacement

Local businesses, tourism operators and agencies	• Government bodies responsible for tourism - UTB • Tour operator umbrella bodies: Association of Uganda Tour Operators (AUTO), Uganda Tourism Association (UTA) • Concensionnaires inside MFNP • Invsetors situated within the vicinity of MFNP	• Impact on tourism • Environmental protection • Nuisance from noise/ light pollution • Prospects for procurement
Land owners and	• Land owners/users affected by land acquisition	• Land acquisition

STAKEHOLDER GROUP	STAKEHOLDERS	INTEREST IN THE PROJECT
users	• Persons directly and indirectly within the vicinity of operations	
Lake users	• Fishermen (subsistence) • Fisheries (commercial)	• Disturbance from noise/ vibration/ dust/ light pollution • Impact on fishing • Public health and safety

NGOs and Civil society	• Advocacy NGOs, coalitions and networks
	• Civil Society Coalition on Oil and Gas (CSCO)
	  ○ Buliisa Initiative for Rural Development Organisation (BIRUDO)
	  ○ Lake Albert Children and Women Advocacy and Development Organisation (LACWADO)
	  ○ BIRUDO
	  ○ LACWADO
	  ○ Civic Response on Environment and Development (CRED)
	• Conservation NGOs
	  ○ World Wildlife Fund (WWF)
	  ○ Wildlife Conservation Society (WCS)
	  ○ International Union for Conservation of Nature (IUCN)
	  ○ Bird Life International
	  ○ Uganda Wildlife Society (UWS)
	  ○ Giraffe Conservation Foundation
	• Human Rights, peace and conflict resolution
	  ○ Uganda Human Rights Commission (UHRC)
	  ○ Inter Religious Council of Uganda (IRCU)
	  ○ Refugee Law Society
	• Development Non for profit
	  ○ GIZ
		• Disturbance from noise/ vibration/ dust/ light pollution
		• Environmental protection
		• Impact on fishermen
		• Impact on local communities
		• Health and safety of community

Protected area sponsors and managers	• Murchison Falls Protected Area	• Environmental protection • Safeguard of protected areas and wildlife
Academic and research organisations	• National Fisheries Resources Research Institute • Makerere University • Kyambogo University • Gulu University • West Nile University • Uganda Petroleum Institute • Vocational Training Centres.	• Environmental protection • Protection of cultural heritage
Media	• New Vision • Monitor • Rupiny	• Transparency and openness • Information

STAKEHOLDER GROUP	STAKEHOLDERS	INTEREST IN THE PROJECT
	• Oil in Uganda	disclosure

7.2.2 Disclosure and Consultation Methods

7.2.2.1 Information Disclosure

Information about the Project and the ESIA process will be disclosed in a variety of ways. Community leaflets (translated into Alur, Acholi, Lugungu and Runyoro, as required), and presentation material will be produced in a culturally appropriate manner.

Table 7-2 presents some of the methods that will be used to disclose information.

Table 7-2: Information Disclosure Methods

INFORMATION TO BE DISCLOSED	METHOD
Information on the Project and ESIA process	• Information leaflets distributed at consultation meetings and made available in key public places • Question & Answer sheets Available in CLO offices or on request from Developers and during stakeholder meetings • Presentations given during meetings tailored to the audience in terms of technical detail and language • Posters displayed during meetings and left in public places
Report Publication including Scoping Report/ToR; ESIA NTS SEP	• Project webpage • Copies of Scoping Report/ToR, NTS and ESIA distributed direct to identified stakeholders by hand, post and email (in co-ordination with NEMA).
Announcement of Report disclosure (ToR/ESIA) and opening of public comment period	• Press releases and public announcements in local newspapers and on local radio • Poster in public places
Date, time, venue and purpose of upcoming meetings	• Meeting invitations sent at least two weeks prior to meetings • Mobilisation of villages by CTLOs and LC1 • Event Posters posted in public places

7.2.2.2 Informed Consultation and Participation:

For projects with potentially significant adverse impacts on affected communities, international standards require “informed” consultation and participation, where this can be understood to mean:

- an in-depth exchange of views and information;
- an organised and iterative consultation leading to the incorporation of Affected Community views into the Project decision making process;
- capturing both men’s and women’s views, if necessary through separate forums or engagements; and
- considering men and women’s different concerns and priorities about impacts, mitigation mechanisms, and benefits, where appropriate.

Table 7-3 outlines the methods that will be used to ensure the ESIA stakeholder engagement process meets the requirements for informed consultation and participation.

Table 7-3: Methods for Informed Consultation and Participation

METHOD	DESCRIPTION	TARGETED STAKEHOLDERS	PHASE
Public Meetings	Forum for providing Project information and hosting question and answer session with a large audience. Meetings will be held at community venues which can be easily accessed by the Project's stakeholders and at convenient times, as agreed in consultation with the MEMD and the leaders of local councils.	Local communities within the Project area including villages located within Buliisa Town Council, Buliisa Sub County, Ngwedo, Kigwera, Purongo and Pakwach	Scoping Consultation ESIA Consultation
Focus Group Discussions	Exchange of information with more targeted groups of stakeholders focused on, for example, age or livelihood.	Local communities within the Project area including villages located within Buliisa Town Council, Buliisa Sub County, Ngwedo, Kigwera, Purongo and Pakwach	Baseline Phase
One-on-one interviews or small group meetings	Meetings with influential stakeholders and those with access to important baseline information. Meetings are generally more technical and can be used for joint decision making and planning.	Government stakeholders (including departments / committees at national and district level such as NEMA, PEDPD, DWRM, MND, OHS) NGOs and CSOs (e.g. BIRUDO, LACWADO, CRED) MFNP and tourism operators within the Park Technical experts e.g. the National Fisheries Resources Research Institute	Scoping Consultation Baseline Phase ESIA Consultation
Public Hearing	Workshops or roundtables with government agencies to discuss outcomes of ESIA and ensure coherence in recommendations made	Government stakeholders (including departments / committees at national and district level such as NEMA, PEPD, DWRM, MND, OHS)	ESIA Consultation
Comment boxes installed in centrally located community buildings in affected communities, such as CLO office	Gives local communities the opportunity to provide confidential feedback on Project activities	Local communities within the Project area including villages located within Buliisa Town Council, Buliisa Sub County, Ngwedo, Kigwera, Purongo and Pakwach	All phases
Post/phone/email	Opportunity to ask questions or raise concerns about the Project and ESIA process in a timely manner	All Stakeholders	All phases

7.3 STAKEHOLDER ENGAGEMENT UNDERTAKEN AS PART OF SCOPING PHASE

7.3.1 Objectives

The overall goal of stakeholder engagement during the Scoping Phase was to enable stakeholders to understand the proposed Project and outline the preliminary potential impacts and potential benefits of the Project in a timely manner. It also gave a platform for any affected communities to give their opinions and allowed them to feed into the Project design process and wider ESIA process.

The key objectives of scoping phase stakeholder engagement were to:

- Introduce the Project and share Project design information with stakeholders, explaining in clear and sufficient detail it's nature and potential impacts;
- Describe the scope of the ESIA study, the study area and the level of assessment in relation to the Project area of influence, associated facilities and Cumulative Impact Assessment;
- Advise stakeholders of their opportunities during the ESIA process to contribute to the Project decision-making and design process and to input into the design of mitigation and enhancement measures;
- Demonstrate the Developers' commitment to following ESIA best practise, national requirements and IFC guidelines;
- Confirm or validate the information gathered in previous consultations;
- Identify key issues and concerns that stakeholders have about the Project;
- Provide stakeholders with the opportunity to comment or provide proposals on the key issues that should be addressed in the Scoping and ESIA report; and
- Lay the foundation for ongoing and positive stakeholder participation.

7.3.2 Consultation and Disclosure Activities

Scoping Phase consultation meetings included:

- Community meetings in the key Affected Communities;
- One-to-one or small groups meetings with stakeholders who might have a particular interest in the Project (e.g. NGOs or research institutes) and a more focussed session is necessary; and
- One-to-one meetings with national regulatory and local authorities.

Stakeholder groups that were met during the Scoping phase included:

- National authorities (regulatory);
- District and lower local government;
- Protected area sponsors and managers;
- Land owners and users;
- Lake users (including fisheries);
- Local businesses and tourism operators;
- Local NGOs and Civil society; and
- Local communities and Project affected persons.

A full outline and plan of the Scoping meetings is provided in Appendix F.

7.3.2.1 Meeting Format

All meetings with stakeholders were organised to facilitate the exchange of information and opinions.

In community meetings, following introductions and opening remarks a non-technical presentation on the Project and ESIA process was given. This was followed by a Question and Answer session, allowing stakeholders to provide comments and suggestions. All comments and questions were noted on an A1 flipchart to ensure they were noted and, as far as possible, were given an immediate response.

For meetings with government agencies and national level stakeholders, meetings started with introductions followed by a technical Power Point presentation and then open discussion.

Meetings were attended by one or two members of the ESIA Stakeholder Engagement Team from AECOM, who were supported by their Ugandan counterparts from Eco & Partner Consult. Representatives from each of the Project Proponents (both members of the management team as well as CTLOs) also attended the meetings. The team for meetings in local communities included cultural intermediaries to assist with translation.

Community meetings were well attended with an average of over a 100 attendees at each of the meetings (see Figures 7-1 and 7-2). Attendance and meeting minutes were recorded for all meetings (refer to Appendix F).

Figure 7-1: Meeting in Gotlyech

Figure 7-2: Meeting in Kigwera South East

7.3.3 Tools and Materials

The following materials were used to support scoping phase consultation activities:

- A simple flip chart presentation on the Project and the ESIA used during community meetings;
- A technical PowerPoint presentation used during meetings with government agencies and other national level stakeholders;
- Copies of the community presentation printed as A5 leaflets were distributed to stakeholders during the meetings and made available at the CLO office;
- Posters to announce upcoming community meetings and advertise the schedule for meetings were displayed in public places; and
- Meeting invitations for government stakeholders, NGOs and CSOs were sent out at least two weeks in advance of the meetings.

Copies of the Scoping Phase consultation materials are provided in Appendix D and depicted in Figures 7-3 to 7-6.

Figure 7-3: Event Poster

Figure 7-4: Record of questions and comments

Figure 7-5 and Figure 7-6: Stakeholders reading booklets

7.3.4 Consultations Undertaken

The full scoping phase consultation programme is provided in Appendix F. A summary of the consultations undertaken during August/September 2015 is provided in Table 7-4.

Table 7-4: Scoping Phase Consultations

STAKEHOLDER GROUP	STAKEHOLDER	MEETING FORMAT
District Government (Technical committees and political leadership)	Buliisa District Nwoya District	Small group meeting
Sub-county Government (Technical committees and Political leadership)	Buliisa Sub County Kigwera Sub County Ngwedo Sub County Buliisa Town Council Purongo Sub County Pakwach Town Council	Small group meeting
Villages	Gotlyech Kizong Kigwera SE Kisimo Kasinyi Kisomere Kilyango Wanseko (cancelled)[13]	Public meeting
Tourism Stakeholders	Nile Safari Lodge Wild Frontiers Paraa Lodge Murchison Falls National Park Association of Ugandan Tourism Operators	One-on-one and small group meeting
Civil Society & NGOs	Civic Response on Environment and Development (CRED) Buliisa Initiative for Rural Development Organisation (BIRUDO) Lake Albert Children and Women's Advocacy and Development Organisation (LACWADO) Civil Society Coalition on Oil and Gas	One-on-one and Small group meeting
Government Agencies and Departments	National Environmental Management Authority Uganda Wildlife Authority Petroleum Exploration and Production Department Department of Water Resources Management Occupational Health and Safety Department Wetlands Management Department Department of Physical Planning Department of Museums and Monuments Directorate of Fisheries Resources National Forestry Authority	Small group meeting
Research Bodies	National Fisheries Resources Research Institute	Small group meeting

[13] *The Wanseko meeting could not proceed due to unrest in the community. Key stakeholders from Wanseko will be engaged during the impact assessment phase of the ESIA and CTLOs will make efforts to engage the community as part of their ongoing activities.*

7.4 KEY ISSUES RAISED DURING STAKEHOLDER ENGAGEMENT UNDERTAKEN TO DATE

A summary of the key issues raised during the scoping phase is presented in Table 7-5.

Table 7-5: Key Stakeholder Issues During Scoping Consultations

ISSUE	*EXPLANATION*
LOCAL COMMUNITY STAKEHOLDERS	
Legacy land acquisition issues	There are many legacy grievances related to the land acquisition process during exploration. Many stakeholders say they have not yet received compensation for land related impacts and were not happy with the compensation they received. There is also mistrust and misunderstanding in the way compensation rates were set.
Disruptions to livelihoods	There are concerns about how livelihoods including fishing, farming (crops and livestock) and tourism will be affected by land acquisition and general oil & gas related activities.
Employment expectations	There are high expectations around local employment and local stakeholders highlight that they will not be happy if they see workers coming from other parts of the country to do jobs that they could do, in particular unskilled jobs. There is also a request for skills training and capacity building to increase their prospects of employment on the Project.
Local procurement	Local producers request capacity building and training to enable them to meet the standards required to sell to the Developers.
Health, safety and environmental concerns	Concerns about the impact of the proposed Project, particularly waste transfer and the pipeline, on the health and safety of the local population and the environment were frequently raised as well as questions about how such impacts would be managed.
Access to information	There were concerns that access to information was inadequate leading to misinformation and consequently distrust by some members of the community in the Developers and Government. There are rumours, for example, that oil is already being transported from the area in waste trucks.
Communication and engagement	District, Sub-County and Local stakeholders each requested that the right protocols were followed when undertaking surveys or consultations in the villages. In particular, stakeholders requested that those who are directly affected by Project activities or surveys (e.g. owners of land that is being surveyed) are directly engaged. It was suggested that in some cases information that was given to the sub county or LC1 chairpersons did not transcend to the village level or the relevant individual. Requests were made for greater government representation during consultations and more efforts by the district government (through the district environmental officers) to sensitise communities about the project and its potential impacts.
Project Information	Requests were made for information about Project location, schedule and details of infrastructure design.
Socio-cultural change	Concerns were raised about how the Project could change the local culture due to the resettlement process and interactions between the Project workforce and local communities.
CSR requests	Requests were made for various types of CSR investments such as assistance with healthcare centres, road improvements, and education and training programmes.
Subcontractor management	Questions were raised about how subcontractors would be managed to ensure they behaved correctly in the communities; respected the Project's requirements for local content / local procurement targets; and performed their work in an environmentally and socially responsible way.

ISSUE	EXPLANATION
NATIONAL STAKEHOLDERS	
Land Acquisition and compensation process	Requests have been made for more information about the land acquisition process and proposed compensation mechanism for affected persons. Information has also been requested on the approximate land take required for Project components and the total number of people likely to be resettled.
ESIA Process and Structure	Various questions have been raised about the ESIA process including about the scope of the ESIA in terms of both technical disciplines and Project components; and the approach to identifying impacts and developing mitigation measures. Technical recommendations/suggestions have also been made in relation to specific aspects of the ESIA such as identification of secondary baseline data sources alternatives analysis, assessment of trans boundary impacts, and assessment of biodiversity impacts. There have been requested that the ESIA structure be reconsidered such that various project components are covered in separate volumes to ensure there is clarity around each component for monitoring purposes.
ESIA Baseline Studies	Stakeholders have requested further clarification on the approach that will be taken for baseline surveys to inform the ESIA. Government stakeholders advised that there is a lot of literature that has been developed about the proposed project area and a comprehensive gap analysis should be undertaken based on review of this literature.
Cumulative Impact Assessment	Stakeholders that are relevant to the scope and strategy for the CIA, in particular government agencies and for the developers of other projects in the CIA study area.
Project Information	More detail on specific aspects of the Project description has been requested. The most frequently requested information relates to waste management, water abstraction, treatment and reuse, Project location and land take requirements; pipeline monitoring; the Nile Crossing; and the composition of oil/gas.
Permitting	It was noted that statutory permits are required before certain activities are conducted on or near water bodies and inspections by the department are required to verify any findings of international certification including for pipelines, flow lines, or anything under pressure.
Legal and Regulatory Framework	It was noted that national standards should be prioritized for the ESIA but that IFC standards should be referred to in the event of gaps in national legislation. Recommendations have also been made on specific laws to be considered in the ESIA such as laws related to wetlands management and the Fish Act.

Where possible, all stakeholder comments were addressed during meetings. A record of questions and comments was recorded and logged in a Project Issue and Response Register (see Appendix F). This enables stakeholder perceptions and concerns about the Project and the ESIA process to be fed back into the ESIA and Project design process and will help to inform future consultations.

7.5 NEXT STEPS IN STAKEHOLDER ENGAGEMENT PROCESS

Figure 7-7 depicts the ESIA process and when stakeholder consultations should take place during this process as required under Ugandan EIA regulations and international IFC Standards.

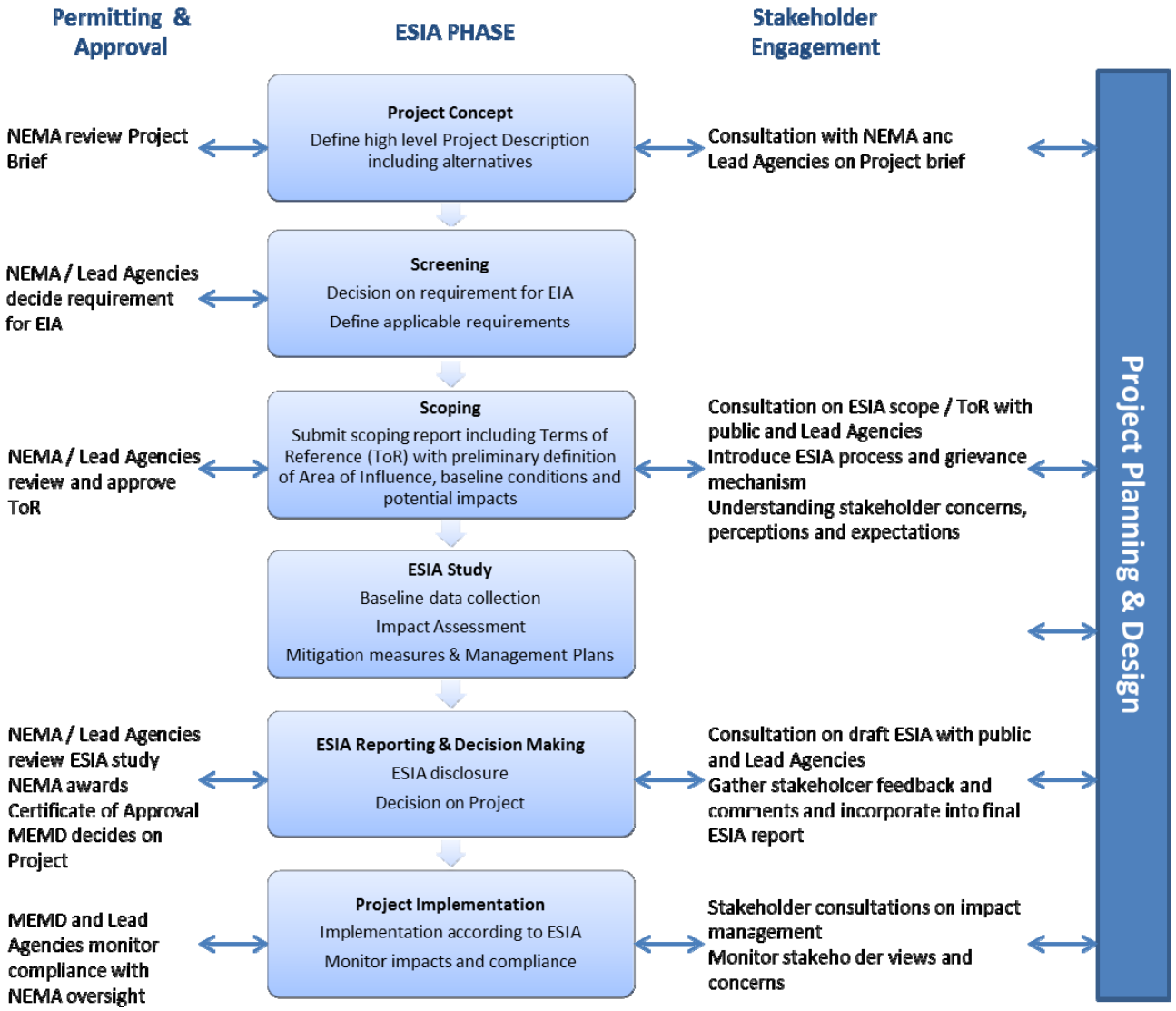


Figure 7-7: Stakeholder Engagement during the ESIA Process

A summary of the specific objectives and approach for stakeholder engagement during the next phases of the ESIA process is presented in Table 7-6. This is adaptive and subject to change based on ongoing feedback from stakeholders and identification of new stakeholders and issues.

Table 7-6: Objectives and Approach for Stakeholder Engagement during Future ESIA Phases

ESIA PHASE	*OBJECTIVES*	*APPROACH*
Scoping Report (including TOR) Disclosure	• Disclosure of ToR; and • Receive comments on the draft ToR (to be incorporated into main ESIA Report).	• NEMA to lead the Scoping Report (ToR) consultation process with support from AECOM, as required, ensuring the process is in line with national and international requirements. • Input may include preparation of disclosure presentation materials; advice on which stakeholders should be consulted; and general guidance on conducting a process that is free, fair, inclusive, prior and informed.
Baseline Studies	• Continue to provide project information to affected people and other Stakeholders; • Continue the dialogue opened during scoping engagement to build trust; • Develop better understanding of affected stakeholders to inform the ESIA, rating of impacts and development of appropriate mitigation; • Collect socio-economic, health and environmental baseline data for the ESIA; and • Ensure stakeholders are aware of the grievance mechanism and who to contact if they have questions.	• Issue focused consultations using key informant interviews and focus group discussions. • Briefing to ESIA specialists and Developer staff undertaking baseline surveys about protocols for engagement with local communities.
Impact Assessment	• Ensure stakeholders receive adequate and timely information about any updates to Project; • Provide stakeholders with an update on the ESIA status, potential impacts and potential benefits; • Provide stakeholders with details of proposed mitigation and enhancement measures; and • Solicit Stakeholder feedback so that it can be incorporated into the ESIA Report and inform the design process.	• Undertake a program of public meetings in Project affected communities supported by communication materials including posters, flipchart presentation and leaflets. • Focus Group Discussions with stakeholders with a particular interest in the Project (e.g. NGOs or research institutes) assisted by PowerPoint Presentation. • One-to-one or small group meetings with national, regional and district authorities.
ESIA Reporting	• Public Disclosure of ESIA Report; and • Receive and respond to comments on the impacts and mitigation and monitoring plans.	• NEMA publicizes ESIA contents and selects locations for inspection. • NEMA makes copies or summaries of the ESIA available. • NEMA and MEMD decide and advertise public places where ESIA will be accessible to public for 14 day disclosure period. • Official review appointment for public Q&A with authorities. • Developers / ESIA consultants will assist this process as required and will also set up mechanism to receive public comments and recommendation on the impacts and mitigation measures in person, via post / email or online.

IDENTIFIED PRELIMINARY POTENTIAL IMPACTS

08

8 IDENTIFIED PRELIMINARY POTENTIAL IMPACTS

8.1 PROPOSED TECHNICAL STUDIES

This section describes the potential impacts identified during the scoping report as well as issues raised by stakeholders regarding the proposed project during consultation. The topics which will be included within the ESIA are highlighted in section 5.2.1 of Chapter 5 and section 6.2.1 of Chapter 6 of this ESIA Scoping Report.

8.2 PROJECT AREA OF INFLUENCE

The IFC Performance Standards (PS) (Ref. 8-1) includes the following guidance with regard to determining a Project's Area of Influence (AOI):

- *"Where the project involves specifically identified physical elements, aspects, and facilities that are likely to generate impacts, environmental and social risks and impacts will be identified in the context of the project's area of influence. This area of influence encompasses, as appropriate:*
    - *The area likely to be affected by: (i) the project and the client's activities and facilities that are directly owned, operated or managed (including by contractors) and that are a component of the project; (ii) impacts from unplanned but predictable developments caused by the project that may occur later or at a different location; or (iii) indirect project impacts on biodiversity or on ecosystem services upon which Affected Communities' livelihoods are dependent;*
    - *Associated facilities, which are facilities that are not funded as part of the project and that would not have been constructed or expanded if the project did not exist and without which the project would not be viable; and*
    - *Cumulative impacts that result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted".*

The defined AOI will include both direct and indirect impacts. *Area of Direct Impacts* usually considers the physical footprint of the project such as right-of-way, construction sites, work staging areas, and areas affected during the operational phase (e.g., new traffic patterns). The *Area of Indirect Impacts* are usually more difficult to define precisely but include areas which may experience induced or cumulative changes in combination with activities not under the direct control of the Project.

The Project's AOI will also take into account:

- The Project activities which have a physical footprint;
- The spatial extent of the Study Areas defined for each of the environmental and social technical subjects (as identified in relevant sections of Chapter 9 of this ESIA Scoping Report); and
- The study area for the Cumulative Impact Assessment (CIA) (as identified in section 10.3 of Chapter 10 of this ESIA Scoping Report).

Taking the above guidance into consideration, it is clear that the Project's AOI will cover a significant area and will include:

- Majority of the Exploration Blocks EA1/EA1A and EA2 North;
- Environmental sensitive areas including the Murchison Falls National Park (MFNP), Murchison Falls-Albert Delta Wetland System Ramsar site and Bugungu Wildlife Reserve and potentially Central Forest reserves;
- The whole of the Buliisa district and significant portions of the districts of Masindi, Nwoya and Hoima (including anticipated locations of any associated facilities); and
- Potentially a broader area with the Albertine Graben where cumulative effects with other related projects are likely to occur.

The Project's AOI will be further defined during the main ESIA phase and will consider the area of influence defined for each of the environmental and social components.

8.3 POTENTIAL IMPACTS BEFORE MITIGATION

A list of the Potential impacts which have been preliminarily identified as part of the ESIA Scoping Phase are outlined in Table 8-1. Each of the identified Potential impacts will be assessed in more detail during the main ESIA and the findings will be presented within the ESIA Report. This list is not considered exhaustive and other impacts may be identified during the detailed impact assessment phase. The methodology for assessing the impact significance is outlined in Chapter 4 of this ESIA Scoping and in order to not pre-empt the detailed impact assessment process has not been used during the scoping stage.

