



TILENGA PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

Volume V

Submitted to:
National Environment Management Authority

May 2018



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20 – Unplanned Events

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20 Unplanned Events

20.1 Introduction

This chapter of the Environmental and Social Impact Assessment (ESIA) provides an assessment of the potential environmental and social risks and impacts from unplanned events, during the four phases of the Project (i.e. Site Preparation and Enabling Works, Construction and Pre-Commissioning, Commissioning and Operations, and Decommissioning).

Unplanned events are activities that are not expected to occur during a project's normal activities, such as emergencies, accidents, and non-routine incidents. The Project follows a defined process for ensuring that unplanned events are appropriately assessed throughout the Project lifecycle in terms of their potential to impact on Health, Safety, Social, and Environmental receptors. This process ensures that engineering design criteria is established in order to reduce the likelihood and severity of unplanned events to a level that is As Low As Reasonably Practicable (ALARP).

20.2 Scope and Approach

This chapter focuses on those unplanned events that are considered to be of relevance to the Project due to their nature, extent, and location. These events have the potential to impact individuals, the public, the environment, and the integrity of the installations. The management of risks associated with unplanned events involves periodic assessment during the project lifecycle and an assessment of appropriate risk reduction and mitigation measures required to an acceptable level (i.e. ALARP).

The key activities / events that could result in unplanned events and have been assessed in this chapter include:

- Road traffic and equipment/plant use which could bring an increased risk of traffic accidents, spills, fires, damages to third party assets or accidental introduction of Alien/Invasive Species;
- Third Party activities that may result in fire, but also sabotage, protests, violence or damages generated by animals;
- Natural events such as seismicity;
- Health epidemics that may spread to the local community or wildlife;
- Drilling of wells, which could bring risks of fluids losses or blowouts; and
- Equipment failure, which could bring risks of spills but could also result in need for emergency flaring, venting, and associated requirement for power generation.

Events considered to be outside the control of the Project Proponents are those that cannot be reasonably mitigated and are not typically expected to occur during the Project lifetime, such as extreme meteorological events, political coups, and aircraft disasters. These have therefore not been considered further.

The likely significance of impacts from unplanned events has been identified using the descriptors given in Table 3-2 of **Chapter 3: ESIA Methodology**, which define an impact significance as *High, Moderate, Low, or Insignificant*. The methodology applied to assess unplanned events slightly differs from **Chapter 3: ESIA Methodology** due to the undefined location and inherently high magnitude of impacts, meaning it is not always possible to accurately determine the receptor sensitivity (although broad assumptions have been made and are noted in this chapter).

The approach has entailed the following tasks:

- Screening of unplanned events to identify those which are carried forward for further consideration;
- Identifying the range of activities that could lead to the occurrence of a potential unplanned event during each phase of the Project;

- Where possible, considering the likelihood of occurrence of such events. Generally however likelihood has not been factored into the impact significance and is only considered in order to highlight the need for additional mitigation or to demonstrate the procedures in place are adequate;
- Defining and describing the geographic range of occurrence of potential unplanned events in order to identify potentially affected receptors;
- For each unplanned event, defining the potential impacts in relation to potentially affected receptors; and
- Defining appropriate risk management measures to reduce the likelihood of occurrence of each unplanned event and minimise the residual significance of any resulting impacts.

The nature of an unplanned event being an emergency or unexpected, means the significance of any impacts are generally likely to be *High*. Measures to reduce the likelihood of occurrence and minimise any impacts that do occur have been described. Reducing the likelihood of an event happening has been key to the design and development of the Project.

Occupational health and safety (OH&S) impacts associated with unplanned events are not considered in this chapter. The Project Proponents will implement national, international standards, and a Proponent Management system to assure the OH&S of the workforce (including during unplanned events) along with the necessary equipment and training to make these effective. This is described in **Chapter 23: Environmental and Social Management Plan** and in **Chapter 18: Health and Safety**.

In order to support the unplanned events assessment, information from the following processes and plans prepared by the Project Proponents have been considered:

- Hazards Identification (HAZID) including Environmental impact identification (ENVID) analyses; for each phase of the Project;
- Technological Risk Assessment (TRA);
- Preliminary oil spill modelling to investigate the fate and behaviour of various oil spill scenarios that may occur following an unplanned event;
- A preliminary Blowout Contingency Plan (BOCP);
- Emergency Preparedness and Response Plan (ERP); and
- Oil Spill Contingency Plan (OSCP).

20.3 Legislative Framework

A range of legislation and national policy has been passed in Uganda relevant to unplanned events. It reinforces the prevention and elimination of accidents and promulgates the need for emergency and management plans, and thus the legislation has been taken into account as part of the Project's unplanned event risk minimisation and management process.

20.3.1 National Policy

Uganda introduced a National Policy on Disaster Preparedness and Management in 2011 (Ref. 20-1) and is in the process of developing a legal framework. It also published the Uganda National Disaster Preparedness and Management Act in 2010 (Ref. 20-2), which deals with national issues such as famine and drought, and notes that the risk of fires is likely to be higher with oil and gas activities. Specifically it states that "*Oil and other mineral exploration activities should be done in a manner that does not compromise the livelihoods of the surrounding communities as well as the environment*" and requires oil and gas companies to put in place and maintain fire prevention and fighting equipment.

Uganda's Office of the Prime Minister and United Nations Development Programme (UNDP) are in the process of preparing a National Risk Atlas, which will increase Uganda's efforts towards disaster risk management, with a focus on hazard assessment, exposure assessment, vulnerability assessment, and risk assessment. Once prepared, the National Risk Atlas will guide and support decision-makers, both in the public and private sectors, and help make evidence-based, risk-informed investment, and planning decisions.

20.3.2 National Legislation

20.3.2.1 The National Environment Act, Cap 153

The National Environment Act (Ref. 20-3) stipulates that the operator of a project shall take all reasonable measures to mitigate undesirable effects not contemplated in the routine environmental assessment (i.e. unplanned events).

Section 66 provides for the preparation of guidelines or plans for coordinating national and local responses to environmental disasters. The Act specifically requires employers whose activities are likely to have a significant impact on the environment to prepare a 'specific disaster preparedness plan'. The Project Proponents have committed to developing an ERP, which will fulfil this requirement as described in **Chapter 23: Environmental and Social Management Plan**.

Section 56 of the Act outlines measures to be taken in the event of spillage or discharge of hazardous substances along with the extent of the spiller's liability. The Project Proponents have committed to developing a number of plans for spill prevention and response such as a Spill Prevention Plan, OSCP, and a BOCP, which will fulfil this requirement as described in **Chapter 23: Environmental and Social Management Plan**.

20.3.2.2 The Petroleum (Exploration, Development and Production) Act, 2013

Section 142 of The Petroleum Act (Ref. 20-4) outlines the general requirements expected of a licensee (or any other participant in petroleum activities) with regard to emergency preparedness. These include maintenance of efficient emergency preparedness and capability to reduce and remedy the harmful effects of potential accidents.

Section 143 stipulates the requirements for emergency preparedness against deliberate attacks to petroleum facilities. It requires the licensee to initiate and maintain measures to avoid such attacks and to place such facilities at the disposal of relevant authorities for emergency and security drills where necessary.

20.3.2.3 The Occupational Safety and Health Act, 2006

The Occupational Safety and Health Act (Ref. 20-5) provides for mandatory requirements for emergency preparedness that shall apply to all work places. These include first aid facilities (s.55), fire preparedness, and response (ss.57-60), drenching facilities (s.86), and chemical safety data sheets (s.96).

20.3.2.4 The Physical Planning Act, 2010

The Physical Planning Act (Ref. 20-6) provides for establishment of a National Physical Planning Board whose functions include coordination of physical planning matters affecting more than one district which require central government intervention (ss.6 and 19).

20.3.2.5 National Environment (Oil Spill Prevention, Control and Management) Regulations, 2014

The purpose of these regulations (Ref. 20-7) is to provide for:

- The prevention, control, and monitoring of oil spill in waters and on land under Ugandan jurisdiction and other matters;
- The establishment of basic principles to be observed in handling oil and other harmful or dangerous substances in facilities, platforms, and vessels;
- The role of the National Environment Management Authority (NEMA) and other spill responders;
- Enforcement of spiller responsibility;
- Access and right-of-entry to spill sites;
- Contractor selection and call-out;
- Emergency response to fire and safety hazard;

- Confining and containing oil releases;
- Corrective action; and
- Personal health and safety protection during an oil spill.

Facilities that need to abide by these regulations are required to:

- Have elaborated an internal proceedings manual for the control and management of oil spill and other pollution risks;
- Prepare individual oil spill emergency plans to combat pollution by oil and other harmful and dangerous substances approved by NEMA and the relevant lead agency;
- Give notification to the competent authority including NEMA, Uganda Wildlife Authority (UWA), National Forest Authority (NFA), and the Petroleum Authority of Uganda (PAU), of any incident which might cause pollution; and
- Give compensation to the competent authorities for expenses made in order to control or minimise the pollution caused by oil spill.

20.3.2.6 The Petroleum (Exploration, Development and Production) (Health, Safety and Environment Protection) Regulations, 2014

These regulations (Ref. 20-8) prescribe mandatory requirements for risk management and emergency preparedness and response with respect to petroleum activities. These include carrying out risk analyses to identify accidental effects that could occur during operations; maintenance of fire safety facilities (ss.115-129), use of emergency plans (ss.132-149), provision of first aid services, and training (ss. 161-166).

20.3.2.7 The Water Act, 1997

Section 31, subsection 1 of the Ugandan Water Act, Cap 152 (Ref. 20-9) stipulates that it is an offence for waste to be discharged into water or for water to be polluted (contrary to the standards established under the National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations (1999)), even in the case of unplanned events.

20.3.2.8 Draft Petroleum Waste Regulations

The Petroleum Waste Regulations is in draft form at the time of writing. Its requirements will be integrated as much as practicable by the Project Proponents when it enters into force and the final details are disclosed.

20.3.3 International Standards

20.3.3.1 IFC Requirements and Guidance

International Finance Corporation (IFC) Performance Standard (PS) 1 Assessment and Management of Environmental and Social Risks and Impacts (Ref. 20-10) states that:

“The client, in coordination with other responsible government agencies and third parties as appropriate will conduct a process of environmental and social assessment, and establish and maintain an Environmental and Social Management System (ESMS) appropriate to the nature and scale of the project and commensurate with the level of its environmental and social risks and impacts. The ESMS will incorporate the following elements: (i) policy; (ii) identification of risks and impacts; (iii) management programs; (iv) organisational capacity and competency; (v) emergency preparedness and response; (vi) stakeholder engagement; and (vii) monitoring and review.”

PS1 goes on to highlight the need for the ESMS to establish and maintain an emergency preparedness and response system:

“...so that the client, in collaboration with appropriate and relevant third parties, will be prepared to respond to accidental and emergency situations associated with the project in a manner appropriate to prevent and mitigate any harm to people and/or the environment. This preparation will include the identification of areas where accidents and emergency situations may occur, communities and

individuals that may be impacted, response procedures, provision of equipment and resources, designation of responsibilities, communication, including that with potentially Affected Communities and periodic training to ensure effective response. The emergency preparedness and response activities will be periodically reviewed and revised, as necessary, to reflect changing conditions.”

Guidance on the content and coverage of ERPs is provided in the IFC Environmental, Health and Safety (EHS) Guidelines (IFC, 2007) (Ref. 20-11). Also of relevance is PS 4 Community Health, Safety, and Security (Ref. 20-12) which addresses a developer’s responsibility to avoid or minimise the risks and impacts to community health, safety, and security that may arise from project related-activities, with particular attention to vulnerable groups. PS 4 states that:

“In addition to the emergency preparedness and response requirements described in Performance Standard 1, the client will also assist and collaborate with the Affected Communities, local government agencies, and other relevant parties, in their preparations to respond effectively to emergency situations, especially when their participation and collaboration are necessary to respond to such emergency situations. If local government agencies have little or no capacity to respond effectively, the client will play an active role in preparing for and responding to emergencies associated with the project. The client will document its emergency preparedness and response activities, resources, and responsibilities, and will disclose appropriate information to Affected Communities, relevant government agencies, or other relevant parties.”

20.3.3.2 Other International Standards

Other international standards of relevance to the Project which the Project Proponents would abide by include the following:

- International Organisation for Standardisation (ISO) 31000 ‘Risk Management’ (Ref. 20-13) outlines the principles, framework, and processes for managing risks faced by organisations. The application of these guidelines can be customised to the Project. The objective of ISO 31000 is to *“help organisations increase the likelihood of achieving their objectives, improve the identification of opportunities and threats and effectively allocate and use resources for risk treatment.”*;
- ISO 15544:2000 ‘Petroleum and natural gas industries — Offshore production installations — Requirements and guidelines for emergency response’ (Ref. 20-14). Although specific to offshore production, this guidance still provides useful principles for the Project in terms of the processes of hazard identification and assessment. It describes objectives, functional requirements, and guidelines for emergency response measures on installations used for the development of offshore hydrocarbon resources;
- COMAH (Control of Major Accident Hazards) ‘On-site Emergency Planning and Mitigation’ (Ref. 20-15) provides on-site emergency planning, testing, review and response arrangements for COMAH sites to minimise the consequences of major accidents; and
- COMAH ‘Off-site Emergency Planning’ (Ref. 20-16) strives to ensure that the necessary measures are in place to prepare, test, review and revise the off-site emergency plan.

20.4 Emergency Preparedness and Response Plan

The Project Proponents have implemented the following method as part of its emergency preparedness to define and assess risks associated with unplanned events:

- Hazard identification – identification of the activities that could lead to the occurrence of an unplanned event;
- Development of unplanned event scenarios;
- For each unplanned event scenario, defining the likelihood of occurrence;
- For each unplanned event, defining the potential impacts in relation to potentially affected receptors (Health, Safety, Environment and Social);
- Defining and describing the geographic range of occurrence of potential unplanned events; and

- Defining appropriate risk reduction and management measures to reduce the likelihood of occurrence and the potential impacts of each unplanned event to minimise the residual significance of any resulting impacts to ALARP.

The Project Proponents have pre-defined risk tolerability criteria which have been used to identify unacceptable risks requiring further mitigation. It involves determining the likelihood of occurrence of an event in probabilistic terms relative to the Project lifetime, and the severity of consequence based on the impact on humans, environment, material costs, and the Project Proponents reputation.

Three risk levels are identified:

Level 1: unacceptable risk - which is to be obligatorily reduced to level 2 or 3. This level of risk requires the following actions:

- Implement temporary protective measures immediately in case of emergency;
- Conduct a detailed analysis; and
- Take steps to reduce the risk to level 2 or 3 (e.g. set up monitoring of the source by installing a fixed, regular sampling and measuring system, and/or reducing the emissions at source, and/or eliminating the source, and/or site remediation).

Level 2: tolerable risk, if demonstrated to be ALARP - This level of risk requires the following actions:

- ALARP demonstration study; and
- Conduct a detailed assessment then work to achieve an ALARP level (e.g. set up monitoring of the source by installing a fixed, regular sampling and measuring system, and/or reducing the emissions at source, and/or eliminating the source, and/or site remediation).

Level 3: acceptable risk - The potential impacts are insignificant or controlled by existing measures and continuous improvement of the Health, Safety and Environment (HSE) management system. This level of risk requires the following actions:

- Set up or maintain simplified and regular monitoring.

A Detailed Risk Assessment has been completed as part of the TRA during the Front End Engineering Design (FEED) for the hydrocarbon and chemical processes i.e. wells, process equipment, production and injection network, service lines and manifolds. This detailed study involves extensive review and analyses of each system through hazard and operability studies (HAZOP) and Quantitative Risk Assessment. This includes systems and equipment which have the potential to cause environmental and social impacts. The result of this analysis will be used to prepare the Major Risk Register for the project which constitutes the basis to facilitate knowledge and communication on major risks of the project and also provides critical information to prepare the ERP for future operations.

Chapter 23: Environmental and Social Management Plan (and the ESMP Mitigation Checklist contained within Appendix T) provides a summary of the measures, plans, and programmes that the Project Proponents have committed to, including the preparation of an ERP for the Project in line with IFC EHS Guidelines (Ref. 20-10).

The Project Proponents have already developed and implemented an ERP for their current operations in Uganda, which will be updated and enhanced following receipt of permit consent. The purpose of the ERP is to provide practical guidelines on how the Project Proponents will respond to a major emergency. As such, it defines:

- The Project emergency organisation, based on defined accident scenarios;
- Functions and responsibilities of key personnel;
- Human and technical means; and
- Emergency Procedures.

The overarching ERP will be supported by a series of other management plans and procedures, such as a Spill Prevention Plan, OSCP and BOCP.

The Project Proponents construction Contractors will be responsible for undertaking environmental risk assessments specific to their scope of work and for preparing their own ERPs for their work activities, which are expected to be in line with the Project Proponents standards and requirements.

The preparation of Contractors' ERPs will be a requirement of the applicable works contract, and will be available prior to the start of construction activities and subject to the Project Proponents review and acceptance. The Project Proponents will also ensure that Contractors' plans are integrated with other Project response plans, including their own overarching ERP.

The Project Proponents will also prepare a Community Impact Management Strategy, which will include a Community Health, Sanitation, Safety, and Security Plan.

To provide a prompt and effective response to an emergency, a specific response organisation will be established.

20.5 Events Identification

Table 20-1 lists the key activities that could result in an unplanned event, a brief description of the unplanned event, and the receptors which could be affected for each phase.

The design control/embedded mitigation measures that will be put in place to reduce the likelihood of occurrence of the above potential unplanned events, as well as the mitigation / response measures that will be enforced to minimise the consequences associated with these events, are discussed below in Sections 20.7, 20.8, and 20.9.

Table 20-1: Key Activities that Could Result in Unplanned Events

Activity	Event	Receptors	
		Environmental	Social and Community Health
Site Preparation and Enabling Works Phase			
Road traffic and use of construction equipment and power generation equipment	Traffic accidents	✓	✓
	Fuel, oil and chemical spillages	✓	✓
	Fires	✓	✓
	Damage to third party assets		✓
	Accidents that extend the impact, e.g. dropping pipe segments outside the designated working areas	✓	✓
	Accidental introduction of alien / invasive species	✓	✓
Third party activity	Major fire caused either by public or nature, e.g. lightning strike requiring evacuation of the site	✓	✓
	Protests and communal violence		✓
Health epidemics	Spread of illness or disease into the local community or wildlife	✓	✓
Construction and Pre-Commissioning Phase			
Road traffic and use of construction equipment and power generation equipment	Traffic accidents	✓	✓
	Fuel, oil and chemical spillages	✓	✓
	Fires	✓	✓
	Damage to third party assets		✓
	Accidents that extend the impact, e.g. dropping pipe segments outside the designated working areas	✓	✓
	Accidental introduction of alien / invasive species	✓	✓
Third party activity	Major fire caused either by public or nature, e.g. lightning strike requiring evacuation of the site	✓	✓
	Protests and communal violence		✓
Health epidemics	Spread of illness or disease into the local community or wildlife	✓	✓
Wells drilling	Loss of drilling muds, fluids and chemicals and contamination of soils and groundwater	✓	✓

Activity	Event	Receptors	
		Environmental	Social and Community Health
	Well Blowout	✓	✓
Horizontal Directional Drilling (HDD) of Victoria Nile Pipeline	HDD frack-out	✓	✓
Pre-Commissioning	Spillage of hydrotest liquids / uncontrolled discharge	✓	✓
	Oil or fluids spillage during well start up	✓	
Commissioning and Operations Phase			
Road traffic and use of maintenance equipment and power generation equipment	Traffic accidents	✓	✓
	Fuel, oil and chemical spillages	✓	✓
	Fires	✓	✓
	Damage to third party assets		✓
	Accidents that extend the impact, e.g. dropping pipe segments during commissioning and maintenance	✓	✓
Third party activity	Major fire caused either by public or nature, e.g. lightning strike requiring evacuation of the site	✓	✓
	Seismic activity	✓	✓
	Sabotage of equipment	✓	✓
	Damage to equipment by animals	✓	
Operational equipment failure	Equipment failure, including accidental release of possible polymer, oily waste, solid corrosion products, sand and wax from pigging operation; water treatment failure; operational blowout	✓	✓
	Major ¹ failure of tank or pipeline	✓	✓
	Emergency flaring and venting	✓	✓
	Emergency Power Generation (i.e. diesel firing), in the event of associated gas being unavailable	✓	

20.6 Embedded Mitigation

In line with IFC PS1 and Good International Industry Practice (GIIP), the engineering and design of the Project followed an iterative process, which has enabled the incorporation of a number of embedded mitigation measures into the Project design to minimise the risk and consequences of unplanned events. The FEED has been conducted in line with a defined set of criteria required for hazard identification and risk assessment. The ENVID, HAZID, HAZOP and TRA studies have been incorporated into the FEED with the sole purpose of identifying major risk and incorporating embedded mitigation measures. The process of embedding identified mitigation into the design, which has also taken into account the baseline information and national and international requirements, will continue to take place during detailed engineering.

A brief summary of embedded mitigation measures applicable to minimise the risk of unplanned events are outlined below. A full description and list is included in **Chapter 4: Project Description and Alternatives** and the Embedded Mitigation Register in Appendix E.

Table 20-2: Embedded Mitigation

Unplanned Event	Embedded Mitigation
Traffic accidents	Several organisational measures will be in place to prevent traffic accidents <ul style="list-style-type: none"> - For the upgraded roads, it will be necessary to cordon off the road (while retaining pedestrian access, where practicable) before widening the road. - Roads used by Project vehicles will be maintained, to the extent that this is possible

¹ A major failure refers to a sudden and complete failure from which there is no recovery.

Unplanned Event	Embedded Mitigation
	<ul style="list-style-type: none"> - Construction activities will be contained within the permanent RoW which will have a 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). - There will be no night driving. However, night driving may be permitted in exceptional circumstances where it is deemed safe and practicable to do so. - Drivers will be required to have a break every 2 hours of driving.
Fires	<p>Fire risk associated with project facilities will be minimised through:</p> <ul style="list-style-type: none"> - The established buffer zones around the CPF, well pads and construction areas; - Vegetation clearance around each well pad will comprise a 15 m wide buffer from the perimeter security structure. - There will be diesel powered firewater pumps (including one backup pump) provided to ensure appropriate fire protection for the Central Processing Facilities (CPF).
Spillages and contamination; and equipment and pipeline failure	<p>Several protection systems will be in place to prevent leaks and spillages as follows:</p> <ul style="list-style-type: none"> - The Production and Injection Network outside the Industrial Area will be buried at least 0.8m below the ground surface. - The pipelines will comprise carbon steel with adequate corrosion allowance built into material specifications (wall thickness) to prevent leaks. - An anticorrosion coating will be applied for external protection. A corrosion inhibitor will be injected for internal protection. - A dedicated Pipeline Integrity Management System will be implemented during the Commissioning and Operations Phase. This will include regular preventative maintenance including operational pigging, intelligent pigging, and inspection campaigns to monitor the status of pipelines. - Contaminated run off will be minimised by ensuring adequate storage facilities are in place for materials stockpiles, waste, fuels/chemicals/hazardous materials, vehicles/washing areas, and parking facilities. - Clean surface water will be diverted away from exposed soils with use of diversion drains and bunds. - With the exception of the CPF which has a bespoke drainage arrangement, drainage arrangements for the permanent facilities will be as follows: <ul style="list-style-type: none"> - Potentially contaminated areas (i.e. fuel and chemical storage areas) will be provided with local effluent collection (sumps, kerbing and bunding) whereby the potentially contaminated water will be collected and removed by road tanker to a licenced waste disposal facility; and - Uncontaminated areas which will drain naturally to the environment via Sustainable Drainage System (SuDS) comprising filter drains and soakaways. The SuDS design is subject to further detailed design. - Sampling points will be established for all potentially contaminated areas to enable samples to be collected for analysis - All dewatering from excavations or isolated work areas will be provided with appropriate level of treatment prior to discharge. <p>All fuels and hazardous materials will be stored within appropriate bunds and drip trays, providing appropriate containment, where practicable.</p> <p>Buffer zones will be established to protect watercourses and habitats.</p> <p>Where practicable, equipment will be located under shelters to prevent the ingress of rainwater</p>
Damage by animals	<p>Around wellpads, there will be a 15 m wide buffer from the perimeter security structure, which will be cleared of vegetation. Within the MFNP, the structure will be designed to prevent the ingress of animals entering the well pads and will comprise a bund wall structure.</p>
Accidental damage	<p>Barriers and fences will be used to isolate work areas.</p>
Protests and communal violence	<p>A Stakeholder Engagement Plan is already in place; this will ensure the community are informed both prior to the commencement of work on site, during the works on a regular basis and after. A Grievance Mechanism will be established for the local community to raise compliant and concerns relating to Project activities (i.e. dust, noise etc.).</p>
Well blow-out	<p>All wells will be drilled using a Blow Out Preventer (BOP) system prior to entering hydrocarbons bearing reservoirs to prevent an uncontrolled release of hydrocarbons in the event that well control issues are experienced during drilling.</p> <p>A down-hole safety valve (DHSV) will be fitted on all production wells crossing major fault lines.</p> <p>A Wellbore Surveying Management Strategy will be implemented to address the main challenges related to wellbore positioning and collision avoidance aspects.</p> <p>Each well pad will include an emergency pit with capacity for up to 50 cubic metres (m³) for use should there be an unplanned event during drilling. The pit will be lined and covered to prevent rainwater ingress.</p>

Unplanned Event	Embedded Mitigation
HDD frack-out	Prior to starting HDD activities a Risk Assessment will be undertaken to identify the necessary design of the HDD tunnels. Appropriate tunnelling and slurry management practices will control groundwater ingress, and prevent and minimise slurry loss from the tunnel into surrounding aquifers/surface waters.
Seismic Event	Given that the Project Area is located within the EARS, the Project Proponents will establish a Passive Seismic Network programme, of seismograph stations in the area to enable detection of naturally occurring seismic events. The Project Proponents will undertake analysis of archive images from Interferometric Synthetic Aperture Radar (InSAR) for ground movement data in the Project Area. Down hole safety valves (DHSV) will be fitted on all production wells crossing major fault lines.
Flaring	There will be no routine flaring during normal operations A flow meter will be integrated into the flare design to monitor flow and a sample point will be integrated to monitor composition. A Vapour Recovery Unit will be located at the CPF to process gases generated.