Table 8-1: Preliminary Evaluation of Potential Impacts before Mitigation

TECHNICAL SUBJECT	POTENTIAL IMPACT	PROJECT ACTIVITIES LIKELY TO CAUSE IMPACT	POTENTIAL RECEPTORS IN THE STUDY AREA	RELEVANT DEVELOPMENT PHASE
Air Quality & Climate	Potential for fugitive emissions of particulate matter (dust) from construction / decommissioning phase activities (e.g. demolition and earthworks etc.).	All construction / decommissioning activities undertaken at CPF, Wellpads, Water Abstraction facility, pipeline routes and Waste Storage areas.	Residential and agricultural areas, protected areas including MFNP, and other sensitive ecological areas within close proximity to the construction works.	Construction / Decommissioning.
	Potential for road traffic exhaust emissions (e.g. NOx, PM etc.) including dust.	Vehicle movements both during construction / decommissioning (e.g. delivering equipment, moving waste) and operation (e.g. operating personnel).	Residential areas and receptors located close to access roads, sensitive ecological areas close to access roads.	Construction Operation Decommissioning
	Potential for atmospheric emissions associated with other project activities (e.g. generators and flaring).	Power generation, venting and flaring.	Residential areas and agricultural, protected areas including MFNP, and other sensitive ecological areas within close proximity to the well pad sites, CPF, and Water Abstraction facility.	Operation
	Potential for increased greenhouse gas emissions to contribute to climate change.	All construction and operational activities undertaken at CPF, Wellpads, Water Abstraction facility, pipeline routes and Waste Storage areas.	n/a	Construction Operation Decommissioning
Noise	Potential for increased noise generation, as a result of construction / decommissioning phase activities (e.g. drilling).	All construction activities undertaken at CPF, Wellpads, Water Abstraction facility, pipeline routes and Waste Storage areas.	Residential areas, protected areas including MFNP, and other sensitive ecological areas within close proximity to the construction works associated with the well pad sites, CPF, Water Abstraction facility, and pipeline routes.	Construction / Decommissioning
	Potential for increased noise generation, associated with vehicle movements.	Vehicle movements both during construction / decommissioning (e.g. delivering equipment, moving waster) and operation (e.g. operating personnel).	Residential areas and receptors located close to access roads, sensitive ecological areas close to access roads.	Construction Operation Decommissioning
	Potential for Project activities to cause vibration (e.g. from piling works).	All construction / decommissioning activities undertaken at CPF, Wellpads	Residential areas, protected areas including MFNP, and other sensitive ecological areas within close	Construction /

TECHNICAL SUBJECT	POTENTIAL IMPACT	PROJECT ACTIVITIES LIKELY TO CAUSE IMPACT	POTENTIAL RECEPTORS IN THE STUDY AREA	RELEVANT DEVELOPMENT PHASE
		(especially during periods of drilling), Water Abstraction facility, pipeline routes and Waste Storage areas.	proximity to the construction works associated with the well pad sites, CPF, Water Abstraction facility, and pipeline routes.	Decommissioning
	Potential for increased noise generation, as a result of operational activities (e.g. at well pad sites).	CPF operations and Well pad site operations including well testing; enclosed emergency flaring; Generators,	Residential areas, protected areas including MFNP, and other sensitive ecological areas within close proximity to the construction works, well pad sites, CPF, Water Abstraction facility.	Operation
Geology & Soils	Potential impacts on soils physical, chemical and biological properties.	All construction/ decommissioning activities undertaken at Well Pads, CPF, Water Abstraction facility, pipeline routes and Waste Storage areas.	Locations within the Project Area including agricultural areas and those within the MFNP, and other sensitive ecological areas within close proximity to the construction / decommissioning works.	Construction / Decommissioning
	Potential for contamination.	All construction activities undertaken at Well Pads, CPF, Water Abstraction facility, pipeline routes and Waste Storage areas. Operational activities including storage and use of fuels or other chemicals/ materials.	Locations within the Project Area including agricultural areas and those within the MFNP, and other sensitive ecological areas within close proximity to the construction / decommissioning works.	Construction Operation Decommissioning
	Potential loss of top soil (i.e. soil erosion).	All construction / decommissioning activities undertaken at CPF, Wellpads, Water Abstraction facility, pipeline routes and Waste Storage areas.	Locations within the Project Area including agricultural areas and those within the MFNP, and other sensitive ecological areas within close proximity to the construction works.	Construction / Decommissioning
Hydrogeology	Potential impacts on groundwater quality.	Construction / decommissioning and operational activities including drilling, storage of fuel or other materials, management of water runoff, seepage from Wells, discharge of processed and foul water from hydro testing or other operations and discharges of untreated or insufficiently treated sanitary waste.	Groundwater and aquifers located within and hydro-geologically connected to the Project Area.	Construction Operation Decommissioning.

TECHNICAL SUBJECT	POTENTIAL IMPACT	PROJECT ACTIVITIES LIKELY TO CAUSE IMPACT	POTENTIAL RECEPTORS IN THE STUDY AREA	RELEVANT DEVELOPMENT PHASE
	Potential impacts on groundwater flow.	Construction /decommissioning and operational activities including drilling, management of water runoff, seepage from wells, discharge of processed and foul water.	Groundwater and aquifers located within and hydrogeologically connected to the Project Area.	Construction Operation Decommissioning
	Potential indirect impacts on groundwater users (e.g. for drinking water and commercial or agricultural) as a result of potential changes in groundwater flow and quality.	Construction / decommissioning and operational activities including drilling, storage of fuel, management of water runoff, seepage from wells, discharge of processed and foul water.	Residential, commercial and agricultural receptors located within and hydro-geologically connected to the Project Area.	Construction Operation Decommissioning
	Leaching through natural breaks, pores and fractures.	Drilling activities and Waste storage areas.	Groundwater and aquifers located within and hydro-geologically connected to the Project Area.	Construction Operation Decommissioning
	Reduction in infiltration of surface water reaching groundwater.	Construction activities leading to compaction of surfaces, removal of vegetation, removal of natural surface depressions and all Project facilities that will result in new impermeable surfaces.	Groundwater and aquifers located within and hydro-geologically connected to the Project Area.	Construction Operation Decommissioning
Surface Water	Potential for changes in surface water flow regimes.	Construction activities leading to removal of vegetation, compaction of surfaces, removal of natural surface depressions and all Project facilities that will result in new impermeable surfaces.	Rivers, ponds and lakes (including the Nile and Lake Albert) and other surface water bodies located within or hydrologically connected to the Project Area.	Construction / Decommissioning
	Potential for erosion as a result of change in run-off rates and extreme rainfall events.	Construction activities leading to removal of vegetation, compaction of surfaces, removal of natural surface depressions and all Project facilities that will result in new impermeable surfaces. Operation of the Project's components.	Rivers, ponds and lakes (including the Nile and Lake Albert) and other surface water bodies located within or hydrologically connected to the Project Area.	Construction Operation Decommissioning

TECHNICAL SUBJECT	POTENTIAL IMPACT	PROJECT ACTIVITIES LIKELY TO CAUSE IMPACT	POTENTIAL RECEPTORS IN THE STUDY AREA	RELEVANT DEVELOPMENT PHASE
	Potential reduction in the catchment area, which feeds local water resources.	The physical presence of the Project facilities along with the need for collection and treatment of water at certain locations.	Rivers, ponds and lakes (including the Nile and Lake Albert) and other surface water bodies located within or hydrologically connected to the Project Area.	Construction Operation Decommissioning
	Potential for impacts on water quality.	Construction activities with potential to discharge contamination (e.g. spillage of oils, fuel and chemicals) and process water and foul water from operational camps.	Rivers, ponds and lakes (including the Nile and Lake Albert) and other surface water bodies located within or hydrologically connected to the Project Area.	Construction Operation Decommissioning
	Potential impacts on watercourses (banks, beds and hydraulic flow).	Construction of Project components adjacent to or crossing a watercourse (including new roads).	Watercourses located within or hydrologically connected to the Project Area.	Construction / Decommissioning
	Potential for increased flooding risk.	Operation of the Project's components, alternation of terrain, removal of vegetation and increased impermeable surfaces. Natural events such as extreme rainfall and climate change.	The Project's facilities and surface water bodies, residential, commercial and agricultural receptors located within or hydrologically connected to the Project Area.	Operation
Visual Aesthetics	Potential visual amenity impacts resulting from reduced aesthetic quality.	Site preparation and construction activities including vegetation clearance and the physical presence of equipment (e.g. such as rigs, machinery and vehicles) and the finished operational components and lack of sufficient waste management.	Local residents within the Project Area and visitors and users of the protected areas including MFNP.	Construction Operation Decommissioning
	Potential landscape impacts.	Site preparation and construction activities including vegetation clearance and the physical presence of the finished operational components.	Protected landscapes within and with visual connections to the Project Area, including protected areas (including MFNP and Bugungu Wildlife Reserve) and elements of cultural or heritage interest.	Construction Operation Decommissioning
	Potential light impacts at night.	Nigh-time lighting used during both construction activities (e.g. lighting of construction works and camps) and the operation of the permanent Project	Local residents, visitors and users of the protected areas (including MFNP) and terrestrial wildlife within the Project Area.	Construction Operation Decommissioning

TECHNICAL SUBJECT	POTENTIAL IMPACT	PROJECT ACTIVITIES LIKELY TO CAUSE IMPACT	POTENTIAL RECEPTORS IN THE STUDY AREA	RELEVANT DEVELOPMENT PHASE
		facilities.		
Waste	Potential impacts upon existing waste management facilities in the region as a result of the anticipated waste streams.	Waste generation particularly during the variety of construction activities, but also during the operation of the facilities.	Existing waste management facilities in the region and local users.	Construction Operation Decommissioning
	Potential impacts on local communities and environmental media (soil, air, water etc.) in relation to transport and storage and disposal of waste.	All construction / decommissioning activities, such as site clearance and preparation, vegetation clearance, disposal of potentially contaminating material and waste derived from the construction camps. Storage of waste during operation, including operation of the waste treatment facilities.	Local communities, water resources, geology and soils within the Project Area.	Construction Operation Decommissioning
Terrestrial Vegetation	Potential impacts on terrestrial habitats (e.g. Loss of habitat or fragmentation).	Site preparation and construction activities including vegetation clearance.	Habitats in the Project Area, including protected areas likely to comprise Critical Habitats (e.g. MFNP and Bugungu Wildlife Reserve).	Construction and Operation
	Potential impacts on sensitive vegetation.	Site preparation and construction activities including dust from vehicle movements, vegetation clearance and operation of Project's components.	Flora, in particular endemic, rare, plants conservation concern (IUCN Red Data lists) or endangered species, and those sensitive to changes in environmental conditions.	Construction Operation Decommissioning
	Potential increase in presence of invasive species.	Site clearance, vegetation removal and importation of materials during construction / decommissioning. Colonisation of disturbed land during operation of the Project's facilities.	Existing native vegetation and wildlife within the Project Area and surrounding area accessible to wildlife.	Construction Operation Decommissioning
	Potential impact on Threatened species.	Site preparation and construction activities including vegetation clearance.	Habitats in the Project Area, including protected areas likely to comprise Critical Habitats (e.g. MFNP and Bugungu Wildlife Reserve).	Construction and Operation

TECHNICAL SUBJECT	POTENTIAL IMPACT	PROJECT ACTIVITIES LIKELY TO CAUSE IMPACT	POTENTIAL RECEPTORS IN THE STUDY AREA	RELEVANT DEVELOPMENT PHASE
	Potential indirect impacts due to in-migration, induced access. This may include introduction or spread of invasive or alien species.	Increase in presence and movements of personnel and numbers of people supplying/ supporting personnel.	Critical Habitat and trigger criteria & Natural Habitats and other sensitive species that may be vulnerable to increased human presence and exploitation, or competition from invasive species.	Construction and Operation
Terrestrial Wildlife	Potential impacts on terrestrial wildlife (including critically endangered species) as a result of disturbance or loss of habitat and increased human wildlife conflicts. These impacts may be indirect due to in-migration, induced access. May include introduction or spread of invasive or alien species.	Site preparation and construction activities including vegetation clearance. All noise, vibration and light generating construction activities. Operation of Project's components, which might include generation of noise, vibration and light disturbance.	Mammals (including threatened species and Critical Habitat trigger criteria such as the Rothschild Giraffe), birds, herpetiles, and invertebrates (e.g. indictor groups such as butterflies and dragonflies).	Construction Operation Decommissioning
Aquatic Life	Potential impacts on water quality of aquatic habitats.	Construction activities with potential to discharge contamination (e.g. spillage of oils, fuel and chemicals) and process water and foul water from operational camps.	Aquatic habitats likely to comprise Critical Habitats (e.g. MFNP and Bugungu Wildlife Reserve) and other aquatic habitats (lake inshore zones, rivers, streams and wetlands) within or hydrologically connected to the Project Area. Trigger species for Critical Habitats.	Construction Operation Decommissioning
	Potential impacts on diversity and productivity of algae in aquatic environments.	Construction activities with potential to discharge contamination (e.g. spillage of oils, fuel and chemicals), sediment laden runoff and process water and foul water from operational camps.	Aquatic habitats likely to comprise Critical Habitats (e.g. MFNP and Bugungu Wildlife Reserve) and other aquatic habitats (lake inshore zones, rivers, stream wetlands).	Construction Operation Decommissioning
	Potential impacts on faecal coliform count in aquatic environments. May be linked to in-migration, induced access.	Construction and operational activities with potential to discharge untreated or insufficiently treated sanitary waste from temporary or operational camps.	Aquatic habitats likely to comprise Critical Habitats (e.g. MFNP and Bugungu Wildlife Reserve) and other aquatic habitats (lake inshore zones, rivers, stream wetlands).	Construction Operation Decommissioning
	Potential impacts on water quality in open water environments (e.g. River Nile and shores of Lake Albert). May be linked to in-migration, induced access and	Construction activities with potential to discharge contamination (e.g. spillage of oils, fuel and chemicals), runoff and	Macro-invertebrates and fish in open water conditions (e.g. River Nile and shores of Lake Albert).	Construction Operation

TECHNICAL SUBJECT	POTENTIAL IMPACT	PROJECT ACTIVITIES LIKELY TO CAUSE IMPACT	POTENTIAL RECEPTORS IN THE STUDY AREA	RELEVANT DEVELOPMENT PHASE
	improvements in infrastructure allowing more rapid exploitation of natural resources.	process water and foul water from operational camps.		Decommissioning
	Impact on fisheries (including spawning grounds) May be linked to in-migration, induced access and improvements in infrastructure allowing more rapid exploitation of natural resources (e.g. fisheries). May include introduction or spread of invasive or alien species.	Construction activities with potential to discharge contamination (e.g. spillage of oils, fuel and chemicals), sediment laden runoff and process water and foul water from operational camps.	Aquatic habitats likely to comprise fisheries and spawning grounds including lake inshore zones, rivers, and wetlands.	Construction Operation Decommissioning
Historical, Archaeological Sites & Cultural Heritage	Potential direct and indirect impacts on designated and non-designated historical and heritage assets and their setting, resulting in damage and reduced aesthetic value of assets.	Site preparation and construction activities and the physical presence of the finished operational components.	Local residents within the Project Area and visitors and users of the protected areas including MFNP.	Construction Operation Decommissioning
	Potential impacts on archaeological features (known and unknown).	Site preparation and construction/ decommissioning activities, including in particular disturbance of previously undisturbed land.	Known and unknown archaeological features within the Project Area.	Construction / Decommissioning
	Potential indirect impacts cultural sites, resulting in disturbance.	Construction / decommissioning and operational activities with potential to cause noise and vibration, reduce visual aesthetics and restrict access and affect the tranquillity and meaning of the site.	Cultural sites within the Project Areas and users / visitors to the sites.	Construction Operation Decommissioning.
Unplanned Events	Potential impacts on environmental media as a result of an accidental oil spill on site.	All construction activities and during operational activities, in particular within the fuel storage facilities, CPF and generators.	Local communities (residents, business and agriculture), water resources, geology, soils and flora and fauna within the Project Area.	Construction Operation Decommissioning
	Potential impacts on environmental media as a result of an accidental oil spill during import / export of fuel off site.	Shipping, unloading and transfer of fuel into the on-site fuel storage facilities, during construction/ decommissioning and operation.	Local communities (residents, business and agriculture), water resources, geology, soils and flora and fauna within and potentially outside the Project Area.	Construction Operation Decommissioning

TECHNICAL SUBJECT	POTENTIAL IMPACT	PROJECT ACTIVITIES LIKELY TO CAUSE IMPACT	POTENTIAL RECEPTORS IN THE STUDY AREA	RELEVANT DEVELOPMENT PHASE
	Potential impacts on air quality and the climate (through emission of greenhouse gasses) as a result of emergency gas flaring.	Flaring activities during operation of the Project.	Residential and agricultural areas, protected areas including MFNP, and other sensitive ecological areas within close proximity to the well pad sites, CPF, and Water Abstraction facility.	Operation
	Potential for increased noise generation, as a result of emergency gas flaring.	Flaring activities during operation of the Project.	Residential areas, protected areas including MFNP, and other sensitive ecological areas within close proximity to the construction works, well pad sites, CPF, Water Abstraction facility.	Operation
	Potential impacts as a result of vehicle collisions.	Vehicle movements both during construction / decommissioning (e.g. delivering equipment, moving waste) and operation (e.g. operating personnel).	Construction and operating personnel on and off site and existing road users off site.	Construction Operation Decommissioning
Ecosystem Services	Potential impact on the supply and demand of ecosystem services.	All construction/ decommissioning activities and operation of the Project. Key activities include induced development and in migration as a result of project activities and opportunities.	Local communities (residents, business, agriculture and visitor attractions such as MFNP) within and potentially out-with the Project Area.	Construction Operation Decommissioning
Cumulative Impacts	A variety of cumulative impacts have the potential to occur and these will be explored in more detail during the main ESIA (see Chapter 10).	Activities associated with our Project and other identified projects in the agreed CIA study area.	The CIA will focus on Valued Environmental Components (VECs) as explained in Chapter 10 below.	Construction Operation Decommissioning
Community Health & Safety	Potential impact to nutritional status due to loss of household income; loss of farming areas or impacts to fisheries.	Acquisition of land for Project construction Indirect impact from Project induced migration placing pressure on existing resources e.g. fisheries, agricultural land.	Local communities within and potentially out-with the Project Area.	Construction Operation Decommissioning
	Risk of accidents and injury.	All Project activities, in particular Road Traffic	Local communities within and potentially out-with the Project Area.	Construction Operation Decommissioning
	Potential increase in disease (vector borne, communicable and non-communicable such as malaria,	Presence of Project workforce.	Local communities within and potentially out-with the	Construction

TECHNICAL SUBJECT	POTENTIAL IMPACT	PROJECT ACTIVITIES LIKELY TO CAUSE IMPACT	POTENTIAL RECEPTORS IN THE STUDY AREA	RELEVANT DEVELOPMENT PHASE
	cholera and HIV).	(indirectly) Project induced migration. Project waste management.	Project Area.	Operation Decommissioning
	Potential health problems due to Project related environmental hazards (e.g. accidental spills of hazardous substance, dust, noise)	Indirect from Project induced environmental impacts (e.g. soil or water contamination, change to water courses).	Local communities within and potentially out-with the Project Area.	Construction Operation Decommissioning
	Potential increase in alcohol or drug abuse.	Resettlement and compensation. (indirectly) Increased cash incomes from direct and indirect Project employment.	Local communities within and potentially out-with the Project Area.	Construction Operation Decommissioning
	Potential mental health issues caused by disruptions / disintegration of traditional support structures and community cohesion and unmet expectations around Project related economic opportunities.	Presence of foreign Project workforce, Resettlement and compensation process (indirectly) Project induced migration	Local communities within and potentially out-with the Project Area.	Construction Operation Decommissioning
Infrastructure & Services	Potential loss of infrastructure and services.	Project land acquisition.	Local communities within and potentially outside the Project Area.	Construction Decommissioning
	Potential improved access to and quality of infrastructure and services.	Community Development Project. (indirectly) Project revenues and tax payments potentially invested by government in local infrastructure and services.	Local, regional and national population.	Construction Operation Decommissioning
	Potential inaccessibility to key community areas as well as key visitor sights within the protected area.	Project land access related activities	Local community in the project area as well as visitors and users within the protected area.	Construction Operation Decommissioning
	Potential strain on existing infrastructure such as roads, bridges and other services which as a result of overuse by increased vehicles and population deteriorate at an accelerated rate	Increase contractor presence for development phase	Local communities as well as visitors and users within the Project Area.	Construction Operation Decommissioning
Socio-	Potential disruptions to livelihood activities.	Project land acquisition.	Local communities (residents, business, agriculture	Construction

TECHNICAL SUBJECT	POTENTIAL IMPACT	PROJECT ACTIVITIES LIKELY TO CAUSE IMPACT	POTENTIAL RECEPTORS IN THE STUDY AREA	RELEVANT DEVELOPMENT PHASE
Economics, Livelihoods & Use of Natural Resources		Indirectly through environmental impacts e.g. soil or water contamination; loss of top soil; vegetation clearance; impacts on fisheries.	and visitor attractions such as MFNP) within and potentially out-with the Project Area.	Decommissioning
	Potential loss in tourism revenue due to perceived and actual disruptions from Project activities.	All Project activities. Presence of the Project in itself may deter visitors. Indirectly due to environmental impacts e.g. disturbance / destruction of fauna and flora.	Tourism operators in MFNP.	Construction Operation Decommissioning
	Potential economic loss due to damage to assets or injury to livestock from Project related activities.	All Project activities.	Local communities (residents, business, agriculture and visitor attractions such as MFNP) within and potentially out-with the Project Area.	Construction Operation Decommissioning
	Potential changes to traditional livelihood patterns due to introduction of wage based employment opportunities.	Project direct and indirect employment.	Local communities within and potentially out-with the Project Area.	Construction Operation Decommissioning
	Potential loss of access to natural resources used for food, medicine, building materials, livelihoods including reduced access to water..	Project land acquisition.	Local communities within and potentially out-with the Project Area.	Construction
In-migration	Potential impacts on accessibility of ingress routes.	All Project activities.	Local communities within and potentially out-with the Project Area.	Construction / Operation Decommissioning
	Potential increase in pressure on community infrastructure (schools, healthcare services, water resources, power) leading to deterioration in quality of services provided and reduced availability / access.	Project induced migration.	Local communities within and potentially out-with the Project Area.	Construction / Operation
	Potential increase in cost of goods and services.	Project induced migration.	Local communities within and potentially out-with the Project Area.	Construction / Operation Decommissioning

TECHNICAL SUBJECT	POTENTIAL IMPACT	PROJECT ACTIVITIES LIKELY TO CAUSE IMPACT	POTENTIAL RECEPTORS IN THE STUDY AREA	RELEVANT DEVELOPMENT PHASE
	Potential increase in crime rates.	Project induced migration.	Local communities within and potentially out-with the Project Area.	Construction Operation Decommissioning
	Potential increase in conflict between migrants and local populations.	Project induced migration.	Local communities within and potentially out-with the Project Area.	Construction / Operation
	Potential increase in human/wildlife conflict and encroachment on forest/critical habitat.	Project induced migration.	Local wildlife and flora.	Construction
	Cultural change.	Project induced migration.	Local communities within and potentially out-with the Project Area.	Construction Operation Decommissioning
Communities & Social Cohesion	Potential conflict and tension between communities, local leadership and Project Developers due to perceived lack of transparency and unmet expectations around Project benefits and employment.	Resettlement and compensation process. Project induced migration. Project infrastructure (e.g. transport routes) disrupting traditional pathways connecting communities. Disturbances from noise / dust / pollution during construction activities. Consultation and engagement strategies. Recruitment strategies.	Local communities within and potentially out-with the Project Area.	Construction Operation Decommissioning
	Potential breakdown of or conflict within family units.	Resettlement and compensation process.	Local communities within the Project Area.	Construction
Governance & Benefit Sharing	Potential erosion of confidence in leadership structures due to unmet expectations from communities placed on local and district governments (e.g. around securing benefits or employment for communities).	Project presence.	Local communities within and potentially out-with the Project Area.	Construction Operation Decommissioning
	Potential development of governance capacities and empowerment of local communities.	Training and capacity building.	Local communities within and potentially out-with the Project Area.	Construction Operation

TECHNICAL SUBJECT	POTENTIAL IMPACT	PROJECT ACTIVITIES LIKELY TO CAUSE IMPACT	POTENTIAL RECEPTORS IN THE STUDY AREA	RELEVANT DEVELOPMENT PHASE
				Decommissioning
Employment & Economic Development	Potential improvements to individual and household wellbeing due to increased income from direct and indirect employment.	Project direct and indirect job creation.	Local, regional and national population.	Construction Operation Decommissioning
	Potential enhancement of skills and professional experience.	Project direct and indirect job creation. Capacity building and training programmes through National Content initiatives.	Local, regional and national population.	Construction Operation Decommissioning
	Potential macroeconomic improvements and improved development context.	Revenues and taxes generated by the project at local, regional and national level.	Local, regional and national population.	Construction Operation Decommissioning
Land Use and Resettlement	Potential physical and economic displacement.	Land acquisition.	Local communities (residents, businesses, farmers, fishermen, livestock herders, tourism operators) within the Project area.	Construction Decommissioning
	Potential increase in Land disputes.	Resettlement and compensation process.	Local communities (residents, farmers, livestock herders) within the Project area.	Construction
	Potential changes in Land Use and Land Tenure.	Land acquisition, Resettlement and compensation process and In-migration.	Local communities (residents, businesses, farmers, fishermen, livestock herders, tourism operators) within the Project area.	Construction Operation
	Potential inflation of land prices, risk of speculative activities.	Resettlement and compensation process.	Local communities (residents, businesses, farmers, fishermen, livestock herders, tourism operators) within the Project area.	Construction
	Potential impeded access to / recognition of land rights leading to increased economic vulnerability.	Land acquisition and resettlement and compensation process.	Local communities – specifically vulnerable groups such as women, youth, illiterate, refugees.	Construction
Labour and Working Conditions	Potential injury or loss of life due to insufficient occupational health and safety standards.	All Project activities.	Project workforce (including subcontractor workforce).	Construction Operation Decommissioning

TECHNICAL SUBJECT	POTENTIAL IMPACT	PROJECT ACTIVITIES LIKELY TO CAUSE IMPACT	POTENTIAL RECEPTORS IN THE STUDY AREA	RELEVANT DEVELOPMENT PHASE
	Potential injury, loss of life or impacts on mental well-being due to insufficient workforce accommodation standards.	Workforce accommodation.	Project workforce (including subcontractor workforce).	Construction Operation Decommissioning
	Potential impacts on wellbeing of workers due to workplace discrimination.	Project recruitment and employment.	Project workforce (including subcontractor workforce).	Construction Operation Decommissioning
	Potential impacts on wellbeing of workers due to infringement of labour and employment rights (e.g. risk of forced or child labour; denial of freedom to associate and collective bargaining; excessive working hours).	Recruitment and employment in Project supply chain.	Subcontractor Workforce.	Construction Operation Decommissioning

ESIA TERMS OF REFERENCE

09

9 ESIA TERMS OF REFERENCE

9.1 INTRODUCTION

This Chapter of this ESIA Scoping Report draws upon the findings of Chapter 8 and describes, in more detail, the proposed scope of works for each of the key technical topics covered within the ESIA process. For each of the identified technical disciplines (as listed in Chapter 8) a narrative has been produced which outlines:

- The key objectives of the study; and
- The scope of work to be undertaken for the main ESIA, including:
    - Preliminary identification of the Study Area;
    - Additional Baseline Data Collection;
    - Potential requirement for any modelling (only where necessary); and
    - Approach to the Impact Assessment.