20.7 Site Preparation and Enabling Works

During the Site Preparation and Enabling Works Phase of the Project, unplanned events may occur as a result of the use of mobile site plant, power generation equipment, and from vehicular traffic in conjunction with equipment malfunction or human error.

20.7.1 Traffic Accidents

The preferred transportation option for the supply of materials required for the Project is road transport using the proposed routes described in **Chapter 4: Project Description and Alternatives**.

The large number of road trips expected during the Site Preparation and Enabling Works phase (almost 2,000 road trips per month) introduces a risk of road traffic accidents occurring. The severity of any accident will depend on many factors such as the speed of travel, type of vehicle involved, local road conditions, and the resilience of the other vehicle, animal, or human affected. The impacts may range from minor fuel spills to loss of life for animal or humans. It has the potential to cause both environmental and socio-economic impacts.

A range of measures will be implemented prior to works commencing to address transportation related risks and impacts, including the preparation and implementation of a Journey Management Plan and Road Safety and Transport Management Plan to plan, manage, and coordinate the transport and logistics requirements of the Project. These plans are discussed in **Chapter 23: Environmental and Social Management Plan**.

The Road Safety and Transport Management Plan will identify fixed traffic routes, as well as measures and safeguards to minimise interference with local transportation and routes. It will include but not be limited to restrictions on speed limits, requirements for drivers' training and sensitisation, and confirmation that animals have the right of way if encountered. Its implementation will also be supported by regular information to stakeholders regarding timing of the Project.

The Journey Management Plan will be the mechanism used to manage the journeys required on site and off site. Road maintenance will be planned and implemented to keep the roads (access roads to Project sites) usable during the Site Preparation and Enabling Works phase and the Construction and Pre-Commissioning phase. Access roads may be left in place depending upon the subsequent use of the land. A handover plan will be developed to ensure that roles and responsibilities for ongoing maintenance of these roads for the operations phase and onwards are agreed and transparent. Regular inspection and maintenance of vehicles will also be undertaken in order to minimise accident risks associated with mechanical failures.

In addition to these risk reduction measures, the ERP will include specific measures to be undertaken in the event of vehicle accidents, including those involving third parties. Any traffic induced oil spillages will be managed as per the OSCP.

With appropriate control measures and monitoring, the likelihood of the event occurring is much reduced, however the magnitude of impact on the environment and communities will vary depending on the circumstances. Whilst the consequences of minor road traffic incidents could be negligible, any

road traffic collisions resulting in one or more serious injuries or fatalities would be **High Adverse** significance.

20.7.2 Fuel, Oil and Chemical Spillages

Site Preparation and Enabling Works will require many large mobile plant items (e.g. excavators, dozers), power generation equipment, and vehicles that will be powered by diesel oil and which will contain lubricant oil and hydraulic oil tanks. There will also be a number of chemicals stored on site (e.g. coolant, cleaning liquids and paints etc.) for use during the Site Preparation and Enabling Works Phase. Most oil or chemical spillage incidents are likely to be relatively small (e.g. less than 100 litres) given the nature of the vehicles / mobile plant being used. Such small quantity spills are assessed in **Chapter 8: Geology and Soils**, **Chapter 9: Hydrogeology**, and **Chapter 10: Surface water**, and have therefore not been assessed in this chapter.

There is the potential for environmental impacts if such materials are spilled depending on the type of spill, its volume, and location. Substances spilled onto unpaved areas could potentially seep into the soil, groundwater, or into nearby ditches and watercourses if the spill is not contained and dealt with appropriately. In the most serious of circumstances, spillages have the potential to result in localised soil or water contamination, which may in turn cause health impacts on terrestrial or aquatic wildlife and communities, either directly through affecting water supplies or indirectly by the loss of food supply if agricultural crops or food sources become compromised. It is however noted that the likelihood of occurrence of an unplanned event of this magnitude during Site Preparation and Enabling Works phase is considered to be extremely unlikely.

The pollution prevention and control measures to be adopted by the Project will be defined within the Spill Prevention Plan and contingency plans and will build upon the measures outlined already in **Chapter 8: Geology and Soils**, **Chapter 9: Hydrogeology**, and **Chapter 10: Surface Water**. In particular,

- Vehicle/equipment maintenance should only be done in designated areas;
- Regular inspection, servicing and maintenance of vehicles and plant to ensure they are operating as per manufacture's specification. Use manufacturer approved parts to minimise potentially serious accidents caused by equipment malfunction or premature failure; and
- A Chemical Management Plan will be developed that will describe the selection, transport, storage and usage processes as well as mitigation measures against releases or toxic effects and spill contingency measures in case of spills. The plan will be based on the results of Chemical Risk Assessment.

The implementation of the Spill Prevention Plan will reduce the risks of any long-term significant adverse impacts on the environment as a result of such events.

Accidents during the bulk transportation of fuel and spillages from bulk fuel storage tanks (e.g. tank rupture or as a result of human error or equipment malfunction during tank loading and unloading operations) could result in a larger spillage of hydrocarbon (greater than 100 litres but typically less than 10 m³) into the environment. The design controls that will be implemented to minimise the risks of such events occurring and to prevent adverse environmental impacts will be included in the Spill Prevention Plan and contingency plans described in **Chapter 23: Environmental and Social Management Plan**. Such measures include:

- Appropriate driver training;
- The use of designated routes for transporting fuel to the site (avoiding where possible environmental sensitive areas and built up areas);
- Definition of spillage containment equipment and clean-up response following such events;
- Ensure spill response equipment (including sampling and personal protective equipment) is readily available on site to contain and clean any spillages as soon as reasonably practicable after the event;
- A 24 hour emergency response team will be established;

- Emergency spill response teams will have appropriate training to handle all types of spills; and
- In case of an unplanned event resulting in confirmed contamination of groundwater an alternative source of water supply to affected communities will be considered.

With appropriate control measures and monitoring in place, the probability of spillages occurring is much reduced. Medium sized spillages are very likely for such large construction projects, with the impacts on the environment and communities anticipated to be **Low** or **Moderate Adverse** Significance, depending on the location it occurs (i.e. sensitivity of the receptor). Major spills are less likely to occur, but by their very nature are expected to generally lead to a **Moderate Adverse** or **High Adverse** impact significance depending on the sensitivity of the receptor where the incident occurs.

20.7.3 Fires

Fires can occur, for example, as a result of roads accidents (section 20.7.1) or the accidental ignition of dry vegetation during certain operations involving hot work (e.g. welding, grinding, etc.), or from use of construction equipment and power generation equipment. Fires could also be caused by inappropriate human behaviour, such as workers not properly discarding cigarettes, as well as actions by third party activities and via lightning strikes.

Fires could spread and cause environmental and social impacts. **Chapter 13: Terrestrial Vegetation** describes the habitats that occur within the Project Area that could be adversely affected by fire. In view of the sensitivity of some of the habitats and their protection status, it is important that stringent measures are enforced to minimise fire risks and the associated potential significant adverse impacts.

Fires also have the ability to impact upon local community assets and the health of local community residents. **Chapter 16: Social** describes the land uses that occur within the Project Area and within adjacent areas that could be adversely affected by a fire. The scale of residential accommodation within the vicinity of the Project Area is limited. There are some residential receptors near the boundaries of the Industrial Area, some well pads, and some roads, as shown in the Fact Sheets presented in Appendix B. The risk from fire to the community infrastructure and housing is considered to be minimal given the embedded mitigation presented in Table 20-1 and general distance between human receptors and most Project activities, although the potential for fire to occur does however remain a possibility and the associated smoke may cause both environmental and health consequences.

Overall, fire risk associated with project facilities will be minimised through:

- The established buffer zones around the CPF, well pads, and construction areas;
- Competent personnel for supervision and response for firefighting;
- The definition and enforcement of strict control measures, including the implementation of a “permit to work” system for hot works with spark potential such as welding, grinding, cutting etc.
- Use of dedicated fire waters, mobile fire protection measures (fire trucks and mobile firefighting measures);
- Controlling smoking with the use of designated smoking areas for workers during all phases of the Project;
- Other ignition sources will also be prohibited, dry vegetation will be removed from the RoWs and from areas close to hot works; and
- Fire breaks, which are cleared areas of vegetation to prevent spread of fire, will be introduced around higher risk activities and specified in the Community Health, Sanitation, Safety & Security Plan (see **Chapter 23: Environmental and Social Management Plan**).

The Project Proponents will also liaise with UWA, who undertakes controlled fires to burn vegetation in the area, to minimise the risk of it affecting the Project or being associated by local communities as having been caused by Project activities.

As described in Section 20.4, the Project Proponents will prepare an overarching ERP. This will include details of fire prevention, fire detection and fire-fighting response. UWA will be consulted during the preparation of the plans to ensure the fire-fighting procedures adequately take account of wildlife.

With appropriate control measures and monitoring in place, the probability of fires occurring is expected to be very unlikely, however the magnitude of impact on the environment and communities will vary depending on the scale and location of the incident. Whilst the impact significance of a small, localised fire in an area of Low or Moderate receptor sensitivity might be **Low Adverse**, the impact of a major fire resulting in harm to the personnel, the community, wildlife or loss of critical habitat would be **High Adverse** significance.

20.7.4 Damage to Third Party Assets

Large mobile construction plant items, such as excavators, dozers, and construction vehicles etc. have the potential to cause damage to third party property. The risk is considered to be relatively low given the low number of properties immediately bounding or close to the working areas, and consideration that construction working areas are included in land acquired for the Project.

Some impacts such as vibration may affect properties set slightly further back from the Site Preparation and Enabling Works activities. This is assessed for all Project phases in **Chapter 7: Noise and Vibration**.

The main concern with respect to potential vibration damage could be expected to be associated with drilling activities at the well pads. To assess potential building damages, future investigations will be carried out on potential vibration levels at receptors within 40 m of a well pad once a drilling rig and methodology have been finalised. Any accidental damage will be considered via the Project Proponents' Grievance Mechanism Procedure.

Transport routes will be pre-planned and described as per the Journey Management Plan and Works and traffic/plant movement will have strict adherence to agreed footprint design including access roads and other infrastructure. In addition, regular servicing and maintenance of plant will be undertaken to ensure they are operating as per manufacturer's specification. Use manufacturer approved parts to minimise potentially serious accidents caused by equipment malfunction or premature failure.

There are no known underground or overhead utilities in the Project Area, however local and national utility companies will be consulted and utilities maps reviewed by the Contractors prior to commencement of site works. Local and National utilities companies to be consulted will include, but not limited to:

- Ministry of Information and Communications Technology and National Guidance;
- Uganda Communications Commission (UCC);
- National Information Technology Authority (NITA-U);
- Uganda Telecom Limited (national fixed line mobile and internet provider);
- National Water and Sewerage Corporation (NWSC);
- Uganda Electricity Transmission Company Limited (UETCL), Electricity Regulatory Authority (ERA), Rural Electrification Agency (REA);
- Uganda Electricity Distribution Company Limited (UEDCL);
- Ministry of Works and Transport (MoWT);
- Uganda Railways Corporation (URC); and
- Civil Aviation Authority (CAA).

Should any utilities be identified or suspected, certain equipment may be prevented from using the right of way to avoid accidental damage. Procedures to stop work will also be implemented until the nature of the services can be established and the risk deemed safe. Project construction activities would restart following the definition of appropriate working methods which would avoid impacting upon the integrity of the subject services and/or the health and safety of the workers.

A compensation procedure for temporary disturbance associated with the project activities (including accidental damages) will be developed, as indicated in **Chapter 16: Social**.

With appropriate control measures and monitoring in place, the probability of occurrence of damage to third party assets is expected to be extremely unlikely, however if damage to third party assets were to occur the impacts on receptors are anticipated to be **Low** or **Moderate Adverse** Significance, depending on the scale of the incident and location.

20.7.5 Accidents that Extend the Impact Outside Designated Working Areas

Accidents during site activities may lead to Project impacts extending beyond the planned area into surrounding habitat, such as by dropping equipment outside the designated working area or non-road mobile machinery trespassing outside the Project Area (for example where wide turns might be required during site clearance). This may cause direct impacts on flora and fauna, where the sensitivity of the receptor would be dependent on the location where the incident occurs. Indirectly it may also affect people and local communities, if for example ecosystem services are affected, such as agricultural land or cultural heritage assets. Tourism may also be affected in some locations depending on the location and nature of the incident.

Works and traffic/plant movement will have strict adherence to agreed footprint design including access roads and other infrastructure. In addition drivers will be sensitised, emphasising the need to adhere to designated routes and speed limits, and to avoid making wide turns at the edges of the site, as far as is reasonably practical. Only trained and accredited (as required) personnel will be allowed in the use of machines.

With appropriate control measures and monitoring in place, the probability of such incidents occurring is expected to be very unlikely. However, the significance of the impact if accidents do extend the impact outside designated working areas has the potential to range from **Insignificant** to **High Adverse**, depending on the location and magnitude of the incident.

20.7.6 Accidental Introduction of Alien / Invasive Species

The importation of materials, workers, plant and equipment to the Project Area will result in the risk of introducing invasive fauna or flora species into the local ecosystem. This is particularly important in the MFNP and areas with high species value. It has the potential to lead to significant impacts should it occur in high sensitivity habitat. Alien and invasive species also have the potential to alter local ecosystems or agricultural systems and therefore affect peoples and local communities, for example through introduction of pests or more competitive (but less economically advantage) species, which might have knock on consequences to food production and livelihoods.

Chapter 13: Terrestrial Vegetation, Chapter 14: Terrestrial Wildlife and **chapter 15: Aquatic Life** provide mitigation measures to minimise the risk of invasive species.

An Alien/Invasive Species Management Plan will be developed and implemented with the construction contractors which will include mitigation measures such as dedicated transportation fleet for activities in MFNP and vehicle/vessel checks, as described in **Chapter 23: Environmental and Social Management Plan** and Appendix T.

A Site Restoration Plan will also be developed and implemented. Should additional bedding material or backfill be required, only material from an approved source free of alien invasive fauna and flora may be used. Where unavoidable, soil and/or other materials shall be brought from outside of Protected Areas for use within the Protected Areas only upon approval by the responsible government agency (i.e. UWA or NFA), and this process will be subject to a risk assessment process as described in the scope for the Alien/Invasive Species Management Plan.

With the implementation of appropriate monitoring and control measures, the probability of occurrence is considered to be reduced to very unlikely. Most incidents should be Negligible or Low magnitude following management, and therefore of **Insignificant** or **Low Adverse** significance. However if it occurs in an area of high sensitivity there is still the potential for impacts of **Moderate Adverse** Significance.

20.7.7 Protests and Communal Violence

Local residents and communities in the vicinity of the Project Area could potentially be impacted by unplanned events involving workforce unrest, civil unrest, and worker-community conflict during the Site Preparation and Enabling Works phase.

The Project Proponents and their construction contractors have the responsibility to provide for the well-being of their workers; this includes compliance with national employment laws and regulations, adherence to appropriate OH&S management systems, and the availability of a worker consultation and grievance process. Grievances raised by workers, including direct Project Proponents' employees and contractors / suppliers' workers, will be handled according to the Grievance Mechanism Procedure and will function through all Project phases. The Worker Grievance Procedure will be implemented by the Project Proponents in partnership with their contractors and will ensure that grievances are brought to the attention of the appropriate Project staff and addressed in an appropriate and timely way.

In addition, the well-being of workers will also be assisted through the adoption of the policies and practices outlined in **Chapter 16: Social**, which should help minimise the likelihood and severity of any protests and the associated impacts on local communities and inhabitants.

In order to minimise the risks associated with workforce conflicts and civil unrest, either caused by Project activities or due to independent events, the Project Proponents will ensure that the contractors abide by the mitigation measures detailed in this ESIA. The Project Proponents will also ensure that security personnel adhere to internationally recognised human rights principles in the provision of Project security services. Further detail concerning the Project's implementation of the Voluntary Principles is provided in **Chapter 16: Social**.

The ERP that will be prepared will also include measures that aim to protect the workforce and members of the public. The Project Proponents will also develop a Community Health, Sanitation, Safety & Security Plan as part of the Community Impact Management Strategy (as described in **Chapter 23: Environmental and Social Management Plan**), which will address community safety and security.

With appropriate control measures and monitoring in place, the probability of protests and community violence occurring is expected to be extremely unlikely, however if it did happen the impacts on local inhabitants and communities are anticipated to be **Low Adverse** Significance, depending on the scale of the incident, duration, and location where it occurs.

20.7.8 Health Epidemics

Health conditions, disease and famine are existing issues in Uganda, which could affect or be affected by the Project; these are discussed in **Chapter 16: Social and Chapter 18: Health and Safety**. Malaria for example is responsible for more illness and death than any other single disease in Uganda and the Government of Uganda has several programmes and initiatives in place to improve health as documented in the Ugandan Health Sector Strategic Plan. The risk of increased sexually transmitted infections is also a concern, with the large influx of people anticipated; this is discussed in **Chapter 16: Social and Chapter 18: Health and Safety**.

Provisions will be made as part of the Occupational Health and Safety measures for a medical fitness test and for workers to voluntarily report any pre-existing health conditions as part of their initial induction in order to protect colleagues and members of the community. In addition the Project Proponents will develop an Infection Prevention and Control Programme to minimise the risk of transmission of infectious diseases and prepare for and prevent outbreaks.

There is also a potential risk of affecting the environment, through disease transmission to chimpanzees and other local fauna. The large influx of people into the area may lead to increased numbers of humans going into the forests and interacting with local wildlife, most likely through wildlife inadvertently ingesting infected human faeces or urine. In addition, the introduction of livestock or other animals brought into the area due to population influx also elevates the risk of introducing new infections to wild animals that may come into contact with these domestic animals.

The Project Proponents have already implemented a Pandemic Response Plan which sits under the overarching ERP.

The Community Impact Management Strategy will set out overall objectives and targets for management of impacts on community health, safety and security. The Project Proponents will work with local government, the Ministry of Health, District Health Teams and selected Non-Governmental Organisation (NGO) partners to deliver education and communication on key public health issues in Project Affected Communities using media advertisements and talk shows on FM radio, through village health teams, and placing posters and banners in public places (such as in health centres, local government offices, schools, police stations).

A feasibility study will be undertaken to assess the feasibility of establishing a mobile clinic to provide health services to communities in Buliisa District particularly those located remote from health centres.

Additional details of health mitigation are presented in **Chapter 18: Health and Safety**.

With appropriate control measures and monitoring in place, the probability of health epidemics occurring is expected to be reduced to very unlikely, however if it did happen the impacts are anticipated to be **Moderate Adverse** Significance.

20.8 Construction and Pre-Commissioning

During the Construction and Pre-Commissioning Phase of the Project, there remains the potential for unplanned events to occur as a result of the use of construction plant, power generation equipment, and from vehicular traffic in conjunction with equipment malfunction or human error. In addition, there are several risks associated with the drilling of the wells, and pre-commissioning and hydrotesting.

Table 20-1 lists the activities that could result in an unplanned event during Construction and Pre-Commissioning, a description of the unplanned event, and the receptors which could potentially be affected.

The potential impacts for traffic accidents, fuel, oil and chemical spillages, damage to third party, accidental introduction of invasive species, fires, protests, and communal violence, and health epidemics during the Construction and Pre-Commissioning phase are considered to be similar to the impacts described for the Site Preparation and Enabling Works phase in Section 20.7 above. This has therefore not been repeated and the control measures described above would also be relevant to and implemented during this phase of the Project.

It is however, important to note that the number of road trips is expected to be higher in the Construction and Pre-Commissioning phase compared with Site Preparation and Enabling Works, however the mitigation measures and management plans in place would remain valid.

20.8.1 Loss of Drilling Fluids

20.8.1.1 Drilling of Wells

Drilling of the wells involves the circulation of large volumes of drilling fluids, and production of oil and associated gas; this gives rise to the potential for contamination of groundwater if problems occur. For example, this can occur if the well casing or rock formation cracks and fluids find a preferential seepage pathway such as fault lines and fractures or loose material, or should the formation fluid become unstable and a 'blowout' scenario commences, as discussed in section 20.8.1.3 below.

The Project Proponents have performed risk assessments for the drilling fluids, drilling requirements, chemical selection, and conducted detailed well design studies and determined suitable mitigation procedures / design in order to minimise the risk of unplanned events during drilling. This includes but is not limited to:

- Surface formation will be drilled with Water Base Mud;
- All products used in the drilling mud will be classified "GOLD/ CHARM" (i.e. environmental friendly);
- Rock mechanic detailed study based on exploration and appraisal wells will be used to determine the frack gradient of formation and estimate the risk of losses when crossing faults (very remote);
- Close control of mud density at surface and equivalent mud density downhole (includes pressure loss, via Logging While Drilling);

- Optimal mud composition (fluid and solids property including grain size distribution) to build an efficient 'cake' in front of the formation; and
- Pills, Loss Control Materials and Cement formulation ready to be pumped to cure losses if needed.

With appropriate control measures and monitoring in place, the probability of occurrence of groundwater/surface water contamination due to fluid loss during drilling is expected to be reduced to a very unlikely event. However, if it did happen the impact is anticipated to be a Low to High magnitude, which would result in a **Moderate Adverse to High Adverse** Significance depending on the location (and therefore receptor sensitivity) of the incident.

20.8.1.2 Horizontal Directional Drilling

HDD will be utilised for the installation of the pipeline under the Victoria Nile. The bores to accommodate the production, water injection pipelines, and the fibre-optic cables will be drilled horizontally a minimum 15 m below the river bed, which may rise to a frack-out. This is where drilling fluids are released through fractured bedrock into the surrounding rock and sand and can travel toward the surface. HDD fluids are categorised as non-hazardous.

Contamination of groundwater could be considered both an environmental and socio-economic impact, depending on the location of the incident and whether the groundwater is used by local communities as a source of water or has other functions. The impact has the potential to be significant, although this will depend on the magnitude and location of the discharge, and whether social receptors are affected.

To reduce the probability of occurrence of a frack-out affecting sensitive resources during HDD under the Victoria Nile, the entrance and exit points for drilling have been located at least 45 m from riparian vegetation as part of the design. In addition, appropriate tunnelling and slurry management practices will control groundwater ingress, and prevent and minimise slurry loss from the tunnel into surrounding aquifers/surface waters. To minimise the potential extent of impacts from a frack out, all HDD activity will be attended by a full-time monitor, to look for observable "frack out" conditions or lowered pressure readings on the drilling equipment.

Pre-HDD surveys will be undertaken to identify and locate sensitive receptors at the site. The findings will be communicated to employees. Measures to respond to a frack-out or fluid losses from HDD will be defined in Emergency Preparedness and Response Plan to ensure that preventive and responsive measures can be implemented. The Project Proponents will also ensure that all field personnel understand their responsibility for timely reporting of frack-outs and the HDD contractor shall possess sufficient knowledge, training and experience for HDD operation. Design protocols will be defined with support from appropriate expertise (geotechnical and geophysical) to integrate appropriate recommendations regarding suitability of the formation to be bored in order to minimise likelihood, and a "frack-out" plan will be developed to ensure that preventive and responsible measures can be implemented.

With appropriate control measures and monitoring in place, the probability of occurrence of groundwater/surface water contamination during HDD is expected to be reduced to a very unlikely event. However, if it did happen the Low or Moderate magnitude of impact is anticipated to lead to a **Moderate Adverse** significance, depending on the scale of the incident.

20.8.1.3 Well Blowout

During well drilling activities, there is a risk of a well control event or blowout. A blowout is defined as the uncontrolled release of reservoir hydrocarbons (liquid and/or gas) after pressure control systems have failed. The rate and duration of the blowout depends on many factors such as the well design, geology, viscosity of the oil, presence of gas and the ability to implement mitigation measures. Onshore blowouts could typically be expected to last in the order of 5-15 days on average based on past experience of onshore drilling by the oil industry, with a worst case duration of 45-60 days where it is more difficult to control the blowout.

The blowout scenarios assessed as part of Project include:

- Hydrocarbon release during drilling operations; and
- Hydrocarbon release during production operations.

Sections 20.8.1.3.1 to 20.8.1.3.3 below outline the main aspects of each scenario and the mitigation measures to be implemented by the Project Proponents to prevent blow outs from occurring.

20.8.1.3.1 Hydrocarbon Release during Drilling

The risk of a well not being under control is very remote (around 1 in a hundred thousand, as per worldwide database). The severity of such an event in terms of environmental and social impact will depend on well eruptivity, productivity, and the time required stopping the release. Impacts are described in detail below.

A BOCP will be established prior to commencement of drilling activities. This will explain the mitigation procedures that will be put in place to reduce the likelihood and the severity of such an event including the notification procedure and response strategy.

Possible causes of well blowout during drilling are:

- Well collision and loss of mechanical barriers due to presence of faults;
- Drilling fluid specific gravities being below formation pressure leading to influx of reservoir hydrocarbons into the well bore;
- Swabbing², which can lead to kicks and wellbore stability issues;
- Failure of the Blow Out Preventer (BOP).

To reduce probability of such occurrences during drilling, strict procedures will be enforced.