As required, each technical discipline lead will liaise with relevant stakeholders to discuss and agree the proposed scope and methodology of assessment as part of the engagement process for the main ESIA Report. As part of the main ESIA, Field Work Plans will be developed detailing the specific methodologies to be employed for the baseline data collection efforts. In addition, methodologies for modelling and impact assessment techniques will be further refined and described in the main ESIA Report.

9.2 ESIA STUDY AREAS

The extent of the required Study Area for individual technical subject will differ depending on the existing baseline and nature of any potential impacts. Consequently, each of the following sections includes an outline of the extent of the Study Area considered for each particular technical topic. The exact extent of each Study Area will be further defined during the main ESIA process and confirmed within the ESIA Report.

9.3 AIR QUALITY ASSESSMENT

9.3.1 Objectives

The main objectives of the air quality assessment will be:

- To define the study area for the air quality assessment;
- To describe baseline ambient air quality and meteorological conditions using information from the previous studies and additional baseline data collection activities in the field;
- To review applicable air quality legislation and standards;
- To undertake appropriate consultation with relevant stakeholders;
- To identify receptors that can be affected by changes in the air quality (human health is the key receptor) and evaluate their sensitivity based on the findings of the baseline study and stakeholder consultation;
- To develop an emissions inventory, which identifies potential sources of air emissions associated with the Project and quantifies emission rates from each source based on published emission factors or information from the client. The pollutants that will be considered are nitrogen dioxide (NO_2), sulphur dioxide (SO_2), ozone (O_3,) hydrogen sulphide (H_2S), volatile organic compounds (VOCs) and dust for local air quality and carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) for greenhouse gas emissions;
- To undertake dispersion modelling to predict short-term and long-term concentrations of key pollutants due to emissions from the Project;

- To assess the model predictions against:
    - Local and international standards/ guidelines; and
    - Current baseline air quality concentrations.
- Assessment and recommendation of various technological alternatives to minimise/abate air quality emissions to the atmosphere should the impact be considered to be significant;
- Regional and national annual GHG[14] emissions will be sought from the public data sources and relevant stakeholders; and
- Assess the residual effects following the application of mitigation measures.

An Air Quality chapter will be included within the main ESIA Report detailing the assessment methodology and criteria, assumptions, data inputs and results of the air quality modelling (in the form of contour plots) and assessments. Supporting technical appendices (included graphics) will be provided with the report.

9.3.2 Scope of Work

The air quality and Green House Gas (GHG)/climate change assessment will include the following scope of work.

9.3.2.1 Study Area

Air quality is affected by the levels of pollutants found in the air which if present at sufficient concentrations over a certain period of time have the potential to affect human health and well-being.

The Study Area with respect to air quality is considered to encompass the key elements of the Project footprint having the potential to effect local air quality (i.e. CPF, well pads, construction areas, base camps, and roads), a 20 km buffer zone for the CPF and 1 km buffer for other activities. The ESIA will also consider a wider area (Project Area of Influence) for assessing impacts on air quality from unplanned/accidental events and cumulative impacts.

The GHG emissions from the Project can also contribute to the global warming/ climate change effect. The study area for GHG assessment will be the Project footprint and the associated impact significance will be considered in the context of national and regional GHG emissions.

9.3.2.2 Baseline Data Collection and Assessment

The desktop baseline study will collate existing air quality and meteorological information acquired from the previous surveys. A review will also be undertaken of the underlying trends and variations linked to climate change. A review of applicable air quality legislation, policies and standards will be undertaken. The initial data gap analysis undertaken for the Scoping Phase will be extended to ensure all available baseline information is incorporated into the main ESIA Report as necessary.

Additional primary data will be collected to characterise the air quality in EA-1/ EA-1A and EA-2. This will be achieved through the analysis and the interpretation of the data collected during two field survey campaigns, which will be undertaken in one wet season and one dry season.

The number and location of survey locations will be informed by the findings of a detailed desktop study and distribution of sensitive receptors; however it is anticipated that at least 12 locations will be investigated with the following tentative distribution:

- Three locations in the proximity of the CPF facility and associated construction and base camps;
- Three locations in EA-1/ EA-1A (considering availability of data from EA1 EBS (AECOM, 2015 Ref. 9-1); and
- Six locations in the northern part of EA-2.

Precise air quality survey locations will be identified by the field operative to ensure a representative monitoring position with cognisance to health and safety requirements and equipment security.

[14] *Under the Kyoto Protocol, six Green House Gasses (GHGs) are specified, namely carbon dioxide (CO2), methane, nitrous oxide, Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs) and sulphur hexafluoride. The dominant GHG emissions from the proposed Project are carbon dioxide, methane and nitrous oxide and the specialist study will focus on these emissions.*

A set of passive samplers will be deployed at each air quality survey location. NO_2, SO_2, NO_2, O_3, H_2S and VOC's will be measured. In addition, a long term monitoring station will be established near the CPF site using the AQ Mesh monitoring system.

Samplers will be collected after the defined exposure time, stored and shipped to Europe for analysis of the pollutant concentrations at an accredited laboratory.

9.3.2.3 Air Modelling

Dispersion modelling will be undertaken using the United States Environmental Protection Agency AERMOD model, which will be used to predict ground-level concentrations of oxides of nitrogen (NO_x), NO_2, SO_2 and particulate matter (PM_{10}). The modelling will utilise emission rates developed for each process and stack/source parameters.

Results will be predicted at identified discrete sensitive receptor locations and presented in both tabular format and as contour plots on a regional base map. Modelling will be undertaken using local meteorological data. Primary land use categories (i.e. residential, recreational, industrial, agricultural etc.) for the modelling will be consistent with those in the previous environmental baseline work.

9.3.2.4 Air Quality Impact Assessment

An assessment of air quality impacts will be undertaken for each phase of the Project. A qualitative assessment will be undertaken to determine the Project's potential dust impact during the construction phase. The assessment will be carried out according to guidance issued by the United Kingdom (UK) Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction (Ref. 9-2).

A quantitative assessment will be undertaken in respect to both the construction and operational phases. The predicted ground-level concentrations from the dispersion modelling exercise will be combined with the existing baseline pollutant concentrations. The potential impacts on identified sensitive receptors will be predicted. The concentrations of NO_2, NO_x, PM_{10} and SO_2 will be compared against the draft Air Quality Standards for Uganda (2006) and WHO Guidelines.

Greenhouse gas emissions for the Project will be estimated from the activities expected to take place and emission factors from published literature. Total greenhouse gas emissions will be reported in terms of tonnes per year. This will be compared with reported national emissions and the significance discussed in terms of proportional increase in comparison to existing emissions.

The potential impacts will be assessed against the specified Project significance criteria to determine the magnitude of impact and its significance, with mitigation proposed as appropriate. Appropriate mitigation measures to reduce the potential air quality impacts of the Project to an acceptable level will be presented in accordance with good international industry practices.

Cumulative and in-combination effects from selected other developments will also be considered in the ESIA.

9.4 NOISE IMPACT ASSESSMENT

9.4.1 Objectives

The main objectives of the assessment of potential noise impacts will be:

- To define the study area for noise assessment;
- To describe baseline noise conditions using information from the previous studies, and the where necessary, additional primary baseline data collection activities;
- To review applicable national legislation and relevant guidance/standards for noise;
- To undertake appropriate consultation with relevant stakeholders;
- To identify noise-sensitive receptors (NSR) that may be affected by Project related noise during both construction and operation phases;
- Undertake noise modelling to predict construction and operation noise levels and prepare a noise map of noise levels across the study area;

- Assessment of construction and operational noise levels on the identified NSRs in relation to:
    - Local and international standards/ guidelines;
    - Current baseline noise levels.
- Provide recommendations for mitigation measures during both construction and operation phases; and
- Assess the residual effects following the application of mitigation measures.

A Noise chapter will be included within the main ESIA Report detailing the assessment methodology and criteria, assumptions, data inputs and results of the noise modelling (in the form of noise contour plots) and assessments. Supporting technical appendices (included graphics) will be provided as necessary.

9.4.2 Scope of Work

The noise assessment will include the following scope of work.

9.4.2.1 Study Area

The Project has the potential to cause noise disturbance to both human and ecological receptors.

The Study Area will be defined to include noise sensitive receptors (NSRs) that may be affected by noise during construction and operation phases associated with the Project. Key elements of the development that will be considered as potential sources of noise will include CPF, well pads, construction areas, camps, as well as Heavy Goods Vehicle (HGV) movements along access and frequently used roads.

At present it is envisaged that the study area and potential noise effects will be limited to a 1 km buffer zone around the Project key elements. This will be further defined during the main ESIA process, taking into account any comments and feedback as part of the stakeholder consultation program.

9.4.2.2 Baseline Data Collection and Assessment

Introduction

Noise measurements are required to determine the background noise levels at the NSRs around the Study Area in order to assess the effects of noise during the construction and operation phases of the proposed Project.

The noise measurements will be undertaken following the principles and guidance of ISO1996-1:2003 '*Acoustics - Description and measurement of environmental noise — Part 1: Basic quantities and assessment procedures'*:

Survey Method

The noise survey will be undertaken to establish the baseline noise environment at the identified locations. The measurements will be carried out to determine the 'representative' noise environment, i.e. the typical noise environment that would normally be experienced at that location. Observation notes of dominant and additional noise sources will be made during the measurements in order to accurately describe the noise environment at each measurement location.

The exact scope of the measurements including measurement locations will be determined during the main ESIA phase and will include discussions with client and relevant stakeholders with the aim of meeting the scope given above and the detailed requirements of the assessment. At this stage it is envisaged that measurements will comprise of the following:

- Daytime noise measurement for the duration of up to 1 hour;
- A 360° picture of the sampling/measurement location;
- GPS data during each measurement; and
- All measurements shall be accompanied by detailed site notes to identify all audible noise sources recorded on the reporting template and to provide context of the noise environment at each location.

Since the majority of construction and operation works are likely to be carried out during daytime hours, no night-time measurements are proposed as part of the survey. Where any night-time construction and operation works are proposed, these will be assessed against the absolute noise level criteria presented in the Uganda *'National Environment (Noise Standards and Control) Regulations, 2003: Noise Level Guidelines'* *(Ref. 9-3).*

The measurements will include the following sound level indicators as defined in ISO1996-1:2003 '*Acoustics - Description and measurement of environmental noise — Part 1: Basic quantities and assessment procedures (Ref. 9-4)'*:

- Average noise level $L_{Aeq,T}$ is the equivalent continuous A-weighted sound pressure level, in decibels, determined over a time interval T;
- Background noise level $L_{A90,T}$ is the A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90% of a given time interval T; and
- Statistical noise level $L_{A10,T}$ is the A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 10% of a given time interval T.

For each noise measurement, the values of L_{eq} for each weighting curve (A, C, Lin) will be recorded, including Slow, Fast and Impulse time weighted values. The Sound Level Meter (SLM) will also enable analysis in third octave bands to highlight the presence of tonal components at the measuring points.

All equipment will hold a current calibration certificate issued by a certified calibration laboratory, and field checks of the sound level meter and microphone calibration will be carried out before and after each measurement to ensure no calibration drift.

Measurements will be carried out during weather conditions conducive to environmental noise measurements i.e. no rain and wind speeds less than 5 m/s.

Final reporting of the baseline survey methodology and results will be prepared by AECOM. Noise data will be provided in the form of tabulated data for each measurement position indicating time, sampling period and measured parameters for each reading.

Survey Locations

The number and location of survey locations will be informed by the findings of a detailed desktop study and distribution of NSRs; however it is anticipated that at least 12 locations will be investigated with the following tentative distribution:

- Three locations in the proximity of the CPF facility and associated construction and base camps;
- Three locations in EA-1/ EA-1A (considering availability of data from EA1 EBS (Ref. 6-1); and
- Six locations in the northern part of EA-2.

Precise noise monitoring locations will be identified by the field operative to ensure a representative monitoring position with consideration to health and safety requirements and equipment security.

9.4.2.3 Noise Modelling

3D noise models for the construction and operation phases of the scheme will be prepared using the CadnaA digital noise modelling software package (CadnaA®, registered trademark of Datakustik GmbH (Munich, Germany), www.datakustik.com). CadnaA predicts noise levels based on the appropriate input data (e.g. location and orientation of noise sources, sound power data and operating times etc.). All noise sources considered in this study will be modelled as noise sources propagating outdoors.

CadnaA uses the methodologies described within ISO 9613:1996 '*Acoustics - Attenuation of Sound during propagation outdoors Part 1 – Calculation of the absorption of sound by the atmosphere'* and '*Part 2 – Attenuation of sound during propagation outdoors'* for the prediction of environmental noise in and around the Project Area. This methodology is accepted as an industry standard for the prediction of environmental, road traffic, rail and industrial noise propagation.

The model outputs will comprise noise contour plots illustrating predicted noise emission levels experienced at surrounding receptors at a height of 1.5 m above ground level. Predicted noise levels at selected NSRs for each of the model scenarios will be tabulated and provided in the reporting.

9.4.2.4 Noise Impact Assessment

The assessment of construction and operation phase noise levels will be in line with the Uganda *'National Environment (Noise Standards and Control) Regulations, 2003: Noise Level Guidelines' (Ref. 9-3)* and WHO Guidelines.

The primary focus of assessment of potential effects will be at residential NSRs, although consideration will be given to ecological receptors. Effects will be assessed according to whether they are temporary or permanent, direct or indirect, or cumulative. Impacts will be assessed for each of the key phases of the Project.

Where significant impacts are identified, measures to reduce noise will be proposed. The effects of construction noise can largely be controlled through the implementation of measures such as limiting construction hours and undertaking construction works in accordance with good practices as described in '*British Standard 5228:2009 'Noise and vibration control on construction and open sites'*. The effects of operation noise (industrial noise sources, fixed plant installations) can largely be controlled the implementation of measures such as use of acoustic enclosures or lagging on generators, consideration for the layout and location of equipment and fixed plant, and use of suitable noise control measures on any proposed flare stacks.

Following implementation of all identified mitigation measures, an assessment will be provided regarding the anticipated residual effect of each noise or vibration effect at nearby NSRs.

The potential for cumulative noise effects of the Project will also be assessed based upon review of information available to the team relating to relevant proposed or consented Projects in the vicinity of the Project area.

9.5 GEOLOGY & SOILS IMPACT ASSESSMENT

9.5.1 Objectives

The main objectives of the geology and soils assessment will be:

- To define the study area for the geo-morphological /soil assessment;
- To understand and describe baseline geological, geo-morphological and soil conditions using information from the previous studies, and where necessary from additional primary data collection to be undertaken during field surveys as part of the main ESIA process;
- To review applicable soil legislation and standards;
- To undertake appropriate consultation with relevant stakeholders;
- To identify soil receptors types, use and importance, and evaluate their sensitivity;
- Using source-pathway-receptor model predict potential impacts during construction, operation and decommissioning;
- Assessment and recommendation of mitigation measures; and
- Consideration of residual impacts.

9.5.2 Scope of Work

The terrain and soils assessment will include the following scope of work.

9.5.2.1 Study Area

The Project study area is considered to encompass the Project footprint. The ESIA will also consider a wider area (Project Area of Influence) for assessing impacts on geo-morphological and soil conditions from unplanned/accidental events and cumulative impacts.

9.5.2.2 Baseline Data Collection and Assessment

The geology and soil baseline assessment will use a combination of desk based review of terrain unit maps, geological maps and other reports. The field work will be based on ground truthing and confirming soils classification, contamination and erosion susceptibility.

The baseline primary data collection will include preparing field work plans, undertaking fieldwork, laboratory analysis (using accredited European laboratory) and reporting of results. Methods for soil sample collection, storage and transportation will be based, where applicable, on ISO 10381-2:2002 Soil Quality – Sampling – Part 2: Guidance on sampling techniques (Ref. 9-5).

Soil sampling will be undertaken in order to obtain samples that are representative of the conditions in the area of investigation. Soil samples will be collected using the following methods:

- From excavation pits using a mechanical excavator (a disturbed soil sample is collected);
- From hand auguring activities (a disturbed soil sample is collected using this method); and
- From hand excavated holes (both disturbed and undisturbed soil samples can be collected using this method).

Composite soil samples will be collected using a method described as the “envelope” method. A composite soil sample in this case shall consist of five sub-samples – one from each corner and one from the centre of the observation area (usually a 10 m x 10 m square) and then combined to create one composite sample. No fewer than five sub-samples shall be taken when following the “envelope” method. When undertaking sampling at an EOP, one composite sample is collected from the surface (0-5cm) and another from depths of 5cm to 20cm.

Soil description will be consistent with the standards set out in ISO 11259 (1998); Soil Quality – Simplified Soil Description (Ref. 9-6):

- Designation of soil type;
- Grain size (descriptive, i.e. sand, silt, clay or mixture);
- Colour;
- Degree of consolidation;
- Moisture content;
- The presence of organic material (roots, etc.);
- Whether there is any evidence of contamination; and
- Any other relevant observations.

Discrete sampling, i.e. specific to a geological horizon, would be undertaken where specific particle size testing or chemical testing is required on a specific geological horizon.

The soil parameters to be analysed in an accredited laboratory will be consistent with the EA-1 EBS study, and will include general parameters (i.e. pH, particle size distribution etc.), metals, BTEX, and TPH.

A Soil and Geology chapter will be provided within the main ESIA Report. The outcomes from the geology and soils baseline data collection will be:

- Collated data from all previous studies pertinent to the Study Area;
- Refined and more detailed terrain and geological mapping;
- Survey data on soils classification, land contamination and erosion susceptibility;
- Identification of soil types and land classifications; and
- Reporting, mapping and GIS data of soil and terrains.

9.5.2.3 Impact Assessment

The Project involves sub surface oil exploitation which could potentially impact physical and chemical characteristics of soil.

The impact assessment will focus on soil quality and integrity in a geological context of the study area and in relation to land uses and ecosystem services it provides. Legal requirements and guidelines on soil quality, use and restoration will be based on regional, national and international standards including those from the Directorate of Water Resources Management and IFC guidelines and Performance Standards (Ref. 9-7).

The geology and soil impact assessment for the Project will include the following tasks:

- A qualitative assessment of potential terrain and soil impacts arising from the Project against the defined baseline conditions, anticipated to include:
    - Contamination of soil - identification and assessment of impacts based on source- pathway-receptor based approach;
    - Evaluating the risk of a soil erosion during construction activities;
    - Assessing impacts from potential borrow pits;
    - Sensitive Sites: consider impacts related to protected sites, soft ground, oil seeps etc.; and
    - Changes in land use due to changes in soil characteristics.
- A defined matrix for magnitude of impact/sensitivity of receptor will be utilised to determine the significance of the potential impacts;
- Propose suitable mitigation measures for significant potential impacts; and
- Consideration of residual impacts.

9.6 SURFACE WATER IMPACT ASSESSMENT

9.6.1 Objectives

The primary objective of the assessment will be to develop an understanding of surface water quality and availability within the catchment areas across the Project area, and to identify an appropriate management approach to preventing and minimising Project potential impacts on water resources. The major catchments in the Project area convey surface water flow into Lake Albert, Albert Nile, and Victoria Nile.

The first step in the process will be to describe the baseline hydrological regime and surface water characteristics in terms of availability and use, quality and sensitivity. This information will be sourced from the previous studies, stakeholder consultation and supported by additional primary data to be collected via field surveys during the main phase of the ESIA. Assessing sensitivity is particularly important for healthy watersheds, and facilitates the prioritization of protection strategies to prevent or minimize degradation. The vulnerability or sensitivity of surface water will be evaluated based on a number of factors including hydrological regime, current levels of pollution, and importance for local and regional ecosystems.

Surface waters can be affected by various land activities, associated with water abstraction, use and discharge, in terms of water availability, flow, quality, and ecosystem balance. Catchments are the natural scale to consider surface water resources management. A coordinated mitigation is desirable at the catchment level by all those who use water or influence land management and this requires greater engagement and support by stakeholders at the catchment as well as local level, supported by the Ministry of Water and Environment and other organisations. This is particularly important when trying to address the pressures placed on the water environment by multiple developments in Albertine Graben. The ESIA will assess Project impacts on surface waters using a catchment based approach.

9.6.2 Scope of Work

The surface water assessment will include the following scope of work.

9.6.2.1 Study Area

Given the nature of the Project, the study area for the surface water assessment is considered to encompass key elements within the Project footprint having the potential to impact water quality, availability, or the environment (i.e. Lake Albert water abstraction facility, CPF, well pads, construction and waste storage areas, base camps; and pipeline corridor), including a 2 km buffer zone.

The ESIA will also consider a wider area (Project Area of Influence) for assessing impacts on surface water resources and respective catchments from unplanned/accidental events and cumulative impacts.

9.6.2.2 Baseline Data Collection and Assessment

Water bodies, wetlands and watercourses that might be affected by Project activities, e.g. run-off from oilfield infrastructure, or wetlands whose supply could be affected through changes in hydrology as a result of such infrastructure, will be studied to determine their status and vulnerability. A field survey will be undertaken where secondary data from the previous studies and stakeholder consultations are not sufficient, as part of the main ESIA phase, in order to close information gaps critical for completing an appropriate impact assessment.

During the field survey, sampling locations will be selected along the main watercourses within the surface water assessment Study Area, including key ephemeral tributaries, and key standing waters or wetland areas. Information gathered as part of the previous baseline studies will inform sampling locations. Sample locations will also be influenced by likely locations of key Project infrastructure, including watercourse crossings, facilities and the well-pads, as well as historical information on seepage trends. Location of settlements and areas of eco-hydrological importance will also be considered.

LiDAR data (provided by the client) will be used as part of the assessment process to delineate the watercourse catchment boundaries to ensure that sampling points are selected from key sub catchments that would be potentially impacted by elements of the Project.

The existing studies including those conducted by Atkins and AECOM will be reviewed to asses whether they are sufficient to provide background data to inform the ESIA and a monitoring plan commensurate with the sccope of the Project. Pending the definition of watershed health parameters, seasonality may be an important factor in the definition of base line conditions.

Surface water samples will be collected using prescribed sampling methods to ensure collection of representative samples and prevent cross-contamination. A portable instrument will be used to measure field parameters such as temperature, dissolved oxygen, pH, conductivity, oxidation-reduction potential and suspended solids/turbidity. The multi-parameter water quality field meter will be calibrated daily as per manufacturer's instructions.

Surface water samples will also be containerized, labelled, preserved (as appropriate), and shipped to a certified analytical laboratory for analysis of pollutants and key water quality chemical parameters. Additional field information regarding surface water flow direction, water depth, water appearance, GPS sample coordinates, and weather conditions, i.e. precipitation, will be recorded. Hydromorphological observations will also be recorded on a field form developed from geomorphological assessment templates as appropriate. All field activities will be documented on field forms, including deviations from planned activities.

All sample containers requiring preservative will come pre-preserved from the chosen accredited laboratory. Samples will be transported from the field to Entebbe by vehicle or on aircraft, if available. If required, an export permit will also be obtained from the Mining Commissioner if required.

Table 9-1 presents the preliminary list of analyses that will be carried out on collected water samples. General parameters such as total dissolved solids, alkalinity and hardness will be also evaluated.

A Surface Water chapter will be included within the ESIA. The outcomes from the surface water baseline data collection will include:

- Data from the previous studies pertinent to the study area;
- Refined and more detailed surface water mapping;
- Survey data on surface water conditions; and
- Reporting, mapping and GIS data.

Table 9-1: Water Sample Analyses

PARAMETER	ANALYTICAL METHOD	CONTAINER	PRESERVATION
Total Petroleum Hydrocarbons (TPH)	In house method, in acc. to EPA 8015b	250ml amber glass with H_2SO_4	H_2SO_4 pH 1-2
Mono Aromatic Hydrocarbons (BTEX)	In house method, in acc. with ISO 11423-1	40ml amber glass vial with H_2SO_4	H_2SO_4 pH 1-2, 1–5 °C
Metals (Arsenic-As, Barium-Ba, Cadmium-Cd, Chromium-Cr-total, Copper-Cu, Iron-Fe, Manganese-Mn, Mercury-Hg, Nickel-Ni, Lead-Pb, Uranium-U, Zinc-Zn)	NEN-EN-ISO 17294-2	50 ml PE with HNO_3	HNO_3 pH<2
Major Anions (Bromide-Br, Chloride-Cl, Fluoride-F, Nitrate/Nitrite-NO_3/NO_4, Phosphorous - P, Sulfate-SO_4)	NEN-EN-ISO 10304-1	100 ml PE	1-5 °C
Major Cations (including Calcium-Ca, Magnesium-Mg, Sodium-Na, Potassium-K, Ammonia-NH3)	NEN-EN-ISO 17294-2	50 ml PE with HNO_3	HNO_3 pH<2
Turbidity	US EPA Method No. 180.1, Turbidity or ISO 7027 - Water Quality: Determination of Turbidity	Plastic or glass	Cool, 4 °C
Suspended sediments	ASTM Standard Test Method D 3977-97	Plastic or glass	Cool, 4 °C
Total suspended solids	ASTM Standard Test Method D 3977-97	Plastic or glass	Cool, 4 °C

9.6.2.3 Impact Assessment

Hydrological, Geomorphological and Water Quality Analysis

The impact assessment will evaluate potential impacts of all phases of the Project on water resources and watershed health. The concept of watershed health incorporates key components such as biology, connectivity, geomorphology, hydrology, and water quality. Current watershed functionality and health will be assessed, as will the potential impacts of the Project in-combination with other developments and activities taking place in the Project Area.