In case of well collision, surface spacing will be specifically selected to minimise risk of well collision (7.5 m between slots and 8 m between rows on the well pads). Measurement While Drilling (MWD) surveys will be undertaken and tools will be run with gyroscope as back-up in case of magnetic interference. Continuous monitoring of drilling parameters will be undertaken and any unexpected behaviour such as erratic torque or a sudden drop in drill rate will be investigated. Mud returns at the shakers shall be also be monitored closely in accordance with GIIP.

As the formation pressures are close to or below fluid hydrostatic pressure, the wells are easy to control with lightweight drilling fluids, therefore minimising the risk of fluid densities being below the formation pressure. Continuous monitoring of drilling parameters will be undertaken and any unexpected behaviour such as erratic torque, sudden drop in drill rate will be investigated. Mud returns at the shakers shall be also be monitored closely as per GIIP.

Some of the wells will cross faults but since the faults are “sealing” types, the risk of total fluid loss followed by a kick is considered very remote.

The drilling programmes will address the risk of blow out with specific focus on procedures and emergency response exercises to be followed by relevant personnel in the field. Key personnel on the rigs will be trained with all mandatory well control training.

In case of a kick, the effluent will be controlled by closing the BOP. The well will then be circulated with a fluid of density high enough to kill the well. If required, a limited quantity of hydrocarbon will be diverted to a dedicated emergency storage pit on the well pad (there will be no flaring of hydrocarbon). Fluids will then be transferred to vacuum trucks for treatment and/or disposal at a licensed facility.

The BOP is considered to be a safety and environmental critical equipment and, as such, will be certified by an independent competent authority and tested at least once every 3 weeks. In case of a kick, the effluent will be controlled by closing the BOP. The well will then be circulated with a fluid of density high enough to *kill* the well. If required a limited quantity of hydrocarbon will be diverted to a dedicated emergency storage pit on the well pad (there will be no flaring of hydrocarbon). Fluids will then be transferred to vacuum trucks for treatment and/or disposal at a licensed facility.

² Swabbing refers to pulling the drill string from the borehole to create swab pressures. Swab pressures are negative, and reduce the effective hydrostatic pressure throughout the hole and below the drill bit. If this pressure reduction lowers the effective hydrostatic pressure below the formation pressure, a potential kick has developed.

In the case of failure of all barriers including the BOP, the well will be killed via a capping device and/or drilling of a dedicated relief well. A detailed list of all equipment needed, location of it, capping procedures, and relief well design will be described in detail within the BOCP.

Strict procedures will be enforced when a workover rig is moving close to or on top of the wells. All lifting activities shall also be risk assessed and supervised by a Competent Person for Lifting Operations (CPLO).

Wellbore pressures and water will be continuously monitored during drilling using sensors mounted in the drilling line to watch for early warning signs of a well control situation or kick. Electronic alarms will warn the drill crews of any fluid level changes in the drilling mud pits. The drill crew will stop the drilling operations and visually check the well for flow. If necessary, the drill crew will close the blowout preventers to secure the wellbore. The Project Proponents will also ensure that the Contractor conducts proper maintenance of the well cellar and well head.

An OSCP describing the means needed to contain and evacuate a blowout release will be available before drilling the first well.

20.8.1.3.2 Blow Out Modelling

The Project Proponents have already completed preliminary well blowout modelling to assess the transport and fate of land-based crude blowouts from different potential well sites distributed over three different reservoir fields, Jobi Rii (JBR), Ngiri (NGR), and Gunya (GNA). The different reservoir fields have slightly different geological and oil properties that would lead to differing distances travelled by the oil in the event of a blowout. The modelling was based on spill scenarios calculated based on a blowout rate over 3 and 30 days duration spill, which was considered a reasonable scenario by the Project Proponents.

For these set of simulations, the land-based spill OILMAP LAND model was used. The model predicts the distance the oil spread during a 30 day spill during a blowout in the three fields, which varies between approximately 5 km and 12 km. This could comprise a large area of high value habitat and therefore lead to a significant adverse impact if it did occur, although the model is a simplification of reality and has not taken into account surface features such as topography, vegetation, soil properties, etc, and may therefore have overestimated the predicted impact.

If the blowout occurred in the MFNP it would potentially be detrimental to flora, fauna, and ecosystem services. It is likely that this would also affect tourism in the MFNP, which could have knock on effects to the local economy.

This preliminary modelling will be updated and refined as part of OSCP preparation.

20.8.1.3.3 Blow Out Response

A series of oil response measures that will be implemented by the Project Proponents are detailed below, to mitigate the impact by reducing the duration and severity of the blowout.

The response to a blowout is contained in the BOCP, described in **Chapter 23: Environmental and Social Management Plan**. There are three levels of well control emergencies, which determine the intervention strategy to be employed to regain well control:

- LEVEL 1: well kicks (minor problems);
- LEVEL 2: escalated event with complications (serious but not out of control); and
- LEVEL 3: out of control (very serious).

A Level 1 emergency is reasonably common and can be relatively easily controlled by on-site staff.

There are hundreds of different Level 2 scenarios, which are considered serious but not out of control. This discussion, therefore, addresses a worst case Level 2 situation where the well is pressurised. If there is minor escalation, the situation would become a Level 3 emergency. There are several means to reduce wellhead pressure to mitigate the potential for a blowout for a Level 2 event. These include:

- Circulation of additional fluid into the well, to remove excess gas and replace it with a stable liquid, therefore reducing the fuel to the blowout;
- To forcibly pump fluids (bullheading) into the well (to remove the gas and replace it with liquid). This is similar to the above but consists of pumping large volumes of 'kill' fluid down the well at high pressure in order to reduce the well head pressure;
- Lubrication of fluid or modified bullheading, commonly referred to as the 'volumetric method'. Again, drilling fluid is bullheaded into the well, but it is undertaken in incremental steps of small volumes. A period of time is allowed between pumping, and the gas is then bled off to reduce the surface pressure;
- Bridging the well. In the situation where a leak has developed and the leak cannot be isolated, bridging off can be accomplished using specialised materials that are injected into the well and form a seal where there is a pressure differential across the leak; and
- Reduction in wellhead pressure is beneficial as it reduces overall risks, allows additional operations, and lowers the overall stress on the well and pressure control equipment.

A Level 3 event is defined as an uncontrolled release of formation fluids and/or gases from the well either to the surface or to a subsurface (underground blowout) that cannot be stopped or controlled by the action of the personnel or equipment on hand.

The BOCP will explain the suitable options for bringing the well back under control under a Level 3 event. This will include but not limited to:

- Capping Operations: The three general procedures typically used to cap a well include capping to a flange, capping to a stub by installing a wellhead, and capping by swallowing the stub. In all procedures the casing or flange must have adequate integrity to handle the loads and pressures of the subsequent kill/control procedures;
- Relief Wells; and
- Hydraulic Kill Operations.

In some cases it may be appropriate to drill a relief well. This is a new well that is drilled at an appropriate, safe location near to the blowout. The relief well will be very similar in design to the production well and it is unlikely that it will fail to kill the blowout on the first attempt. Either the relief well trajectory takes the well to a convergent point where the pressure in the blowout well is reduced by diverting oil to the relief well, or HDD is used between the blowout and relief well to create a diversion route for the oil to the controlled relief well. Usually this coincides with dynamic injection of a kill fluid (e.g. brine) and drilling mud mixed at a weight density designed to kill, or stop, the blowout well.

Should a well blowout occur, it has the potential to lead to a significant impact on personnel safety and the environment. Social receptors may also be affected indirectly where ecosystems services are negatively impacted. Substantial volumes of non-combusted gas and oil are likely to flow from the well in case of a blowout, either underground or above ground that has the potential to contaminate soils, groundwater, surface water bodies, and local habitats and flora. Some mobile fauna such as birds may be able to move away if the danger is apparent; however a blowout has the potential to lead to major adverse impact on all types of flora and fauna.

In extreme circumstances a blowout can also catch alight, which in turn can lead to a substantial, unplanned release of atmospheric pollutants with a high particulate content and greenhouse gas emissions. This would be temporary, however, likely lasting a few days or weeks, as mentioned above.

In the unlikely event of a blowout, the impact on the environment and communities is therefore anticipated to be a High magnitude and of **High Adverse** significance. However with appropriate blowout prevention, control measures and monitoring in place, the probability of blowouts occurring is expected to be reduced to a rare or infrequent event.

20.8.2 Loss of Hydrotest Water during Pre-Commissioning

Hydrotesting of the pipelines is a process designed to test the mechanical integrity of the equipment and to check for any defects during construction and installation. It is therefore an essential mitigation for minimising unplanned events associated with the process pipework at the well pads, CPF, and the production and injection network. However, as part of this testing procedure leaks may occur and the hydrotest water may inadvertently be discharged into the environment.

Hydrotesting of the production and injection network will take place while the trenches are still open; if a leak is detected the test will be stopped and the line checked for defects and repaired. The quantity of release to the environment should therefore be minimised and small in scale.

The hydrotest water will be sourced from either boreholes or Lake Albert for well pads located south of the Victoria Nile and the Victoria Nile for the well pads located north and shall be inhibited to prevent any bacterial contamination of the pipeline which can cause corrosion. A detailed Chemical Risk Assessment shall be undertaken to determine the dosage of chemicals required for the hydrotesting. Priority shall be given to using chemicals which pose little or no risk to the environment in terms of ecotoxicity potential and required concentrations. A detailed suite of hydrotesting procedures and a Chemical Management Plan will be prepared by the Project Proponents to manage these activities.

With appropriate control measures and monitoring in place, the likelihood of loss of fluids during hydrotesting is expected to be reduced to an infrequent event, however if it did happen the impacts are anticipated to be **Low** or **Moderate Adverse** significance, depending on the scale of the incident and location where it occurs.

20.9 Commissioning and Operations

Table 20-1 lists the activities that could result in an unplanned event during the Commissioning and Operations Phase, a description of the unplanned event, and the receptors which could be affected. This includes many of the same risks identified during the Site Preparation and Enabling Works and Construction and Pre-Commissioning phases, with the additional risks of failure of equipment during production, well blowout, water treatment failure and loss of production fluids, and emergency flaring.

Toxic gas release is not considered a risk for the Project; the Project process fluids do not contain hydrogen sulphide (H₂S) and only includes small quantities of other gases that are considered harmful to personnel (relative to the limits set for the protection of human health).

The potential impacts for traffic accidents, fuel, oil and chemical spillages, damage to third party equipment or property, and fires during the Commissioning and Operations Phase is considered similar to the impacts of these same incidents during the earlier phases of the Project. Therefore, the assessment of these incidents has not been repeated here and many of the controls listed earlier in this chapter would be maintained during the Commissioning and Operations Phase.

There will be a significant reduction in the number of workers and activities undertaken during this phase of the Project. As such, a substantially lower risk of spillages from maintenance equipment and works, operational worker protests, and transport collisions is expected. Equipment will undergo regular maintenance to mitigate the increased risk of spills occurring through wear and tear. Pigging for example is part of this maintenance procedure, which is outlined in **Chapter 4: Project Description and Alternatives**.

20.9.1 Seismic Activity

Natural ground movements, seismic activity, and hydrocarbon seeps are constant and common over the Project Area. Lake Albert lies across the west arm of the East African rift, a major plate tectonic feature that is dividing the African continent under northwest-southwest extension. The following risks are therefore present with respect to project activities:

1. **Induced Subsidence.** Localised ground movement or collapse as a result of a drop in the reservoir pressure (for example, due to a lack of water injection, water injectivity loss, or local overproduction). Preliminary modelling suggests induced subsidence, if it did occur, could cause in the order of a 1 m change in ground level locally;

2. **Induced Seismicity.** Earth tremors or earthquakes as a result of changing reservoir pressures in a major fault which could lead to earthquakes; and
3. **Induced hydrocarbon leaks (oil & gas).** The Project may create pathways for hydrocarbons to move along fault planes, vertically or horizontally.

The Project Proponents have assessed the seismicity of the Albertine Region and conducted seismic hazard studies for the region, with ground motion estimates (Ref. 20-17; Ref. 20-18). They found 25 areal and 31 fault shallow crustal sources of seismogenic ground shaking within 500 km of the Project Area.

Bwambale *et al.* (Ref. 20-19) found that the return period for an earthquake capable of causing damage to engineering structures in the Project Area is averaged at 30 years. Statistically therefore, the Project can experience one earthquake during its lifetime. In case of a seismic event, an earthquake may directly and indirectly cause unstable ground conditions and liquefaction, ruptured pipelines, slope failure leading to land-slides, and oil spills.

In order to increase the Project's resilience to earthquakes, the Project Proponents have considered the following risks:

- **Site-specific site response analyses:** The Project Area contains areas of soft soil and there is a potential for significant ground motion modification as the seismic waves propagate from the bedrock to the ground surface. A good understanding of this through developing site specific response analyses in the ERP will aid emergency preparedness;
- **Slope failure hazard:** Slope failures are the dominant driver of hazards to engineered facilities and may pose a hazard to parts of the Project. Mapping and controlling slopes that are at risk of failure within the Project Area is crucial to preventing land-slides that may endanger the Project Site. The Landscape Management Plan and ERP will both consider final slope design;
- **Surface fault rupture hazard:** Surface fault rupture hazards occur when fault plane dislocation is of sufficient size to propagate to, and intersect the ground surface; it is especially dangerous when considering engineering structures, where buried pipelines may be dissected. As the Project Site is located close to the top of the surface projection of major active faults, the ERP will include a surface fault rupture hazard; and
- **Liquefaction:** Liquefaction occurs as seismic waves propagate through low plasticity fine sediment layers, and induce shear deformation and collapse loose particular structures. As pore water pressures increase, the sediment layer softens, and structures are at further risk of collapse. Liquefaction may lead to a loss of bearing capacity, and permanent ground failure. Site specific ground testing will therefore be performed to identify continuity of the liquefiable soils.

A continuous monitoring system (Passive Seismic Network) comprising seven seismograph stations will be installed by the Project Proponents. Real-time pressure gauges will also be used to measure reservoir pressure to quickly detect issues and redistribute water injection accordingly. Radarsat-2 monitoring data will also be purchased annually to provide additional data for comparison against historic conditions to identify any anomalies.

Measures to prevent induced subsidence, seismicity, and induced hydrocarbon leaks will be outlined in the ERP. This plan will also include response measures to naturally occurring or induced events.

Should a seismic event occur, it has the potential to lead to high magnitude impacts that would be of **Moderate** or **High Adverse** significance (depending on the sensitivity of the affected receptors).

20.9.2 Sabotage

The Project assets may be subject to deliberate damage from people and communities, for example as part of community protests, terrorist attacks, or to illegally siphon oil for personal use. This is more likely in the operational phase, when the presence of workers onsite reduces. This has the potential for either environmental or social and community impacts, depending on the nature and scale of the sabotage and ability to respond to any damage.

The above ground equipment is restricted to the industrial area and well pads, which will be monitored using Closed-Circuit Television (CCTV) and protected with security fencing. Equipment sensors, including Fibre Optic Cable, will also relay information back to the CPF Central Control Room, from where major damage should be detected and a response team activated.

If sabotage does occur it has the potential to lead to Moderate or High magnitude of impacts, which may lead to impacts of **Low to High Adverse** significance, depending on where the sabotage occurs and the receptor sensitivity.

20.9.3 Damage to Equipment by Animals

The equipment is vulnerable to damage by animals, especially to the larger fauna such as elephants in MFNP. Elephants have the potential to damage fencing and break equipment within the well pads, or buried pipelines, which could result in leaks or spillages.

Equipment damage by animals is a small risk during any stage of the Project; however it is during the 25 years of operation when the facilities within MFNP will be unmanned that the risk is considered greatest. During the other Project phases the regular and frequent vehicle movements, site plant equipment, and noisy construction or decommissioning activities are expected to keep animals away from the Project areas, and should damage occur it is more likely to be witnessed by Project staff and therefore dealt with rapidly to avoid escalating problems.

The pipelines and flowlines within MFNP will be buried deeper to protect against animals, at a minimum 1 m depth below ground level. Well pads will be fenced with earth bunds installed to screen facilities and prevent elephants from reaching the fencing. **Chapter 4: Project Description and Alternatives** describes the mitigation measures to prevent access by animals to equipment.

Such an event may also result in injured or trapped animals which would require a response team. Details will be set out in the Biodiversity Management Plan.

The significance of impacts from damage by animals will depend on the location where it occurs and nature of the event. It is most likely to cause **Low to Moderate Adverse** impacts, although **High Adverse** impacts cannot be ruled out in the case where a major incident results and affects sensitive receptors.

20.9.4 Operational Equipment Failure

During the Commissioning and Operations Phase the following unplanned events are possible at the well pads and CPF.

20.9.4.1 Accidental Releases at the Well Pads

Accidental releases at the well pads may lead to discharges of oily water, solid corrosion products, sand, and waxes. The main well cellar area and flowline culverts will therefore be concrete lined and covered.

The well pads will be monitored constantly by CCTV and equipped with leak detection. Remote isolation functionality shall also be available via the Central Control Room. Operational teams shall visit each of the well pads once per week in order to carry out routine inspections and maintenance and report any issues or visual events. Staff will make routine circuits of equipment and shall report any visual events, thereby serving as a manual back up to the automated detection systems.

20.9.4.2 Accidental Releases at the CPF

At the CPF, accidental releases at the pumping and heating stations and pig launchers may lead to discharge of deoxygenated water, oily water, solid corrosion products, sand, and waxes. The main storage facilities and process areas within the CPF (oil treatment/storage, chemical storage/injection, pig launcher/receivers etc.) will be provided with secondary containment to ensure that accidental spillages are captured, isolated, and removed. In addition, the CPF will have an open drainage system draining to an oil-water separator. In the event of spillage, the system will be isolated and any contaminated fluids shall be treated and removed by vacuum truck if necessary. These releases are therefore not expected to lead to a significant impact on either the environment or social receptors.

20.9.4.3 Failure of the Water Treatment Systems

Failure of the water treatment system either at the Lake Water Abstraction facility or CPF is not considered likely to cause any significant impacts; should a problem occur the production would cease and separated produced water would be temporarily stored in the water buffer storage tanks within the CPF and circulated back through the water treatment facility upon re-commencement of production. A Detailed Risk Assessment is currently being undertaken during FEED to determine the frequency of occurrence and severity of different equipment failure modes. This is a very detailed study which involves extensive review of each system.

20.9.4.4 Hydrocarbon Release

The risk of blow out during production operations is very remote (less than 1 in a hundred thousand). Similar to drilling operations, severity depends on well eruptivity, productivity, and the time required for stopping the release. Severity, which will be also addressed in a detailed study, will be less than the worst case of the drilling scenario as there will be restriction to the flow (as the completion string is in place).

Possible causes of well blowout during production are:

- Hydrocarbon release via the well bore; and
- Hydrocarbon release behind the well casing.

Hydrocarbon releases from the wellbore may occur where there is failure of downhole equipment (Down Hole Safety Valve - DHSV) or where there is loss of surface barriers (i.e. the Well Head or Christmas tree). A detailed risk assessment has been undertaken by the Project Proponents and has confirmed that only oil producing wells crossing major faults need to be equipped with DHSV. Regular maintenance will be planned on DHSVs during the production phase to assure their continued operation. In the case of losing a surface barrier, the biggest risk is posed by a dropped object incident causing damage to the wellhead or Christmas Tree. The probability of this happening is near zero, as each well will be located below ground level and inside a covered/protected cellar. To reduce the probability even further, strict procedures will be enforced when a workover rig is moving close to or on top of the wells. All lifting activities will also be risk assessed and supervised by a Competent Person for Lifting Operations (CPLO). Maintenance of the well cellar and well head will also be conducted.

Hydrocarbon released from behind the well casing may also occur, due to poor cementing of the casing. An imperfect cement job can trigger micro-channelling of hydrocarbon via the micro-annulus in the cement bond behind the casing. Because of high restriction (very low induced permeability) only gas can migrate through this channel, resulting in possible gas bubbling at the surface. Also to get to this point, gas must migrate outside all casings rendering it no longer containable by the wellhead at surface (gas in contained annulus). All casings are cemented from the shoe up to surface, giving a better chance to have enough good cement for a proper isolation. Fit for purpose cement slurry/spacers formulation, displacement parameters, casing centralisation will be used to ensure a good cement job during well construction. Casing will be even rotated on more critical wells (crossing gas cap) to limit the risk of a poor cement bond. In addition, the cementing operation will be analysed and a cement bond log will run accordingly to check the quality of cement. An appropriate Plug and Abandon operation will also be put in place in case of a much degraded situation to restore and isolate relevant reservoir.

For all scenarios as described above, access will be made available to well killing equipment so a well can be isolated (via tubing or the annulus path should equipment be of sufficient integrity to enable appropriate connection), if a blowout scenario occurs. In cases where all barriers are severely damaged, then the well will be killed via a capping device or relief well as explained in section 20.8.1.3. The BOCF and OSCP will be available before commencement of drilling activities and will be updated for production phase.

20.9.4.5 Summary

With appropriate control measures and monitoring in place, the likelihood of equipment failure at the wells, CPF, and water treatment failure is expected to be reduced to an infrequent event, or rare in the case of operational blowouts. The magnitude of impact is anticipated to range between Low and Moderate in most cases, with the sensitivity of the receiving environment expected to be Negligible to Moderate, leading to impacts that are predicted to be **Insignificant to Moderate Adverse** significance,

depending on the type of equipment failure, resultant scale of the incident, and location where it occurs. Under a rare event, such as a blowout, it may lead to a High impact magnitude that would be of **Moderate** or **High Adverse** significance, depending on the receptors affected.

20.9.5 Accidental Polymer Release

The JBR-04 well pad will be used as a pilot to test the effectiveness of injecting polymer to increase production. Polymer will be delivered in solid pellet form, mixed with lake water / produced water and heated to generate a fluid for injection.

There is the potential for the pellets to be spilled during the delivery or transfer of the pellets and contaminate the local soil, surface water, and groundwater. Polymer under powder or solid form is non-toxic and non-flammable / explosive, and any loss of solid pellets would be collected and sent offsite to a licensed landfill for disposal.

Liquid polymer spillages are unlikely given the closed system, but any spillage if they did occur would be collected and reused or disposed of appropriately. The proposed polymer, PAM, is commonly regarded as nontoxic to humans or the environment and therefore has no current published water quality standards in Uganda or worldwide. However in the presence of sunlight it may degrade to toxic acrylamide, and a potential risk therefore exists to human health receptors from potable water where a leakage occurs within the radius of influence of a drinking source.

A preliminary risk assessment undertaken by the Project Proponents (Ref. 20-20) shows that there is only predicted to be a risk to humans and the environment where a breach occurs within 80 m of a water course or water body. The JBR-04 well pad is located a minimum 4,365 m from Lake Albert, Albert Nile, or the Victoria Nile River, and over 380 m from a designated ordinary water course (**Chapter 10: Surface Water**); it is therefore not expected that a spillage would affect an aquatic receptor or a drinking water source.

The magnitude of impact is considered Low to Medium, if a polymer spillage occurs. The receptor sensitivity is Negligible given the absence of water bodies or watercourses near the JBR-04 well pad, resulting in an impact of **Insignificant** significance.

20.9.6 Tank or Pipeline Incident

Crude oil transport by pipeline is considered safe and reliable for bulk transport. Leaks from oil pipelines tend to be relatively small and the effects local. Where leaks do occur they are usually result of corrosion of the pipeline, mechanical failure, human error, or natural hazards. Rights of way will be regularly inspected and trees that become established along the pipeline route will be identified and removed as soon as possible.

In the event of a leak being detected on the production line (depending on the location and extent), the production would be stopped and the leaking section of pipeline depressurised to the CPF. The section of line would then be flushed with hot water from the nearest well pad (a temporary connection between the water injection and oil producer pipelines will be made) in order for a repair to be undertaken. The likely quantity of oil and impact this could cause will be quantified in a Detailed Risk Assessment.

As mentioned in Table 20-1, a number of control measures will be implemented to minimise the risk of tank and pipeline failure. In addition, cathodic Protection (CP) will be applied to buried carbon steel non-insulated pipelines in accordance with the Cathodic Protection Philosophy. A high visibility polyethylene pipeline warning net shall be laid 0.3 m above the pipeline over the entire route of the pipeline. A leak detection system will also be in place and the fibre-optic monitoring system will be regularly tested and maintained. Furthermore, the Project Proponents will undertake regular preventative maintenance (intelligent pigging campaigns to check the integrity) as defined by the Pipeline Integrity Management System described in **Chapter 4: Project Description and Alternatives** and **Chapter 9: Hydrogeology**. The Spill Prevention Plan, ERP and OSCP will also address leaks.

The production and injection network will be trenched and buried its entire length outside the boundary of the main facilities (well pads, CPF and Lake Water Abstraction Facility), and therefore, if a failure did occur it could contaminate soils and potentially also the groundwater if the spillage leak were to percolate through the soil to the groundwater aquifers. The oil would not dissolve and should largely float on the surface of the groundwater (at a rate slower than the groundwater transport velocity),

therefore restricting the pathway to sensitive receptors. Ground and groundwater investigations will take place following a spillage to determine the extent of impact and monitor any effects on baseline condition. This monitoring will also be used to determine the appropriate remediation methods to be adopted depending on the size and location of the leak.

With appropriate control measures and monitoring in place, the probability of tank and pipeline leaks occurring is expected to be reduced in frequency and scale. If it did happen the impacts are anticipated to be generally Low to high magnitude, leading to impacts that are **Low to High Adverse** significance, depending on the nature of the incident and location where it occurs.

20.9.7 Emergency Flaring and Storage Vessel Venting

Emergency flaring is a safety requirement of the plant design to depressurise the facility and minimise risk of fire and explosion. However, flaring does have the potential to cause short-term noise and visual impacts. A description of the flaring scenarios is provided in **Chapter 4: Project Description and Alternatives**. The basis of the design is for the production to be ceased if flaring occurs for a continuous period exceeding 48 hours, unless it is not safe to do so.