Catchments within the Project Area will be delineated, as will discrete permanent and ephemeral watercourses, springs and wetlands.

These results will be used to determine likely intensity of impacts through the identified pathways. Examples of potential water resource impacts include:

- Changes in surface water flow regimes and potential risk to downstream receiving environments, villages and communities (e.g. effect of channel filling or water crossing construction on flow conveyance characteristics and properties);

- Geomorphological impact and water quality impact from upgrades to the barging station across the Nile;
- Impact on the Victoria Nile from the construction of the flow line connection;
- Reduction in or degradation of available surface water resources and impact on other water users due to project water abstraction (e.g. from Lake Albert), use and potential discharge;
- Loss or degradation of wetlands;
- Reduction of watercourse flow conveyance capacity (e.g. due to placement of fill or construction of water crossings) and impact on hydrological and ecological characteristics and processes;
- Change in overland runoff flow characteristics, quantity and quality (e.g. due to temporary or permanent removal of vegetation and construction of facilities);
- Pollution of surface waters from operational discharges, leaks and spills of oil and chemicals, and contaminated runoff from developed areas; and
- Increased erosion and sedimentation.

Surface Water Impact Assessment

The impact assessment will focus on water resources (quality, quantity and availability) and watershed health within identified catchment areas. The impact assessment will involve a qualitative and quantitative evaluation of the Project's potential impacts compared to baseline conditions on other water users, water quality, and ecological functions of surface water resources. Consideration of the legal requirements and guidelines on water quality for different uses, abstraction and discharge will be based on regional, national and international standards including those from the Directorate of Water Resources Management and IFC guidelines and Performance Standards.

Legal requirements and guidelines on water quality for different uses, abstraction and discharge will be based on regional, national and international standards including those from the Directorate of Water Resources Management and IFC guidelines and Performance Standards.

The surface water impact assessment for the Project will include the following tasks:

- Identifying Project activities with potential to affect surface water quality or hydrological regime, and their location in relation to the potential users and ecologically sensitive sites;
- Identify watershed catchments, permanent and ephemeral watercourses, springs, and wetlands associated with the Project Area will be delineated and characterized;
- The current health of the affected catchments will be assessed by evaluating existing biological characteristics, connectivity, geomorphology, hydrology, and water quality;
- Project activities and elements with the potential to affect surface water quality or the hydrological regime will be identified, and their location established in relation to potential users and ecologically sensitive sites;
- The sources and rates of Project-related water abstraction and usage will be defined, as will the fate and disposition of the abstracted water, its characteristics and flow, and the resultant potential impact on water resources;
- An estimate of peak flows for main river systems transecting the surface water assessment Study Area will be determined, and estimates generated of lower flows using low flow software adapted for local meteorological data, catchment characteristics and catchment sizes.
- The potential impact of the Project on surface runoff quantity and quality will be assessed by evaluating the area of land disturbance (both short and long term), especially in areas containing erodible soils;
- The potential impact on wetland resources will be assessed by evaluating the location, ecological characteristics and area of affected wetlands;

- The extent to which project elements such as roads, pipelines and facilities would potentially interfere with or affect water resource availability, quality and use will be evaluated using measurable criteria such as length and area of proposed roads, pipeline corridors, and the number of proposed water crossings;
- Using aerial photography, previous EBS data and other sources of data, the likely geomorphological regime of the Victoria Nile to determine potential for impact from the proposed river barging facilities will be evaluated;
- Engagement with regulators and stakeholders to discuss interim findings, initial impact assessment and potential mitigation options to inform the final assessment;
- Assessment and recommendation of mitigation measures for potential significant impacts; and
- Consideration of residual impacts.

9.7 GROUNDWATER IMPACT ASSESSMENT

9.7.1 Objectives

The primary objective of the assessment will be to develop conceptual 'source-pathway-receptor' models representative of different hydrogeological regimes within the Study Area, and to identify an appropriate management approach to preventing and minimising Project potential impacts on groundwater resources.

The first step in the process will be to describe the baseline hydrogeological regime and associated characteristics of groundwater in terms of availability and use, quality and vulnerability. This information will be sourced from the previous studies, stakeholder consultation and supported by additional primary data (as required), which will be collected during field surveys undertaken as part of the main ESIA. Groundwater vulnerability (a measure of how easily contamination can reach groundwater from surface sources) will be evaluated based on a number of factors including the geological setting of the aquifer, the infiltration zone, and the depth of the water table.

The source-pathway-receptors analysis will be used to predict potential groundwater impacts during construction, operation and decommissioning phases of the Project.

9.7.2 Scope of Work

The hydrogeology assessment will include the following scope of work.

9.7.2.1 Study Area

The Project study area with respect to groundwater resources is considered to encompass the key elements of the Project footprint having the potential to affect water quality or availability (CPF, well pads, construction areas, base camps; pipeline corridor) within a 2 km buffer zone. This is based on the understanding that groundwater reserves are mainly contained in localised unconfined aquifers with no regional aquifers present in the Albertine Graben.

The ESIA will also consider a wider area (Project Area of Influence) for assessing impacts on groundwater resources from unplanned/accidental events and cumulative impacts.

9.7.2.2 Baseline Data Collection and Assessment

Hydrogeological baseline data from previous environmental baseline studies will be utilised, along with a review of meteorological data and groundwater dependent ecosystems/ wetlands in the Albertine Graben with a focus on areas where infrastructure development is likely.

Groundwater is present in meso/ceno-zoic sedimentary rocks and is used in many areas by local communities for drinking and domestic purposes. An Environmental Sensitivity Atlas for the Albertine Graben (NEMA, 2009, Ref. 9-8) highlights groundwater use and sensitivity. Evidence from boreholes and shallow wells indicate relatively high water table conditions in many places. Such conditions imply high sensitivity of the water resources to oil exploration and development activities.

Wetland features which are fed from a combination of surface water and groundwater are to be preserved and enhanced where practicable. A thorough understanding of the hydrogeology and groundwater

dependent ecosystems is therefore essential. Similarly, the interaction of groundwater and surface water is important so that consequent effects of changes to the surface water environment on the groundwater environment and vice versa can be assessed.

There are naturally occurring oil seeps in some areas and contamination related to past and present industrial activity. The location and source of these will feed into the baseline assessment so that pre development conditions with respect to groundwater pollution is clearly identified and not subsequently attributed to the Project.

The baseline primary data collection will include preparing field work plans, undertaking fieldwork, laboratory analysis (using accredited European laboratory) and reporting of results. Methods for sample collection, storage and transportation will be based, where applicable, on ISO 5667-11:1993 – *Water Quality – Sampling – Part 11: Guidance on sampling of groundwaters* (Ref. 9-9).

There are mainly two types of boreholes present across the survey area: boreholes used by local communities, and boreholes associated with exploratory drilling operations. Springs and wells were also identified in earlier surveys. Monitoring locations (including wells, boreholes and springs) will be selected taking into account their proximity to the key Project facilities and existing knowledge of water quality in that area. Only those boreholes or installations where the geology and construction details are known will be used for monitoring so that there is certainty about the geological formation being monitored.

The monitoring locations will provide locations at which groundwater levels and quality can be recorded. Where possible there should be continuity with previous monitoring to extend the period of records and observe seasonal variability. It is anticipated that up to a total of 10 new boreholes will need to be installed at a number of key Project locations (such as the CPF). The exact location will be determined based on the suitability of existing monitoring locations and will be selected in conjunction with the groundwater resources report undertaken for Buliisa and Hoima by the DWRM. Recommendations for additional monitoring locations may also be made as part of ongoing environmental monitoring plans and/or mitigation during the main ESIA process.

Samples from the community boreholes are envisaged to be obtained using the mechanism already installed e.g. a hand pump. Where there is no existing pumping system, boreholes will be sampled using an electrical submersible centrifugal pump powered by a portable generator where access is possible. At some locations bailers or other manual systems to remove water will be adopted. Each borehole will be purged (removal of 3x well volumes) prior to sampling to ensure representative samples are obtained from the water bearing geological formation.

9.7.2.3 Development of Conceptual Hydrogeological Models

An important element of the impact assessment will be the development of conceptual hydrogeological models. These will be based on geological mapping, available results from ground investigations and baseline monitoring information. The purpose is to define aquifer systems, their source of recharge, flow and hydraulic characteristics, and groundwater quality. Where there is no or limited hydraulic connection between proposed activities and groundwater at sensitive receptors (aquifers, boreholes, wells, springs, groundwater dependent ecosystems), the potential impacts will be lower or localised by virtue of separation from the drilling and other activities which may be taking place within the same catchment. Similarly, if groundwater is already contaminated and unsuitable for potable supplies, the potential impacts will be lower than where groundwater is of high quality. Therefore the potential impact of Project activities upon drinking water aquifers will be assessed.

A thorough understanding of the hydrogeology and groundwater dependent ecosystems will underpin the impact assessment process. Similarly, the interaction of groundwater and surface water is important so that consequent effects of changes to the surface water environment on the groundwater environment and vice versa can be assessed.

9.7.2.4 Impact Assessment

The Project involves sub surface oil exploitation which could potentially impact water quantity and/or quality if good industry practices and mitigation measures are not in place. Significant above ground infrastructure such as CPF has the potential to affect groundwater recharge. Oil or chemical pollution from accidental spillage, seepage, drilling returns and disposal of produced water, waste water, and oilfield wastes is also a risk.

The impact assessment will focus on groundwater quality and availability. Legal requirements and guidelines on groundwater quality, abstraction, discharges and remediation will be based on regional, national and international standards including those from the Directorate of Water Resources Management and International Finance Corporation (IFC) guidelines and Performance Standards.

The hydrogeological impact assessment for the Project will include the following tasks:

- Identifying Project activities with potential for groundwater depletion (lowering of the water table) or pollution in the context of importance and vulnerability of the groundwater resource (based on permeability of the aquifer and properties of the overlying soil, along with the depth to the water table), groundwater availability (flow and estimated recharge rates), and location with respect to potential receptors (existing water supply wells and ecologically sensitive sites);
- A qualitative assessment of potential hydrogeological impacts arising from the Project against the defined baseline conditions and consideration of the effects on conceptual hydrogeological models. Potential impacts may include:
    - Reduction in groundwater availability (quantity) as a result of groundwater abstraction for Project needs;
    - Disruption to groundwater flow (quantity) by dewatering or below ground construction;
    - Impact on surface-groundwater connectivity (quantity);
    - Pollution of groundwater from oilfield production wastes, spillages of oil or chemicals, as well as contaminated runoff from the development (quality); and
    - Pollution of groundwater via leaks or oil seepage from wells or pipeline (quality).
- Engagement with regulators and stakeholders to discuss interim findings;
- Outline suitable mitigation measures for significant potential impacts; and
- Consideration of residual impacts.

9.8 LANDSCAPE AND VISUAL IMPACT ASSESSMENT

9.8.1 Objectives

The objective of the landscape and visual impact assessment is to assess the potential key effects on the landscape and visual resource of the study area and establish the overall significance of these effects arising from the proposed Project activities.

Landscape effects associated with a development relate to changes to the fabric, character and quality of the landscape resource, and how it is experienced. Visual effects relate closely to landscape effects, but also concern changes in views as a visual assessment is concerned with people's perception and response to changes in visual amenity.

When considering the potential effect of changes that future development may have on the landscape and visual resource it is necessary to identify those key elements of the landscape which make it distinctive. These can be seen as layers which overlay each other and vary in dominance from place to place. These layers mainly comprise landform, settlement pattern, land use and built environment, circulation and access, vegetation and views.

The objectives of the assessment of potential landscape and visual impacts are as follows:

- Identify and describe the baseline landscape and visual resource, using information from the previous Environmental Baseline Surveys (EBS) surveys Ref. 9-1 and Ref. 9-10) and other available sources including analysis of GIS data sets;
- To delineate the landscape and visual assessment study area and identify character areas, sensitive receptors and viewpoints;
- To undertake appropriate consultation with relevant stakeholders;

- To collect primary baseline landscape and visual data and photographs, including site visits;
- Undertake Zone of Theoretical Visibility mapping in order to understand the likely theoretical extent of visibility of the various components of the Project and to assist in defining the spatial scope;
- Assessment and recommendation of mitigation measures including advice on micro-siting of well pads;
- Consideration of residual impacts; and
- Incorporate the landscape and visual mitigation measures into the overall ESMP for the Project.

9.8.2 Scope of Work

The landscape and visual assessment will include the following scope of work.

9.8.2.1 Study Area

The Study Area to be considered for the landscape and visual assessment incorporates all key Project components along with the surrounding areas from which any of the facilities may be visible. The spatial extent of the Study Area will be further defined during the main ESIA phase, but it is considered to cover at least a 1km buffer area around each of the key Project components. A Zone of Theoretical Visibility (ZTV) based on maximum height and footprint parameters will be run during the main ESIA process to further assist in determining the likely extent of visual influence and to inform the spatial scope of the Study Area.

9.8.2.2 Baseline Data Collection and Assessment

The main objectives of the landscape and visual baseline data collection will be to:

- Collate data from relevant published research articles and previous studies covering the Project area, including drawings, topographical maps, aerial photography and mine layout drawings;
- Collate data from GIS data sets such as topography, geology, hydrology, soils, land cover and vegetation, settlements, infrastructure and designations and the analysis of these to develop landscape character areas and key visual receptors;
- Refine and provide more detailed landscape character mapping within Project area;
- Identify of key visual receptors and representative viewpoints;
- Survey data on landscape and visual receptors; and
- Reporting, mapping and GIS data.

Information gathered during the initial desk based data gathering exercise will be supplemented, where necessary, and verified through a site visit/ walk over, which will be undertaken during the main ESIA phase. The baseline data will be analysed to enable character areas and viewpoints to be identified, which will form the basis for the landscape and visual assessment. Close liaison with other specialists will enable the inter-relationships between landscape / visual and other specialist topic areas to be fully understood and to influence the characterisation of the landscape.

The following activities will be undertaken:

- Describe the setting and context of the landscape and visual assessment study area in which the Project will be located and identify the landscape character of the site and its surroundings;
- A draft ZTV will be run using ArcGIS to inform the spatial scope and baseline stage will be based initially on the draft scheme and then re-run for the assessment phase based on the fixed Project infrastructure layout. For both ZTVs maximum height and footprint parameters will be used for the various components of the scheme such as the drilling equipment at the well pads and the CPF;
- Describe the baseline condition (including the value) of the landscape and visual resources within the landscape and visual assessment study area that are likely to be affected by the Project;
- Up to 15 viewpoints will be selected from within the visual assessment study area from which to assess effects; and

- The field survey report will be provided supported by reference photography.

Landscape Character

Physical and cultural elements such as landform, hydrology, vegetation, land cover, land use pattern, cultural and historic features combine to create a common 'sense of place' and identity that is experienced as landscape character. Definable units (character areas, types and character zones) can be used to categorise the landscape and the level of detail and size of unit can be varied to reflect the scale of definition required. It can be applied at national, regional and local levels.

The quality or condition of a landscape receptor is a reflection of its attributes, such as the condition of the buildings and spaces or woodland components and the attractiveness and landscape quality of the area as well as its sense of place. A landscape with consistent, intact and well-defined, distinctive attributes is generally considered to be of higher quality and, in turn, higher value, than a landscape where the presence of inappropriate or discordant elements has detracted from its inherent attributes.

Visual Amenity

In order for there to be visual effects there is the need for a viewer (i.e. a person) (receptor). Receptors include residential properties, recreational facilities, road users, pedestrians and other outdoor sites used by the public including visitors which would be likely to experience a change in existing views as a result of the Project.

Representative viewpoints will be selected to reflect some of the most significantly affected receptors within the study area and will reflect a range of receptor type and nature and duration of view. Desk based review of the ZTV and GIS data analysis will inform the selection of viewpoints which will be consulted upon and will be refined through field surveys during the main ESIA Phase.

9.8.2.3 Landscape and Visual Impact Assessment

The assessment will be carried out with reference to the Guidelines on Landscape and Visual Impact Assessment (GLVIA) Third Edition, Landscape Institute and Institute of Environmental Management and Assessment, 2013 (Ref 9-11).

A Landscape and Visual chapter will be included within the main ESIA Report. The landscape and visual impact assessment for the Project will include the following tasks:

- Once the Project design has been finalised, ZTV's will be re-run to inform the assessment stage of the Landscape and Visual Impact Assessment (LVIA);
- An assessment of the value, susceptibility and resulting sensitivity of identified landscape and visual receptors, using the information gathered in the baseline study and a thorough understanding of the Project components;
- A maximum of five photomontages representing different components of the Project from identified sensitive landscape and visual receptors will be produced;
- An assessment of the magnitude (considering size or scale of change, geographical extent, duration and reversibility) and significance for identified landscape and visual receptors of the potential effects of the Project, using standard assessment criteria;
- Identification of potential for mitigation measures to reduce these impacts, with the emphasis focussed on development of mitigatory restoration and reinstatement measures to inform the ESMP as well as demonstrating primary mitigation measures in the micro-siting of the well pads;
- A statement as to the significance of residual effects during construction and operational phases, taking into account agreed mitigation measures; and
- Cumulative and in-combination effects from selected other developments will also be considered in the ESIA.

9.9 WASTE IMPACT ASSESSMENT

9.9.1 Objectives

The overall objective of the study is to identify all waste streams associated with the Project, identify the potential impacts of these waste streams and develop measures to mitigate those impacts that cannot be eliminated or minimised.

9.9.2 Scope of Work

AECOM has developed a straightforward methodology for waste impact assessment that has been accepted for many IFC-compliant ESIA projects in Africa and elsewhere. This methodology for this will be adopted for this Project.

The methodology used to assess potential waste impacts will differ slightly from that used for other technical topics due to the unique nature of waste when considered as a Project impact. Unlike many other impact categories, waste is a product of the Project and impacts from waste will depend on the ability of facilities and the waste management infrastructure to store, transport, treat and dispose of waste in a safe and environmentally sound manner. There are a number of applicable legislative requirements and standards that exist which must be adhered to, as well as a range of potential waste management mitigations and practices that can be applied.

The Waste chapter of the main ESIA Report will describe the legal and regulatory framework applicable to the Project based on wastes anticipated to be generated by Project activities. In light of this, available waste facilities capable of receiving anticipated Project wastes will be identified.

The waste chapter will identify the type and volume of wastes anticipated to be generated by the Project. The pre-mitigation significance of impacts will not be assessed in this chapter because it is not realistic to consider any situation in which management/mitigation would not be carried out; legislation dictates requirements for waste storage, management and disposal, and these are therefore considered part of the Project design.

The requirements for waste management and mitigation measures for the Project will be described and the residual impacts will then be assessed. Mitigation measures that will be adopted to manage anticipated wastes to minimise their environmental impact and ensure compliance with relevant local, national and international regulations will be provided.

The residual impacts for each waste stream will then be assessed, taking into account the identified mitigation measures.

9.9.2.1 Study Area

The study area for waste management will comprise the geographic extent of the Project (in terms of determining waste arising's), and may extend to the regional or national scale in terms of identifying suitable facilities to manage the wastes.

9.9.2.2 Baseline Data Collection and Assessment

Cognisance will be given to the requirements of the International Finance Corporation (IFC) Sustainability Performance Standards (EHS Guidance for Waste Management Facilities, EHS Guidance for Onshore Oil and Gas Development, Ref. 9-12) and relevant Ugandan regulations.

All available information on waste management facilities in the region will be reviewed and carry out additional assessment, where necessary, in order to evaluate what facilities are available locally, regionally (e.g. in Kampala) and within the wider East African region. This review will identify currently existing facilities in terms of landfills, incinerators, recycling facilities and other such infrastructure, and what are the standards to which it operates.

Local regulations will also be reviewed, including the National Environment (Waste Management) Regulations (S.I. No. 52/1999) (Ref. 9-13) and the requirements of the National Environment Management Authority, the competent authority in Uganda for the trans-frontier movement of waste under the Basel Convention.

The types of waste generated by the Project will be estimated. Waste types will be described, and classified as hazardous, non-hazardous or inert. The timing and approximate quantities of waste arising's will also be estimated.

9.9.2.3 Impact Assessment

In order to assess the impacts of waste management activities, the Waste chapter within the main ESIA Report will:

a) Describe mitigation measures that should be applied in order to minimise the likelihood of pollution and nuisance from the on-site handling and temporary storage of wastes;

b) Identify key environmental / technical / economic trade off management options which will need to be incorporated into an inegrated waste management strategy.

c) Identify potential management facilities that will be used for managing the Project waste streams.

The residual impacts of waste management activities will then be assessed based on a consideration of the quantities of waste generated and the adequacy of the identified facilities to manage these wastes in compliance with IFC and local requirements.

9.10 ECOLOGY and BIODIVERSITY

9.10.1 Study Area

For any impact assessment it is vital to define the 'Study Area'. This enables the assessment to be focused and specific, so that impacts can be fully understood and the appropriate mitigation and monitoring regimes designed and implemented.

For biodiversity, there will be a number of 'nested' study areas. This is because there are a wide variety of biodiversity receptors, whose range and geographical distribution and sensitivity need to be understood in order to identify potential impacts and to define appropriate mitigation.

At a basic level the Study Area could be defined as the physical footprint of each physical element of the development, comprising wellpads, laydown areas, access roads, pipelines, the CPF, waste sites and other defined construction or operationally related facilities. This sort of study area relates to specific land cover/vegetation issues as well as site specific consequences for animal species that may be present in or reliant on these areas.

A wider study area is required for larger and more mobile animals, for example elephants or birds, or those receptors susceptible to 'down-stream' effects or which are considered to be landscape species (i.e. species that migrate from one region to another, or protected sites) but which may pass through or interact with development areas. Therefore for these receptors a larger more geographic study area is required.

In addition, there may be indirect impacts that may affect receptors some distance from the Project Area. This is particularly the case when considering Critical Habitat because such areas will be located within much wider Discrete Management Units (DMU) which may have a regional and/or catchment wide basis. In addition, Critical Habitat criteria or trigger species may not be located within the actual Critical Habitat at all times and therefore the likely locations, habitat use and sensitivities of these species when outwith the defined Critical Habitat will have to be included within the overall definition of "Study Area".

Consequently, we consider that the Study Area should as a minimum comprise the main Project areas within the western and southern MFNP and the Buliisa regions down to and including the northern part of the Bugungu Wildlife Reserve. The adjacent area of Lake Albert and the Victoria Nile and Albert Nile are included in this wider study area. Impacts on other receptors such as the Budongo Central Forest Reserve (CFR) will also be considered in the ESIA, although these are more likely to be representing indirect effects of the development outside the immediate Project.

Any other areas of Critical Habitat, including areas where the trigger criteria species may able be present, to be defined by ongoing studies within the EA1 and northern EA2 block, will be considered as receptors and the ESIA will consider the potential and residual effects on these as necessary.

Impacts on identified receptors further afield, such as other CFR (e.g. Bugoma CFR) are more properly considered in the Cumulative Impact Assessment because of their distance from the Project Area, although

that does not mean that some trigger species may range that far. Such receptors may include identified or 'candidate' areas of Critical Habitat but this will depend on where they are and the location and distribution of the criteria for which they have been defined.

9.10.2 Ecology and Biodiversity Impact Assessment

The level of existing knowledge and available data for different aspects of biodiversity differ depending on general vegetation types, habitats, species groups and how much these receptors have been previously studied. In addition, baseline survey and data collection methods will differ between target groups but the same overall approach to impact assessment on ecology and biodiversity will be implemented.

The following sections discuss our approach to the many receptor groups within the overall topic of ecology and biodiversity, which will be defined as:

- Terrestrial Flora (including vegetation, habitats and flora);
- Terrestrial Fauna; and
- Aquatic Ecology.

Although the ESIA will include separate technical chapters on each of these topics, it is important to note that many of them are inter-related and where appropriate, will therefore be considered together in a well-structured way. Cross referencing between chapters will be provided as necessary.

9.10.3 Vegetation, Habitats and Flora

9.10.3.1 Objectives

The assessment of terrestrial vegetation, habitats and flora will have the following objectives:

- To understand and describe the terrestrial vegetation baseline within the Project area based on previous baseline studies and mapping, including the currently on-going vegetation and land use mapping being undertaken by TEP Uganda and TUOP, as well as other available information;
- To collect primary baseline data (as appropriate), including surveys as described later in this chapter;
- To define the terrestrial vegetation study area and identify sensitive receptors, which may include areas of Critical Habitat not yet defined;
- To undertake appropriate consultation with relevant stakeholders;
- To use the available terrestrial vegetation information to identify potential impacts during construction, operation and decommissioning;
- To discuss agreed mitigation measures, including, where impacts on Critical Habitat and Natural Habitat cannot be avoided, the feasibility and requirements for offsetting to ensure no net loss and/or no net gain as appropriate;
- To assess residual impacts on vegetation, habitats and flora taking agreed mitigation into account;
- To identify the presence and extent of invasive alien species; and
- Summarise the terrestrial vegetation mitigation measures into the overall ESMP for the Project.

This section of the assessment will also discuss protected areas, such as the MFNP, CFRs and Wildlife Reserve (WR) as receptors in their own right. In addition, other important receptors such as Critical Habitat (or more specifically areas where Critical Habitat trigger criteria are present) will be described, where these have been defined.

9.10.3.2 Baseline Data Collection and Assessment

Survey Site Selection and Ground Truthing

There are a number of recent and on-going land use/vegetation mapping projects that will be referred to as part of the main ESIA. Overall, the general vegetation types within the overall Project Area are quite well mapped and the objective during the main ESIA phase of the Project will therefore be to:

- Ground-truth and refine vegetation types within and adjacent to the footprint of Project elements;
- Survey these areas for notable, threatened, endemic or alien invasive plant species;
- Define the importance of these vegetation types as habitats for other (fauna) species; and
- Use the data as the basis for the impact assessment.

The general approach to survey site selection will include:

- Reconnaissance of preliminary survey locations (completed);
- Desk top study and preliminary consideration of survey locations; and
- Confirm survey site location selection.