The emergency flare may or may not have a pilot burning at all times in readiness for an emergency. This is dependent on the flare type and ignition technology required to guarantee availability of the flare for each emergency scenario. Emissions associated with a pilot burn are negligible and do not influence the air quality predictions made for the normal scenarios considered in the air quality assessment (presented in **Chapter 6: Air Quality and Climate**).

A series of embedded design mitigation measures are included and described in **Chapter 4: Project Description and Alternatives** to reduce the impact of emissions associated with unplanned events, including the equipment sparing philosophy including 2 x 50% for gas compression, the inclusion of a vapour recovery unit to recover any fuel gas from the system (tanks, vessels) with 2 x 50% sparing, the design of the flare technology for optimum combustion efficiency to ensure smokeless operation, appropriate flare stack height to ensure adequate dispersion of combusted fuel gas, and the limiting of the duration of emissions as far as practicable.

Two different emergency scenarios were modelled as described in **Chapter 6: Air Quality and Climate** and **Chapter 7: Noise and Vibration** to quantify potential unplanned event impacts.

The results in **Chapter 6: Air Quality and Climate** indicate that the individual operation of the emergency generators, fire pumps, and elevated flare would not cause an exceedance of the air quality Environmental Assessment Levels (EALs), which are set for the protection of human health. However, the operation of the Enclosed Ground Flare in the second scenario could cause an exceedance of the EAL for daily mean fine particulate matter. This is considered a High magnitude event on receptors that are High sensitivity, because the flaring event will lead to the exceedance of short term EALs and national regulatory limits set for the protection of human health. This is predicted to result in a **High Adverse** significance impact. The EALs for daily mean PM₁₀ and PM_{2.5} could be exceeded at sensitive locations close to the Industrial area, should flaring occur continuously for a period of 24 hours or more (which is in line with the EALs for daily mean PM₁₀ and PM_{2.5}, which are based on a maximum 24 hour averaging period). In reality, flaring at the rates modelled (as shown in Table 6-25) are likely to occur over a much shorter duration than the period modelled.

The air quality standards that are relevant to ecological sensitivity are all based on annual mean conditions. The unplanned events considered in this assessment are expected to be operational for hours or days at most and will therefore have very little impact on annual mean conditions at the ecological sensitive areas. The impact of emergency flaring on ecology is therefore considered of Negligible magnitude and **Insignificant**.

In emergency scenarios, the venting of storage tanks has also been taken into consideration, and focused on the worst-case scenario where the export oil tank and off-spec tank vent together for a period of 24 hours and 8 hours respectively, within the same 24 hour period. The results indicate that the individual operation of the tanks would not cause an exceedance of the EALs. The impact on human receptors and the environment through the release of hydrocarbons (which are also greenhouse gas (GHG) emissions) is therefore considered to be an Insignificant magnitude impact on receptors which are High sensitivity. This results in an impact that is **Low Adverse** significance.

Worst case noise impacts are predicted to occur if emergency flaring occurs during the night-time period as identified in **Chapter 7: Noise and Vibration**; however, with appropriate additional control measures and monitoring in place the potential residual impact of maintenance and emergency flaring is considered to result in a Low impact magnitude on High sensitive receptors, leading to a **Moderate Adverse** significance.

Appropriate procedures will include engaging with nearby communities to ensure affected residents understand the need for unplanned flaring events. There will also be a communication strategies outlined as additional mitigation measures during that phase should be adopted for emergency flaring, i.e.:

- Informing stakeholders regarding timing of key activities associated with the Project on a regular basis, particularly when noise is expected to be generated;
- Implementing a Grievance Mechanism Procedure, to allow recording and follow up of any complaints related to Project activities, in a timely manner; and
- Monitoring of noise levels associated with Project activities to be undertaken by the Project contractor (as part of the Environmental Monitoring Programme). This will include monitoring noise levels at nearby sensitive receptors.

20.9.8 Emergency Power Generation

Impacts from the following emergency sources have been quantified in **Chapter 6: Air Quality and Climate** and **Chapter 7: Noise and Vibration**:

- Diesel-fired emergency energy generation plant at the CPF; and
- Diesel-fired fire water pumps at the CPF.

Two different scenarios have been modelled to quantify potential unplanned event impacts. The first scenario considers the operation of two 6 MW diesel-fired generators and two 2,000 Kilovolt-Ampere (kVA) fire water pumps. The second Scenario considers the operation of three 2 MW diesel-fired generators and three 2,000 kVA fire water pumps.

The results indicate that the individual operation of the emergency generators and fire pumps would not cause an exceedence of the EALs for air quality or noise. The magnitude of impact is therefore considered Negligible, and the impact significance **Low Adverse**.

20.10 Decommissioning

The decommissioning programme will be developed during the 25 year production prior to commencement of any decommissioning activities, in liaison with NEMA. The content of the final plans will be dependent on the anticipated future land use. The plans will include methods and activities associated with the decommissioning of the infrastructure, including the transportation and final disposal or re-use strategy for Project components and wastes. Completion criteria will be detailed in the management plans. These completions criteria will be determined in consultation with the respective national and local authorities. It is likely that the technological options and preferred methods for decommissioning of an onshore upstream oil development will be different by this time.

Prior to decommissioning, an intrusive ground investigation will be carried out as deemed necessary based on historical site data and monitoring data done throughout Life of Field.

Consequently, unplanned events associated with the Decommissioning Phase are unknown at this stage; however, it is anticipated that some of the potential unplanned events will be similar in nature to some of those that may arise during the Construction and Pre-Commissioning Phase. As such, the impacts and mitigation as defined in Section 20.8 are also likely to be applicable to the Decommissioning Phase.

Under all circumstances, decommissioning activities will be undertaken in accordance with GIIP and with the applicable international and national legislation and regulations prevailing at that time, and in liaison with the relevant regulatory authorities. As part of the decommissioning planning programme, the potential for unplanned events will be considered and appropriate mitigation and management

measures put in place to reduce risks and consequences to the surrounding environmental and local community receptors.

20.11 Conclusion

This chapter has identified a number of unplanned events that may occur during the Project lifetime. By the very nature that they are unplanned or emergency scenarios, the events have the potential to result in significant impacts on the environment and local people and communities if they were to occur. Rigorous control measures have therefore been developed as part of the Project design and through the introduction of additional mitigation measures to reduce the risk of these events occurring to as low as reasonably possible, as well as ensuring rapid and efficient response plans are in place if an event were to occur.

A series of supporting plans have been proposed to accompany the ESMP to assist with minimising the potential risk and impacts of unplanned events.

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21 – Cumulative Impact Assessment

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21 Cumulative Impact Assessment

21.1 Introduction

An assessment of potential cumulative effects is required by the Ugandan Environmental Impact Assessment Regulations S.I. No. 13/1998¹ (Ref. 21-1) and in order to meet the requirements of the International Finance Corporation (IFC's) Performance Standard (PS) 1 (Ref. 21-2).

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 provides an assessment of the potential cumulative effects of the Project together with other developments that will also have effects within the Project's Area of Influence (Aoi). 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. 21-3).

The structure of the Cumulative Impact Assessment (CIA) is as follows:

- Section 21.2 sets out the **methods** used to undertake the CIA;
- Section 21.3 explains how **stakeholder engagement** informed the CIA;
- Section 21.4 describes the **other developments** to be covered by the CIA as well as other external stressors affecting valued environmental and social components (VECs);
- Sections 21.5 provides the **assessment of potential cumulative effects on each VEC**, including a summary of **baseline conditions** for each VEC; and
- Section 21.6 describes the proposed **measures to mitigate and manage the potential** impacts on the VECs.

21.2 CIA Methodology

21.2.1 Main Stages in the CIA Process

As described in the IFC Good Practice Handbook (Ref. 21-3) ‘*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 VECs. VECs are environmental and social attributes that are considered to be important in assessing effects of projects.

The IFC guidance states that Government and regional planners have ultimate responsibility for CIA and introduces the concept of a rapid CIA; a preliminary approach for private sector developers that can be integrated in to the ESIA process. The rapid CIA may evolve into a more robust and comprehensive CIA led by Government or regional planners.

The IFC Guidance sets out six key steps for rapid CIA as shown in Figure 21-1. The approach taken to each of these steps is described in Sections 21.2.2 to 21.2.8 below.

¹ Section 14 of the Regulations states ‘*the Environmental impact statement shall provide a description of... (h) the environmental effects of the project including the direct, indirect, cumulative, short-term and long-term effects and possible alternatives*’.

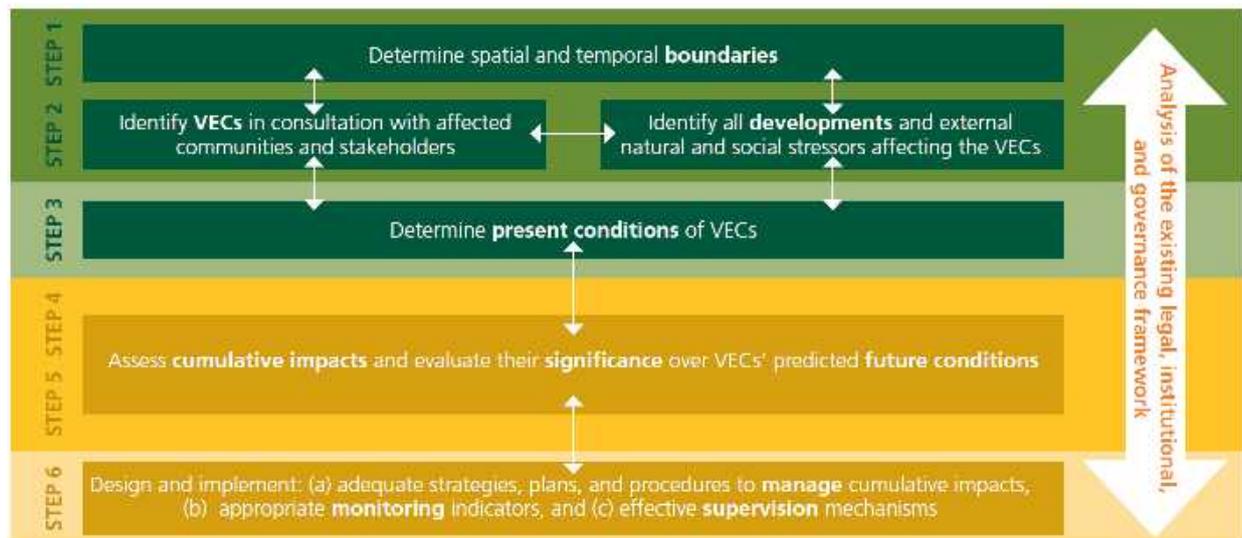


Figure 21-1: Key Stages in the Rapid CIA Process following IFC Guidelines

21.2.2 Spatial and Temporal Scope of CIA

21.2.2.1 Spatial Scope

The overarching spatial scope of the CIA is based on the Project’s Aol as described in **Chapter 1: Introduction** and shown on Figure 21-2 below. It is recognised that the spatial scope varies from VEC to VEC. A spatial scope (referred to as the Study Area for the VEC) has therefore been defined for each VEC in Section 21.5 below, representing either the entire Project Aol or an area/or areas within the Project Aol.

21.2.2.2 Temporal Scope

The temporal scope for the CIA is defined in relation to the lifespan of the Tilenga Project (as described in **Chapter 4: Project Description and Alternatives**) and the duration of the Project’s impacts. In summary, Site Preparation and Enabling Works are scheduled to commence in 2018. The operation of the Tilenga Project is scheduled to last 25 years after which decommissioning will take place. In total the Tilenga Project duration through all phases will be approximately 28 years although the Project’s impacts may last beyond this date.

21.2.3 Selection of Priority VECs

The IFC’s Good Practice Handbook defines VECs as ‘sensitive or valued receptors whose desired future condition determines the assessment end points to be used in the CIA process’. ‘VECs are environmental and social attributes that are considered to be important in assessing risks’. For the purpose of this study VECs are synonymous with the terms used to describe environmental and social attributes in the ESIA. It is necessary for the ESIA and CIA to use the same terms and definitions in order that the studies can be aligned – only in this way can effects of the Project be combined with the effects of other projects and activities to determine cumulative effects.

The selection and definition of VECs was iterative and was refined as the ESIA and CIA progressed. The VEC selection process therefore followed a number of stages and refinements aimed at identifying which VECs should be prioritised. The criteria for prioritising VECs included:

- The Tilenga Upstream development (i.e. this Project) has impact on the VEC. (As the IFC guidance (Ref. 21-3) says ‘VECs to include are those that would be affected by the project. Thus

VECs for which an impact was deemed insignificant² in the ESIA are not to be included in the CIA’);

- The VEC will also be affected by other development(s);
- The VEC was identified as being of particular concern to stakeholders; and
- The VEC should be prioritised because it is, or is declining towards, in an unsustainable state and/or critical threshold.

An initial list of candidate VECs was identified in the Project Scoping Report based on previous published reports, including:

- *Strategic Environmental Assessment (SEA) of the oil and gas activities in the Albertine Graben of Uganda* (approved by Ugandan Government in 2015) (Ref. 21-4);
- *Strategic Plan for the Northern Albertine Rift Of Uganda 2011 – 2020* (Ref. 21-5);
- *The Environmental Monitoring Plan for the Albertine Graben 2012-2017* (Ref. 21-6); and
- *A Cumulative Impact Assessment (CIA) Framework for Proposed Oil Development Activities in the Albertine Rift, Uganda* (eCountability, 2014) (Ref. 21-7).

A stakeholder workshop was subsequently undertaken in November 2016 for the purpose of further prioritising VECs. The results of the workshop were presented and reported in *Consultation on Candidate Priority Valued Environmental and Social Components (VECs)* (Tilenga ESIA Team, 2017) which is included in Appendix F. Further refinements were made to the list of VECs based on the results of the ESIA and in order to reduce overlaps between VECs. Based on the above, and linked to the results of the Project ESIA, the priority VECs selected for the CIA are listed in Table 21-1.

Table 21-1: Priority VECs

Priority VECs	Where assessed in the ESIA
Nature-based tourism in protected areas	Chapter 19: Ecosystem Services with further information in. Chapter 16: Social, and Chapters 13: Terrestrial Vegetation, Chapter 14: Terrestrial Wildlife, Chapter 15: Aquatic Life, and Chapter 11: Landscape and Visual. .
Critical and Natural Habitat and Key Indicator Species	Chapters 13: Terrestrial Vegetation, Chapter 14: Terrestrial Wildlife and Chapter 15: Aquatic Life.
Climate change linked to carbon emissions	Chapter 6: Air Quality and Climate with further information in Chapter 19: Ecosystem Services and Chapter: 13 Terrestrial Vegetation.
Sustainable woodland	Chapter 19: Ecosystem Services, with further information in Chapter 13: Terrestrial Vegetation, and Chapter 16: Social.
Bushmeat	Chapter 19: Ecosystem Services, with further information in Chapter 14 Terrestrial Wildlife.
Lake Albert capture fisheries	Chapter 19: Ecosystem Services with further information in Chapter 16: Social and Chapter 15: Aquatic Life.
Open-access grazing land	Chapter 19: Ecosystem Services and Chapter: 16 Social.
Food security	Chapter 16: Social, Chapter 18: Health and Safety and Chapter 19: Ecosystem Services.
Access to safe drinking water resources	Chapter 16: Social with further information is provided in Chapter 18: Health and Safety and Chapter 10: Surface Water.
Community health	Chapter 18: Health and Safety.
Primary and secondary school education	Chapter 16: Social.
Access to land and shelter	Chapter 16: Social.
Local economic stability	Chapter 16: Social.
Safe communities	Chapter 18: Health and Safety.
Social cohesion	Chapter 16: Social and Chapter 18: Health and Safety.

² In this case we have therefore considered those residual impacts of Low or higher significance.

21.2.4 Determining Indicators and Thresholds for VECs

For each VEC a threshold and indicators have been identified, as described below.

21.2.4.1 Thresholds

Following IFC Guidance ‘thresholds’ are described as *‘limits beyond which changes resulting from cumulative impacts become of concern. They are typically expressed in terms of carrying capacity, goals, targets, and/or limits of acceptable change’* (Ref 21-3). IFC Guidance recognises that thresholds based on carrying capacity or tipping points can be extremely difficult to define, measure and monitor. For the purpose of this CIA we have therefore defined thresholds based on targets and/or limits of acceptable change linked to the present conditions of the VEC. Thresholds may represent the status quo (i.e. no change in current conditions), or where current conditions are poor or unsustainable the thresholds may represent an improvement over existing conditions.

Targets and/or limits of acceptable change are presented for each VEC in Sections 21.5 below. For all VECs, the threshold applies to the VEC Study Area and from the first year of the Project commencing (2018) over the lifespan of the Project’s impacts.

21.2.4.2 Indicators

For each VEC a number of indicators have been identified. Indicators are defined as *‘an expression of VEC condition’* (Ref. 21-3) and help describe the status of a VEC, are used to identify past and future trends and are used to monitor the effectiveness of management measures. Indicators have been selected:

- Because they are measureable with data that are currently available or can be reasonably collected;
- Because they are measurable with data that can be collected repeatedly and consistently over time; and
- Where possible are defined as variables, i.e. as a characteristic, number, or quantity that can increase or decrease over time, or can take different values in different situations.

21.2.5 Identifying other Developments and Stressors

21.2.5.1 Other developments

The Project, supporting infrastructure and associated facilities are described in **Chapter 4: Project Description and Alternatives**. Following IFC guidance (Ref. 21-3) the CIA considers the cumulative impacts on VECs as a result of the Project together with other *‘reasonably defined developments at the time the risks and impact identification process is conducted’*.

A list of other known developments within, or likely to overlap with, the Project AoI was prepared between November 2017 and March 2018 and is presented in Section 21.4 below. The information was collected in consultation with:

- The Project Proponents responsible for current oil & gas development in the Albertine area;
- National Environment Management Agency (NEMA), who provided a list of known projects from their library;
- Uganda Electricity Transmission Company Limited (UETCL) who provided preliminary routes of proposed transmission line projects;
- Ministry of Energy and Mineral Development (MEMD) for further information on energy sector projects; and
- Other published sources.

Given the scale of the Project AoI, particularly in relation to the project’s indirect impacts, the list of developments considered has been prioritised based on the following criteria:

- The development's impacts are likely to overlap with the Tilenga Project Aol;
- The development is of a type and scale that means it is likely to result in significant environmental and social impacts;
- The development is likely to have impacts on the VECs that fall within the scope of the CIA;
- The development is reasonably defined at the time the CIA was conducted; and
- The development is likely to proceed based on its known status.

While the CIA is not solely focussed on oil and gas development it is recognised that oil and gas developments are the primary source of cumulative impacts in the region and that these developments are interrelated to a certain extent.

21.2.5.2 External natural and social stressors

In addition to identifying other developments, the IFC Guidance also recommends that the CIA considers other existing and predictable external natural environmental and social drivers that may also affect VECs in combination with the Project. A summary of stressors is provided in Section 21.4.4 below.

21.2.6 Determining Present Conditions and Trends

Present conditions and trends for each VEC are presented in Section 21.5 below. The summary of present conditions is based on the selected indicators for each VEC as explained in Section 21.2.4 above. Information on historic and predicted trends is provided for each indicator where data is available. The summary of existing conditions assists in defining the sensitivity of the VEC using the criteria explained in Section 21.2.7 below.

21.2.7 Methodology for the Assessment of Cumulative Impacts

The impact assessment methods for the CIA are aligned with the methods used for the ESIA (based on the magnitude of the impact against the receptor's sensitivity) as set out in **Chapter 3: ESIA Methodology** but with adaptations as explained below.

Firstly, for the CIA the significance of a cumulative impact is evaluated in terms of the impact to the sustainability of the VEC i.e. the risk that the threshold (see Section 21.4.2 above) will be exceeded. Thresholds '*are limits beyond which changes resulting from cumulative impacts become of concern; they are typically expressed in terms of carrying capacity, goals, targets, and/or limits of acceptable change*' (Ref. 21-3).

Secondly, cumulative impacts are assessed qualitatively. There are practical reasons for this which are related to the lack of data on Projects and results of ESIA's and certainty about the projects covered by the CIA i.e., see more details in 21.2.9 Study limitations below.

21.2.7.1 VEC Sensitivity

VEC sensitivity considers how a particular VEC may be susceptible to a given potential impact. More sensitive VECs 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. VEC sensitivity is based on multiple characteristics, namely:

- *Vulnerability*: the degree to which a VEC is vulnerable to change (i.e. higher sensitivity) or resilient to change (i.e. lower sensitivity). A VEC that is declining towards an unsustainable state and/or critical threshold would be of high sensitivity; and
- *Value*: the degree to which a VEC is valued by stakeholders or protected, with higher value receptors (based on ecological, cultural, social, economic, or other grounds) having a higher sensitivity.

The sensitivity of a receptor may be rated as high, moderate, low, or negligible based on the criteria set out in Table 21-2 below.

Table 21-2: Sensitivity Criteria

Sensitivity	Description
High	The VEC has little or no capacity to absorb change without fundamentally altering its present character, is of very high environmental value, or of international or national importance.
Medium	The VEC has low to moderate capacity to absorb change without fundamentally altering its present character, is of some environmental value, or of regional importance.
Low	The VEC is tolerant of change without detriment to its character, is low environmental value, or local importance.
Negligible	The VEC is resistant to change and is of little environmental value.

21.2.7.2 Impact magnitude

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

- *Extent*: the spatial extent e.g. the area impacted, population affected;
- *Duration*: how long the impact will last i.e. temporary (e.g. during construction) or long-term or permanent; and
- *Frequency*: how often the impact will occur (e.g. a one-off event, periodic, or continuous); and
- *Reversibility*: the length of time for baseline conditions to return (e.g. reversible in the short-term or long-term, or irreversible).

The magnitude of an impact can be rated as high, moderate, low or negligible based on the criteria set out in Table 21-3 below.

Table 21-3: Impact Magnitude Criteria

Magnitude	Description
High	Major long term or permanent alteration to key elements/features of the baseline conditions such that character/composition of baseline condition will be fundamentally changed.
Moderate	Permanent loss or alteration to key elements/features of the baseline conditions such that character/composition of the baseline condition will be materially changed.
Low	Changes arising from the alteration will be detectable but the underlying character/composition of the baseline condition will be similar to the pre-development situation.
Negligible	Very little change from baseline conditions. Change is barely distinguishable, approximating to a “no change” situation.

21.2.7.3 Impact Significance

Once the VEC sensitivity and impact magnitude have been rated, the overall significance of the impact is predicted based on the risk to the sustainability of the VEC. This is assisted by an impact assessment matrix (Table 21-4) and the impact significance definitions (Table 21-5). The significance matrix provides guidance to determine the risk that the target or limit of acceptable change will not be met/exceeded or whether a beneficial impact will result. However, the resulting significance level was also interpreted based on professional judgement and expertise, and adjusted if necessary.

In assessing the cumulative impacts of numerous developments, it has been assumed that impacts may be synergistic rather than additive i.e. the combined impact of developments may be greater than the sum of their separate individual impacts. High and Moderate adverse impacts are considered to represent significant risks to the sustainability of the VEC.

Table 21-4: Impact Significance Matrix

		Receptor Sensitivity			
		Negligible	Low	Moderate	High
Impact Magnitude	Negligible	Insignificant	Insignificant	Insignificant	Insignificant / Low*
	Low	Insignificant	Low	Low Moderate*	Moderate
	Moderate	Insignificant	Low Moderate*	Moderate	High
	High	Insignificant / Low*	Moderate	High	High

* Professional expertise will determine the impact significance

Table 21-5: Significance Definitions Linked to Thresholds

Significance	Description of significance
High adverse effect	There is high risk that the goal, target or limit of acceptable change will not be met, or will be exceeded, and therefore the sustainability of the VEC is threatened.
Moderate adverse effect	There is a moderate risk that the condition of the VEC will deteriorate to the extent that the goal, target or limit of acceptable change will not be met, or will be exceeded.
Low/ Insignificant	The risk that the goal, target or limit of acceptable change will not be met is low. The sustainability of the VEC is unlikely to be threatened.
Beneficial effect	VEC conditions are predicted to improve and the threat to the sustainability of the VEC reduced.

21.2.8 Mitigation and Management Measures

Section 21.6 of this report sets out the management strategies necessary to mitigate cumulative impacts. Management strategies are ‘commensurate with the project’s contribution’ (Ref. 21-3), but also aim to demonstrate the Project Proponents best efforts to engage with other stakeholders for the management of the expected impacts on VECs.

The CIA identifies the Project’s impacts that are contributing to cumulative effects and in doing so highlights the Project level mitigation measures that address the Project’s contribution. The CIA also identifies where 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.

Unlike the approach to the Project ESIA the CIA will not distinguish between potential and residual impacts. For the CIA mitigation typically requires collaboration between a number of parties that cannot be guaranteed. The CIA therefore highlights the risks to VECs and proposes collaborative mitigation that should be prioritised by stakeholders.

21.2.9 Study Limitations

The primary limitations of the CIA relate to the scope and coverage of a single Project level CIA; baseline data; information on other developments and their impacts; and the inherent difficulties in assessing indirect and induced effects over an approximately 28 year period.

The CIA was undertaken as part of the Tilenga Project ESIA. The VECs that form the focus of the CIA, its spatial and temporal scope, and the impacts that were assessed, relate directly to the Project. This CIA does not attempt to provide an overarching assessment of all development in the region and it recognised that other developments will have impacts on different VECs. Other developments may also have types of cumulative impact that are not considered in this CIA e.g. large hydro project which may have impacts on river geomorphology but on which Project is expected to have limited impact.

Baseline data assumptions and limitations are described in each of the technical chapters of the ESIA. In summary, baseline data limitations include:

- Data for many other developments was not available at the time of preparing the CIA;
- Some data is only available at a national level but not at a local or regional level;
- Data collected on the basis of surveys for the ESIA had potential for bias and subjectivity; and
- Considerable uncertainties in establishing trends /future conditions without development over a period in excess of 28 years.

With respect to other developments:

- Details of many projects have not yet been made public and there was limited descriptive information on other developments including: precise location, scale, processes, associated facilities, timing of construction and operation; and
- Limited or no information on the residual impacts of other development e.g. because ESIAs/EIAs/Project Briefs (PBs) have not yet been carried out, or the ESIAs/EIAs/PBs do not provide accurate descriptions of residual effects on VECs.

For many of the VECs, the most significant effects are indirect and induced e.g. induced population change and its subsequent effects on communities, biodiversity, ecosystem services etc. Indirect and induced effects over a 30 year timespan have a higher degree of uncertainty, and these uncertainties are amplified by the other limitations associated with baseline data and accurate information on other developments.

21.3 Stakeholder Consultation

21.3.1 Introduction

To support the development of the CIA, engagement with relevant stakeholders was run in parallel to the ESIA stakeholder engagement process. The primary objectives for stakeholder engagement for the CIA were 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 on 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 for the management of adverse effects on VECs.

Stakeholders who could support these objectives were identified through desk-top research. This desktop research included reviewing the project, strategic, and regional studies already completed in the Project Aol. A full list of stakeholders consulted is presented in **Chapter 5: Stakeholder Consultation**. Further information on key stages in the CIA process is provided below.

21.3.2 Scoping

The Scoping Report included a chapter on the proposed approach to the CIA and included an initial list of VECs, an outline of the proposed methods and the spatial and temporal coverage of the CIA.

This was presented to stakeholders in a series of meetings held in September 2015 prior to submission of the Scoping Report to NEMA in December 2015. The Scoping Report was approved by NEMA in April 2016, with no specific comments on the scope of the CIA or proposed methods.

21.3.3 VEC selection Workshop and Meetings

Further consultation was held in November 2016 and March 2017 which included a workshop with national level stakeholders in Kampala and a series of meetings held in the Project Aol with local communities and district level organisations. The objectives of the meetings were to establish stakeholder views on priority environmental and social issues and concerns in order to select VECs for inclusion in the CIA. All attendees were encouraged to provide feedback and comments into the CIA process. The results of the consultations were set out in the report *Consultation on Candidate Priority Valued Environmental and Social Components (VECs)* (Tilenga ESIA Team, 2017) included as Appendix F.

21.3.4 Pre- ESIA Submission Consultation

Consultation meetings were held during Stakeholder engagements in January 2018, details of which are provided in **Chapter 5: Stakeholder Consultation**. With respect to the CIA the following key issues were raised:

- Opinions on the scope of the CIA and the issues that would be covered/not covered and why;
- Opinions on the VECs of particular concern in relation to existing problems and anticipated cumulative impacts;
- Specific issues raised in relation to the practicality of proposed mitigation measures; and
- The management of cumulative impacts and opportunities for stakeholders to be involved.

A summary of Issues and Responses raised during consultations is provided in Appendix G.

21.4 Other Developments and Stressors

21.4.1 Introduction

This section of the CIA provides a description of the other reasonably defined developments that have been used as the basis for predicting cumulative impacts. This section also provides a summary of the existing external and natural stressors that are also affecting the VECs in the Project Aol.

The information on other development was collected in consultation with stakeholders between November 2017 and March 2018. As stated in Section 21.2.5.1 the list of developments includes those:

- Whose impacts are likely to overlap with the impacts of the Tilenga Project i.e. that have overlapping areas of influence;
- Which are of a type and scale that means they are likely to result in significant environmental and social impacts;
- Which are likely to have impacts on the VECs that fall within the scope of the CIA;
- Which are reasonably defined at the time the CIA was conducted³; and

³ In relation to the identification of reasonably defined projects, the IFC Handbook 'generally recommends that a short time horizon be considered (e.g., three to four years in the European Union) owing to uncertainty about longer-term developments. Where development plans are not available, guidance recommends that emphasis be given to identifying other projects in the planning stage or formal approval process (e.g., through preparation of ESIA documents or permit submissions). This short-term view does not provide certainty regarding which developments will actually occur. Some developments in the planning stage will not proceed while others that are not immediately apparent will be developed and go ahead. Proponents clearly cannot know for certain what specific developments will occur but in some circumstances, where rapid development is occurring, a general pattern of development may be able to be anticipated'.

- Which are likely to proceed based on their known status.

21.4.2 Oil and Gas Related Development

The CIA is not solely focussed on oil and gas development but oil and gas developments are a primary source of cumulative impacts and these developments are interrelated to a certain extent. Oil and gas developments are shown on Figure 21-2 and described in Table 21-6, and consist of:

- Three field development areas: Tilenga (this project) and Kingfisher are currently at planning phase and LA-2 South (Kaiso Tonya), which is likely to be developed in the next 10 years. (Further development of Tilenga Project is also planned in approximately 10 years after start of the production fields). Tilenga and Kingfisher development will consist of a number of wells, flow lines, a central processing facility (CPF), access roads, borrow pits and a feeder pipeline to the delivery point in Kabaale. Kaiso Tonya development will consist of wellpads, flowlines, access roads, detailed plan for infrastructure of this project will be developed at later stage;
- A refinery at the Kabaale Industrial Park;
- The East Africa Crude Oil Export Pipeline (EACOP);
- The Hoima–Kampala Petroleum Products Pipeline (HKPPP); and
- Supporting infrastructure in form of roads, transmission lines, pipelines, airstrips, and waste management facilities.

Table 21-6: Oil and Gas Related Development

No.	Details	Title and Description
1	Project Title:	Tilenga Feeder Pipeline
	Developer:	Total Exploration & Production Uganda B.V, (TEP Uganda) Tullow Uganda Operations Pty Ltd (TUOP) and the China National Offshore Oil Corporation (CNOOC) and Uganda National Oil Company (UNOC).
	Location:	From Tilenga CPF, Buliisa District, to delivery point in Kabaale, Hoima District.
	Description:	The 95 km Tilenga Feeder pipeline will transport crude oil produced by the Tilenga Project to the Delivery Point. The 24-inch diameter pipeline will be buried and insulated with a trace heating system. A 20 x 20 pigging station for the pipeline is located at the Tilenga CPF. During construction there will be a construction camp with a pipe yard dedicated to the Tilenga Feeder Pipeline.
	Overlap with Tilenga Aol	The feeder pipeline is an associated facility of the Project. The entire pipeline lies within the Project's Aol.
	Status:	Front End Engineering and Design (FEED) Completed. A separate ESIA is being developed for the Tilenga Feeder Pipeline. The route was refined to a 30-m wide corridor as an iterative process between the FEED and ESIA studies. Construction is scheduled to commence in 2018 and the pipeline is scheduled to be operational by 2020.
2	Project Title:	132 kV Transmission Line from Tilenga CPF to Kabaale Industrial Park
	Developer:	UETCL
	Location:	From the Tilenga CPF to Kabaale Industrial Park
	Description:	The 132 kV line will both evacuate excess power being generated at the Tilenga CPF and also import power to the CPF when the excess gas is reduced/depleted. It was requested for by the JVPs but UETCL also intends to use it to serve this power to Kabaale Industrial Park (KIP) and surrounding areas. In case there is any power generated within the KIP, UETCL will be able to provide the Project with this power.
	Overlap with Tilenga Aol	The transmission line is an Associated Facility located entirely within the Project Aol.
	Status:	The line will be subject to a separate ESIA. The route and timing of project are not yet determined.
3	Project Title:	EACOP
	Developer:	TEP Uganda, TUOP, CNOOC, Government of Uganda (GoU) and Government of Tanzania
	Location:	The oil pipeline will start in Kabaale, Hoima District, will cross Uganda border in Mutukula and will end at marine storage terminal in Chongoleani, Tanga, Tanzania.

No.	Details	Title and Description
	Description:	The EACOP project will be constructed to export the crude oil from the delivery point in Kabaale to international markets, net of supply commitments to the Kabaale refinery. The EACOP project comprises a 24 inch diameter buried 1,446 km long pipeline through Uganda and Tanzania (296km in Uganda and 1,150km in Tanzania), above ground installations (AGIs) and a marine storage terminal (MST) at Chongoleani, Tanga district on the eastern coast of Tanzania. The pipeline will be thermally insulated to maintain oil temperature during transport. AGIs will comprise six pumping stations and two pressure reduction stations to provide the appropriate pressure for crude oil flow. Oil will be stored at the MST until exported via the offshore load-out facility to oil tankers.
	Overlap with Tilenga Aol	The pipeline is an Associated Facility of the Project. A section of EACOP near the KIP and Refinery lies within the Project's Aol and it is likely to contribute to the economic development of the region and influx into the area.
	Status:	FEED Completed. A separate ESIA is being developed for EACOP Project.
4	Project Title:	Kingfisher Development
	Developer:	CNOOC Uganda Limited (CUL)
	Location:	The Kingfisher Development Area (KFDA) is located in the area commonly known as the Buhuka flats, situated in the administrative boundary of Kyangwali Sub-County in Hoima District.
	Description:	The field is approximately 15.2 km long by 3.0 km wide and covers an area of 32.3 km ² . Although much of the field lies under Lake Albert, the structural culmination in the Kingfisher Area lies under a narrow strip of land, some 10 km by 2 km, formed against the basin bounding fault. The main components of the Project include: <ul style="list-style-type: none"> • Four onshore well pads with a total of 31 wells (20 producer wells and 11 water injection wells); • A CPF to be constructed on the Lake Albert Buhuka Plain; • A lake water abstraction station; • Production flow lines and injection flow lines; • Supporting facilities including camps, a helipad, supply base, a jetty, safety check station, and infield roads; • Kingfisher Feeder line – a crude oil pipeline from the Buhuka Flats to Kabaale Hub (PS-1); • Escarpment road - field access route from Ikamiro to main oil facilities in Kingfisher area; and • A transmission line to/ from Kabaale (being developed by UETCL).
	Overlap with Tilenga Aol	KFDA lies outside the Project's Aol but it is likely to contribute to the wider economic development and influx into the region. The Aols of the two projects are likely to overlap in areas where influx occurs, primarily in urban centres such as Hoima and Masindi.
	Status:	In planning. A separate ESIA is in preparation for the KFDA. Construction scheduled to commence after Final Investment Decision. A separate EIA report was prepared and approved for the escarpment road.
5	Project Title:	Kabaale Industrial Park
	Developer:	The GoU, represented by the MEMD.
	Location:	The refinery and industrial park will be built on a 29 square kilometres (11 sq mi) piece of land in Kabaale Township, Buseruka Sub-county, Hoima District.
	Description:	The industrial park is to accommodate a greenfield refinery, an international airport (see Kabaale Airport below), a crude oil export hub, energy based industries, petrochemical industries and other associate infrastructure including roads, power generation and transmission and water supply. The oil refinery has been considered as one of the delivery options for the oil coming from upstream developments. The refinery will be designed to a capacity of 30 Mbopd with a possibility to upgrade to 60 Mbopd at later stage. The refinery is served by the Hoima-Kaiso-Tonya Road which has already been constructed.
	Overlap with Tilenga Aol	The Industrial Park is located within the Project Aol and it is likely to contribute to the wider economic development and influx into the region. The Aols of the two projects are likely to overlap in areas where influx occurs, primarily in urban centres such as Hoima and Masindi.
Status:	In planning. No EIA or ESIA has been prepared for the refinery or Industrial Park, however a Resettlement Action Plan (RAP) was prepared in 2012 and implemented from 2013. As separate ESIA was prepared for the Kabaale Airport (see below) and a further ESIA and RAP are being commissioned by the Ministry of Water and Environment (MWE) for the development of water supply infrastructure for the	

No.	Details	Title and Description
		refinery.
6	Project Title:	Kabaale Airport
	Developer:	The GoU, represented by the MEMD and through the Uganda Civil Aviation Authority (UCAA) as the implementing agency supported by the International Civil Aviation Organisation (ICAO).
	Location:	Within the Kabaale Industrial Park, in Kabaale Parish, Buseruka Sub-County in Hoima District.
	Description:	The Project comprises of a runway with a length of 3,500 metres (m) and a width of 45m plus 30m safety zone including shoulders, to be constructed within the already acquired Industrial Park land. The airport will comprise a taxiway of width of 25 m and 60 m length including shoulders. The airport development includes two associated 33kva power transmission lines (both now fully operational). The development of the airport has been identified to accommodate large cargo planes and enable the transport of long, heavy and sensitive materials and equipment to be utilised in the planned refinery and other oil related activities. It is also intended the Airport will go on to support travel among the local population and tourists travelling to and from Hoima District and the surrounding areas. New access roads will be constructed in order to enable access to the airport facilities.
	Overlap with Tilenga Aol	The airport is part of the Kabaale Industrial Area and is located within the Project Aol and is likely to contribute to the wider economic development and influx into the region. The Aols of the two projects are likely to overlap in areas where influx occurs, primarily in urban centres such as Hoima and Masindi.
	Status:	In planning. An ESIA by the UCAA was prepared for the development in 2017.
7	Project Title:	Kaiso-Tonya Field Development (LA-2 South)
	Developer:	TEP Uganda, TUOP, CNOOC
	Location:	Kaiso Tonya (LA-2 South), Buseruka and Kabwoya Subcounties, Hoima District.
	Description:	The development is likely to be similar to the developments at Tilenga and Kingfisher consisting of a number of wells, flow lines, access roads and other supporting infrastructure. The LA-2 South field extends below the surface of Lake Albert.
	Overlap with Tilenga Aol	The LA-2 South Field and is located outside the Project Aol but it is likely to contribute to the wider economic development and influx into the region. The Aol's of the two projects are likely to overlap in areas where influx occurs, primarily in urban centres such as Hoima and Masindi.
	Status:	Likely to be developed within the next 10 years.
8	Project Title:	UNRA Road Upgrades
	Developer:	Ugandan National Roads Authority (UNRA)
	Location:	See list of roads below.
	Description:	<p>The GoU and Partners through Lake Albert Basin Development Committee (LABDC) set a target to achieve First Oil by 2020. In order to achieve this target, enabling road networks have to be in place to support oil and gas infrastructural developments. Upgrades to 11 roads and several bridges to bituminous standard are proposed. The roads proposed for the upgrade include; Paraa-Pakwach, Kisanja-Park junction, Sambiya-Murchison Falls, Wanseko-Kasenyei-Kirango-Bugungu Camp, Buliisa-Paraa, Kyotera-Rakai, Masindi-Biiso, Kaseeta-Lwere via Bugoma Forest, Hohwa-Nyairongo-Kyarushesha, Kabale-Kiziramfumbi, Buhimba-Nalweyo- Kakindu-Kakumiro-Mubende, and associated bridges. In addition, the Project Proponents requested a road upgrade between Hoima and Wanseko (through Biiso).</p> <p>While referred to as oil critical roads by UNRA the routes between Paraa-Pakwach and Sambiya-Murchison Falls were not requested by the oil companies in support to oil and gas development activities.</p> <p>It is proposed that the existing roads will be widened to a 6m two-lane carriageway and shoulder width of 1- 2m. A total of 6 existing bridges were identified within the project area including Tangi and Emmi bridges which will be replaced and widened within limits of the carriageway. There will be a number of alternations in the alignment of existing roads especially at the escarpments, Emmi and Tangi Bridges.</p>
	Overlap with Tilenga Aol	The roads which fall within the Project's Aol are as follows: 121km of upgraded road falls within Murchison Falls National Park; while 47 km traverse community areas of Buliisa and Masindi districts. The Buliisa-Paraa road (30km), starts from Buliisa town and traverses community settlements up to Bugungu gate of MFNP and then proceeds through the Park to Victoria Nile ferry crossing at Paraa. The Wanseko - Kasenyei-Kirango – Bugungu Camp road (11km), traverses agricultural and grazing

No.	Details	Title and Description
		areas. The Kisanja–Park junction road (72km) mainly crosses community settlements along the first 16km up to Kicumbanyobo gate of MFNP and within the Park for the rest of the 56km. Sambiya - Murchison Falls (12km) starts from the Northern Bank of River Sambiya to the Southern Bank view of the Murchison Falls. Whereas Paraa - Pakwach road (24km) starts from the Northern Bank of Paraa (Ferry crossing) to the Karuma-Pakwach road near to Pakwach Bridge. Other roads outside the Aol will contribute to the wider economic development and influx into the region.
	Status:	In planning. Several separate ESIA's have been completed by UNRA and approved by NEMA in January 2018. Construction due to commence in 2018.
9	Project Title:	Waste Treatment and Disposal facilities
	Developer:	To be determined.
	Location:	Facilities that will be used for oil & gas development not yet determined. Location of existing facilities within the Project Aol that will be used or extended is uncertain. Main facilities within the Project Aol currently include Enviroserv, Allways, and White Nile Consults.
	Description:	The oil and gas projects will require facilities for the purpose of waste treatment, landfill, waste storage, laboratory analysis, treatment of oil-waste, recycling and re-use.
	Overlap with Tilenga Aol	A number of existing facilities are within the Project Aol.
	Status:	Unknown.
10	Project Title:	The Hoima–Kampala Petroleum Products Pipeline (HKPPP)
	Developer:	GoU, represented by MEMD
	Location:	A proposed pipeline to transport refined crude oil products from the Kabaale refinery near Hoima to a distribution terminal in Buloba in Wakiso District, approximately 17 kilometres, by road, west of Kampala's central business district.
	Description:	The total length of the pipeline will be approximately 210 kilometres. The pipeline will be accompanied by information and communication technology cables, a dual-carriage highway, and power transmission lines between Hoima and Kampala, all contained in a 110 metres (360 ft) "utility corridor". The pipeline will transport various products, including jet fuel, gasoline, kerosene, and diesel fuel.
	Overlap with Tilenga Aol	A section of the pipeline is located within the Aol but otherwise it lies outside the Aol. The Aols of the two projects are likely to overlap in areas where influx occurs, primarily in urban centres such as Hoima and Masindi.
	Status:	Unknown.
11	Project Title:	Further Development of EA-1A, CA-1 and LA -2 North (Extension to the Tilenga Project)
	Developer:	TEP Uganda, TUOP, CNOOC
	Location:	Within EA-1A, CA-1 and LA -2 North
	Description:	The Project Proponents may further develop existing and new fields within CA-1, EA-1A and LA-2 North in order to sustain the production plateau. The following new fields are considered for further development: Lyeo, Jobi-East, Mpyo, Ngege and Ngara. Later start of the fields will allow to optimize the use of the CPF and common facilities capacity and to provide economy of scale. Identification of the number of well pads and associated development is subject to further detailed studies and will be the subject of a future ESIA.
	Overlap with Tilenga Aol:	Proposed development is located entirely inside the Project Aol.
	Status:	It is estimated that the development will be initiated in approximately 10 years after start of the production fields.
12	Project Title:	Thermal Power Plant
	Developer:	Albatross Energy
	Location:	Busisi Division, Hoima Municipality
	Description:	Uganda Electricity Generation Company Limited (UEGCL) on behalf of the GoU contracted Albatross Energy to construct a 230MW thermal power plant at Itara cell, Kibingo Ward, Busisi division, Hoima Municipality. The power plant is expected to utilise both crude oil and natural gas (multi-fuel) produced from the Albertine graben.
	Overlap with Tilenga Aol:	Within Project Aol.
	Status:	EIA report submitted to NEMA in May 2015.

21.4.3 Other Development Proposals

The list of other identified developments includes a variety of development types, including major hydropower generation, transmission lines, industrial development, agricultural development, and railway upgrades. A summary of the developments is provided in Table 21-7 below. Projects have been grouped by development type.

Table 21-7: Other Non-Oil and Gas Development Proposals

	Details	Title and Description
13	Project Title:	Karuma Hydroelectric Power Station
	Developer:	Sinohydro Corporation Limited. Proposed by MEMD and UEGCL.
	Location:	The power station is located upstream of Karuma Falls on the Victoria Nile.
	Description:	The Karuma Hydro Power Project is a run of the river scheme ⁴ . Project area falls within Kiryandongo and Oyam Districts of Uganda located in the vicinity of Karuma village and Murchison Falls Conservation Area (Karuma Wildlife Reserve). Most of the project components such as the underground power house, the weir and head race channel are located outside the MFNP as well as Karuma Wildlife Reserve area. However, the tail race system, the access and surge chambers will be located within Karuma Wildlife Reserve (but, outside the MFNP). The Project will utilise a gross head of about 70 m and design discharge of 1128 cumecs for generation of 600 MW (six units of 100 MW each). The project will require a new 400kv transmission line and access roads.
	Overlap with Tilenga Aol:	Karuma is partially within the Karuma Wildlife Reserve (part of the Murchison Falls Protection Area (MFPA) and will have impacts on the Victoria Nile upstream of the Tilenga Project. It largely lies within the Project Aol.
	Status:	An ESIA was prepared for the project in 2011. Under construction. Expected to be operational in 2018.
14	Project Title:	Ayago Hydropower Project
	Developer:	China Gezhouba Construction Company (CGCC) International Limited
	Location:	Victoria Nile, within MFNP
	Description:	Ayago Power Station is a proposed 600MW hydroelectric power project to be constructed along Victoria Nile, downstream of Karuma Power Station, but upstream of Murchison Falls. The project will be developed in two simultaneous phases, known as Ayago North (estimated capacity 350MW) and Ayago South (estimated capacity 250MW).
	Overlap with Tilenga Aol:	Ayago is wholly within the MFNP and will result in habitat loss within the Park and impacts on the Victoria Nile upstream of the Tilenga Project and it therefore lies within the Project's Aol.
	Status:	An ESIA was published for this Project in July 2016. Current status of Project uncertain.
15	Project Title:	Other large hydro power projects on Victoria Nile
	Developer:	Various, uncertain
	Location:	The projects are located within MFNP as indicated by Figure 21-1.
	Description:	A cascade system of hydropower projects was proposed by the MEMD in their report Project for Master Plan Study On Hydropower Development in the Republic Of Uganda. In addition to Karuma and Ayago described above the Masterplan identified three other large hydro projects within the Project Aol (with estimated installed capacities): <ul style="list-style-type: none"> • Oriang (392 MW) • Kiba (288 MW) • Murchison (648 MW) Each project would consist of a dam structure incorporating a powerhouse, tailrace, an inundation area behind the dam wall, a substation, access roads and transmission lines.
	Overlap with Tilenga Aol;	The three hydro power projects are within the MFNP and will result in habitat loss within the Park and impacts on the Victoria Nile upstream of the Tilenga Project and therefore overlap with the Project Aol.
	Status:	Uncertain.

⁴ In run of river systems, running water is diverted from a flowing river and guided down a channel, or penstock, which leads to a generating house. There the force of the moving water spins a turbine and drives a generator. The water is fed back into the main river further downstream.