Information will be gathered during desk-based studies, satellite imagery and previous mapping, to identify interfaces between vegetation communities and the locations for each Project component (i.e. CPF, well pads, roads, flow line corridors etc.). These maps will also be helpful in getting an overview of the level of habitat heterogeneity in the Project area. Of particular interest for the vegetation surveys will be plant assemblages in Critical Habitats, Natural Habitats and modified habitats as well as areas along large animal migration routes and corridor forests.

Survey locations will be selected based primarily on where the proposed Project components will be located. Note that we expect that the results of the previous (and on-going) surveys will influence the FEED so that areas likely to have biodiversity importance or high ecological sensitivity would be taken into consideration and avoided, wherever possible. Such areas would include Critical Habitat, areas where trigger criteria are present and other important features such as seasonal wetlands or areas of remnant forest.

Once the development sites have been identified, which will include wellpads, access roads, pipeline routes, laydown areas, borrow pits, the CPF, waste sites, the water intake sites, etc.,these will be evaluated against the findings of habitat and vegetation mapping in EA1 and EA2. It is expected that an iterative process will be required to optimise the footprint and avoid important biodiversity features. The final agreed footprint will be surveyed in detail and will be described in relation to the broader land cover, vegetation and habitat mapping to provide an accurate and ecologically coherent baseline description. A suitable buffer around the infrastructure footprint will also be surveyed. In addition, any areas of Critical Habitat or otherwise important habitat (such as where Critical Habitat trigger species are present) will also be surveyed where they may be subject to direct or indirect impacts of the development, This work will be further defined and refined during the main ESIA process.

Key aspects of the preliminary survey locations selection process include the following:

- Land cover and vegetation and habitat mapping, and ground-truthing will be used to identify priority areas (such as Critical Habitat and trigger species locations) to be avoided during the FEED process;
- Preliminary survey locations will be selected by overlaying the Project infrastructure locations on the existing mapping to identify the various vegetation types within the Project area of influence (where these are already defined);
- The corridors for flow lines, pipelines and roads will be considered with respect to potential Critical and Natural Habitats and specific locations along the lines to be surveyed will be selected;
- Depending upon the proposed locations of the fixed Project components, it may be possible to generate “survey zones” that encompass the locations of multiple sites (i.e. well pads); and

- Preliminary survey locations will cover the Project footprint associated with the key Project components and a buffer of approximately 2 km around them, plus other areas of important habitat such as Critical Habitat, seasonal wetlands and other areas where Critical Habitat trigger species may be present.

Field Surveys

The principal aims of the vegetation field surveys will be to identify, characterise and map in detail the different vegetation types within and adjacent to the footprint of the Project infrastructure. In addition, Critical Habitat or Natural Habitat (as defined by IFC PS6) if present in the area, will be subject to this level of detailed survey (if it has not already been surveyed to this level of detail). As well as refining vegetation types, the surveys will also specifically identify the presence of species of conservation concern such as rare, endemic, threatened or otherwise notable plant species. These surveys will build on the comprehensive vegetation mapping undertaken in EA2 and EA1.

Where detailed survey is undertaken, the plant species will be identified and their relative abundance determined so that the vegetation types can be characterised using a phytosociological approach. As noted, special attention will be paid to identifying any endemic, rare, endangered species, (i.e. such as IUCN CR or EN species and/or Ugandan Red List CR or EN species, if different), particularly those sensitive to changes in environmental conditions. The presence of alien invasive species would also be recorded.

To study the vegetation structure and composition, line transects and quadrats will be used to assess the vegetation types, floristic composition and plant communities in detail within the infrastructure footprint, buffer zones and areas of Critical and Natural Habitat that may be impacted by the Project, with a particular focus on the Project locations, migration routes and corridor forests.

Boundaries between vegetation types as captured by previous mapping, satellite imagery and existing remote sensing mapping will be confirmed/ established in relation to the Project infrastructure locations. Using the land cover/vegetation mapping for EA2 and EA1 as a starting point, vegetation surveys will be undertaken at Project component locations in order to ground truth vegetation types and identify flora of conservation concern (as noted above) up to a 2 km radius of Project component locations, at selected locations along infrastructure corridors and in areas of Critical and Natural Habitat.

Habitat fragmentation significantly effects biodiversity in natural habitats. A clear definition of vegetation types, based on plant assemblages present within a definable area, is an important step in accurately defining habitats. The main objective of this element of the baseline data collection phase will therefore be to refine and build on the previous mapping at the types of specific locations described previously (Project footprint and buffer zone, Critical and Natural Habitats, etc.) and improve the vegetation descriptions and subsequent classifications on a consistent basis, relying on plant community assemblages and species dominance as well as structural features implied by density of woody and non-woody species cover. Sampling along vegetation type gradations will be replicated for each combination of adjacent vegetation types with respect to the location of the Project.

Of particular concern will be the level of human-induced disturbance, burning, presence of invasive species, level of pollution, extent of habitat fragmentation, viability of existing naturally-occurring species assemblages, assessment of existing ecosystem functionality and structure to historical conditions and the biodiversity values of the sites (e.g., threatened species and ecosystems, culturally important biodiversity features, ecological processes necessary for maintaining critical habitats).

This will have long term benefit for the impact assessment phase of the ESIA process and will inform the Biodiversity Action Plan (BAP) and ESMP. In addition an understanding of trends and underlying factors of changes is necessary for the demonstration of No Net Loss (NNL) or Net Gain.

The following summarises the approach to this study:

- Land cover and vegetation mapping and ground-truthing will be used to identify priority areas (such as Critical Habitat) to be avoided during the FEED process;
- Survey locations and boundaries will be defined by overlaying the location of each of the Project components on the vegetation map to identify the various habitats within the Project area. At this stage it is intended that all areas that will be occupied by Project components within the MFNP and Ramsar site will be surveyed along with a number of other sensitive locations, as discussed above;
- Depending upon the proposed locations of the fixed Project components, wider “survey zones” could be generated that encompass the locations of multiple sites (i.e. well pads);

- At fixed locations such as well pad sites, the CPF and waste management sites, the surveys will be within a 2 km radius of the facility;
- All Project components (wellpads, CPF etc.), plus corridors for flow lines, pipelines and roads will be considered with respect to critical and natural habitats and specific locations along the lines to be surveyed will be selected;
- A general baseline (gradsect) traversing multiple vegetation boundaries as indicated on satellite imagery and maps will be the main technique used for the survey;
- Woody species that have large individuals will be assessed in plots 30 x 30 m while non-woody plants will be assessed in 5 x 5 m plots consistently nested in the top left corner of the bigger plot. This design will be predetermined from the beginning to minimise bias;
- Within the 30 x 30 m quadrat, a record will be made of type of habitat, i.e. vegetation and its structural features, height and floristic aspects, as well as identifying dominant .and invasive species;
- A photographic record of the habitats and any features of interest will be taken. Other landscape features such as topography, general soil description and indications of drainage will be recorded. Proximity to important features such as river and streams will be noted on the field recording forms (as with other metadata);
- Geographic coordinates will be taken of each survey area to inform mapping and refinement of the existing vegetation maps and be used to inform the subsequent impact assessment phase of the ESIA;
- From the surveys, specific habitat types will be identified, each having its own alpha-numeric code and description. The broad classes to be used will be Forest, Woodland, Bushland, Thicket, Wooded Grassland, Grassland and Wetland but these will be refined as necessary taking into consideration recent vegetation mapping schemes recently completed for the previous EBS for EA1 and EA2;
- Species of conservation concern such as rare, endemic, threatened, alien invasive or otherwise notable plant species will be identified and their locations recorded. Reference will be made to International Union of Conservation of Nature (IUCN) Red List (website) (Ref. 9-14) and the Draft Ugandan Red Data Book; and
- Results will be recorded on data sheets, which will include a record of dominant woody and non-woody species; altitude, tree cover, shrub cover, herbaceous cover, bare ground cover.

Seasonal Variations

Considering that different species of plants have different phenological stages and life cycles, the sampling regime will be such that repeat visits will be made to the Study Areas so that it is visited (at least) once in the drier and once in the wetter seasons of the year. This is important given that during the dry season several parts of the overall Project Area may be burnt, making identification of plants in the herb layer nearly impossible. Timing of surveys is therefore important. In addition, some wetlands may exhibit quite different flora depending on the season.

Secondly, this will enable capturing of variation in floral assemblage due to seasonality. The available climatic data covering the site will be used to identify these seasons and the visiting scheduled according to these climatic patterns (often wet during April-May and August-November periods, and drier during the December-March and June-July in MFNP).

Plant Identification

The Angiosperm Phylogeny Group (APG) system of classification will be adopted in the taxonomic treatment of angiosperms for this study. The taxonomy of each plant will be defined at family, genus and species (and in a few instances sub species or variety) levels. The life form of each plant will be recorded as Tree, Shrub, Woody Climber, Herbaceous Climber, Graminoid or Forb. Species that may not be easy to identify in the field will be collected as voucher specimens, given collection numbers and pressed with descriptive notes about them for subsequent identification and deposition at the Makerere University Herbarium.

Species of Conservation Concern

All species of plants conservation concern observed, e.g. those on IUCN Red Lists and the Ugandan Red List, endemic taxa and nationally threatened species will be geo-referenced and their habitats noted. Surveys will also identify invasive species within the surveyed areas.

9.10.3.3 Impact Assessment Process

The impact assessment will follow the requirements of the Ugandan EIA Regulations. In addition, the assessment of ecology and biodiversity will be undertaken with reference to the requirements of IFC Performance Standard 6 (PS6) (Ref. 9-15).

Baseline information on the wider Study Area and on the areas within and adjacent to the footprint of proposed Project infrastructure will be gathered, based on previous and on-going studies in EA1 and EA2. This will indicate vegetation types in these areas and the presence of protected sites and records of habitats, taxonomic groups and species of conservation concern, which represent ecological and biodiversity receptors. This baseline information will be used to direct field surveys towards these areas and these habitats, taxonomic groups and species. Red List species, particularly those defined as Critical Habitat trigger species, that are listed as threatened and recorded for Uganda, derived from the IUCN website, as well as the draft Ugandan Red Data Book, will be used to identify species of conservation concern and pinpoint areas and habitats on which they may be dependent.

The aim of the baseline studies and field surveys will be to establish the presence of species of conservation concern within the Project footprint and buffer zones as well as Natural and Critical Habitat in the area that may be directly or indirectly affected by the project. The sensitivity/importance of these species, and the habitats they depend on, will be determined and the assessment will focus on these sensitive receptors.

The potential impacts of the Project will be established. These will include impacts associated with construction, operational and decommissioning. Direct impacts, for example impacts occurring within the footprint of the Project, such as wellpads, access roads, pipelines, laydown areas, camps, batching plants, borrow pits, water intakes, drilling sites, bridges, etc., will be characterised. Indirect impacts, such as the effects of airborne pollution, or changes in the local human population and demographics and therefore increased pressure on biodiversity (such as habitats, threatened species and Critical Habitat trigger species) ecological services will be identified. The magnitude of these potential impacts will be established.

Having identified the types and sensitivity of all receptors, and established the magnitude of potential impacts, the design or activities required to control and reduce these impacts will be discussed. It will be assumed that mitigation measures included within the assessment will be adopted and maintained by the Project Proponents. Such mitigation would include definition and identification of requirements for offsetting, where this is necessary to comply with the no net loss and/or net gain requirements of IFC PS6.

Taking into account the agreed mitigation, the residual impacts on each identified receptor will be established, using the standard assessment matrix presented in Chapter 4 of this ESIA Scoping Report.

9.10.4 Terrestrial Fauna

9.10.4.1 Objectives

The terrestrial fauna assessment will have the following objectives:

- To Understand and describe the terrestrial fauna baseline within the Project area based on the results of previous studies, data and other available information;
- To collect primary baseline data (as appropriate), including surveys;
- To define the terrestrial fauna study area and identify sensitive receptors;
- To undertake appropriate consultation with relevant stakeholders;
- To use the available terrestrial fauna information to identify potential impacts during construction, operation and decommissioning;
- To discuss and agree mitigation measures, which may include the requirement for offsetting to comply with the requirements of IFC PS6 for no net loss and/or net gain, where impacts on Natural Habitats or Critical Habitats cannot be avoided or otherwise mitigated;

- To assess residual impacts of the Project on terrestrial fauna; and
- Incorporate the terrestrial fauna mitigation measures into the overall ESMP for the Project.

9.10.4.2 Baseline Data Collection and Assessment

Ground Truthing and Site Selection

The proposed lay out of the Project will be evaluated against the recent vegetation and habitat mapping in EA1 and EA2 with a view of optimizing the footprint in terms of eocological impact.

Builiding on earlier survey findings a baseline fauna survey of mammals, birds, herpetiles and invertebrates will be undertaken within and adjacent to the optimum agreed footprint of the proposed Project components. In addition, Critical Habitat, Natural Habitat or areas likely to support Critical Habitat trigger species (as defined by IFC PS6) if present in the area, will be subject to this level of detailed survey. These surveys will indicate the presence of species and confirm or determine their associations with vegetation types and landscape features, with special focus on species of conservation concern and their ecological requirements. The location of the fauna surveys will be made in coordination with the vegetation team and will focus on the locations for the Project's key components (i.e. well pads, CPF, camps, roads, pipelines and other infrastructure), Critical Habitats, Natural Habitats, other important areas for diversity, including areas where Critical Habitat trigger species may be present.

The general approach to survey site selection includes:

- Desk top study, analysis of agreed Project layout against landscape based habitat or vegetation mapping ine EA1 and EA2 to confirm survey locations and target species/taxa;
- Survey these areas for presence, signs or other evidence of notable, threatened or endemic animal species, taking into account species that may be Critical Habitat criteria;
- Make any recommendation to confirm or amend the mapping at the landscape level;
- Relate mapped vegetation types to presence or otherwise of fauna species; and
- Use desktop and field data as the basis for the impact assessment.

Information will be gathered during desk-based studies, satellite imagery and previous mapping as well as the proposed locations for each of the Project components (i.e. CPF, well pads, roads, flow line corridors etc.). The desk based studies will use accessible geo-referenced data relating to occurrence and populations (if available) of species to understand the likely distribution of such species. This will be used as basis for selecting priority survey locations for new data collection to fill the identified gaps.

The habitat mapping in EA2 and vegetation mapping in EA1 discussed above will be used to understand the level of vegetation type heterogeneity in the Study Area. Coordination between the vegetation team and the terrestrial fauna teams will be essential in survey location refinement so as to relate species with vegetation types and confirm habitat definition in the landscape. This approach will enable a coherent vegetation type/ habitat focus to Site characterisation and impact assessment.

In addition to a review of the findings from several on going large mammal surveys in EA1 (Elehant collaring, Giraffe surveys and aerial surveys), the desktop study will include a review of satellite imagery to attempt to identify potential large animal movement routes and key features along those routes (i.e. watering holes). TEP Uganda's GIS 'Avoidance Mapping', which identifies water holes, wallows, termite mounds, kob lekking sites, etc., will also be utilised. This is premised on the basis that large mammals including elephants, buffalo, giraffe and hippos, although usually spatially dispersed, use well-beaten trail routes every so often to move between different parts of the landscape for different reasons. On the ground at least in the dry season these stand out as very prominent paths in the savanna and therefore it could be possible to map these so that at least some of them can be ground-truthed to start to understand the reasons of the movements as well as dispersal patterns.

Survey locations will be selected based on where the proposed Project components will be located, having previously incorporated findings into the FEED process to ensure avoidance of sensitive receptor habitats/Critical Habitat. This will include wellpads, access roads, pipeline routes, lay-down areas, borrow pits, the CPF, waste sites, the water intake sites, etc., buffer zones, Natural and Critical Habitat in the area, and areas where Critical Habitat trigger features may be found, that may be directly or indirectly affected by the Project.

The survey locations that will be selected will be used as the primary reference points for the ground-truthing and survey locations and, as noted, these points will cover the main areas where the Project components will be placed. However, there may also be the need to cover areas of potential Critical Habitat, or areas where Critical Habitat trigger criteria may be present, for example in the MFNP or the Bugungu Wildlife Reserve and with consideration of the locations of the Project's infrastructure. In addition, wildlife corridors and migration routes will be considered and overlayed with the Project infrastructure, wells, pipeline and road improvement network.

The following summarises our general approach to this study:

- Land cover and vegetation mapping (EA1) and habitat mapping (EA2) and ground-truthing will be used to identify priority areas (such as Critical Habitat) to be avoided during the FEED process;
- Survey locations will be selected by overlaying the Project locations on the vegetation and habitat map to identify remaining critical or sensitive habitats (depending on the proposed locations of the fixed facilities, it may be possible to generate "survey zones" that encompass the locations of multiple sites (i.e. well pads));
- At fixed locations such as well pad sites, CPF, waste management sites, pipelines, roads and support facilities the surveys will be within a 2 km radius of the facility; and
- The corridors for flow lines, pipelines and roads will be considered with respect to Critical Habitats and specific locations along the lines to be surveyed will be selected.

Species of Conservation Concern

Signs of species of conservation concern observed, e.g. those on IUCN Red Data lists and Draft Ugandan Red Data Book endemic taxa, Critical Habitat trigger species and nationally threatened species will be geo-referenced and their habitats noted.

Surveys will also identify potential habitats of high conservation value within the surveyed areas that may not otherwise have been designated as such.

Field Surveys

Small Mammals *- Shrews and Rodents*

This group of animal are important survey targets for a number of reasons: they can be important in their own right due to conservation status or where they contribute to the ecology such as prey species for larger predators (some of which may also be threatened). In addition, they can be important ecological effectors in that they can be significant seed predators/ dispersers /planters thus driving habitat change.

Furthermore, because of their small size, nesting habits and relatively small home ranges, they could potentially be heavily impacted by human induced pressures such as uncontrolled fires.

Trapping for terrestrial small mammals (shrews and rodents) will be undertaken at selected sites (as defined above), where good potential for such species has been determined based on vegetation type, field signs, previous records, etc., using baited Sherman traps, placed along each transect. Transects will be identified within each defined survey location in order to maximise the habitat sub-types encountered. To enhance chances of capturing animals, traps will specifically, whenever possible, be placed at locations having feeding signs, runways and along or beneath logs. The following approaches will be used:

- Traplines will be set up and run concurrently in the different vegetation types;
- Baited traps will be set up in different habitats at an inter-trap distance of approximately 10 m following the methods used in the EA-1 EBS;
- The traps will be checked each morning (between 0800 and 1000) and every evening (between 1600 and 1700) to recover captured animals and to minimise disturbance or harm to the animals;
- The traps will be maintained for at least 4 nights in each trapping area for each survey visit;
- Outside the MFNP and areas such as the Bugungu Wildlife Reserve where the risk of injury to larger wildlife is minimal if not absent, pitfall traps using 10 litre buckets may be used as they tend to capture more shrews than Sherman traps;
- Captured animals will be removed from the traps, identified and released; and

- Where possible, photographs of specimens will be taken to verify species identification.

Surveys will preferably take place mainly away from inhabited areas because previous experience has found that there is a high likelihood of disturbance and loss of traps due to human interference. However, such disturbed areas are likely to be of lesser significance for the less common small mammals in any case.

Small Mammals *- Bats*

Volant small mammals (bats) will be surveyed at selected sites using mist nets, harp traps and acoustic techniques. As with other small mammals, bats are important survey subjects for a number of reasons: they can be important in their own right due to conservation status and they contribute to the ecology as prey species for larger predators (some of which may also be threatened). In addition, they can be important ecological drivers where they are significant pollinators and seed dispersers (e.g. fruit bats). In addition, bats can have defined habitat preferences and roosting sites, for example in trees, and therefore can be an indicator of habitat changes or condition. The following approach will be used:

- Mist nets of varying lengths (6 m and 12 m) will be set up across flyways, over open water and in habitats perceived likely to be used by bats as foraging areas. The precise locations for the nets will be determined in the field;
- The nets will be opened at dusk (around 18:45) and closed at 22:00 every netting night. Mist-nets will be continually monitored until 22:00 to recover individuals, to avoid distress to bats and to minimise damage to the nets;
- As with mist nets, harp traps will be deployed at sites where bats use natural flyways, along trails and other foraging areas or commuting areas understood to be used by bats (Kunz and Parsons, 2009), Ref. 9-16);
- Captured bats will be placed in small cotton bags and identified by the mammal team, after which they will be released; and
- All bat handling will be done using gloves. Only those qualified to handle bats will be allowed to participating in recovering bats from the nets, i.e. rangers will not handle the bats.

As part of the bat surveys, acoustic techniques will be employed. As compared to the harp trap and mist net techniques, acoustic surveys are preferred since these enable the detection of bats which fly out of reach of traps and nets. However, for acoustic techniques to be used in isolation, a complete library of species related calls is required so that bats can be identified solely on the basis of their calls. Unfortunately, a comprehensive library of bat calls does not exist for Uganda and therefore capture methods are required in order to identify bat species encountered.

A limited library of bat calls was created during the previous EBS (Ref. 9-1), which can be built upon and may be useful for future monitoring endeavours which can be captured in the Environment and Social Management Plan (ESMP).

Acoustic techniques will involve the use of detectors (Anabat D500X Petterson and SM2 BAT) which will both be deployed passively in the different survey areas. These will detect the presence of bats that may not be caught in the mist nets. Detectors will be placed in areas considered to be used by bats for roosting, feeding, and commuting. A microphone will be connected through a 10 m cable to the bat detectors. The cable will then be mounted on poles to raise it above the ground and vegetation that could interfere with the sound signals. To prevent detectors getting wet they will be held in toolboxes customised for the purpose. Detectors will be secured and concealed at ground level or other levels as appropriate. Because the detectors can be adversely affected by water, the detectors will only be deployed when there is no rain. The memory cards will record data, which will be analysed by AnaBat software. Acoustic monitoring will be undertaken for the duration of the survey period in each area.

Insectivorous bats captured using the mist nets and harp traps will be ziplined to acquire reference calls. Recordings will be maintained building order to develop a call library for use with D500X and SM2 bat monitoring equipment to expedite bat identification by sound analysis and will reduce the reliance on trapping in future surveys within the Study Areas.

Bat recordings will be analysed using the Sonobat software to identify the different bats that were recorded at the different survey locations, to determine species presence, habitat use and relative importance of the different survey areas for the different species.

Medium to Large Sized Mammals

For the purposes of these surveys, this group includes all the other mammals that do not fit into the definition of small mammals provided above. The proposed surveys will aim for medium to large sized ungulates and medium to large sized carnivores.

Detailed survey for rare species (which by definition will not be common) would require significant resources and time to survey for and to detect individual animals. Building on the biodiversity survey and habitat mapping in EA1 and EA2 as well as opportunistic sightings known habitat preferences will be used to determine the likelihood of presence of rare or uncommon species within a given habitat.

These surveys for mammals will aim to yield data on temporal habitat use, relative abundance and/or habitat specific densities and not total population estimates. The relative abundance and density figures will be used to infer habitat preference by the different species.

The following approaches will be used:

- Surveys for mammals will employ line transect counts as appropriate, to count and characterise as much as possible the population structure of the different species. In areas where roads traverse a survey area, advantage will be taken and roads will be used as transects to view, count and characterise the individuals in the survey area. The road counts will be conducted in road sections of up to 2 km, for which the start and finish point will be geo-referenced;
- Off-road sites will be censused using foot transects of 2 km traversing the target habitat; and
- A sample of the large mammal trails picked up from analysing satellite imagery will be ground-truthed to document habitat features along them that might be important for interpreting large mammal occurrence, movement and distribution along them.

In both cases mammals will be identified and counted in a belt of 200 m.

To correct for temporal variations in species presence and record temporal variation in habitat use, the transect counts will be repeated during two seasons (dry and wet).

The use of transects for mammal surveys is a standard and systematic, though necessarily ‘broad brush’, technique. However, utilising transects will be complemented by the “sit, wait and watch” and camera trap techniques discussed below, which provide a more location and habitat focused method.

Limited camera trapping is intended, particularly at wallows and waterholes within the MFNP. This will be particularly useful in understanding what species are using these resources and when, especially where project infrastructure may result in disruption to these areas or access to them (i.e. preferred routes used by animals using watering holes, etc.).

This will also increase the chances of recording species that may use the habitats in the selected survey areas that may be missed through the day observations. This will permit capturing the presence of nocturnal and cryptic species. Cameras will be set at various heights from 1 to 2 m above ground level depending on vegetation and fields of view, etc. This technique is particularly useful in enclosed habitats (thickets/bush) where cameras can be set up on trails or tracks, where field of view from human observers would be restricted.

Some laboratory analysis of samples will be required where field identification is not possible. This will take place at Biological Sciences Department, Makerere University. The laboratory analyses will include:

- The extraction of basic photo metadata including camera location, photo serial numbers, date and time of when a photo was taken;
- Analysis of camera trap data to identify species and their numbers recorded at different camera trap station; and
- The data will be used to complete site specific inventories of the mammals, presence or absence for species at the different locations, and activity patterns for the different species in the different camera trapping locations.

Birds

Surveys will include the following:

- 2 km walked continuous transects will be identified from mapping and related to the proposed locations of the Project components, buffer zones and Natural and Critical Habitat in the area that may be directly or indirectly affected by the Project;
- Each transect will be divided into ten 200 m sections;
- The vegetation cover will be recorded at the centre of each section and described in relation to the vegetation / habitat conditions described in EA1 and EA2 as the percentage of both woody and non-woody, native and non-native, in four layers (0-1, 1-3, 3-8 and >8 m; (Pomeroy, 1993) Ref. 9-17);
- Within the MFNP, walked transects will be distributed according to a stratified random sampling plan based on habitat type taking into consideration the locations of the proposed components including the flow lines;
- Roosting sites for water birds are known along the Nile, and there are probable roosting sites for Pink-backed Pelicans and Marabous outside the Murchison Falls Conservation Area (MFCA), south of the MFNP HQ area. A probable roosting site for Grey Hornbills has been identified east of the Bugungu Wildlife Reserve gate. These will be considered as survey locations if warranted; and
- Particularly within and around the footprint of Project components, signs of nesting birds (including ground, shrub and tree nesting species) will be recorded.

Survey sites in the area from Sambiya extending towards Bugungu (nightjars) will also be considered. Although the Albertine Rift is thought to be a commuting corridor for some migratory birds, such as some raptor species, it is relatively wide and migration will thus be on a fairly broad front. Surveys will be designed to take into account the extensive previous surveys in EA1 and EA2 and data available with regard to birds within and around the MFNP.