Details		Title and Description								
16	Project Title:	Karuma Interconnection Project								
	Developer:	UETCL								
	Location:	As described below. The line between Karuma and Olwiyo is likely to run through MFNP, generally following the Karuma-Pakwach Highway.								
	Description:	Evacuation of power from Karuma HPP and Supporting Rural electrification program. The Project has the following components: <ul style="list-style-type: none"> • Karuma 400kV Switchyard • 240km 400kV Double circuit Karuma – Kawanda Transmission Line and Kawanda 400/132kV Substation • 55km 400kV Double circuit Karuma – Olwiyo Transmission Line and Olwiyo 400/132kV Substation • 80km 132kV Double circuit Karuma – Lira Transmission Line and associated 132kV line bays at Lira Substation. 								
	Overlap with Tilenga Aol:	The line between Karuma and Olwiyo is likely to run through MFNP, generally following the Karuma-Pakwach Highway and therefore overlaps with the Project Aol.								
Status:	Project commissioning is expected in 2018.									
17	Project Title:	Nkenda- Fortportal-Hoima Transmission project								
	Developer:	UETCL								
	Location:	Part of the line would run through Hoima district.								
	Description:	Improvement of reliability and quality of supply in the western region of Uganda. Provision of transmission capacity to evacuate power from Kabaale 53MW Testcrude. The Project involves the following components: <ul style="list-style-type: none"> • 216km 210kV Double circuit transmission line (to be initially operated at 132kV) • Hoima 132/33kV Substation • Nkenda Substation Extension 								
	Overlap with Tilenga Aol:	The transmission line is partly located within the Project's Aol and is likely to contribute to the wider economic development and influx into the region.								
Status:	Uncertain.									
18	Project Title:	Transmission line upgrade								
	Developer:	UMEME Ltd and UETCL								
	Location:	Not available								
	Description:	UETCL is in the process of constructing 132/33kV Substations in Hoima district. The project will involve the installation of the following lines: <ul style="list-style-type: none"> • 4 x 33kV AAAC 150 25.6km integration lines from Hoima-UETCL substation. • 4 x 33kV 185sqmm 1C 2.4km cables to be laid from the feeder bays to the overhead termination points. • 1 x 33kV 185sqmm 3C 1.9km cable to be laid where the O/H power line installation is not possible due to way leave issues. • 4 x 11kV 185sqmm 3C 1km cables are to be laid where both 33kV and 11kV O/H lines intersect. • 4x 33kV bays will be installed at Hoima-UETCL substation i.e. Buseruka line, Hoima-UMEME, Munteme line and Masindi-Hoima line bays. 								
	Overlap with Tilenga Aol:	The transmission line is partly located outside within the Project's Aol but and it is likely to contribute to the wider economic development and influx into the region.								
Status:	ESIA report prepared submitted to NEMA November 2016.									
19	Project Title:	Agricultural developments								
	Developer:	See description below								
	Location:	See description below								
	Description:	<table border="1"> <thead> <tr> <th>Project</th> <th>Developer</th> <th>Location</th> </tr> </thead> <tbody> <tr> <td>Sugar Factory</td> <td>Bukona Agro Processors Limited</td> <td>Nwoya Lapem Village, Coorom Parish, Kach Goma Sub County</td> </tr> <tr> <td>Proposed Construction site of Agro-processing factory. The Agro-processing factory will be built on an approximately 5 acres of land and will</td> <td>Kamp Group Ltd</td> <td>Nwoya Onyomtil Sub Ward, Ogom Ward, Anaka Town Council, Nwoya District</td> </tr> </tbody> </table>	Project	Developer	Location	Sugar Factory	Bukona Agro Processors Limited	Nwoya Lapem Village, Coorom Parish, Kach Goma Sub County	Proposed Construction site of Agro-processing factory. The Agro-processing factory will be built on an approximately 5 acres of land and will	Kamp Group Ltd
Project	Developer	Location								
Sugar Factory	Bukona Agro Processors Limited	Nwoya Lapem Village, Coorom Parish, Kach Goma Sub County								
Proposed Construction site of Agro-processing factory. The Agro-processing factory will be built on an approximately 5 acres of land and will	Kamp Group Ltd	Nwoya Onyomtil Sub Ward, Ogom Ward, Anaka Town Council, Nwoya District								

Details		Title and Description		
		include milling and packaging machines for maize, rice, soya beans, sim-sim and tea leaves.		
		Wadelai and Tochi Irrigation Scheme	MWE	Nebbi /Oyam
		Sugar Manufacturing Plant in Kiryandongo	Kiryandongo Sugar Limited	Kiryandongo Ranch
		Proposed Expansion of Kinyara Sugar Limited Sugar Milling and Cogeneration Plants. MT per annum is planned to be increased to about 2.5 million MT per annum	Kinyara Sugar Limited	Masindi ,Budongo Sub County,Kinyara Village, Bujenje County
		Crop Farming Project	Asili Farms	Masindi Rubani Village, Rukandwa Parish, Rwijanga Sub County, Bujenje County
		Abattoir at Bulera	Ministry of Lands Housing and Urban Development	Hoima Bulera East Kyantare Ward Mparo Division Hoima Municipality
		Proposed Kingstar Agro processing Stores. The project will have in place stores, sanitary facilities, perimeter wall fence, parking yard and well-sealed courtyard among others. A section within the store will be fitted with a processing machine for milling maize.	Kingstar General Hardware Ltd, Kingstar Construction Ltd	Hoima Butanjwa Cell, Kyentale Ward, Mparo Division, Hoima Municipality, Hoima District
		Fish Cage Farming	I See Limited	Nebbi Dei A Village, Dei Parish, Panyimur Sub County , Jonam County
	Overlap with Tilenga Aol:	Indicative locations of agricultural developments are shown on Figure 21-2. Several developments lie within the Project's Aol.		
	Status:	Uncertain.		
20	Project Title:	Railways		
	Developer:	Ministry of Works and Transport (MoWT)		
	Location:	Gulu to Pakwach railway lies within the Project Aol		
	Description:	The GoU through the MoWT is leading the development of a Standard Gauge Railway (SGR) network in order to raise the country's competitiveness, reduce the cost of doing business and foster faster socio-economic transformation of Uganda. The SGR will be a modern, high-capacity railway system that is efficient, reliable, safe and affordable for both freight and passengers. The project is being implemented as a regional project. Partner states include; Kenya, Rwanda and South Sudan. The countries agreed to use a uniform Standard Specification but each county will construct their sections. In Uganda, the SGR network will comprise three major routes with a total route length of 1,614 km. The Northern Route comprises of the Tororo - Gulu - Pakwach alignment, which traverses through, Tororo, Butaleja, Mbale, Bukedea, Pallisa, Kumi, Ngora, Soroti, Amuria, Alebtong, Lira, Kole, Oyam, Gulu and Nebbi.		
	Overlap with Tilenga Aol:	Part of the route from Pakwach is within the Project's Aol, to the north of MFNP.		
	Status:	In planning. Gulu to Pakwach line scheduled for completion in 2025.		
21	Project Title:	Other Power Projects		
	Developer:	See description below		
	Location:	See description below		
	Description:	Project	Developer	Location
		Biogas Plant in Bwendero. The project will involve the use of spent wash from molasses for generation of	Bwendero Dairy Farm	Hoima, Bwendero Village, Bwirugura Parish, Kitoba Sub County, Bugahya

Details		Title and Description		
		biogas to be used for steam generation in the developer's distillery.		County
		A 230MW thermal power plant	UEGCL on behalf of the GoU contracted Albatross Energy	At Itara cell, Kibingo Ward, Busisi division, Hoima Municipality.
		ORIO Hydropower Project a proposed run-off-river 3.312MW mini hydropower plant along River Hoimo (which drains into Lake Albert),	Uganda Energy Credit Capitalisation (UECC)	Hoima Buseruka
		9.6MW Nkusi Hydroelectric Power Station	PA Technical Services Limited	Nguse Village, Ndiyaga Sub- County
		Proposed Pachwa Small Hydropower Project	Flow Power 1 Limited	Kibaale, Kahuniro Village, Pachwa Sub- County
Overlap with Tilenga Aol:	Generally within the Project's Aol and will contribute to the local economy and provide alternative sources of energy generation.			
Status:	The Hoima Small Hydropower Project has been constructed. Nkusi HPP under construction, commissioning expected 2018. The status of other projects is uncertain.			
22	Project Title:	Industrial developments		
	Developer:	See description below		
	Location:	See description below		
	Description:	Project	Developer	Location
		Batching Plant in Kigorobyia	Hydromax Limited	Hoima Kigorobyia Sub County
		Bwendero Dairy farm proposes to develop a sugar processing plant in Kitoba sub-County to process and package cane sugar	Bwendero Dairy Farm	Hoima, Kitoba sub-County
		Distillery Facility in Kisalizi	Kisalizi Industries Limited	Masindi, Kisalizi Village, Kahembe Parish, Bwijanga Sub County
Overlap with Tilenga Aol:	Located on main roads within the Project's Aol.			
Status:	Uncertain			
23	Project Title:	Tourism developments		
	Developer	Uncertain		
	Location	Three tourism lodges within or close to MFPA may be expanded or constructed. These are Pakuba Lodge (expansion), Albert Nile Lodge (a new lodge), and Twiga Safari Lodge (expansion).		
Overlap with Tilenga Aol:	Located within the Project's Aol.			
Status:	Albert Nile Lodge was started in 2017. The schedule for the development of the Pakuba Lodge and Twiga Safari Lodge is uncertain.			

21.4.4 Drivers and Stressors

Table 21-8 below summarises other drivers and stressors that are already affecting the sustainability of some of the VECs in the Project Aol. While described separately, many of the drivers and stressors are closely interrelated. Further information on these stressors is provided in the description of current conditions for VECs where indicated.

Table 21-8: Drivers and Stressors affecting VECs

Driver or Stressor	Trend	Examples	Further information on stressors
Population growth and in-migration	Up	Population growth (estimated at 3% per annum nationally and 4.86% in Buliisa District) will put further pressure on existing resources and facilities. Uganda has one of the highest proportion of young children (age 0-14 years) currently estimated at 50%.	See Section 21.5.18 Social Cohesion
Climate Change	Up	Carbon emissions are increasing as a result of Land-Use Change and Forestry (LUCF) (deforestation, land conversion), changing agricultural practices (extent of burning, livestock contributions), industrialisation and an increase in vehicle traffic. Some areas are already considered relatively prone to drought as a result of climate change.	See Section 21.5.6 Climate Change Linked to Carbon Emissions
Water quality deterioration	Up	Key activities contributing to deterioration in water quality include agricultural activities (such as nutrient run-off due to application of agro-chemicals), and poor sanitation practices (such as poorly constructed pit latrines and damaged and decaying sewerage systems). Forest clearance, farming, infrastructure development have reduced vegetation cover and may contribute to increased rates of soil erosion and levels of sediment in rivers and streams used for water supply.	See Section 21.12 Access to Safe Drinking Water Resources
Land conversion for farming and shortage of land for farming	Up	Intensification and commercialisation of farming is taking place and this may reduce access to land for small-scale subsistence farmers.	See Section 21.5.11 Food Security
Deforestation and degradation	Up	A high proportion of the population rely on fuel wood for cooking. Forest reserves are cleared illegally for farming.	See Section 21.5.7 Sustainable Woodland
Overfishing	Up	Lake Albert fishery is already considered over-fished. In-migration and growth of fishing communities are increasing fishing activity. New roads that were constructed for the oil and gas industry may have exacerbated levels of over-fishing by improving access to markets.	See Section 21.5.9 Lake Albert capture fisheries
Wildlife poaching	Up	Wildlife illegal hunting is a long standing problem affecting threatened species. It is linked to improved road access and growth in population near protected areas.	See Section 21.5.8 Bushmeat
Conflict	Stable	The majority of disputes within the Project AoI are related to land such as disputes over land boundaries, issues around land inheritance and land partitioning among heirs, fraud over illegal land purchasing, exclusion of women from land ownership.	See Section 21.5.18 Social Cohesion
Urbanisation	Up	The population of urban areas including the towns of Buliisa, Hoima and Masindi has grown. This has had both positive and negative socio-economic and environmental impacts.	Cross cutting VEC including section 21.5.16 Local Economic Stability, 21.5.18 Social Cohesion, Section 21.5.13 Community

Driver Stressor	or Trend	Examples	Further information on stressors
			Health, 21.1.15 Access to land and Shelter

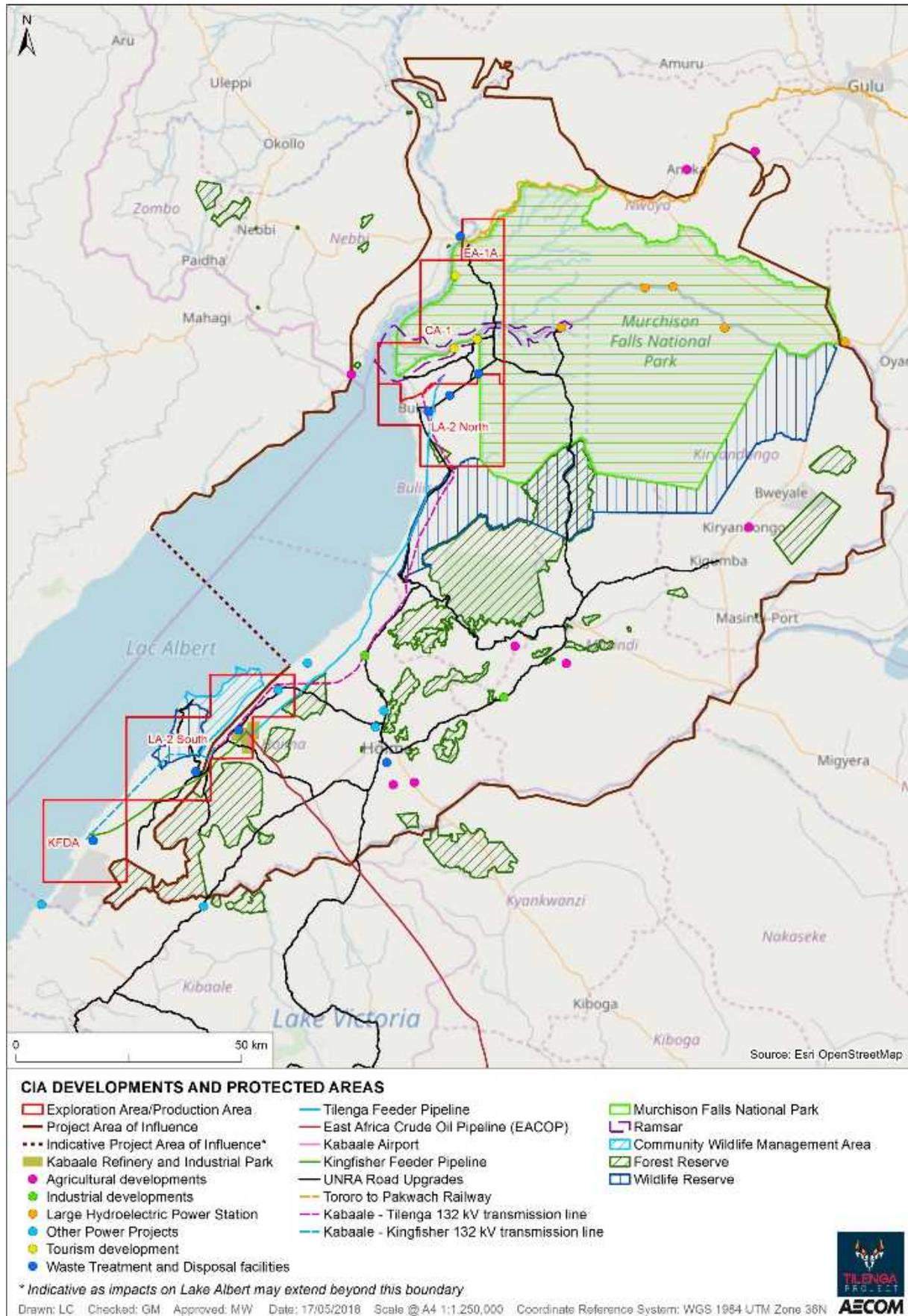


Figure 21-2: Other Developments

21.5 Assessment of Cumulative Impacts

21.5.1 Introduction

This section of the CIA provides the assessment on each of the priority VECs. For each VEC the following information is provided:

- A description of the VEC;
- The Study Area for the VEC. Generally, the Study Area is the Project AoI, but for some VECs this has been refined to focus on more specific locations within the Project AoI;
- Indicators of baseline conditions with a summary of trends (where data is available);
- The sensitivity of the VEC, based on the criteria in Section 21.2.7.2 and informed by the current status and trends for each indicator;
- A threshold for the VEC against which judgements on the significance of cumulative impacts have been made; and
- The cumulative impact assessment on each VEC, presented as follows:
 - Summary of the residual impacts of the Project on the VEC based on the results of the ESIA for the highest level of impact assessed across all phases. The Project's residual impact also represents the Project's contribution to cumulative impacts i.e. where the Project's residual impact is High or Moderate, the contribution of the Project to cumulative impacts is considered to be significant;
 - Developments that will contribute to cumulative impacts on the VEC based on the information on other developments presented in Section 21.4 and Table 21-7 below;
 - The overall cumulative effect and the magnitude of the effect determined using the criteria presented in Section 21.2.7.1; and
 - The significance of the cumulative impact based on the sensitivity and magnitude and linked to Table 21-4 and Table 21-5, which provides impact assessment definitions linked to VEC thresholds and the risk to the sustainability of the VEC.

21.5.2 Cross Cutting Issues to Aid the Assessment of Cumulative Impacts

To aid the assessment the following is presented below:

- A summary of predicted influx and employment generation.
- A comparison of VECs predicted to be affected by the Developments summarised above.

21.5.2.1 Influx and employment generation

The primary driver for indirect and induced impacts is population influx into the area because of employment opportunities generated by oil and gas development. To aid the assessment of cumulative impacts resulting from influx a summary of potential employment opportunities is provided here based on the 2014 Industrial Baseline Survey (IBS) performed by JV Partners and reported within the In-Migration Risk Assessment and Situation Analysis (Ref: 21-76). The IBS outlined the following assumptions for potential employment during the development of oil fields in the Lake Albert region:

- The oil projects specifically will generate thousands of direct jobs in Uganda, with a peak of about 13,000 workers in the construction phase and a plateau at 3,000 people in the operation phase.
- Out of the total manpower required, 15% will be engineers and managers, 60% will be technicians and craftsmen and 25% will be unskilled workforce.
- Beyond direct jobs that will be created on site, oil and gas activity will also have a potential to generate 100,000 to 150,000 indirect and induced jobs.

In addition to oil and gas development, other projects will also contribute to influx.

21.5.2.2 Comparison of VECs against developments

Table 21-9 below identifies which VECs are predicted to be affected by the developments summarised in Table 21-6 and Table 21-7. The shades highlight each development that is likely to affect a VEC; it does not consider the magnitude of the effect or whether the effect would be positive or negative.

Table 21-9: Summary of VECs potentially impacted by other Development

Development	Nature based tourism	Critical & natural habitat	Climate change linked to GHG	Sustainable woodland	Bushmeat	L.Albert capture fisheries	Open access grazing land	Food security	Access to safe drinking water	Community health	Primary & secondary education	Access to land & shelter	Local economic stability	Safe communities	Social cohesion
Tilenga Feeder Pipeline															
Tilenga CPF-Kabaale Transmission															
EACOP															
Kingfisher Development															
Kabaale Industrial Park															
Kabaale Airport															
Kaiso-Tonya Development															
UNRA Oil Roads															
Waste Management															
Hoima-Kampala Pipeline															
Tilenga Field Extension															
Karuma Hydroelectric Power Station															
Ayago Hydro Project															
Other Victoria Nile Hydro Projects															
Karuma Interconnection Project															
Hoima Transmission Line															
Agricultural Developments															
Railway															
Small Power Developments															
Industrial Developments															
Tourism Developments															

21.5.3 Nature Based Tourism in Protected Areas

21.5.3.1 Description of VEC

This VEC focusses on ecotourism within MFPA, (which comprises of MFNP, Bugungu and Karuma Wildlife Reserves), and Budongo Forest Reserve. MFPA is internationally renowned for its nature-based tourism. Budongo Forest Reserve is a popular destination for chimpanzee trekking and bird watching.

The biodiversity values of these areas are considered in Section 21.5.5 Critical and Natural Habitat and Key Associated Species.

21.5.3.2 Study Area for VEC

The Study Area for this VEC is MFPA and Budongo Forest Reserve.

21.5.3.3 Indicators of Baseline Conditions

21.5.3.3.1 Tourism statistics

Current conditions

Data on tourism is provided in **Chapter 19: Ecosystem Services** and **Chapter 16: Social**, in summary:

- At a national level, tourism accounted for 9.9% of GDP amounting to USD 1.8 billion in 2014. Tourism is Uganda's single largest export earner and generator of foreign exchange, at USD 1,039 million per annum (Ref. 21-8). In 2014 the tourism industry contributed 590,000 jobs (direct and indirect) nationwide and directly provided 247,000 jobs, estimated to be 8.8% and 3.6% of total employment respectively (Ref. 21-9);
- Tourism revenue for the National Park equaled US\$5.4 billion in 2011, having risen from US\$500 million in 2001. The number of tourists visiting MFNP increased from ~20,000 in 2001 to ~75,000 in 2016. Tourists visiting MFNP in 2016 accounted for approximately 31% of visitors to national parks in Uganda making it the second most visited national park in Uganda (Ref.21-10);
- Tourist accommodation in MFNP includes lodges, budget camps, and transit hotels in Masindi town. There are 17 lodges in direct proximity to MFNP concentrated in the two tourism spots: close to Paraa on the south shore of the Delta, and close to Tangi Gate. There are five lodges in MFNP: Paraa Safari Lodge, Chobe Safari Lodge, Pakuba Safari Lodge, Sambiye River Lodge and Red Chilli Rest Camp. There are also 12 accommodation facilities located in close proximity to MFNP: 11 on privately owned land and Budongo Eco Lodge which has a concession from the National Forest Authority (NFA). The supply of accommodation for tourists has doubled in the past five years (Ref. 21-11);
- According to the 2015 SHBS (Ref. 21-11) occupancy level of lodges and hotels varies depending on the provider and differs from 20% up to 80% (see **Chapter 16: Social**, Table 16-28);
- Most tourists to the National Park are from the United States, the United Kingdom and Germany. Ugandan tourists also make up a significant proportion of visitors;
- At present, visitor satisfaction with MFNP is high – 96% of visitors rated their experience there as 'excellent' or 'very good' on TripAdvisor (based on over 500 reviews); and
- Whilst relevant data was not identified for Budongo Forest Reserve visits to the reserve are often combined with visits to MFNP.

Trends and issues

The number of tourists visiting MFNP has risen steadily since the early 2000s and increased from about 60,000 in 2011 to 72,000 in 2015, with a slight decrease registered in 2014 compared to 2013

(Ref. 21-64). In the long term, The Tourism Development Master Plan (Ref. 21-12) recognizes Uganda’s exceptional range of natural and cultural tourism assets and prescribes strategies to unlock their potential, which it forecasts will lead to a significant boost to the tourism sector over the next 10 years. By 2024, the master plan forecasts an increase in foreign receipts to more than \$1.4 billion per annum, and the creation of over 150,000 additional tourism jobs nationally.

21.5.3.3.2 Wildlife population statistics and conservation status

Current conditions

Tourism in MFPA and Budongo Forest Reserve depend on the continued viability of its animal populations, and in particular the abundance of flagship species such as elephants, Rothschild’s giraffe, shoebill and chimpanzee. A summary for the key indicator species that are important to tourism is provided in Section 21.5.5 Critical and Natural Habitat and Associated Species below:

- Rothschild’s Giraffe;
- Lelwel Hartebeest;
- African Elephant;
- Kob;
- Shoebill;
- Chimpanzee; and
- Lion.

Trends and issues

A discussion of trends is provided in Section 21.5.5 below. Generally, population of species are stable, and in some cases have risen in recent years (see **Chapter 14: Terrestrial Wildlife**). However, there are considerable threats to species as a result of illegal hunting and loss of habitat.

Table 21-10: Summary of VEC Status, Sensitivity and Threshold for Ecotourism

Indicator	Current status/trend without development	VEC sensitivity	VEC threshold
Tourism statistics	Visitors to MFNP totalled 75,000 in 2016 making it Uganda’s second most visited national park. Visitor numbers and revenues are likely to remain at these levels in the short- and possibly the medium-term, but Ugandan government policy encourages considerable growth of the tourism sector.	High	No reduction in tourist numbers.
Wildlife population statistics and conservation status	Generally, flagship species of importance to the tourism industry are all threatened. Populations of flagship species in MFNP have staged a recovery since the 1990s (see Chapter 14: Terrestrial Ecology), however, increasing illegal hunting pressure and loss of habitat may threaten this stability.		

21.5.3.4 Cumulative Impacts on VEC

Table 21-11 and Table 21-12 below provide an assessment of the potential cumulative impacts on the VEC. As the key indicator species and types of impacts differ between MFPA and Budongo Forest Reserve, separate assessments have been completed for each of these protected areas.

Table 21-11: Assessment of Potential Cumulative Impacts on Nature Based Tourism in MFPA

Tilenga Project Potential Impacts (Direct and Indirect)	Project's residual impact significance	Other developments and activities also affecting VEC and potential cumulative impacts	Magnitude of potential impact	Sensitivity	Significance
Reduction of MFPA's reputation for remoteness and wildness.	Moderate adverse	<p>The UNRA road upgrades, the extension to the Tilenga Project, tourism developments, hydropower projects taking place within the National Park (including Ayago Hydropower Project and other hydropower projects on the Victoria Nile, including Oriang, Kiba, Murchison), as well as the Karuma Interconnection Project have the potential to lead to impacts on visitors' perceptions of 'wildness' and sense of place. Whilst direct cumulative effects of the Project and the hydropower scheme on views are unlikely due to the location of proposed developments, there may be potential direct impacts on noise from an increase of traffic flows. However, indirect effects on visitors' perceptions of the MFPA in terms of sense of place, aesthetic value and experience are likely to be more significant. This is particularly relevant given the importance international tourists place on perceptions of the National Park's wildness and sense of place.</p> <p>The Tilenga Feeder Pipeline, Tilenga CPF-Hoima transmission line, extension to the Tilenga Project and UNRA roads are expected to lead to some habitat loss and degradation and therefore impact directly on MFPA,. The construction of five hydroelectric power developments (four within MFNP on the Nile River), along with associated access roads and transmission lines, will further directly increase habitat loss and degradation within MFPA. Although these impacts will be outside the Project Area, the effects will impact key species that range throughout the Park (e.g. Elephant, Rothschild's Giraffe, Uganda Kob, Lelwel's hartebeest and lion).</p>	Moderate	High	High adverse
Loss or degradation of habitats as a result of direct and indirect impacts		<p>The UNRA roads upgrades and hydroelectric power projects are likely to have greater significant indirect effects on MFPA. The UNRA roads will improve access within the region and allow more people to travel to previously isolated areas. This will further exacerbate the Project's effects with respect to increased human presence and land-use change, increased demand for wood fuel, increased fire risks, leading to habitat loss and degradation.</p> <p>Other oil and gas related developments (the extension to the Tilenga Project, the</p>			

Tilenga Project Potential Impacts (Direct and Indirect)	Project's residual impact significance	Other developments and activities also affecting VEC and potential cumulative impacts	Magnitude of potential impact	Sensitivity	Significance
<p>Increased illegal hunting of key indicator species important to tourism</p>		<p>Tilenga Feeder Pipeline, EACOP, Kingfisher Field, Kabaale Industrial Park, Kaiso-Tonya Field, UNRA Oil Roads, and Waste Management) as well as non-oil and gas developments (agricultural developments, industrial and tourist developments) have the potential to contribute to influx into the areas to the south and west of the MFPA and to main urban centres within the region particularly Hoima town, Masindi town, Biiso town, Buliisa, and Pakwach town. As projects will all have different timelines, this may mean that cumulatively population growth is experienced over a longer period before it stabilises. There are also likely to be higher rates of population growth cumulatively than rates that would be associated only with the Tilenga Project.</p> <p>A cumulative increase in the human population resulting from these developments is likely to lead to an increase in subsistence and commercial hunting, both to meet basic needs and/or to generate a monetary income. In particular there is a risk that this has the potential to increase instances of commercial hunting of flagship species in the vicinity of the MFPA to support the wider national and international market for such activities.</p> <p>There is a risk that the potential cumulative effect of these impacts on MFPA will mean that the threshold will not be met, and the sustainability of the VEC is therefore threatened.</p>			

Table 21-12: Assessment of Potential Cumulative Impacts on Ecotourism in Budongo Forest Reserve

Tilenga Project Potential Impacts (Direct and Indirect)	Project's residual impact significance	Cumulative impacts	Magnitude of potential impact	Sensitivity	Significance
<p>Loss or degradation of habitats as a result of direct and indirect impacts</p> <p>Increased commercial hunting of Chimpanzee</p>	<p>Moderate adverse</p>	<p>The construction of UNRA road upgrades is expected to lead to some habitat loss and impact directly on Budongo Central Forest Reserve (CFR). This could directly impact on chimpanzees and Nahan's partridge that inhabit this forest. The influx is also expected to exacerbate Project's effects with respect to increased human presence and land-use change, increased demand for wood fuel, increased fire risks, leading to habitat loss and degradation.</p> <p>Other oil and gas related developments (the extension to the Tilenga Project EACOP, Kingfisher, Kabaale Industrial Park, Kaiso-Tonya Field, oil roads, and Waste Management) as well as non-oil and gas developments (agricultural developments, and industrial developments) have the potential to contribute to influx into the areas around the Budongo Forest Reserve.</p> <p>A cumulative increase in the human population resulting from these developments is likely to lead to an increase in subsistence and commercial hunting, both to meet basic needs and/or to generate a monetary income. This will take place due to a combination of an increase in the overall number of people engaged in hunting supported by an increase in demand for bushmeat from an enlarged population. In particular there is a risk that this has the potential to increase instances of commercial hunting of Chimpanzee to support the wider national and international market for such activities. However, the level of protection of the species and the relatively contained area of the Forest Reserve has the potential to limit the significant of impacts.</p> <p>There is a risk that the potential cumulative effect of these impacts on Budongo Forest Reserve will mean that the threshold will not be met, and the sustainability of the VEC is therefore threatened.</p>	<p>Low</p>	<p>High</p>	<p>Moderate Adverse</p>

21.5.4 Critical and Natural Habitat and Key Indicator Species

21.5.4.1 Description of VEC

Critical and Natural Habitats are areas with high biodiversity value as defined by IFC Performance Standard 6 (PS6) (Ref. 21-13). Around 120 species have been identified as being associated with Critical and Natural Habitat within Project’s Ecological AoI through the Critical Habitat Assessment (CHA) process. Given the large number of species, for the purpose of the CIA the assessment is based on key indicator species associated with the Landscape Contexts (see **Chapter 13: Terrestrial Vegetation**, and **Chapter 14: Terrestrial Wildlife** for a description of landscape contexts) within the Project AoI, comprising those parts of Landscape Contexts A, B, C, D and F affected by the Project. The key indicator species have been selected from the Critical Habitat Qualifying Species (CHQS) that have formed the basis of the biodiversity impact assessment as shown in Table 21-13 below. These species were selected because:

- The Tilenga Project is expected to result in significant impacts on those species (as assessed in **Chapters 13: Terrestrial Vegetation**, **Chapter 14: Terrestrial Wildlife** and **Chapter 15: Aquatic Life**);
- They are also likely to be affected by other activities and developments within the Tilenga Project’s AoI; and
- They are representative of one or more Landscape Context, are of high conservation value and are generally quite well studied so that there is baseline data against which to compare trends and changes.

Table 21-13: Key Indicator Species Associated with Critical and Natural Habitat

Landscape Context	Name	Description	Key Species
A	MFPA	Grassland and woodland within the MFPA, with a notable concentration in MFNP north of the Nile.	<ul style="list-style-type: none"> • Rothschild’s Giraffe • Lelwel Hartebeest • African Elephant • Uganda Kob • Lion • Vultures
B	Savanna corridor	Grassland and open wooded or scrub habitats along a weakly-protected savanna corridor that runs north-south along and below the escarpment.	<ul style="list-style-type: none"> • Vultures • Uganda Kob • African Elephant • Lion
C	Lake Albert, rivers and wetlands	Lake Albert and fringing wetlands	<ul style="list-style-type: none"> • Endemic fish (species) • Shoebill
D	Tropical high forest	Forest and forest fragments and corridors	<ul style="list-style-type: none"> • Nahan’s Partridge • Chimpanzee
F	Mixed landscape	Mixed habitats landscape-wide, including agriculture, for African Elephant and Chimpanzee.	<ul style="list-style-type: none"> • African Elephant • Chimpanzee

21.5.4.2 Study Area for VEC

Locations within the Tilenga Project AoI where part or all of an indicator species population may be present.

21.5.4.3 Indicators of Baseline Conditions

For each key species the following indicators are provided:

- Status / designation with reference to, where applicable, the IUCN Global Red List, The Uganda Red List and Critical Habitat qualifying criteria; and
- Population levels and distribution within associated Landscape Contexts.

21.5.4.3.1 Rothschild's Giraffe

Current conditions

Rothschild's giraffe (*Giraffa camelopardalis rothschildii*), is globally Endangered (EN) and nationally Vulnerable (VU). It is defined in the CHA as a Criterion 1, Tier 1 Critically Endangered or Endangered Species (Ref. 21-14). In the Republic of Uganda, giraffe are protected under the Game (Preservation and Control) Act of 1959 (Chapter 198) and are also listed under Part A of the First Schedule of the Act as animals that may not be hunted or captured in Uganda.

Rothschild's giraffe is one of the most threatened giraffe (sub) species remaining in the wild. Illegal hunting, agricultural expansion, human encroachment, and habitat degradation, fragmentation and destruction have led to the loss of Rothschild's giraffe from almost all of its former range. The species is concentrated in and around the Project Footprint, in MFNP and mainly north of the Nile. Small numbers (18) of Rothschild's giraffe have recently been re-introduced south of the Nile within the park.

Rothschild's giraffe is associated with Landscape context A (MFPA) and individuals move seasonally within that landscape to areas of higher quality and/or quantity forage generally in line with the end of each wet or dry season.

The current global estimate for Rothschild's giraffe is less than 2,500, where MFNP supports the only wild population in the world. There are currently estimated to be over 1,400 unique individuals within the MFNP (Ref. 21-17) based on survey work undertaken in 2016.

Trends and issues

Recent aerial sample counts (Ref. 21-15) of wildlife in the MFPA Area estimated the Rothschild's giraffe population at 900-1000 individuals, indicating an increase from previous estimated numbers, (e.g. Ref. 21-16) which found 884 individuals. However, as noted above more recent giraffe studies (Ref. 21-17) photographed over 1,400 unique individuals within the MFNP during 2016. Review of data in that report indicates that giraffe numbers have increased by around 500% since 2006. The main pressure on giraffe is illegal activities such as illegal hunting, which reduced giraffe numbers to less than 200 individuals by the late 1990s, but with return of the rule of law and political stability the number of giraffe has continued to increase steadily perhaps reaching the numbers recorded in the 1960s (Ref. 21-17).

However, this species remains under considerable threat as its range is restricted essentially to the northern part of MFNP, despite recent attempts to relocate some individuals to areas south of the Victoria Nile and also to Lake Mburo NP.

21.5.4.3.2 Lelwel Hartebeest

Current conditions

Lelwel Hartebeest (*Alcelaphus buselaphus* ssp. Lelwel), formerly known as Jackson's Hartebeest, is globally Endangered (EN) and nationally Near Threatened (NT) and are associated with savanna habitats. It is defined in the CHA as a Criterion 1, Tier 1 Critically Endangered or Endangered Species (Ref. 21-14).

Aerial surveys recorded around 10,000 hartebeest (Ref 21-15). This is 66% higher than previous Uganda Wildlife Authority (UWA) estimates of 2006, suggesting that the population is increasing rapidly, and/or that many hartebeest have been missed in previous counts. Hartebeest show a consistent distribution in MFPA throughout the surveys, implying that herds have small home ranges and do not have discernible seasonal movements across the park.

Trends and issues

Lelwel Hartebeest once ranged from southern Chad through the Central African Republic, southern Sudan, northern and north-eastern Democratic Republic of Congo (DRC), south-western Ethiopia, north-west Kenya, northern Uganda and extreme north-western Tanzania. However, they have undergone significant reductions in numbers particularly in Uganda and Central African Republic, where they are now confined to a few protected areas.

Numbers have fallen drastically in the last 50 years due to habitat destruction, hunting, poaching, and encroachment by human settlement, as well as competition for food with domestic cattle. The distributions of most hartebeest subspecies are likely to become increasingly fragmented until they are confined to those areas where there is effective control of poaching and encroachment by livestock and settlement.

21.5.4.3.3 African Elephant

Current condition

The African elephant (*Loxodonta africana*) is IUCN listed as globally Vulnerable (VU) (Ref 21-18) and nationally Critically Endangered (CR) and with ranges that stretch across sub-Saharan Africa, although it is declining globally.

In Uganda populations are now largely confined to protected areas. The species is protected by national law under the Game Preservation and Control Act. According to IFC PS6, elephants are a Nationally-threatened, Criterion 1, Tier 2 Critical Habitat-qualifying species.

MFNP holds one of the three main populations in Uganda and is key to conservation of the species in this landscape. Elephants are associated with Landscape Context A (MFNP), B (Savanna Corridor), D (Tropical High Forest) and F (Mixed Landscape).

Trends and issues

In the 1960s MFPA supported some 12,000 elephants. With such high elephant densities, woodlands were significantly affected with the result that large areas of woodland both sides of the Nile converted to open grassland. The loss of woodland prompted the Uganda National Parks to cull around 2,000 elephants in the late 1960s.

Towards the late 1970s, the spread of armed militias resulted in the massive slaughter of elephants in MFPA for ivory. An aerial survey of elephants in MFPA in 1980 revealed that some 90% of elephants had been killed, with just 1,400 remaining. Poaching continued throughout the 1980s, and the decline continued; by 1995, the elephant population estimate was just 300 (see Ref. 21-15).

Recent aerial survey (Ref. 21-15) provides an overall estimate of elephant numbers for MFPA of about 1,484 elephants. The study indicates that this is close to estimates obtained by previous UWA surveys over the last five years.

African elephants face several threats. At a global level, the killing of elephants and traffic of ivory is considered the biggest threat. At a local level, the greatest threat to elephants in Uganda is habitat loss and fragmentation, which is caused by human population expansion and rapid land-use change.

21.5.4.3.4 Uganda Kob

Current condition

Uganda kob (*Kobus kob thomasi*), is globally LC but is not included in the Uganda Red List. Kob is widespread in a band across Africa from Senegal to south-east Ethiopia. The subspecies *thomasi* (Uganda Kob) occurs in north-east DRC, south-west Sudan and widely throughout Uganda.

Uganda kob is not a threatened species in Uganda. In the Study Area the species prefers savanna habitat, which associates them with Landscape Contexts A (MFPA) and B (savanna corridor). Recent aerial survey work identified an aggregated estimate of 118,290 kob \pm 13,473 (SE) (Ref. 21-15) within the entire MFPA.

Trends and issues

Kob congregate at traditional lekking sites during breeding, which have been identified at various locations within the MFNP.

The sedentary nature of kob and their tendency to occur in relatively large concentrations make them highly susceptible to hunting. Poaching pressures means that the species now survives mainly in and around protected areas. However; the recent aerial survey (Ref. 21-15) estimates that numbers are twice the previous highest estimate for kob within MFPA of c58,000 (counted in May 2014 as part of the Pan-Africa Elephant Aerial Survey (Ref. 21-77), and raises the general Uganda population estimate by approximately 75%.

The recent aerial survey suggests that previous surveys have substantially underestimated kob, and the population of this species in MFPA is rapidly increasing.

21.5.4.3.5 Lion

Current condition

Lion is globally VU and nationally CR. The global population is estimated at 20,000 individuals and is declining and in Uganda the population is estimated at around 400 individuals forming isolated meta-populations existing in only three of 10 national parks, including MFNP, Kidepo Valley National Park and Queen Elizabeth National Park. Lions are protected through regulations for protected areas and by-laws.

MFPA remains one of only three sites in Uganda with potentially viable populations of lions. Conserving lions is a specific management priority for the MFPA, especially as the population has been significantly declining.

In East Africa lions prefer savanna woodlands, but they have a broad habitat tolerance and thick brush, scrub, and grass complexes appear to be optimal habitats in providing cover for hunting and denning.

In MFNP, typical lion prey species include giraffe (*Giraffa camelopardalis rothschildi*), Ugandan kob (*Kobus kob thomasi*), warhog (*Phacochoerus africanus*), waterbuck (*Kobus ellipsiprymnus*), buffalo (*Syncerus caffer*) and hartebeest (*Alcelaphus buselaphus*) (Ref. 21-19).

Lions are associated with Landscape Contexts A (MFPA) and B (Savanna Corridor), specifically MFNP and Bugungu WR, which support more than 25% of the Uganda population.

Trends and issues

Within the MFPA the population is estimated at around 250 individuals (Ref. 21-78) with a declining population. There are 5 established prides within MFNP; 4 (Delta, Oil, Borassus, and Wangkwar Prides) on the northern bank and 1 (Southern Bank Pride) on the southern bank of the Nile (Ref. 21-20). The highest lion densities are on the northern side, near the west delta areas. The Southern Bank Pride is estimated at 27 individuals.

A recent survey (Ref. 21-21) identified another pride of lions occupying habitat within the south west delta area and Bugungu Wildlife Reserve that may be threatened by indirect impacts.

The lions of MFPA occur at low densities estimated at about 12 individuals per 100 km², which lies below the established 35 to 45 individuals per 100 km² for the prey rich and large East Africa savannahs but above 1.5 to 2.0 lions in the drier regions in southern Africa like Kalahari. They also form smaller group sizes of about 18 only observed in lions that dwell in woodlands with the more open savannah parks like Serengeti having larger lion assemblies at 35 individuals (Tutilo and Jingo 2014).

The lions of MFPA were found to live in small ranges (36 km² – 70 km²) about half of the area recorded for home ranges elsewhere in East Africa but typical of Uganda's lions as observed in Queen Elizabeth National Park (QENP). Such small ranges have been observed in prey rich open savannahs. This is not surprising because large mammal census in MFNP showed all the lion prey

population to be on the increase from previous estimates. Therefore, it is reasonable to assume as observed elsewhere that prey presence is one of the major factors influencing habitat choice and size (Tutilo and Jingo 2014).

The lion population is already under extreme pressure from poaching with 71% of mortality in adult lion population being due to illegal snares and traps (Tutilo and Jingo 2014). It is therefore critical that effective management planning and appropriate mitigation is implemented to reduce these threats.

21.5.4.3.6 Vultures

Current condition

Five species of vulture of conservation concern have been identified that are relevant to the Tilenga Project (Ref. 21-22):

- White-backed Vulture (*Gyps africanus*);
- Rüppell's Vulture (*Gyps rueppelli*);
- Hooded Vulture (*Necrosyrtes monachus*);
- White-headed Vulture (*Trigonoceps occipitalis*); and
- Lappet-faced Vulture (*Torgos tracheliotus*).

White-backed Vulture

White-backed Vulture is a globally CR and nationally EN species. The national population estimate for White-backed Vulture is c1,000-2,600 birds (Ref. 21-22). White-backed Vulture is associated with Landscape Context A (MFPA).

Rüppell's Vulture

Rüppell's Vulture is mainly associated with Acacia woodland within MFPA where it frequents open areas of Acacia woodland, grassland and montane regions.

The CHA has ascribed this species to Landscape Contexts A (MFNP), B (savanna corridor) and D (tropical high forest) which indicates its widespread occurrence within the Study Area.

Hooded vulture

Hooded vulture are often associated with human settlements north of the Equator, but is also found in open grassland, forest edge, wooded savanna, desert and along coasts. Within the Study Area this species is present within Landscape Contexts A (MFNP) and B (savanna corridor). Hooded Vulture is globally CR and nationally EN.

The total population has been estimated at a maximum of 197,000 individuals (Ref. 14.66). Population estimates for four protected areas in Uganda (Lake Mburo NP, Murchison Falls CA, Queen Elizabeth NP & Kidepo Valley NP) are 20-146 birds (Ref. 21-22).

White-headed Vulture

White-headed Vulture is a globally CR and nationally CR species. The CHA defined this species as being associated with Landscape Contexts A (MFNP) and B (savanna corridor).

Population estimates for four protected areas in Uganda (Lake Mburo NP, Murchison Falls CA, Queen Elizabeth NP & Kidepo Valley NP) are 44-187 birds (Ref. 21-22). There are no recent records outside of MFNP.

Lappet-faced Vulture

Lappet-faced Vulture inhabits dry savanna, arid plains, deserts and open mountain slopes. The species is associated with Landscape Context A (MFNP). Lappet-faced Vulture is a globally EN and nationally CR species.

National population estimates for Lappet-faced Vulture are c160-500 birds (Ref. 21-22).

Trends and issues

White-backed Vulture

It is the most widespread and common vulture in Africa (Sudan, South Sudan, Somalia, Kenya, Ethiopia, South Africa, Uganda; where an estimated 40,000 individuals remain (Ref. 21-23)), although it is now undergoing rapid declines Uganda appears to have a relatively stable population which makes it very important in a global context.

The species is concentrated in Queen Elizabeth National Park and MFNP and is rare outside of these protected areas.

Rüppell's Vultures

Current populations and trends are unknown. Threats to this species are similar to other vultures.

Hooded vulture

This species is widespread in sub-Saharan Africa and in Uganda the population has declined outside of protected areas although it is reportedly stable within National Parks.

Main threats include non-target poisoning, capture for traditional medicine, persecution and bushmeat.

White-headed Vulture

This species has a large range in sub-Saharan Africa and in Uganda the population accounts for around 5% of global numbers where it is found in Kidepo, Semliki, Lake Mbura and MFNP.

Threats include habitat loss and associated reduction of prey species (medium sized ungulates). Poisoning and other human actions also affect these species.

Lappet-faced Vulture

This species breeds in many African countries although its breeding range is decreasing. Approximately 6% of the global population occurs in Uganda, mainly in MFNP. Threats to this species are similar to other vultures.

21.5.4.3.7 Endemic fish (species)

Current conditions

Endemic or restricted range fish identified in the CHA (Ref. 21-14) and defined as receptors for the Tilenga Project are listed below:

- *Haplochromis albertiae*;
- *Haplochromis loati*;
- *Haplochromis mahagiensis*;
- *Haplochromis avium*;
- *Haplochromis wingatii*;
- *Oreochromis leucostictus*;
- *Synodontis afrofisheri*;
- *Marcusenius victoriae*; and
- *Mesobola bredoi*.

During field surveys for the ESIA, various *Haplochromis sp.* were recorded. This is a diverse genus, containing more than 200 species, most of which are present in East Africa and several are endemic to Lake Albert and its catchment. Three of this species of this genus (*Haplochromis albertiae*, *Haplochromis loati*, *Haplochromis mahagiensis*) were identified as CHQS, within Criterion 2 (endemic/restricted range species) (Ref. 21-14).

While none of the other CHQS fish species identified in the CHA were recorded during field surveys, it is possible that they may be present in the Study Area, and were not recorded as they were in low numbers or present at different times of year.

In addition, several species were recorded during the site surveys that are considered as being of some importance due to their endemism/restricted range. These include fish species that were recorded but have not been assessed or entered into the IUCN database, but are considered as being of high sensitivity (potentially vulnerable and endangered). This is due to their low population number, restricted distribution and/or being endemic to Lake Albert and the River Nile system. Recent surveys by Taabu-Munyaho et al. (Ref. 21-41), Mbabazi (Ref. 21-43) and Treweek et al. (Ref. 21-36) also provide a detailed summary of changes in fish assemblages over the last 50 years. These sources suggest that:

- Two species – *Citharinus citharus* and *Hydrocynus vittatus* – are considered near-extinct in the Lake Albert. Notably, *C. citharus* was one of the Lake's most important commercial species at the start of the 20th Century. It has therefore declined very significantly over the last 100 years; and
- Eight species in the Lake Albert are Endangered (*Lates macrophthalmus*, *Thoracochromis mahagiensis*, *T. ovim*, *T. loati*, *Hyperopisus bebe*, and *Synodontis victoriae*) or Critically Endangered (*Citharinus latus*, *Heterobranchus longifilis*).

Trends and issues

Little is known about any of these endemic fish species in terms of population numbers. None of these are commercial fish but it is known that overall species diversity in Lake Albert is declining, with two species (of commercial, non-endemic fish) close to extinction (See Section 21.5.9 Lake Albert Capture Fisheries below).

Although there is no evidence demonstrating a causal link between over-fishing and declines in species diversity, it is likely that over-fishing will have contributed to the reduction and possible near-extinction of a number of species.

21.5.4.3.8 Shoebill

Current conditions

The shoebill (*Balaeniceps rex*) is defined as globally VU and nationally EN and is a nationally-threatened Tier 2 Critical Habitat-qualifying Species thought likely to occur in/near to the Project footprint. It is associated with Landscape Context C, Lake Albert, rivers and wetlands. The Uganda population is estimated at 100-150 individuals where the Murchison Falls-Nile Delta Ramsar Site and wetlands along Lake Albert and Semliki are key sites. The Ramsar site and wetlands along Lake Albert are important for this species. A total of 40 individuals were estimated in 1998/9 within the Murchison Falls Ramsar site on the stretch from the falls to the delta (Ref. 21-25).

Trends and issues

The species is widely but locally distributed in large swamps from South Sudan to Zambia where the global population estimate is around 5,000-8,000 individuals. The species is mainly threatened by habitat destruction and degradation.

21.5.4.3.9 Chimpanzee

Current conditions

Chimpanzees are listed by IUCN as globally EN and under Appendix I of CITES. In Uganda, they are protected by national law under the Game Preservation and Control Act.

Chimpanzees in Uganda are *Pan troglodytes schweinfurthii*, the Eastern Chimpanzee, which is (one of four subspecies in Africa,) and number less than 5,000 individuals with a distribution mainly restricted to 12 isolated national parks and forest reserves with varying degree of protection (Ref 21-26). Outside of these areas forest habitat has been cleared for agricultural fields and human settlement.

The CHA defined Chimpanzee as Criterion 1, Tier 1 and a Critically Endangered and Endangered Species and also globally threatened Criterion 1, Tier 2 and a Critical Habitat-qualifying Species.

The total Eastern chimpanzee population is estimated to be approximately 181,000–256,000 and ranges from the Ubangi River/Congo River in Central African Republic and DRC, to western Uganda, Rwanda and western Tanzania. Small, relict populations are found in Burundi and south-eastern Sudan.

Within the Project Aol, chimpanzees are associated mainly with Landscape contexts B (Savanna Corridor) and D (Tropical High Forest) but they are wide ranging and may be found in Landscape Context F (Mixed habitats) also. Sizeable populations are found in Budongo Forest Reserve (400 – 800 individuals), Bugoma (450 - 850), Kibale NP (900 – 1800) and Wambabya (100 – 150) (Ref. 21-79)..

Trends and issues

Within the Project Aol, the main threats to chimpanzees include deforestation, degradation and fragmentation, zoonosis disease transfer and epidemic disease (e.g. Ebola haemorrhagic fever); bushmeat hunting and snaring (e.g. for crop protection); and capture of infants for the pet trade (often as a by-product of the bushmeat trade).

Deforestation, degradation or fragmentation of species habitat

Harvesting of trees for timber is legal in several forest reserves, notably Budongo and Bugoma. Much of the harvesting is carried out using pitsawing rather than sawmills and is only legal in certain areas. Illegal logging occurs in many of these forests, particularly those with valuable timber species (e.g. mahogany) found in Budongo. Charcoal burning is a practise that also erodes away the forest. Studies indicate that chimpanzees can survive in forests that have been selectively logged. The disturbance and openings in the forest resulting from selective logging offer increased opportunities for tree species (notably figs) that provide fruit for these animals. However, where logging has taken place the density of chimpanzees is often lower than in mature forest.

The greatest impact on the forests occurs where the forest has been encroached for farmland. This reduces forest connectivity and dispersal opportunities for chimpanzees. In the long term, the inability to disperse could be the greatest threat to chimpanzee communities in these forests.

Bushmeat hunting and snaring

Ugandan's generally do not eat chimpanzee meat nevertheless, the hunting of chimpanzees for bushmeat does occur in most forests. Furthermore, cross-border poaching (e.g. poachers from DRC) is a threat.

Bugoma and Budongo forests have relatively high levels of bushmeat hunting, particularly along their southern edges where the human population density is higher (See 21.5.8 Bushmeat below).

Chimpanzee infants are often taken from mothers, usually as by-catch when their mothers have been killed for meat, in order to sell them as pets or biomedical research. Not much of this trade occurs in Uganda but infant chimpanzees are often smuggled across the border (e.g. from DRC). This activity is illegal in Uganda and if found, the chimpanzees are confiscated (Ref. 21-28).

Human-wildlife conflict is an increasing problem, as deforestation brings wild species and humans closer together. Around Bugoma Forest, where cocoa is grown, and Budongo Forest, where sugar cane is grown, villagers actively hunt chimpanzees or sett snares at the edges of their fields (Ref. 21-28).

Zoonosis disease transfer and epidemic disease

Great apes and humans are genetically closely related, which creates a high potential for infectious pathogen exchange. As a result, many human pathogens can infect great apes and many have the capacity to cause individual death or threaten whole communities or populations.

Examples of cases of likely or proven human-to-great ape disease transmission include respiratory disease, human herpes simplex virus, polio -like disease, a measles-like disease, scabies, and enteric helminths and protozoa. Close proximity between great apes and people is known to promote transmission of bacteria such as *Escherichia coli*, *Salmonella* and *shigella*, and chimpanzees living close to humans have been shown to harbour gastrointestinal *E. coli* that are resistant to multiple antibiotics used by people (Ref. 21-29).

Ebola is considered a major threat to chimpanzees. The virus is more deadly for great apes as it is for humans, with mortality rates approximately 77% for chimpanzees (*Pan troglodytes*).