Herptiles

Stage 1: Ground Truthing: Habitat stratification

During survey key amphibian and reptilian habitats will be stratified for ease of sampling. The key habitats for amphibians which will be focused on for the purposes of the surveys include lentic habitats and vegetated wetlands, particularly those identified in previous avoidance feature surveys as discussed above. Whilst those for reptiles include rocky outcrops and woodlands. The surveys in these habitats will be repeated in dry and wet seasons to capture seasonality data.

Stage 2: Methods for sampling herpetofauna

Visual Encounter Surveys

Visual Encounter Surveys (VES) are a well-known and robust method for surveying herpetofauna. The VES method is similar to the Timed Constrained Count (TCC) method described by Heyer *et al*., (1994) (Ref. 9-18). VESs are used to document presence of amphibians and are effective in most habitats and for most species that tend to breed in lentic habitats. They generate encounter rates of species in their habitats in a unit hour.

The method comprises moving through a habitat, turning logs or stones, inspecting retreats and watching out for and recording surface-active species. The data gathered using this procedure provide information on species richness of the habitat. For amphibian fauna, the best results are achieved when the surveys take place after dusk in the evenings between 1800 and 2100 hours as this is when most amphibians are active, preceded by a daylight reconnaissance to check for hazards and other features. This survey will be carried out for both the dry season and wet seasons in the selected sites. Early morning surveys are not suitable for these taxa.

Some laboratory analysis of samples will be required where field identification is not possible. This will take place at Biological Sciences Department, at Makerere University.

Dip-Net Sampling

A standardised dip-net will be used to scoop through aquatic habitats to sample for aquatic species and for tadpoles. Specimens of aquatic species or tadpoles caught by this method, if not identifiable in the field will be preserved for later identification. This survey will be carried out for amphibian fauna both during the dry and wet seasons.

Opportunistic Encounters

Opportunistic records are those made outside the sampling points but occur in the surrounding area to be impacted by the project. It helps complete the checklist of the animals as much as possible. Amphibians and reptiles are mobile (although particularly attention will be paid to slow moving species such as tortoises) and can therefore be encountered outside their preferred habitats both spatially and temporally.

Consultations

If the survey locations are identified within rural/village settings, it is proposed that local people will be interviewed in order to gain further data. For survey sites inside the Protected Areas, Park Rangers will be interviewed, particularly to establish the reptilian species known to be living in the Protected Areas.

Limitations

Evening and night-time surveys are very important for amphibians. This should be put into consideration so that the research team is not unnecessarily halted when the surveys commence. Therefore access needs to be agreed / consents need to be put in place prior to survey to ensure that fieldwork using this method is not interrupted/prevented.

Invertebrates

There are thousands of invertebrate species known to inhabit the Project Area. Most of these invertebrate groups are not well characterised and little is known about their ecology or significance in relation to site condition or potential impacts. Therefore, in order to provide a cost-effective focus for the ESIA, the study will concentrate on surveying groups that can act as suitable indicators for other groups.

The indicator groups that we will concentrate on will comprise: butterflies, which are known sensitive indicators of environmental changes associated with human-induced disturbances (for example, burning or loss, degradation or other anthropomorphic influences on habitat, reduction in plant diversity, etc.); and dragonflies, which are very sensitive to structural habitat quality and river/stream disturbances such as physical or chemical changes in watercourses where presence of amphibious larvae are critical in regard to water quality, nutrient recycling and habitat structure.

In addition, such indicator groups are useful for establishing baseline and for monitoring purposes to determine whether impacts are taking places and/or whether mitigation is being effective.

Objectives of the insect study are as follows:

- Establish insect (butterfly/dragonfly) baseline information for species richness and diversity for the selected study sites where Project components will be located, buffer zones and Natural and Critical Habitat in the area that may be directly or indirectly affected by the project, as discussed earlier. As noted these indicator groups are important because a lot is known about these groups' ecology and they can be used a proxies for other invertebrate groups that are harder to sample;
- Establish below ground invertebrate population baseline (particularly relating to termites) in order to define target species and locations;
- Confirm indicator species (especially habitat specialists) that can be used for future monitoring in the project areas;
- Take appropriate GPS coordinates of surveyed areas (including for secondary data) to be used to map out selected species distributions;
- Make field observations and descriptions as supportive information especially for identifying important habitats for the insect taxa; and
- Explore existing surveys reports and use as supporting data where this provides data on what the presence, abundance and composition of indicator species are able to provide.

Stage 1: Ground Truthing and Site Selection

The information gathered during desk-based approaches will be ground-truthed during the surveys to identify species presence and relative abundance and important habitats. Vegetation maps will be reviewed to confirm suitable specific survey locations and take into consideration the locations of the facilities and infrastructure proposed as well as locations surveyed under previous studies.

Stage 2: Methods for sampling Invertebrates

Butterfly Survey Method

Transect Sweep Netting

The butterfly fauna in the Project Area will be sampled through the systematic use of sweep nets. Several transects will be established within different habitat categories mainly (woodland, open grassland, wooded grassland, and riverine forest/shorelines) at selected survey sites. A minimum of 2 km will be sampled per transect. Specimens of unidentified species in the field will be collected and taken to Makerere University Zoology museum.

Baited Traps

Traps similar to those used by DeVries *et al*. (1997) (Ref. 9-19) may be used. The traps will be set up at uniform intervals of 20 m apart along transect in the understory and canopy in wooded/forested areas. Understorey traps will be hung suspended 1 m from the ground and canopy traps height will be determined by presence of trees. Appropriate bait, such as fermented banana will be used.

Dragonflies Survey Method

Adult dragonflies will be sampled by sweep netting along transects and target wet areas. Systematic surveys for dragonflies will be carried out along smaller rivers and streams. Voucher specimens will be prepared and preserved for further identification at Makerere University Zoology museum. Several fresh specimen photographs will be taken to avoid misidentification due to the fading colours from preserved specimens.

Ground Invertebrate Survey Method

Transects will be defined with and across each area defined as infrastructure footprint, as well as a suitable buffer zone and areas of Critical Habitat and other important areas of biodiversity. Termite mounds will be counted along each transect and counts including all mounds seen within 100m either side of the transect line will be recorded. Note, however, that the survey may be limited in locations with dense vegetation where the mounds were not so tall. Where feasible the dominant species of termite in each survey site will be identified and correlated with vegetation type.

For other species, soil samples will be retrieved from a limited number of shallow test pits in differing habitat types within the infrastructure footprint. Samples will be preserved and the invertebrate species extracted from them identified in the laboratory to the appropriate taxonomic level (Family, Genus and if possible, Species).

Survey Periods

Surveys will be repeated in the dry and wet seasons to enable capturing of variation in invertebrate assemblage due to seasonality.

9.10.4.3 Impact Assessment

The impact assessment will follow the same process as that identified within section 9.10.3.3

9.10.5 Aquatic Ecology

9.10.5.1 Objectives

The aquatic life assessment will be undertaken with the following objectives:

- Understand and describe the aquatic life baseline of the Project area from the previous EBS and subsequent studies and other available information;

- To undertake appropriate consultation with relevant stakeholders so as to ensure that their concerns are adequately addressed by the planned baseline study;
- To delineate the aquatic life study area – ecosystems/habitats/buffer zones- and identify sensitive receptors notably spawning/breeding, nursery and feeding areas; and habitats for endangered species as well as fragile aquatic environments;
- To collect primary aquatic baseline data on seasonal basis – targeting major and minor wet season and the main dry- so as to identify likely seasonal biological phenomena in the life cycle of selected biota;
- Use the available aquatic life information to predict potential impacts during construction, operation and decommissioning;
- Assessment and recommendation of mitigation measures;
- Consideration of residual impacts; and
- Incorporate the aquatic life mitigation measures into the overall ESMP for the Project, taking into account the requirements of no net less and/or net gain in terms of IFC PS6.

9.10.5.2 Scope of Work

The aquatic ecology assessment will include the following scope of work. The Aquatic Ecology chapter will clearly and succinctly describe all work to be undertaken, the methods to be use and the reasons for adopting this approach.

9.10.5.3 Study Area

Pending the results of fish survey of the Biodiversity Baseline survey in EA2 and analysis of any additional secondary data aquatic baseline surveys will seek to define various ecological and biological attributes considered valuable in selected ecosystems and habitats that are likely to be affected (sometimes enhanced) directly or indirectly by Project activities.

Baseline studies will hence focus on sections of the Victoria and Albert Nile within the Project area; a selection of rivers and streams that drain into the Nile within the Project area; and the River Waiga that crosses the Project area into the Bugungu Conservation area before entering the extensive fringing wetland that covers the delta and floodplains of River Waiga and Waisoke. Generalised sampling areas are given below in consideration of various essential ecological, biological and other environmental attributes detailed below as well as the location of key Project facilities.

The River Nile below Murchison Falls is a large river that supports fish breeding grounds for local artisanal and sport fishing. Affluent rivers and streams which feed into the River Nile offer breeding and nursery areas to seasonal migratory fishes breed and nursery.

The Nile Delta and Murchison Falls are the most prominent features of the Ramsar area that comprises the Victoria Nile below Murchison Falls plus a fringe of Lake Albert waters. The Delta, largely comprised by a unique likely fragile wetland, is an important breeding and nursery ground possibly for most of the major fish species in Lake Albert. The number of baseline and monitoring survey locations for the extensive Nile Delta will be determined during the main ESIA process.

Based on impressions from maps we suggest five survey locations: one at the top of the Delta and four along its ‘arc’ with Lake Albert. The extensive fringing wetland that covers the delta and floodplain of River Waiga and Wisoke will also be explored as part of the baseline study. No ecological studies are available about this vast fringing floodplain wetland. The wetland is reported by local fisherfolk to support very rich fisheries of Nile tilapia, Nile perch and Tiger fish, among other species.

Two very old fish landings: Bugoigo to the extreme south and Kabolwa to the immediate north of the fringing wetland are testimony to the importance of the Wetland to fisheries of Lake Albert. Three sampling locations along the Lake Albert fringe are suggested. Sampling locations will also be identifies along the Albert Nile and up the largest feeder river/stream within the Project area.

9.10.5.1 Baseline Data Collection

Aquatic ecology baseline studies will focus selected aspects of three major disciplines namely:

- Water quality plus diversity and relative abundance of algae to indicate environmental quality and primary productivity;
- Macro-invertebrate diversity and distribution to indicate availability of food for young and juvenile fishes; plus indication of environmental quality status by particular taxa of macro-invertebrates; and
- Baseline status of fish comprising aspects of fish ecology and biology namely: taxonomic composition, distribution, relative abundance; food composition and maturity/breeding status. This will include presence or otherwise of alien or invasive fish (and other) species.

Field data sampling will be seasonal (during the main rains, minor rains and the main dry season). The studies are intended to provide an assessment of habitat quality for fish based on their taxonomic diversity, size composition, food habits and breeding status.

Other baseline studies

Water hyacinth, one of the most noxious invasive weeds is on Lake Albert. It was a major constraint to water transport and fishing activities in the Nile Delta areas of the lake and along Victoria and Albert Nile. While the impacts of the weed subsided considerably over the years since 2000 water hyacinth is likely to resurge in the event of environmental enrichment. Surveillance for Water hyacinth and other potential invasive species to establish baselines will be considered.

9.10.5.2 Aquatic baseline field surveys and data analysis

Water Quality Survey

Dissolved oxygen (mg L-1), temperature (°C), pH and water conductivity (µS cm-1) will be measured in situ at 0.5 m below water surface using Multiprobe (Hach HQ40d), suspended solids / turbidity. Samples for determining water quality in the laboratory will be collected at 0.5 m under surface using a 5Lvan dorn sampler. They will be transported in a cool-box on ice. Ammonia-nitrogen and nitrate-nitrogen will be determined using Jenway 6505 UV/Vis Spectrophotometer. Ortho-phosphate, total phosphorus (TP), total nitrogen (TN) and soluble reactive silica will be determined using various standard methods as set out in APHA (1995) (Ref. 9-20). Chlorophyll a will be determined spectrophotometrically using the hot ethanol extraction method.Turbidity, suspended sediments and total suspended solids will also be examined where necessary.

Diversity and Productivity of Algae

At each sampling site, 20 ml of water for assessment of baseline status of phytoplankton will be drawn at 0.5 m depth, fixed with Lugol´s solution, and stored away from light (Wetzel and Likens, 2000). In the laboratory, sedimentation method of Utermöhl (1958) will be used to count the phytoplankton under an inverted microscope (Leica DM IL). Taxonomic identification will be made with the help of standard literature (John et al., 2002 (Ref. 9-21); Komarek and Anagnostidis 1999 (Ref. 9-22)).

Species counts will be made at a 400-times magnification. For each sample, two transects in the sedimentation chamber will be counted and the average recorded. Nitzschia and Planktolyngbya will be counted as filaments, and their total length and width measured using the micrometer scale inserted into the eyepiece. Other species such as Anabaena, Chroococcus, Merismopedia and Oocystis will be counted as single cells. Cell lengths and widths will be determined for biovolume calculation. Twenty (20no) randomly selected specimens from the dominant species will be measured and their volumes calculated by assuming a geometric shape, that is, for Microcystis.

Faecal Coliform Count

Coliform count will be done by membrane filtration technique using Laurel sulphate broth as the incubating media. 100 ml of unfiltered sample will be passed through a cellulose esters membrane filter. The filter will be incubated at 35°C for 12 hours and the yellow colonies counted as faecal coliform.

Macro-invertebrates

Macro-invertebrate surveys in open water conditions (e.g. River Nile, shores of Lake Albert) will mostly target benthos and the main sampling equipment will be the Ponar Grab of approximate jaw area and inner depth

of 238 cm^2 and 8 cm, respectively. Two composite samples each comprised by three Ponar grab hauls will be collected one from close to the shore and the second in deeper water. For each of the samples water depth and type of benthic sediment will be recorded.

Surveys in stream wetlands with moderate flow rate will be sampled using a kicknet. Netting of appropriate mesh size mounted on suitable wooden or metallic frame set downstream will be used to trap invertebrates released by steadily shuffling benthic substrate with both feet over a distance of one metre immediately upstream of the kicknet. Taxonomic identification will be done using guides to fresh water aquatic macro-invertebrates.

Fish sampling and data collection

Fish sampling gear and technic for a given habitat (e.g. riverine strong or weak flow, small river, fringing wetland, open lake) will be determined during reconnaissance tours conducted during the main ESIA process. Possible fishing gears include Open waters of River Nile - driftnet fishing with gillnets (mesh size and design to be determined during reconnaissance survey); shoreline wetland habitats of the Nile and lake fringes - local fish traps; and other major rivers: gillnets (mesh size to be determined during reconnaissance survey); and hand lines. All fish retrieved from experimental gillnets will be identified and each species counted and measured for total length (TL) and standard length (SL) to the nearest 1 mm. The individual weights of fish will be measured to the nearest 0.1g using a digital scale (model CS-10KWP-IP65).

Where necessary, fish will be dissected and sexed. Maturity stages of the fish will be assigned from stage I to VII according to a method described by Witte & van Densen (1995) (Ref. 9-25). The guts will be fixed in 4% formalin and later preserved in 70% ethanol in labelled sample bottles for laboratory examination and analysis.

9.10.5.1 Impact Assessment

The impact assessment will follow the same process as that identified within section 9.10.3.3

9.10.6 Supporting Ecological Studies

In addition to the ecological surveys described above, further studies are required specifically in order to prioritise biodiversity features identified in the Critical Habitat ScreeningAssessment and to assess their status (distribution and numbers) and the ecological processes and/or management issues that may affect them. Work will also be required in order to define appropriate mitigation, include development and design of offsetting to enable no net loss and/or net gain, as per IFC Ps6. These required studies will:

- Determine better the distribution and status of poorly-known terrestrial Critical Habitat trigger species within MFNP, and especially within the direct project footprint (to facilitate avoidance measures);
- Establish the status of biodiversity in the Ramsar site, in particular the poorly-known Delta area, focusing on fish, freshwater molluscs and birds that may be Critical Habitat trigger species, as well as populations of keystone species such as Nile crocodile;
- Continue ongoing survey work to determine numbers of large mammal species (which include several Critical Habitat trigger species) in and around the project footprint, including their movements within the MFCA. As part of this baseline study, sampling of stress-hormonal levels in priority species would be useful within the context of surveys to understand the movements or displacement of animals from Critical Habitats (ecosystem disturbances) and how this affects aspects of animal behaviour (e.g. activity budgets, reproduction, and immunity) in the long term. We would need to know this in order to understand and appropriately mitigate impacts (cumulative impacts on animals) including offsetting design;
- Survey human-wildlife interaction around the MF Conservation Area, including for example illegal hunting/snaring by people and crop damage or injuries/mortality caused by wildlife; and
- Studies in order to support Biodiversity Conservation Initiatives would be required. The purpose of these would be to enable planning in advance for managing residual impacts by starting to put aside resources for offset measures, given that planning for offsetting can be a long and potentially resource intensive requirement of IFC PS6.

9.11 SOCIAL IMPACT ASSESSMENT

9.11.1 Introduction

The social impact assessment will consider all potential interactions between the Project and social receptors based on an understanding of the Project related activities and existing socioeconomic and community health baseline conditions.

The Social Impact Assessment will focus on areas that may be directly and indirectly affected by the Project and will include individuals, households and communities that may be affected due to:

- Proximity to the Project Footprint and interaction with the Project workforce;
- Location within areas at risk of environmental impacts or indirect socioeconomic impacts including influx;
- Dependence on livelihood resources that will be affected the Project (agricultural or grazing lands, fisheries, forest resources);
- Dependence on or connection to cultural, social or health infrastructure and resources that will be impacted by the Project; and
- Potential to benefit from economic opportunities (direct and indirect employment and local content).

Social receptors sensitive to Project impacts that were identified during scoping are those located within:

- Buliisa and Nwoya District: specifically, villages within the Buliisa District sub counties of Buliisa Town Council, Buliisa Sub County, Ngwedo and Kigwera, as well as Purongo Sub County in Nwoya District;
- Pakwach Town Council (Nebbi District);
- Hoima Town (Hoima District); and
- Communities located along Project transport corridors (to be confirmed).

Impacts may also be experienced by social receptors at the regional and national level.

9.11.2 Objectives

The social impact assessment will be undertaken with the following objectives:

- Understand, characterise and describe the social environment of the areas to be affected by the Project based on a combination of secondary and primary baseline data;
- Collect primary baseline data (as appropriate), including consultation and survey data;
- Delineate the social impact assessment study area(s) and identify sensitive receptors;
- Undertake appropriate consultation with relevant stakeholders;
- Use the available social information to predict potential impacts (positive and negative) during construction, commissioning, operation and decommissioning;
- Undertake an assessment and recommendation of mitigation measures to minimise negative impacts and enhance potential benefits as far as possible;
- Consideration of residual impacts; and
- Incorporate the social mitigation measures into the overall ESMP for the Project.

9.11.3 Social Study Area

The social Study Area for the ESIA will consider areas affected by both direct and indirect impacts. This will include:

- ***Buliisa and Nwoya District***: Likely to experience both direct and indirect Project impacts from construction activities; Within Buliisa District, this area includes villages within Buliisa Sub County; Ngwedo Sub County; Kigwera Sub County; and Buliisa Town Council. Within Nwoya District this includes Purongo Sub County;
- ***Murchison Falls National Park (MFNP)***: Tourism operators within and visitors to MFNP may experience direct impacts from Project construction and infrastructure, as well as indirect impacts such as reduced visitor numbers due to perceived disturbances from oil and gas related activities;
- ***Packwach Town Council (Nebbi District):*** A number of contractors and subcontractors will be based in Packwach, which is likely to have indirect impacts due to interactions between workers and the local community;
- ***Hoima District:*** Likely to experience indirect Project impacts This area includes Hoima District Local Government Buseruka Sub-County, Masindi District Local Government and Kiryandongo District; and
- ***Regional and National context:*** impacts are likely to be experienced across the wider region, including Hoima and Masindi districts as well as at the national level including direct impacts from supporting infrastructure and along Project transport corridors, and indirect impacts from employment and procurement opportunities and contributions to the national economy from taxes and revenues.

9.11.4 Scope of Work

9.11.4.1 Social Baseline

Qualitative and quantitative data will be used to identify potential receptors, define their sensitivity or importance, enable assessment of impacts and consider what mitigation will be appropriate to be undertaken.

The social baseline survey will provide:

- Collated data from all previous studies covering the Project area or parts of the Project area;
- Refined and more detailed social mapping within Study Area and Project area of influence;
- Survey data on communities and local social resources;
- Identification of social receptors and sensitive areas for social receptors; and
- Reporting, mapping and GIS data.

A summary of the key data requirements required to enable a comprehensive social baseline assessment is provided in Table 9-2.

Table 9-2: Socioeconomic Baseline Data Requirements

ASPECT	SPECIFIC DATA REQUIRED
Political, Governance and Administrative Data	• Geographic and historical background • National and regional political systems, governmental organisation and administrative framework • Governance and Benefit Sharing • Decision making • Gender equity • Formal and informal leadership structures • Judicial systems (formal and customary)
Ecosystem Services	• Natural resource use for provisioning services (e.g. for food, fuel, medicine, building material, crafts, fodder) • Cultural services (e.g. recreation, spiritual or educational value attached to ecosystems, landscape or species)
Population and Demographics	• Population data including size; birth/death rates; gender balance; age structure • Population change including migration patterns and influx (In-Migration patterns including study of geographic nature and accessibility of ingress routes, physical barriers and constraints, commerce and social attraction points and traditional migration and trade routes) • Ethnicity and Religion • Vulnerable Groups
Socioeconomic and Livelihood Information	• Economic development context including GDP and economic trends • Development Plans (national, regional, local) and poverty alleviation programmes • Employment Sectors • Employment rates • Prices and Inflation • Household budgets (Income and Expenditure) • Housing and household assets • Indicators of poverty and well being • Income generating and subsistence livelihoods (farming, livestock herding, fishing, tourism, artisanal activities) • Economic coping mechanisms • Community groups (livelihood groups, savings groups, women's support networks) • Gender roles
Land Tenure and Land Use	• Formal and customary ownership structures • Land use zones and activities • Land occupation • Settlement patterns • Land Use Plans • Land speculation • Land related conflict

ASPECT	SPECIFIC DATA REQUIRED
	• Resettlement Issues
Social Infrastructure and Services	• Energy Use • Water resources (drinking, domestic and irrigation) • Transportation infrastructure • Community Based Organisations (CBOs) and Non-Governmental Organisations (NGOs) (local, regional, national, international) • Waste and Sanitation
Education	• Literacy Rates • Education and training facilities • Gender and education • Skills and qualifications
Community Health and Safety	• Health Infrastructure and health system • Medical resources and personnel • Traditional medicine practices • Access / constraints to good health status • Key health indicators • Morbidity and Mortality data • Health profile (prevalence of diseases, key enablers / barriers to health) • Road traffic accidents and emergencies • Crime • Health issues within specific sub-groups of population • Food security
Sociocultural Information	• Tangible and intangible cultural heritage • Cultural sites • Intercommunity relationships • Cultural practices • Community organisation (status, roles, social groups) • Community Conflict
Human Rights	• Human rights context • Labour and Working Conditions (overview of the existing context for labour and working conditions based on assessment of national employment regulations and labour rights and profile of existing practice in the region and for the construction sector) • Security concerns • Ethnic marginalisation • Transparency (information accessibility and transfer)

The social baseline assessment process will build on the reviews of relevant existing reports undertaken during scoping, including any new or updated documentary studies and social baseline field surveys that were prepared specifically to inform the current ESIA. The Social and Health Baseline Study undertaken by Artelia Eau et Environment in 2015 (Ref. 9-25) is a large contributing source for informing the social baseline data. Other studies being undertaken in parallel to the ESIA that will contribute to the socioeconomic baseline are the Ecosystem Services Study and a Preliminary Resettlement Action Plan.

Any gaps in existing baseline data (see Section 4.6.3) will be filled by gathering up to date secondary data (including census and demographic survey results, national and district development plans and health and education surveys), as well as additional primary data gathered through field surveys. Fieldwork will be based on direct observation and information gathered during key information interviews, focus group discussions and stakeholder engagement. This will be undertaken during the main ESIA phase.

9.11.4.2 Impact Assessment

The Impact Assessment will include identification of the likely direct and indirect Project positive and negative impacts on social receptors and assessment of their potential significance. The Social Impact Assessment will include identification of mitigation measures to remove or reduce negative impacts as far as possible and enhance any potential benefits. The Social Impact Assessment will be sub-divided into the following individual assessments:

- Community Health and Safety (includes human health, livestock health, accidents and incidents);
- Socio-economics (including Employment and economic development), livelihoods and use of natural resources impact assessment;
- In-migration impact assessment;
- Communities and social cohesion impact assessment;
- Governance and benefit sharing impact assessment;
- Land use and resettlement impact assessment; and
- Human rights and labour environment impact assessment.

The approach to impact assessment will be broadly the same for all of the assessments listed above. Therefore, for the purposes of this ESIA Scoping Report, this section applies to all components of the Social Impact Assessment.

A list of potential social impacts identified to date is provided in Chapter 8 of this ESIA Scoping Report.

9.11.4.3 Potential Management Plans

A number of social management plans will be developed to capture all of the mitigation measures identified during the impact assessment and provide a framework for their implementation and monitoring. The exact list of required plans will be established during the ESIA process, but are likely to consist of a series of separate documents including, but not limited to:

- Stakeholder Engagement Plan;
- Resettlement Action Plan (developed by RAP consultants);
- Livelihood restoration Plan (developed by RAP consultants);
- Community Development Plan;
- Sourcing and Recruitment Plan; and
- Chance Finds Procedure Plan.

9.12 HISTORICAL, ARCHAEOLOGICAL SITES & CULTURAL HERITAGE IMPACT ASSESSMENT

9.12.1 Objectives

The broad objective of the heritage impact assessment is to identify, characterise and assess the significance of the palaeontology, archaeology, history and cultural heritage (including sacred sites and intangible heritage) within the Project area. This will enable the avoidance or reduction of potential cultural heritage impacts; and where impacts cannot be avoided, appropriate mitigation measures will be developed.

The objectives of the historical, archaeological and cultural heritage impact assessment are as follows:

- To describe the baseline heritage conditions, using information from the previous ESIA's of Area EA-2, such as the Environmental Sensitivity Atlas for the Albertine Graben (Ref. 9-8) and other available sources;
- To develop predictive mapping and a targeted methodology to verify and ground-truth known sites and sample areas of tangible archaeological potential, sensitive landforms and proposed impact areas, ensuring adequate survey;
- To undertake appropriate consultation with relevant stakeholders;
- To identify, characterise, describe and map the known and potential historical, archaeological and palaeontological and cultural heritage sites throughout the study area, including:
  - sensitive and/or critical cultural heritage that needs to be safeguarded and preserved.
  - existing impacts and conservation issues, in particular those related to other past or present oil exploration activities;
- To characterise the intangible cultural heritage, ethnography and traditional practices of Potentially Affected Communities;
- To assess the context and significance of identified heritage;
- To assess potential Project impacts upon heritage receptors in the ESIA, setting out cultural heritage management and mitigation measures;
- To consider residual impacts; and
- To incorporate the archaeological and cultural heritage mitigation measures into the overall ESMP for the Project. This will include the preparation of a GIS database and constraints mapping to assist in the strategic planning and design of future works to avoid impacts on known sites/areas of cultural significance.

9.12.2 Scope of Work

The cultural heritage assessment will include the following scope of work.

9.12.2.1 Study Area

The initial definition of the Study Area encompasses all of the areas associated with the Project Components, along with a surrounding buffer zone of 1 km. In addition, known historic, archaeological, paleontological and cultural heritage resources contained within the Project Area of influence will also be included.

9.12.2.2 Baseline Data Collection and Assessment

Information gathered during the initial desktop exercise will be supplemented, where necessary, and verified through a site walkover survey. The baseline data will be analysed to prepare a predictive model to identify areas of heritage potential, which will form the basis for the field survey. Close liaison with other specialists will enable the inter-relationships between heritage and other specialist topic areas such as visual aesthetics; hydrogeology and surface water; terrestrial ecology; terrain and soils; socio-economics; land use; ecosystems services to be fully understood.

The following activities will be undertaken by the cultural heritage team:

- Documentary review of existing cultural heritage data and information. The aim of the desktop review is to determine, as far as is reasonably possible from existing records, the nature, extent, location and significance of the palaeontological, archaeological, historical and cultural heritage within the proposed development area. It will consider field studies as well as oral histories written records, archival data and cartographic sources;
- Consultation and stakeholder engagement regarding the classification and identification of heritage assets, including consultation of the national database of known sites;
- Input into design tools and templates for social survey and focus groups, focusing on sacred sites, oral history, cultural geography, resource use, landmarks, and place-name evidence. The cultural heritage and socio-economic teams will:
    - Engage with local authorities and obtain information on living local communities and traditional guardians of cultural heritage;
    - Identify and consult key stakeholders (local leaders, village elders, historians and relevant authorities) to identify cultural sites including archaeological sites, ruins, sacred sites, ceremonial areas, traditional story/myth/song locations, ancestral burials, cultural routes and significant/sacred landform features; and
    - Undertake interdisciplinary baseline survey using questionnaires which will include questions regarding sacred sites, oral history, cultural geography, resource use, landmarks, and place-name evidence. This will involve oral interviews and participatory surveys with GIS-based participatory mapping where appropriate, or being accompanied to visit non-secret sites if appropriate.
- Population of the Project GIS with known heritage sites and development of an archaeological predictive model and cultural sensitivity predictive mapping;
- A detailed survey methodology for fieldwork will be developed following the desktop review, predictive mapping and data gap analysis stages. An archaeological fieldwork specification will be completed and issued to the National Environment Management Authority and Uganda Department of Museums and Monuments for approval;
- Preparation of a fieldwork survey plan, Health, Safety and Environment (HSE) planning and logistics and acquisition of permits and land access for field surveys;
- Key areas where development is likely to impact upon areas of heritage potential will be subject to:
    - Walkover survey (ground reconnaissance) to identify/relocate and ground truth previously identified sites, map (GPS) and further characterise cultural heritage, including photography. In the MFNP the survey method will be purposive and opportunistic due to the requirement to follow existing paths/tracks and be guided by a ranger rather than use of the systematic survey transects;
    - Potentially undertake random sampling (linear transects and test pit sampling) of landform units outside predicted areas of heritage potential, but within areas of potential impact, to assess the strength of the predictive model; and
    - Potentially undertake the digging of test pits (0.5m x 0.5 m) excavated in 0.1m spits; soil horizons will be sieved using a 3mm screen and finds bagged for further assessment, catalogued, analysed, and lodged with the Uganda Museum following completion of fieldwork.
- The excavation process and the description/mapping of archaeological features and finds will be recorded in detail using photography, field plans and appropriate forms. Fieldwork and recording methods, metadata, classification, identification of artefact typologies and applied nomenclature systems will be compatible with those of Uganda. Finds and samples will be processed, analysed and later classified in accordance with known analysis schemes of Uganda in particular and East Africa in general; and
- Reporting will include field survey reporting and the baseline report to be included in the ESIA.

9.12.2.3 Modelling

The following tasks will be undertaken:

- Preparation of a heritage GIS project database of known heritage sites;
- Preparation of archaeological predictive modelling and zoning of heritage potential using in-house automated landform and cultural sensitivity predictive mapping, based upon the project Digital Elevation Model (DEM) and geological, topographical and landform mapping; and
- Assessment of aerial/satellite imagery and any available vegetation and land use mapping to identify areas of previous ground disturbance as well as any readily visible potential heritage features such as linear boundaries and former settlements; and

Predictive modelling will focus on areas such as watercourses, ridge-lines, overhangs and caves as well as geologically productive areas (e.g. Semliki Series deposits) and areas with potentially exposed strata.

9.12.2.4 Archaeology and Cultural Heritage Impact Assessment

The archaeological and heritage potential and significance of identified sites will be assessed, and it will include the results of consultation with local stakeholders. Heritage significance would be assessed according to the criteria of the *Burra Charter* (ICOMOS 1999 Ref. 9-26) and the principles of *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties* (UNESCO 2011) Ref. 9-27). It will also consider the principles implicit in the Historical Monuments Act 1967 and the Historical Monuments (Amendment) Decree (No.6) of 1977 and Uganda National Cultural Policy 2006. Heritage assessment will be undertaken in compliance with IFC performance standards 2012, the *General EHS Guidelines* and the *Industry Specific EHS guidelines*, in particular *Performance Standard 8: Cultural Heritage* and *Guidance Note 8: Cultural Heritage (Ref. 9-28)*, as well as the Project Proponents environmental and social policies, guidelines and standards, Ugandan regulations and institutional frameworks

The ESIA chapter on Historical, Archaeological Sites and Cultural Heritage will assess potential development impacts on historical, archaeological, paleontological sites and cultural heritage. If heritage resources will be adversely affected by the Project, alternatives will be considered. Mitigation measures and planned commitments will be agreed upon that will link to the Commitments Register and ESMP.

The ESIA chapter will involve:

- An assessment of the value, susceptibility and resulting sensitivity of identified heritage receptors, using the information gathered in the baseline study;
- An assessment of the impact magnitude and significance for identified heritage receptors of the potential effects of the Project, using standard assessment criteria;
- Identification of the potential for mitigation measures to reduce these impacts, with the emphasis focussed on development of mitigatory restoration and reinstatement measures to inform the ESMP;
- A statement concerning the significance of residual effects during construction and operational phases, will be undertaken taking into account agreed mitigation measures; and
- Cumulative and in-combination effects on historical, archaeological, paleontological sites and cultural heritage from selected other developments will also be considered in the ESIA.

General heritage avoidance, protection, management, mitigation and monitoring measures will be developed in compliance with IFC PS8 (2012).

9.13 ECOSYSTEM SERVICES

A separate ecosystem services chapter will be provided within the main ESIA Report. While there is no single system for categorising ecosystem services, the Millennium Ecosystem Assessment (MA) (Ref. 9-29) is widely accepted as a standard bearer, and as acknowledged in IFC PS Guidance Note 6 (paragraph 2) (Ref. 9-15), provides a useful starting point. The MA identifies four broad categories of ecosystem service:

- *Provisioning services* – the products people obtain from ecosystems. These may include inter alia (i) crops, livestock, seafood and game, wild foods, and ethnobotanical plants; (ii) water for drinking, irrigation, and industrial purposes; and (iii) vegetated areas which provide the basis for many biopharmaceuticals, construction materials, and biomass for renewable energy. Goods may be

provided by heavily managed ecosystems, such as agricultural and aquacultural systems and plantation forests, or by natural or semi-natural ones, for example in the form of capture fisheries and the harvest of other wild foods;

- *Regulating services* – the benefits people obtain from the regulation of ecosystem processes. These may include inter alia (i) local climate regulation and carbon storage and sequestration; (ii) natural hazard mitigation; (iii) purification of water and air; (iv) control of pests and disease; and (v) pollination;
- *Cultural services* – the cultural, educational, and spiritual benefits people obtain from ecosystems. These may include inter alia (i) cultural, spiritual, or religious upliftment from cultural heritage, spiritual, or sacred sites; (ii) opportunities for recreation such as sport, hunting, fishing, ecotourism; and (iii) opportunities for scientific exploration, knowledge-building, and education; and
- *Supporting services* – the natural processes that maintain the other services such as soil formation, nutrient and water cycling, or primary production.

The ecosystem services assessment will be undertaken in accordance with the 2012 IFC Performance Standards, drawing on the methodology used during the regional scale Ecoystem Service Review in EA2 (WRI's conceptual framework for Ecosystem Services Review for Impact Assessment (Ref. 9-30)). The Ecosystem Service chapter will bring together the findings of the other technical chapters to examine the issues at an ecosystem level and to assess how impacts on one aspect of the environment can affect others. As such, the chapter will be heavily informed by the other chapters of the ESIA Report.

The approach to, and methodology for, the ecosystem services assessment will be coherent with and based on the Ecosystem Services Identification, Valuation, and Integration (ESIVI) approach. The ESIVI tool was created in order to provide a rigorous and transparent framework for ecosystem service assessments that meets the requirements set out in the 2012 IFC Performance Standards.

The development of the ESIVI will be informed by both the conceptual framework established by the MA, which explicitly links ecosystem services and human well-being, and the WRI's conceptual framework for Ecosystem Services Review for Impact Assessment (Ref. 9-30). The WRI framework puts the Project at the centre of the interactions between human well-being, ecosystem services, ecosystems, and drivers of ecosystem change, recognising that the Project has the potential to affect all the components of the framework and is itself affected by them. It reflects the two ways the Project relates to ecosystem services in terms of:

- Potential impacts on the existing relationships between human well-being, ecosystem services, and ecosystems; and
- Project dependence on these relationships for the achievement of successful performance.

The potential impacts and dependencies on ecosystem services resulting from the construction and pre-commissioning, operational, and decommissioning phases of the Project will be assessed. In addition, measures to anticipate and avoid, or where avoidance is not possible, minimize, and, where residual impacts remain, compensate / offset for risks and impacts on priority ecosystem services will be presented.

Specifically, the Ecosystem Services chapter will:

- Pending completion of the regional study, confirm the relevance of the Priority Ecoystem Services identified duriing the Ecosystem Service Review of 2015 in EA2 in the affeted communities.
- Systematically identify and assess the likely impacts of Project activities on the priority ecosystem services identified during the ESR and the nature and significance of these impacts on ecosystem beneficiaries;
- Evaluate Project dependence on such ecosystem services in order to help manage risks and take advantage of opportunities related to ecosystem change;
- Help inform, for unavoidable impacts, the selection of appropriate mitigation measures which aim to maintain the value and functionality of priority ecosystem services and enhance the resource efficiency of Project operations; and
- Inform a Biodiversity Conservation strategy, BAP and management plan.

9.14 COMMUNITY HEALTH AND SAFETY

A separate Community Health and Safety chapter will be included within the main ESIA Report. The chapter will consider the potential health impacts to national, regional and local population groups, including particularly vulnerable groups who may be disproportionately affected as a result of Project activities.

The approach will be guided by relevant legislative and policy requirements; including the International Finance Corporation (IFC) guidance on Health Impact Assessment (HIA). For example the approach which will be followed addresses the two key characteristics required by the IFC guidance, namely: predicting the consequences of Project-related actions; and providing information that can help decision makers prioritize prevention and control strategies throughout the Project cycle.

The assessment will include the identification of potential impacts of Project activities; a review of existing baseline health and safety conditions and key trends; evaluation of community views from stakeholder engagement; and a health assessment to classify potential health risks before and after the application of mitigation measures.

Key activities associated with the health and safety impact assessment will include:

- Identifying legislative requirements;
- Gathering and reviewing relevant project information;
- Evaluating health context, including consideration of: location; climate; endemic diseases and influx;
- Reviewing project design, including consideration of: water bodies; roadways; pipelines; construction camps; operational facilities; sources of potential exposure; and transmission-line corridors;
- Identifying potentially impacted geographic areas and potentially affected communities;
- Identifying key stakeholders;
- Setting the geographical, time scale, and population boundaries of the assessment;
- Determining the assessment approach; and
- Collecting additional primary baseline data as necessary.

An occupational health and safety assessment which considers the potential health impacts to the Project's workforce and the regulatory framework that governs safe working practices will also be included as necessary.

CUMULATIVE IMPACT ASSESSMENT

10

10 CUMULATIVE IMPACT ASSESSMENT

10.1 INTRODUCTION

An assessment of cumulative effects is required by the Environmental Impact Assessment Regulations S.I. No. 13/1998 (Ref. 10-1) and in order to meet the requirements of the IFC's Performance Standard 1 (PS1) (Ref. 10-2).

PS1 defines cumulative impacts as those that "*result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted".*

This Chapter of the ESIA Scoping Report sets out the approach to be taken to assess the cumulative effects of the Project together with other developments. The approach is based on the IFC's *Good Practice Handbook to Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets* (2013) (Ref. 10-3). The Scoping Report has also been informed by a number of studies, in particular:

- PEDPD and NEMA (2015) *Strategic Environmental Assessment (SEA) of Oil and Gas Activities in the Albertine Graben, Uganda (Ref. 10-4)*; and
- TUOP (2014) *A Cumulative Impact Assessment (CIA) Framework for Proposed Oil Development Activities in the Albertine Rift, Uganda. (Ref. 10-5).*

10.2 KEY STAGES OF CIA

As described in the IFC Good Practice Handbook "*CIA is the process of (a) analysing the potential impacts and risks of proposed developments in the context of the potential effects of other human activities and natural environmental and social external drivers on the chosen VECs over time, and (b) proposing concrete measures to avoid, reduce, or mitigate such cumulative impacts and risk to the extent possible"*. The recommended approach to CIA focuses on the effects on valued environmental and social components (VECs). VECs are environmental and social attributes that are considered to be important in assessing effects of projects.

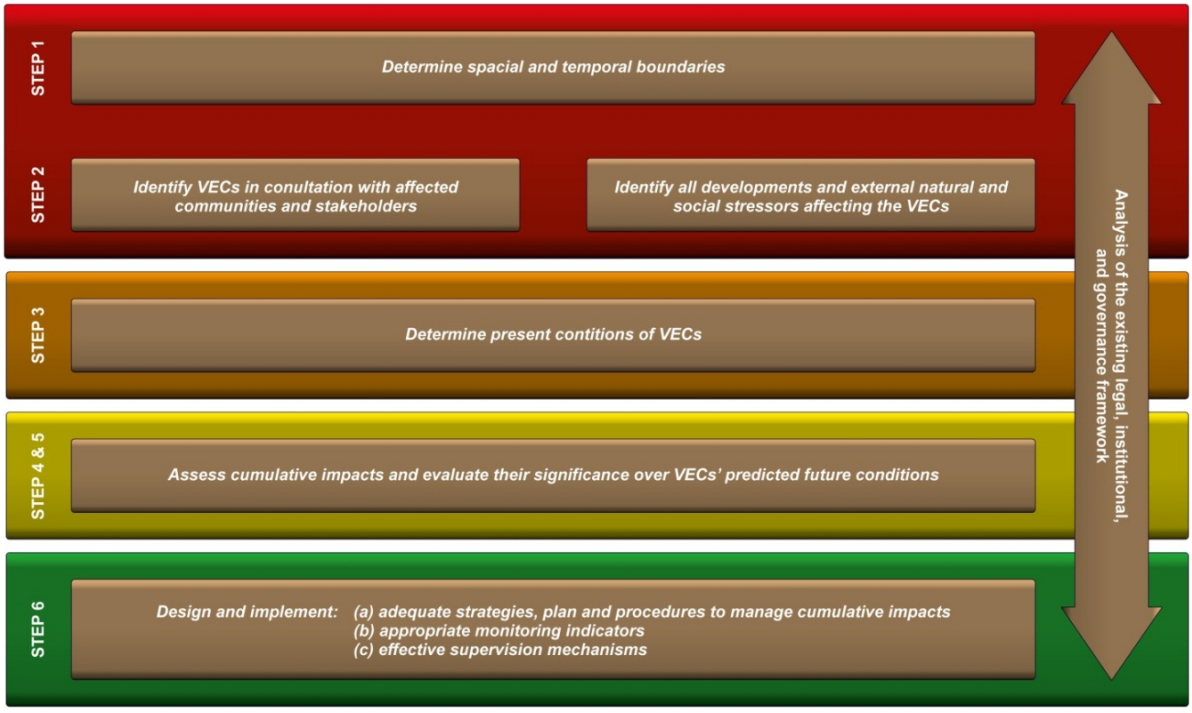


Figure 10-1: Summary of Key Stages in CIA Process following IFC Guidelines

In summary, the CIA involves the following key stages, each of which are described in the following sections of this Chapter:

- Define spatial and temporal scope (Section 10.3);
- Identify VECs to be considered by the CIA (Section 10.4);
- Identify other developments to be covered by the CIA as well as other external stressors affecting VECs (Section 10.5);
- Baseline data collection to describe the condition of VECs (Section 10.6);
- Stakeholder consultation (Section 10.7);
- Define and agree mitigation and management measures (Section 10.9); and
- Report the results of the CIA in the main ESIA Report (Section 10.10).

10.3 SPATIAL AND TEMPORAL SCOPE

The spatial coverage of the CIA will encompass the oil & gas development of the three Exploration Areas (EAs) in the Albertine Graben, associated facilities and other major projects with overlapping areas of influence. More specifically, the spatial scope for the Project CIA will take into account the following:

- The EA1/EA2 North Project (and its constituent components) and its associated facilities;
- The VECs relevant to the Project and supporting infrastructure (as described in section 10.4 below);
- The locations of planned and reasonably foreseeable oil-developments and other relevant development and activities (as described in section 10.5 below) that will result in cumulative effects;
- Areas supporting Project relevant VECs in which changes have already occurred or may occur as a result of other planned or foreseeable oil-related development; and
- The spatial areas necessary to assess cumulative impacts of different VECs, including the wider distribution of VECs so that the significance of cumulative impacts can be assessed. To include areas needed to address source-pathway-receptor interactions including, e.g. Lake Albert, river systems.

The **temporal scope for the CIA** will be defined in relation to the lifespan of the Project through all phases as described in Chapter 3 of this ESIA Scoping Report, including enabling and construction, pre-commissioning and commissioning, operation and decommissioning. Where information is available, Project development phases will be linked to the phases of other projects.

10.4 IDENTIFICATION OF VECs

VECs are environmental and social attributes, such as:

- Physical features, habitats, wildlife populations;
- Ecosystem services;
- Natural processes;
- Social conditions; and
- Cultural aspects.

For the purpose of this Scoping Report we have identified a preliminary list of VECs based on the following:

- Potential effects of the Project and supporting infrastructure;
- Potential effects on priority ecosystem services (see Section 9.12 of this ESIA Scoping Report for further information on ecosystem services);
- Effects of past exploration activities; and
- The findings of the Government's SEA of oil and gas activities in the Albertine Graben.

This preliminary list of VECs will be refined following on-going stakeholder consultation including comments received on this ESIA Scoping Report. It will also be amended to take account of the results of the ESIA process to link the CIA to the residual effects of the Project.

Table 10-1: Preliminary List of Priority VECs

Proposed VEC	***Description within Project Study Area / Rationale for inclusion /Potential cumulative effects***
Bio-physical VECs	
Protected areas	Protected areas within the Project Area include Murchison Falls National Park and the Murchison Falls-Albert Delta Wetland System Ramsar Site. Other sites potentially affected by associated facilities (such as the feeder pipeline) include Bugungu WR and Budongo CFR IBA. Cumulative effects could result from other developments directly and indirectly affecting these sites. Indirect impacts are primarily associated with in-migration and the economic development of areas linked to oil development.
Species of conservation value	There are numerous species of conservation value in the Project study area including those that are endangered, protected, or considered to be flagship or landscape species. Examples include: elephant, lion, Rothschild's giraffe, Uganda kob, shoebill, grey-crowned crane. Cumulative effects could arise from habitat loss, construction disturbance, habitat fragmentation, or may be result with wider indirect effects associated with in-migration and economic development.
Critical and Natural Habitat	Critical Habitats are areas with high biodiversity value as defined by PS6. Studies are being undertaken to identify critical habitat in the study area (see Section 9.8 above). Cumulative effects could arise from habitat loss, construction disturbance, habitat fragmentation, introduction of invasive species or may be result with wider indirect effects associated with in-migration and economic development.
Rivers and wetlands (permanent and seasonal)	Key receptors include the Victoria Nile and tributaries, and other rivers and wetlands in the Project study area. Cumulative effects could result from multiple developments affecting water quality (pollution risk, sediment mobilisation), or the hydrology and geomorphology of rivers.
Ecological corridors	Loss of habitat resulting in risk of habitat fragmentation and severance of existing ecological corridors.
Landscape character	Potential for multiple developments to affect the character and quality of the landscape within the study area, with specific reference to Murchison Falls

Proposed VEC	*Description within Project Study Area / Rationale for inclusion /Potential cumulative effects*
and quality	National Park.
Global air quality linked to carbon emissions	Contribution to changes in greenhouse gas emissions and therefore to global warming.
Socio-Economic	
Drinking water and sanitation	Potential for positive cumulative effects resulting from oil development by improving access to drinking water and sanitation. Other cumulative effects could occur as a result of in-migration putting pressure on existing resources.
Woody biomass	Potential for loss of areas used to collect biomass (for fuel, housing etc.) or greater restrictions on access to these areas. Cumulative effects could also occur as a result of in-migration and additional pressure on available resources.
Eco-tourism	Tourism resources are located in and around Murchison Falls National Park and also in the Budongo Forest Reserve. Oil development together with other projects (such as major hydro in the National Park), have the potential for cumulative effects on tourism numbers, revenue or tourist's experience.
Lake Albert catch fisheries	Potential beneficial cumulative effects could result from alternative employment opportunities created by the oil industry. Indirect cumulative effects could occur as a result from in-migration, greater access to markets from improved roads, and compensation being used to fund fishing gear.
Community health	Cumulative effects could occur as a result in changes in accessibility to health services. In-migrant workers may introduce infectious diseases or STDs, and in migration may put pressure on local health resources. Inflation in prices linked to oil development may affect some people's ability to afford health care.
Education	Potential for positive effects from training provided by oil companies and an increase in incomes may influence decisions to allow children to remain at school. Cumulative effects could occur as a result changing access to education services and in-migration may put pressure on existing education resources and facilities.
Productive agricultural land and food security	Cumulative effects could occur as a result of the loss of productive land (including land for crops and grazing) at the same time as an increase in demand for agricultural products from in-migration. This may encourage the opening up new agricultural land, with associated deforestation and conversion of wetlands.
Land and property	Cumulative effects could result from loss of land, changes in land tenure, property speculation, and land price inflation.
Employment opportunities and economic development	Cumulative effects could occur as a result direct employment creation or employment within the wider supply chain. Wider indirect effects associated economic development activities which may be positive (e.g. new jobs) or negative (e.g. as a result of inflation).
Gender equality	Cumulative effects could be positive and negative, and linked to other VECs including equal employment opportunities, education, and land and property.

Proposed VEC	*Description within Project Study Area / Rationale for inclusion /Potential cumulative effects*
Community safety and security	Cumulative effects could result from increase road traffic from multiple developments, or anti-social behaviour and crime linked to in-migration. Security for oil projects may require the deployment of armed forces or private security personnel which, which depending on training and discipline, may affect the security of people and communities.
Social cohesion	This is a cross-cutting VEC with a relationship with employment and income, community health, gender equality, education, land and property, and community security.

10.5 INITIAL LIST OF PROJECTS COVERED BY THE CIA

The Project, supporting infrastructure and associated facilities are described in Chapter 3 of this ESIA Scoping Report. The CIA will consider the cumulative effects on VECs of all of all these development components together with the effects of other relevant projects in the agreed study area. An initial list of other developments is provided in Table 10.2 below. This will be updated and refined during the preparation of the CIA to ensure that the assessment is based on the most up-to-date information on development activities in the study area.

It should be recognised that available information on many projects may be limited in detail or may be confidential. Only projects that have a high probability of proceeding will be included in the assessment – including speculative projects would decrease the accuracy of the assessment and therefore result in less focussed mitigation and management measures. It should also be noted that the timing of other development is often uncertain and linking to the Project development phases is problematic.

Table 10-2: Initial List of Projects to be covered in the CIA (Preliminary)

COMPONENT	*DEFINITION*	*DESCRIPTION*
The 'Project'	This is the activities and components subject to the approval application(s) for the field development within EA1/EA-1A and EA2 North. This is the primary focus of the ESIA.	Includes the following facilities within the EA1 and EA2 North blocks: • Central Processing Facility (CPF) area; • Well pads, each with multiple wells; • A network of flow-lines; • Pipeline crossing of the Nile; • Water abstraction from Lake Albert; • Waste management storage areas; • Upgraded and new access roads within EA1 and EA2 North; • Operational centres, camps, and laydown areas; • Borrow pits; and • Barge.
Associated Facilities	As defined by the IFC these are: *facilities that are not funded as part of the project and that would not have been constructed or expanded if the project did not exist and without which the project would not be viable.*	Includes: • The refinery at Kabaale; • The export pipeline; • Waste management facilities; • Major road and rail upgrades for the purpose of transporting materials to the EA1 and EA2 North oil fields;

COMPONENT	DEFINITION	DESCRIPTION
		• A feeder pipeline linking the CPF to the delivery point, near the refinery project in Kabaale; and • Airstrip upgrades at Pakuba and Bugungu.
Other developments encompassed within the CIA	These are other projects that will be considered by the CIA (in addition to those listed above). These are not part of the Project, are not necessary to support the EA1/EA-1A and EA2 North development, and are not 'associated facilities'.	Includes: • Kingfisher field development and feeder pipeline; • Kaiso Tonya field development; • Other major transport infrastructure upgrades promoted by the Government; • Transmission line upgrades promoted by the Government ; • Hydro power projects on the Nile; • Thermal power project near Hoima; and • Geothermal energy projects.

10.5.1 Identifying other Activities and Environmental and Social Drivers

In addition to identifying other developments, the IFC Guidance also recommends that that the CIA considers other existing and predictable external natural environmental and social drivers that may also affect VECs in combination with the Project. The key issues which will need to be investigated as part of the CIA, include:

- In-migration and population growth leading to greater levels of urbanisation;
- Wildlife poaching, particularly in protected areas;
- Fishing practices in Lake Albert;
- Deforestation linked to fuel wood collection;
- Land conversion for farming;
- Water quality deterioration;
- Climate change pressures; and
- Increase in road traffic.

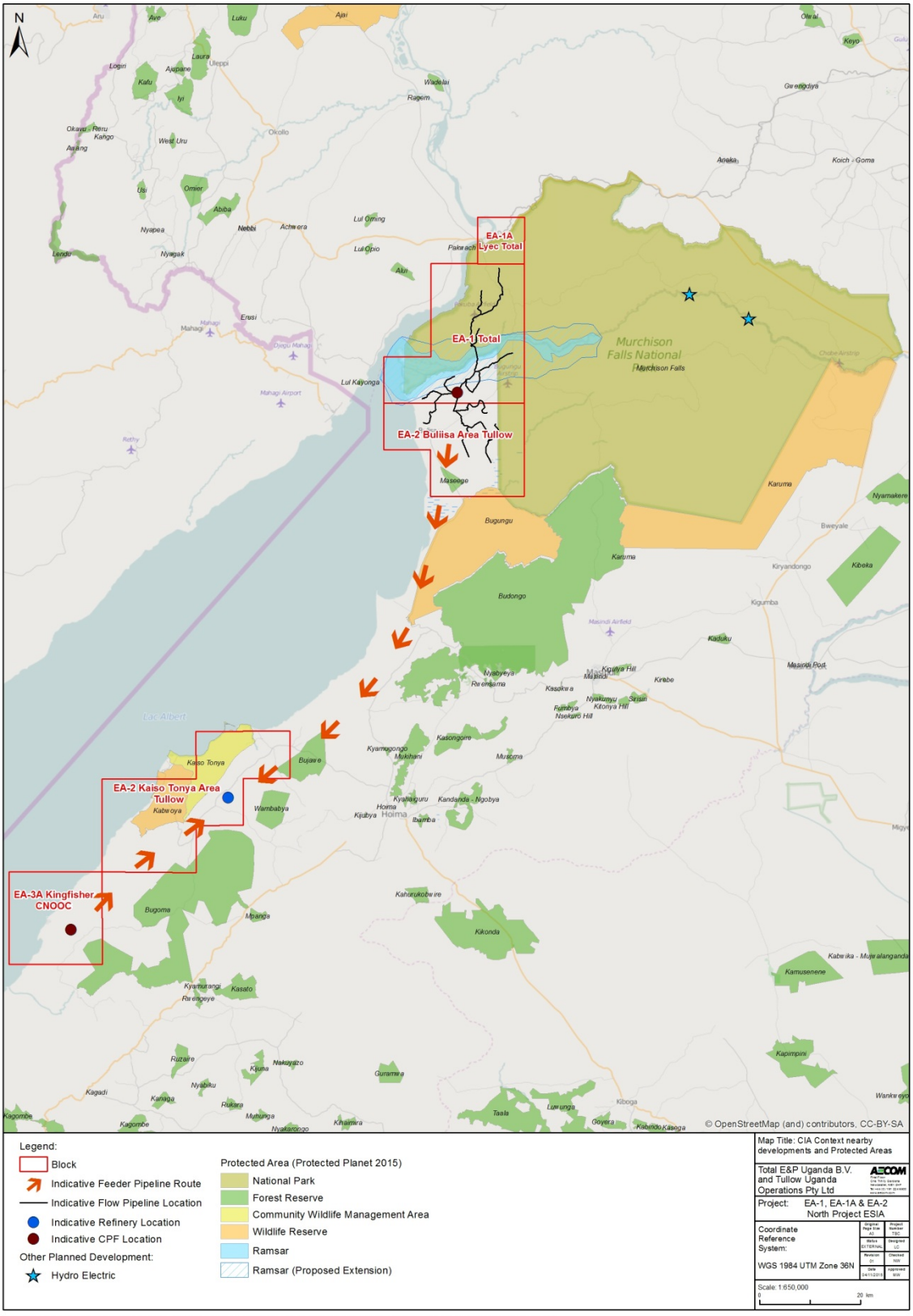


Figure 10-2: CIA Context - nearby developments and protected areas

10.6 BASELINE DATA COLLECTION AND REVIEW

For selected VECs a detailed desk based data review will be undertaken. The detailed data review will:

- Describe the baseline status for selected VECs within the spatial area for the CIA;
- Focus on the data necessary to address the agreed indicators for each Project VEC; and
- Undertake a gap analysis to identify the limitations of the CIA and make recommendations for further data collection.

It will be necessary to define indicators to focus CIA level data collection and analysis. The table below follows IFC Guidance and illustrates how the ESIA can be aligned with the CIA i.e. using common Project aspects and related indicators to focus data collection.

Table 10-3: Example of CIA Indicators

Project Aspect	Indicator of incremental Impact (ESIA)	Indicator of cumulative impact (CIA)	IFC Standard
Additional wage employment opportunities	▪ Incremental numbers of employed and unemployed, participation rates of affected population ▪ Incremental value of subsistence income, wage, and other income to population	▪ Number, size, skill levels of regional labour force ▪ Measures for shifts in livelihood and sustainability of livelihoods	PS 1 and 2
Addition of mortality to a wildlife population	▪ Direct mortality caused by project operations over time ▪ Percentage of local population (or range) lost with relation to global and/or regional population numbers (or range)	▪ Change in rates of regional and/or global population decline ▪ Measures of population (or range) fragmentation	PS 6

10.7 STAKEHOLDER CONSULTATION

To support the development of the CIA, engagement with relevant stakeholders will be carried out and this will run in parallel to the ESIA stakeholder engagement process (see Chapter 7 of this ESIA Scoping Report). The primary objectives for stakeholder engagement for the CIA are to:

- Obtain a wide range of opinions on VECs and to seek, as far as possible, collective agreement on priorities;
- Identify additional sources of baseline data for VECs;
- Help define and agree indicators and thresholds to support baseline descriptions and define the significance of impacts;
- Identify and describe other developments and activities that will result in cumulative impacts; and
- Begin the process of collaboration and agreeing measures for management of adverse effects on VECs.

10.8 LIMITATIONS AND RECOMMENDATION ON THE ROLE OF GOVERNMENT FOR THE CIA

CIA involves the assessment of effects of multiple developments and also considers other activities and environmental and social drivers affecting VECs in a given study area. The actions necessary to avoid or mitigate the cumulative impacts on VECs resulting from these multiple developments and activities is beyond the capacity of the Project to implement in isolation. Effective CIA therefore requires a multi-stakeholder, collaborative approach. For this reason the IFC's good practice (see Figure 10-3 below) recommends that governments and regional planners have ultimate responsibility for CIA. We therefore recommend that a Government led working group (or similar) should be formed in order to provide oversight for the CIA process.

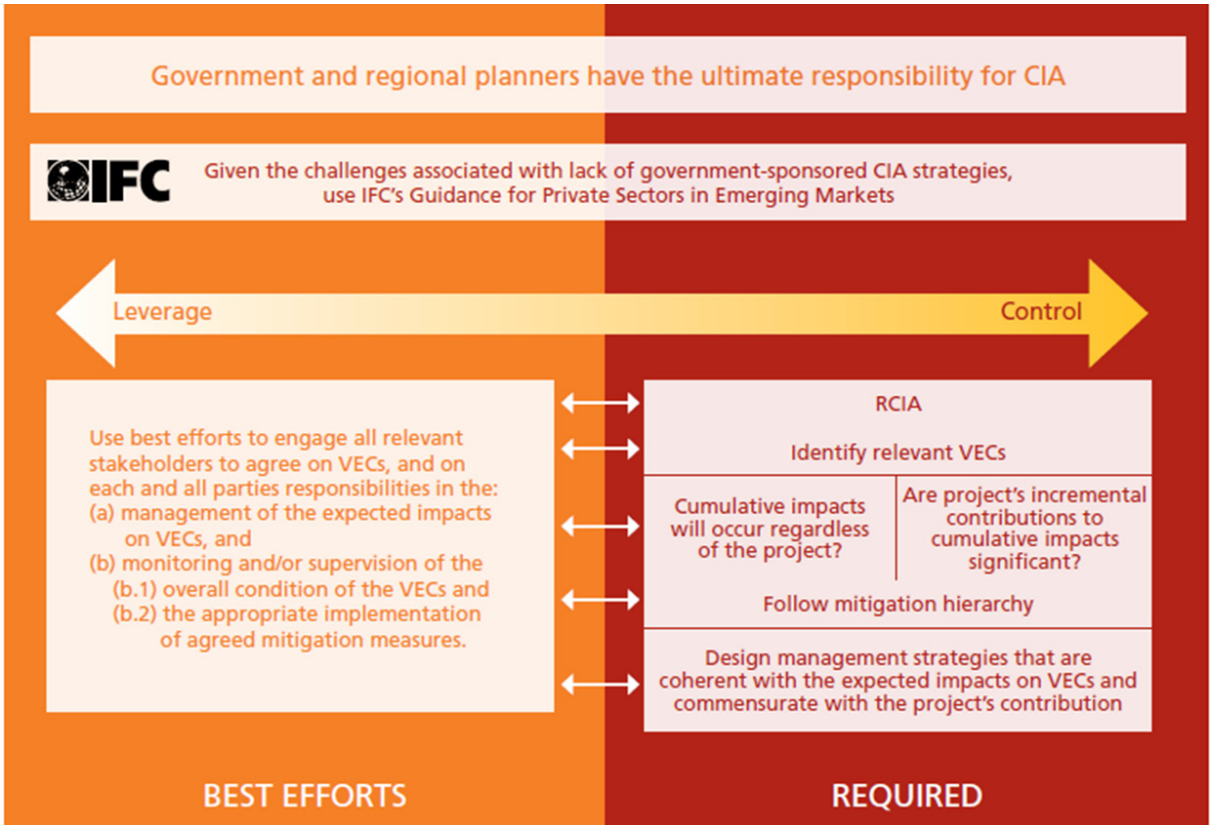


Figure 10-3: Recommended Approach to Managing CIA Process

10.9 MITIGATION, MANGEMENT AND MONITORING MEASURES

The CIA will inform Project level mitigation but, as stated above, where significant residual cumulative effects are identified there will be a need to engage in a multi-stakeholder, collaborative approach to implementing management actions that are beyond the capacity of the Project to implement in isolation. In order to achieve this, and following IFC Guidance, we will need to design and implement: (a) adequate strategies, plans, and procedures to manage cumulative impacts, (b) appropriate monitoring indicators, and (c) effective supervision mechanisms.

As highlighted in Figure 10-3 above, the Project CIA will design management strategies that are '*commensurate with the project's contribution*'. Best efforts will also be made to engage with other stakeholders to develop and implement wider management and mitigation measures.

10.10 CIA ASSESSMENT AND REPORTING

The CIA will form a chapter of the ESIA Report. The CIA chapter will include:

- The methods used for the CIA;
- The priority VECs and the rationale for their selection;
- The spatial and temporal boundaries of the CIA;
- A summary of the stakeholder consultation activities carried out and how they informed the CIA;
- A description (with annotated maps) of the other developments and activities for which cumulative effects have been assessed;
- A summary of baseline conditions for the selected VECs in the CIA study area (focussed on the selected themes and key indicators);
- An assessment of the cumulative impacts on VECs. The assessment of the significance of predicted cumulative impacts will be based on agreed thresholds / limits of acceptable change. These thresholds and limits will in turn be linked to agreed indicators used to define baseline conditions for VECs. It is proposed that the assessment will be qualitative; and
- CIA management and mitigation measures with an action plan for their implementation (including responsibilities, collaboration requirements, timescales, monitoring indicators).

PROPOSED CONTENT OF THE ESIA REPORT

11

11 PROPOSED STRUCTURE OF THE ESIA REPORT

11.1 OVERVIEW OF ESIA REPORT CONTENTS

Based on the agreed approach and ESIA Strategy as described in section 1.5 of Chapter 1 of this ESIA Scoping Report, it was necessary to further define the structure and overview of the ESIA Report. Consequently, an internal workshop was held in August 2015 to discuss how to include all of the relevant information and detail, yet make it easy and straightforward for individuals to access certain sections or pieces of information.

The result of this process is shown in Figure 11-1 below.

Additionally, the proposed structure of the ESIA is specifically designed to help ensure that the National level agencies can readily find the information specifically relating to their specific interest and which they would need to review as part of their own remit.

This approach has been deemed to bring the following benefits:

- Considering all Project components in combination is the only way to accurately and comprehensively assess effects on receptors across the study area;
- It is also the best way that comprehensive mitigation measures can be identified and implemented;
- All information relating to a topic or receptor can be provided in one Report and one Chapter;
- A single comprehensive project description provided in one section;
- Avoids duplication of information in multiple documents;
- More efficient – for such a complex project we need to avoid complicating the assessment process; and
- Provides a clear review and approval process for the Project.

11.2 PRODUCTION OF TWO ESIA REPORTS

As a result of there being two project proponents, each who are responsible for managing the separate concession blocks (TEP Uganda for EA1/EA1A; TUOP for EA2), and as agreed at the Consultation Meeting on the 21st July 2015, two ESIA Reports will be produced and submitted to the regulators. These documents will be identical and the Project will be assessed as one. Subtle differences with the presentation of the material may be made to ensure that relevant information is prioritised depending upon which ESIA it relates.

11.3 CONTENT OF TECHNICAL ESIA CHAPTERS

In addition to the overall ESIA Strategy and overview which is outlined in Figure 11-1, it has been necessary to further define the contents of each of the technical chapters to ensure it covers all of the required information. It is also important that the information contained in the technical chapters is presented in a logical, easy to follow and well-structured format which relates to the components of the Project and the requirements of the Ugandan EIA requirements (Ref. 11-1) and International IFC Performance Standards and guidelines (Ref. 11-2).

Consequently, Figure 11-2 provides an overview of the anticipated structure and contents of the ESIA technical chapters.

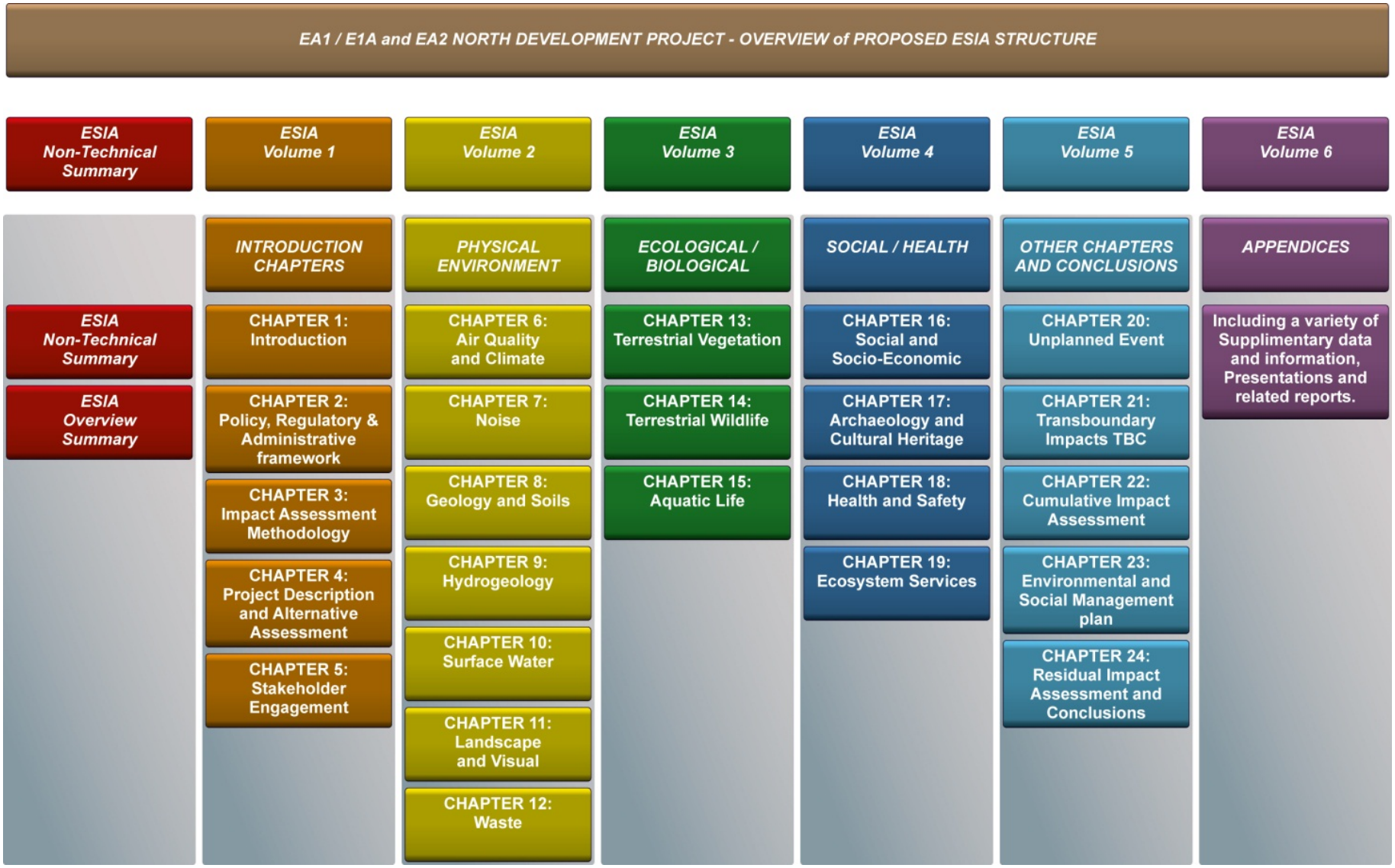
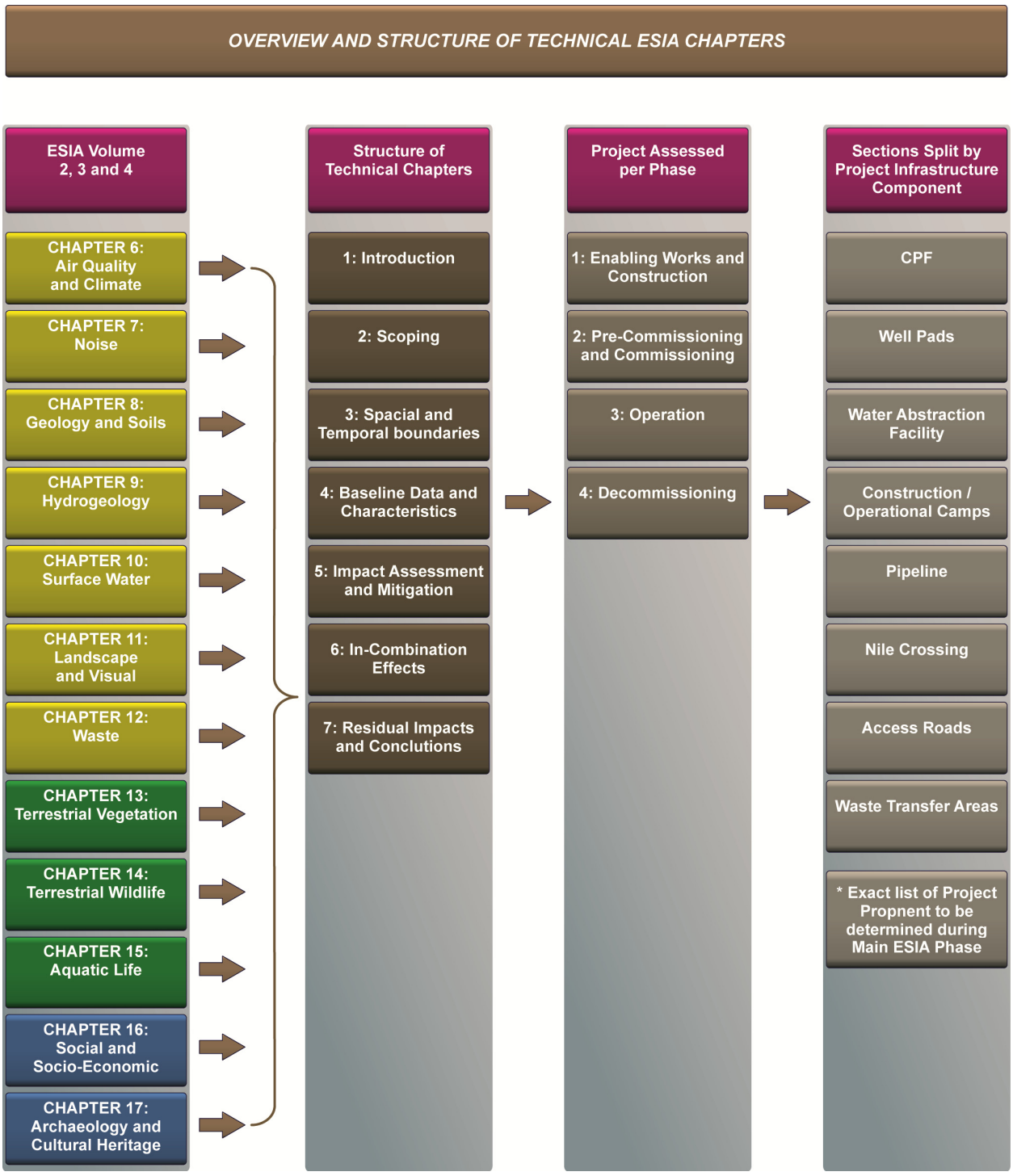


Figure 11-1: ESIA Report Structure Overview



** Chapter 12: Waste, will follow an amended version of this structure*

Figure 11-2: Anticipated Structure and Contents of the ESIA Technical Chapters

11.4 SUMMARY

A summary of the contents of the ESIA Reports is provided below.

11.4.1 Overview and Summary Documents

ESIA Non-Technical Summary – in line with the Ugandan EIA Requirements and other international ESIA Guidelines, an ESIA Non-Technical Summary (NTS) will be provided. The purpose of the NTS is to provide a helpful summary of each of the chapters of the main ESIA (Volumes 1-6) and also ensure that the conclusions and required mitigation measures are clearly expressed. It is important to note that as part of the ESIA process, full disclosure of the Scoping Report and ESIA Report is required under Uganda Law as well as IFC requirements. To that end, the NTS will be translated into various local languages to allow stakeholders the opportunity to understand and provide comment on the documents.

11.4.2 ESIA VOLUME 1: Introductory Chapters

ESIA Volume 1 - will provide the front end chapters which will provide a detailed description of the Project is; outline the legislative framework and ESIA Guidelines to which the ESIA has been prepared; provide an assessment of the alternatives considered; define the structure of the ESIA; and, discuss the stakeholder engagement and consultation process undertaken at the time of publication and how it has influenced the ESIA process and production of the ESIA process.

11.4.3 ESIA VOLUME 2: Physical Environment

ESIA Volume 2 - will contain the technical chapters relating to the Physical Environment, including: Air Quality and Climate; Noise; Geology and Soils; Hydrogeology; Surface Water, Landscape and Visual and Waste. The structure of these chapters will follow the layout shown in Figure 11-2 (with the exception of the Waste chapter, which will follow a slightly amended table of contents).

11.4.4 ESIA VOLUME 3: Ecological and Biological

ESIA Volume 3 - will contain the technical chapters relating to Ecological and Biological topics, including Terrestrial Vegetation; Terrestrial Wildlife; and Aquatic Life. The structure of these chapters will all follow the layout as shown in Figure 11-2.

11.4.5 ESIA VOLUME 4: Social and Health

ESIA Volume 4 - will contain the technical chapters relating to Social topics, including the Social and Socio-Economic Context, Land Acquisition and Resettlement and Human Rights; and Archaeology and Cultural Heritage. Additionally, a chapter on Health and Safety topics, including Community Health & Safety, Occupational Health & Safety and Road Traffic and Labour conditions will be included. The structure of these chapters will all follow the layout as shown in Figure 11-2.

11.4.6 ESIA VOLUME 5: Other issues and Summary

ESIA Volume 5 - will include additional assessment chapters, which are required to meet the ESIA Guidelines, including: Unplanned Events; Transboundary Impacts; Cumulative Impact Assessment; and Ecosystem Services – along with a chapter on the Environmental and Social Management Plan and a concluding chapter, which reports the residual impacts and summarises the findings of the ESIA process.

11.4.7 ESIA VOLUME 6: Appendices

ESIA Volume 6 - will contain an array of additional data and documents, which would broadly follow the order presented within the ESIA.

NEXT STEPS IN THE ESIA PROCESS

12

12 NEXT STEPS IN THE ESIA PROCESS

In accordance with the ESIA process as described in chapter 2, this Scoping Report and Terms of Reference will be disclosed for stakeholder comment and review. Upon the incorporation of comments by stakeholders, including the relevant Ugandan Government Ministries, and issuance of an approval by NEMA, the subsequent phases of the ESIA will commence. The ESIA process continues with the refinement and elucidation of the project activities, collection of additional baseline data collection that is required to characterize the natural and social environment in sufficient detail to allow for potential impacts to be assessed. During the impact assessment process, the issues raised by stakeholders and the potential impacts of the Project on the identified environmental and social receptors will be examined in detail. Stakeholder issues will therefore assist to drive the ESIA process through continued consultation.

The findings of the additional baseline work and the impact assessment will be integrated into a single report, the ESIA Report. The report will also present the mitigation and management measures developed to address the identified impacts. A draft of this ESIA Report will then be disclosed for a period of time to allow interested stakeholders to provide any further additional comments, after which, it will be finalised and submitted to NEMA for a final decision on whether the Project will be approved. This whole process is expected to occur during 2016.

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13 REFERENCES

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