21.5.4.3.10 Nahan's partridge

Current condition

Nahan's Partridge (*Ptilopachus nahani*) is a globally EN and nationally VU species and has been defined in the CHA as a Criterion 1, Tier 1 Critically Endangered or Endangered Species and Criterion 2 (Tier 1 and 2) Endemic/Restricted Range Species.

It is known from a few localities in the eastern DRC in central and western Uganda in Budongo, Bugoma and Mabira Forest Reserves. Bugoma supports a high density of this partridge and the local population has remained stable since the 1990s. The species is known from very few locations worldwide and Budongo-Bugoma forests could hold 50% or more of the global population (see Uganda Red List, 2016) (Ref 21-30). Budongo-Bugoma forests together corresponds to Landscape Context D (tropical high forest).

It is a strict forest specialist but may be found in logged or unlogged areas. Main threats are therefore from forest clearance, habitat fragmentation and poaching.

It is highly territorial and breeds throughout the year, though mainly towards the beginning of the rainy season (March/April approximately). Most nests are placed on the ground between the buttresses of large trees (Ref. 21-23).

Trends and issues

Recent surveys estimated the population in Uganda to be 44,038 is fairly common in Budongo Forest. The species' range is in decline throughout its highly fragmented distribution (Ref. 21-23).

21.5.4.4 Summary of VEC Status, Sensitivity and Threshold

Table 21-14 provides a summary of the VEC status, sensitivity and threshold.

Table 21-14: Summary of Trends, Sensitivity and Threshold for Critical and Natural Habitat and Key Indicator Species

Indicators	Current status/trend without development	VEC sensitivity	VEC threshold
Rothschild's Giraffe	Globally EN and Nationally VU. Currently c. 1,400 individuals increasing gradually.	High	No change in conservation status or decline in species populations of key indicators species for all landscape contexts.
Lelwel Hartebeest	Globally EN and Nationally NT. Currently c.10,000 within the MFPA with increasing population	High	
African Elephant	Globally VU and Nationally CR. Currently c1,200 in MFPA which represents 10% of elephant population in the 1960. Population is increasing slowly.	High	
Uganda Kob	Globally LC (not included in Uganda Red List). However, included under PS6 Criterion 3 (Congregatory Species). Population within MFPA is approximately 120,000 and increasing.	High	
Lion	Lion is globally VU and nationally CR. Within the MFPA the population is estimated at around 250 individuals, with a suggested declining population.	High	
Vultures	Five species, mostly globally CR and nationally CR or EN. Where known, population numbers are 1000 or less for all species, in some cases considerably lower.	High	
Endemic fish (species)	Includes nine species of mainly Haplochromis sp. Defined under PS6 Criterion 2. Lake Albert holds approximately 50% of the global population of these species (Ref. 21-30). Trends are unknown but are likely to be declining due to overfishing of Lake Albert.	High	
Shoebill	Globally VU and nationally EN. Ugandan population is 100-150 with perhaps 40 in MFNP.	High	
Chimpanzee	Globally EN and Nationally N. Ugandan population is less than 5,000. Numerous threats to habitats and populations.	High	
Nahan's Francolin	Globally EN and nationally VU. Approximately 44,000 individuals in Uganda but likely to be decreasing due to habitat loss.	High	

21.5.4.5 Cumulative Impacts on VEC

Table 21-15 to Table 21-19 below provide an assessment of the potential cumulative effects on the VEC. Separate assessments have been provided for each landscape context considered in the assessment.

Table 21-15: Assessment of Potential Cumulative Impacts: Key Indicator Species within Landscape Context A MFPA

Tilenga Project Potential Impacts (Direct and Indirect)	Project's residual impact significance	Other developments and activities also affecting VEC and potential cumulative impacts	Magnitude of potential impact	Sensitivity	Significance
Loss or degradation of species habitats as a result of direct impacts	Low to moderate significant long-term effects	Site preparation and construction of the Tilenga Feeder Pipeline, Tilenga 132kv transmission line, UNRA road upgrades and the extension to the Tilenga Project is expected to result in direct loss of habitat and associated habitat degradation within MFPA.	Moderate	High	High adverse
Disturbance as a result of construction or operation of development, including increased traffic	Low to moderate significant long-term effects	The construction of five hydroelectric power developments (four within MFNP on the Victoria Nile), along with associated access roads and transmission lines, will further result in direct loss of habitat and likely changes to adjacent habitats resulting in degradation of habitat quality. Tourism development, while small in scale, may also result in direct habitat loss within MFPA.			
Barrier impacts caused by construction or presence of development	Low to moderate significant long-term effects	In addition, large scale projects will potentially create barrier effects within MFPA, either through creating physical barriers (such as flooding and widening sections of the Victoria Nile) or by creating corridors where vehicle movements deter animals from crossing from one side to the other.			
Loss, degradation or fragmentation of species habitats as a result of indirect impacts linked to influx	Moderate significant long-term effects	<p>These developments will impact key species associated with this landscape context (e.g. elephant, Rothschild's giraffe, Uganda kob, Lelwel's hartebeest and lion).</p> <p>In addition to potential direct physical impacts, construction of the hydroelectric power projects which occur at the same time as the Project could increase the disturbance to key species within MFNP, potentially disrupting their seasonal movements (e.g. prevent animals accessing or using their preferred habitats in the dry season when nutritional food and water are scarce).</p> <p>In addition, to potential direct impacts, other developments will have potential indirect impacts on MFPA. The extension to the Tilenga Project, UNRA roads upgrades and hydroelectric power projects are likely to generate indirect effects on MFPA by improving access within the region and allowing more people to travel to areas that were previously more inaccessible.</p> <p>During construction, the hydro-electric power projects will further attract people to the region in search of economic opportunities. This will exacerbate the Project's effects with respect to increased human settlement and land-use change adjacent to MFPA, increasing demand for wood fuel and increasing fire risks, leading to habitat loss and degradation.</p>			

Tilenga Project Potential Impacts (Direct and Indirect)	Project's residual impact significance	Other developments and activities also affecting VEC and potential cumulative impacts	Magnitude of potential impact	Sensitivity	Significance
		<p>As a result of influx, the likely increase in poaching will impact on several species within MFPA (e.g. Uganda kob, Lelwell hartebeest) as well as larger species that are not directly targeted by poachers, such as giraffe, but which are often caught in these snares and suffer severe injuries to limbs and even death. Particularly at risk from poaching activities will be the small translocated population of Rothschild's giraffe on the southern bank of the Nile, which currently number less than 20 individuals.</p> <p>Furthermore, this disturbance may impact on the movement and density of key prey species (e.g. Uganda kob, Lelwell hartebeest and giraffe) for predators such as lion, resulting in insufficient prey availability within certain areas. This could cause lion to shift their territory, bringing them into conflict with other prides, resulting in injuries or even death, especially among males and young.</p> <p>One of the lions' pride occupies habitat within the south west delta area and Bugungu Wildlife Reserve that may be threatened by impacts from the Tilenga feeder pipeline, which passes through this pride's territory. Disturbance and habitat loss and degradation during site clearance and construction may cause this pride to shift their territory into MFNP bringing them closer to and into conflict with the Pride on the southern bank of the Nile.</p> <p>As more people settle in the area, there will be further land-use change. It is likely that some livestock will browse close to the borders of the Park. This may attract predators such as lion, resulting in increased human-wildlife conflict incl. poisoning for loss of wildlife, leading to increased lion mortalities.</p> <p>There could be an increased risk of fire, either from poachers or by accident (e.g. discarded cigarette), as more people pass through the landscape.</p> <p>There is a risk that the potential cumulative impacts on MFPA will mean that threshold will not be met, or will be exceeded, and the sustainability of the VEC is therefore threatened.</p>			

Table 21-16: Assessment of Potential Cumulative Impacts: Key Indicator Species within Landscape Context B Savanna Corridor

Tilenga Project Potential Impacts (Direct and Indirect)	Project's Residual impact significance	Other developments and activities also affecting VEC and potential cumulative impacts	Magnitude of potential impact	Sensitivity	Significance
Loss or degradation of species habitats as a result of direct impacts	Low significant long-term effects	The extension to the Tilenga Project, the Tilenga feeder pipeline, EACOP pipeline, and Kingfisher pipeline, Kabaale Refinery and Industrial Park, and certain UNRA road upgrades will be constructed within savanna corridor. This landscape context is associated with key species such as African elephant, Uganda kob and vultures.	Moderate	High	High adverse
Disturbance as a result of construction or operation of development, including increased traffic	Low to moderate significant long-term effects	These projects are expected to result in direct loss of savanna habitat and associated degradation (reductions in habitat quality). There will also be a potential increase of risk of fire during site clearance and construction phases. These developments could therefore impact key species associated with this landscape context (e.g. vultures, elephant, Uganda kob, lion).			
Barrier impacts caused by construction or presence of development	Low to moderate significant long-term effects	The projects may increase disturbance of these species particularly during construction. Disturbance will include creation of temporary barrier effects during pipeline construction.			
Loss, degradation or fragmentation of species habitats as a result of indirect impacts linked to influx	Moderate significant long-term effects	<p>In addition, the UNRA roads and other un-buried linear infrastructure will create permanent barrier effects, as well as on-going disturbance from vehicle movements on roads.</p> <p>Elephants, in particular, could be significantly affected as these developments are expected to impact on elephant's use of migratory corridors within these savanna areas, in order to move between habitats (e.g. MFNP and Queen Elizabeth National Park). If this migratory route is blocked it could be significant in terms of the long-term viability of this migratory species.</p> <p>With regard to potential indirect impacts, the UNRA roads will improve access within the region and allow more people to travel to previously isolated areas. This will further exacerbate the Project's potential indirect effects with respect to increased human settlement and land-use change, increased demand for wood fuel, increased fire risks, leading to habitat loss and degradation.</p> <p>Potential cumulative impacts related to in-migration to the region will lead to more people inhabiting the region, which could result in increased disturbance (visual and noise), and increased poaching.</p> <p>A pride of lions is known to occupy a territory within the south west delta area and Bugungu Wildlife Reserve. Disturbance, habitat loss and degradation and loss of prey</p>			

Tilenga Potential Impacts (Direct and Indirect)	Project's Residual impact significance	Other developments and activities also affecting VEC and potential cumulative impacts	Magnitude of potential impact	Sensitivity	Significance
		<p>species during site clearance and construction of other developments (e.g. Tilenga feeder pipeline) may cause this pride to shift their territory into MFNP bringing them closer to and potentially in conflict with the pride of lions occupying the southern bank of the Nile.</p> <p>As more people settle in the wider area, this may impact on habitats and populations of wild ungulates, leading to a reduction in availability of carrion. This will impact on scavenging birds of prey, such as Rüppell's vulture, hooded vulture and white-headed vulture.</p> <p>As more people settle in the area and keep livestock, the risk of human-wildlife conflict is likely to increase, if livestock are lost to predators. This may also lead to increased indirect poisoning of vultures as a by-product of poisoning of lion and other predators.</p> <p>There is a risk that the potential cumulative impacts on savanna corridor habitats will mean that the threshold will not be met, or will be exceeded, and the sustainability of the VEC is therefore threatened.</p>			

Table 21-17: Assessment of Potential Cumulative Impacts: Key Indicator Species within Landscape Context C Lake Albert, Rivers and Wetlands

Tilenga Project Potential Impacts (Direct and Indirect)	Project's Residual impact significance	Other developments and activities also affecting VEC and potential cumulative impacts	Magnitude of potential impact	Sensitivity	Significance
Loss or degradation of species habitats as a result of direct impacts	Low significant long-term effects	The construction of a cascade system of major hydroelectric power developments on the Nile River (four of which are within MFNP) may impact significantly on the Victoria Nile River, causing changes to water flow and geomorphology of the river, and consequential impacts on the downstream Ramsar site. It should be noted however that the Project will not itself contribute significantly to these same types of impacts.	Moderate	High	High adverse
Disturbance as a result of construction or operation of development, including increased traffic	Low to moderate significant long-term effects	Where sediment balance changes downstream of Murchison Falls, this may result in loss of delta reed-bed habitat upon which birds, such as shoebill, are dependent. In addition, there may be water quality (or water level) caused by construction or operation of these upstream hydroelectric project resulting in changes that affect habitats, particularly spawning areas, used by endemic fish.			
Barrier impacts caused by construction or presence of development	Low to moderate significant long-term effects	Such impacts on particular receptors may be cumulative with Project related impacts on the same receptors.			
Loss, degradation or fragmentation of species habitats as a result of indirect impacts linked to influx	Moderate significant long-term effects	<p>The Tilenga feeder pipeline and certain UNRA roads will be constructed close to Lake Albert shoreline, near Buliisa. The construction phase of these developments, together with the activities of the Tilenga Project is unlikely to have direct impacts on receptors associated with this landscape context. However, there may be potential indirect impacts resulting from improved access leading to population influx to the region, which could lead to an increase demand for natural resources including fish, plant fibres, thatching, fuel and land.</p> <p>The increased presence of people in wetland areas will, in addition to increasing pressure on natural resources also likely to increase disturbance of animals including birds by displacement of foraging and breeding birds and/or abandonment of Shoebill nests from the area.</p> <p>In addition, influx is likely to lead to resource demands and this may then exacerbate the potential risks of unsustainable fishing practices (see Lake Albert Fisheries below).</p> <p>There is therefore a risk that the potential cumulative impacts on Lake Albert, rivers and wetlands will mean that the threshold will not be met, or will be exceeded, and the sustainability of the VEC is therefore threatened.</p>			

Table 21-18: Assessment of Potential Cumulative Impacts: Key Indicator Species within Landscape Context D Tropical High Forests

Tilenga Project Potential Impacts (Direct and Indirect)	Project's residual impact significance	Other developments and activities also affecting VEC and potential cumulative impacts	Magnitude of potential impact	Sensitivity	Significance
Disturbance as a result of construction or operation of development, including increased traffic	Low to moderate significant long-term effects	<p>The UNRA roads upgrades are expected to lead to localised direct habitat loss and degradation and therefore impact directly on Budongo CFR. The Tilenga feeder pipeline, EACOP pipeline, and Kingfisher pipeline, Kabaale Industrial Park and Refinery will be constructed near tropical high forests (e.g. Bugoma Forest Reserve, Wambabya CFR) that have populations of chimpanzees. and Nahan's partridge.</p> <p>Chimpanzees inhabiting Bugoma and Wambabya Forest Reserves also use the mixed subsistence farming landscape, in particular the cultivated corridors between the two forests. This currently puts them in direct conflict with local farming communities, as they regularly raid their crops. The site clearance and construction phases of the EACOP may create a temporary barrier between these two forests, due to increased human presence, traffic and noise, which may indirectly impact on the ranging of both populations of chimpanzee.</p>	Moderate	High	High adverse
Barrier impacts caused by construction or presence of development	Low to moderate significant long-term effects	<p>Many smaller CFRs in the Masindi Area will be indirectly impacted by the UNRA roads and multiple other developments such as agricultural and industrial developments, and the small scale power project near Hoima. These developments are expected to attract people to the area looking for economic opportunities and this will result in land-use change, degradation, and more people moving through forest areas, and subsequently increased fire risk, wood fuel collection and poaching.</p> <p>In addition, influx into the area is expected to lead to more settlement and land-use change, further increasing human-wildlife conflict and potential increase in poaching for chimpanzees (e.g. around Bugoma & Wambabya).</p> <p>Nahan's partridge nest on the ground between the buttresses of large trees are easily poached by hunters and are vulnerable to fire and habitat loss. If the larger trees are cut down this could impact on their breeding behaviour and the success rate of clutches. Developments will further indirectly impact on populations of chimpanzees and Nahan's partridge through increased disturbance, barrier effects and increased poaching and wood fuel collection.</p> <p>There is a risk that the potential cumulative impacts on tropical high forests will mean that the threshold will not be met, or will be exceeded, and the sustainability of the VEC is therefore threatened.</p>			
Loss, degradation or fragmentation of species habitats as a result of indirect impacts linked to influx	Moderate significant long-term effects				

Table 21-19: Assessment of Potential Cumulative Effects: Key Indicator Species within Landscape Context F Mixed Landscape Habitats

Tilenga Project Potential Impacts (Direct and Indirect)	Project's residual impact significance	Other developments and activities also affecting VEC and potential cumulative impacts	Magnitude of potential impact	Sensitivity	Significance
Loss or degradation of species habitats as a result of direct impacts	Low significant long-term effects	The extension to the Tilenga Project, the Tilenga feeder pipeline, EACOP pipeline, and Kingfisher pipeline and UNRA road upgrades may impact on two landscape species, African Elephant and Chimpanzee, which are wide-ranging across several ecosystems and in Modified Habitat. These may be direct impacts caused by localised habitat loss, disturbance particularly during construction and also barrier effects during construction of pipelines and roads, as well as during operation of the UNRA roads.	Moderate	High	High adverse
Disturbance as a result of construction or operation of development, including increased traffic	Low to moderate significant long-term effects	In addition, the UNRA roads, the railway and smaller developments such as agricultural and industrial developments are expected to attract people to the area looking for economic opportunities and this will result in land-use change, degradation, and more people moving through forest areas, and subsequently increased fire risk, wood fuel collection and poaching. These will be indirect impacts.			
Barrier impacts caused by construction or presence of development	Low to moderate significant long-term effects	Chimpanzees inhabiting Bugoma and Wambabya Forest Reserves also use the mixed subsistence farming landscape, in particular the cultivated corridors between the two forests. This currently puts them in direct conflict with local farming communities, as they regularly raid their crops.			
Loss, degradation or fragmentation of species habitats as a result of indirect impacts linked to influx	Moderate significant long-term effects	<p>The site clearance and construction phases of the EACOP may create a temporary barrier between these two forests, due to increased construction traffic and noise, which may indirectly impact on the ranging of both populations of chimpanzee.</p> <p>Influx into the area is expected to lead to more settlement and land-use change further increasing human-wildlife conflict and potential killing of chimpanzees.</p> <p>Elephants are a migratory species that inhabit and traverse several landscapes. Their long-term viability depends on their ability to move between different habitats during varying seasons. The potential cumulative impacts of these developments may impair the ability of elephants to migrate to favourable habitats when required.</p> <p>There is a risk that the potential cumulative impacts on key species within mixed landscapes habits will mean that the threshold will not be met, or will be exceeded, and the sustainability of the VEC is therefore threatened.</p>			

21.5.5 Climate Change Linked to Carbon Emissions

21.5.5.1 Description of VEC

This VEC concerns climate change as a result of greenhouse gas (GHG) emissions and carbon stocks.

21.5.5.2 Study Area for CIA

The Study Area for this VEC is the emission sources within the Project Aol. The impacts are global and set within a national context.

21.5.5.3 Indicators of Baseline Conditions

21.5.5.3.1 GHG emissions per capita

Current conditions

The average CO₂ emissions per capita in Uganda was 01.36 tCO₂e in 2014 (Ref 21-31). Uganda has one of the lowest greenhouse gas emissions per capita in the world and far below the global average of approximately 7.99 tons per capita. In 2014, Uganda's total emissions were approximately 59.92 MtCO₂e per year (0.1% of world total). No data is available for GHG emissions specific to the Project Aol.

Trend and issues

Uganda's GHG emissions grew by over 50% from 1990 to 2012 (Ref 21-32). According to Uganda's Intended Nationally Determined Contribution (INDC, 2015) (Ref-21-33) the business-as-usual (BAU) scenario estimated that emissions in 2030 will rise to 77.3 MtCO₂e per year. However, the INDC proposes policies and measures for each priority sector that is claimed would result in approximately 21% reduction of national greenhouse gas emissions in 2030 compared to BAU.

21.5.5.3.2 Agricultural practices

Current conditions

Agriculture was a major source of GHG emissions in 2014, accounting for 24 MtCO₂e (approximately 40% of the national total). According to the Second National Communication (SNC) to the United Nations Framework Convention on Climate Change (UNFCCC) (Ref. 21-34) activities that drive agriculture sector emissions are livestock production, inefficient animal waste management systems under pasture range and paddock, and the cultivation of organic soils. Paddy rice production and use of nitrogen fertilizers are also contributors.

Trends and issues

Agriculture as a source of GHG grew by an average of 4% per annum between 1990 and 2012. The SNC identifies activities that would reduce agriculture emissions, including intensive livestock management systems using improved breed quality and improved feed, fodder and pasture quality that is more digestible; adoption of manure management practices including biogas production and utilization; adoption of minimum tillage practices on cultivated land (including organic soils); and increased use of fertilizer accompanied by precision planting techniques to enhance efficiency.

21.5.5.3.3 Land use change and forestry (LUCF)

Current conditions

LUCF is the most significant source of GHG emissions in Uganda accounting for approximately 25.81 MtCO₂e (43.1% of total emissions) in 2012 (Ref.21-31). SNC's 2010 analysis of land use trends showed forested land to be decreasing while crop land and bush were increasing. Forest degradation was highest outside of protected areas and in areas where agriculture expanded. Fires were also a major source of degradation of land cover, with fires commonly seen in northern Uganda. Direct drivers of deforestation and forest degradation are subsistence agriculture and biomass extraction for timber,

charcoal, and commercial fuel wood. Commercial farms, infrastructure, and urban development are increasingly reducing forest cover in some areas of Uganda.

Trends and issues

The LUCF sector is expected to remain a net emitter through the 2030s, although the SNC notes that with interventions, the sector could become a major sink as early as 2025. The INDC states that the proposed afforestation measures will reverse the trend of deforestation and convert the LUCF sector from a source of net emissions under business-as-usual to a source of net removals.

As described in Section 21.5.6 below, the supply of woody biomass is declining across the Project Aol. Declines in supply are reflected in the area of forest, woodland, and wooded grassland in the Project Aol, which decreased by 89,444ha between 2007 and 2013. It is anticipated that these decreases will continue over the medium-term.

21.5.5.3.4 Energy

Current conditions

In 2014, energy accounted for approximately 8.54 MtCO₂e (approximately 14.3 % of total emissions) (Ref. 21-31)). Approximately 93% of Uganda's energy needs are met by biomass, which is used by households and small-scale industries. With 12% of the population connected to the power grid, electricity consumption accounts for only 1% of energy use, and the remaining 6% of energy needs are met by oil.

Trends and issues

The SNC in 2010 projected that transportation would be the largest driver of growth in energy sector emissions through 2035. The INDC energy sector measures propose to increase the amount of renewable energy capacity by at least 1,100 Mega Watts compared to BAU by 2030, generating an estimated 4.6 - 5.2 Terawatts (TWh) more than in the BAU case. Technologies include hydro, solar, biomass and geothermal.

The SNC identified petroleum and gas as playing a major role in economic development, which is projected to increase emissions after 2020. The construction of a refinery, instead of exporting crude oil, will allow the country to reduce import of refined petroleum products. Increased domestic consumption would likely affect future GHG intensity.

21.5.5.3.5 Industry and waste

Current conditions

In 2014, GHG emissions in Uganda from the industrial and waste sectors accounted for 1.08 MtCO₂e (1.8 % of total emissions) and 0.49 MtCO₂e of GHG (0.8% of total emissions) respectively (Ref 21-31).

Trends and issues

While a relatively small percentage of total national GHG emission, the industrial sector is one of fastest growing sources of GHG in Uganda.

21.5.5.3.6 Indicators of climate change

Current conditions

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. The majority of Uganda experiences a double rainy season. Generally, the long rains occur March to June whilst the short rains occur October to November. However, Northern Uganda and specifically the Project Area has unique pattern with the rains running March to November the primary peak being April/May.).

Trends and issues

Climate change projections at a country level can be summarised as follows:

- Temperature: Average temperatures in Uganda have risen by about 1.3°C since 1960 and are projected to increase by 1°C by the 2030s compared to the 1970-1999 average;
- Precipitation: Annual rainfall has decreased at a rate of about 3.5% per decade since 1960, with the greatest reductions during the long wet season between March and November. Projections of rainfall in Uganda are uncertain, ranging from a decrease of 7 percent to an increase of up to 14 percent by the 2030s compared to the 1970-1999 observed average; and
- Uganda has experienced an increase in the frequency and intensity of droughts and floods in recent decades. Droughts have been experienced in the Project Aol over the last two years. The percentage of rainfall coming in the form of heavy precipitation events is anticipated to increase.

21.5.5.4 Summary of VEC Status, Sensitivity and Threshold

Table 21-20: Summary of VEC status, sensitivity and proposed threshold Climate Change Linked to Carbon Emissions

Indicators	Current status/trend without development	VEC sensitivity	VEC threshold
GHG emissions per capita	Uganda has one of lowest per capita GHG emission in the world. Total GHG emissions are predicted to increase over the next 30 years but remain low in comparison to the global average.	Moderate	No increase emissions above INDC targets.
Agricultural sector	The agricultural sector is a major source of GHG emissions and it is expected that this will continue over the next 30 years.		
LUCF	LUCF is a major contributor to GHG emissions. Within the Project Aol there has been a significant loss of woodland. LUCF is predicted to continue to be a net contributor but if could become a net sink with the implementation following proposed INDC activities.		
Energy	Energy currently amounts for approximately 14 % of GHG emissions and this is likely to grow, driven by traffic growth and industrialisation. Proposals for renewable energy may reduce the rate of growth from this sector.		
Industrial and waste	Industry and growth account for very small percentages of GHG emissions but industrial emissions are likely to increase in importance in line with economic growth.		
Climate change indicators	Climate indicators point to changes in climate nationally and within the Project Aol, with droughts being experienced in recent years. Changes in temperature, perception and the occurrence of extreme weather events are predicted to increase.		

21.5.5.5 Cumulative Impacts on VEC

Table 21-21 presents the potential cumulative impacts on the VEC.

Table 21-21: Assessment of Potential Cumulative Impacts: Climate Change Linked to Carbon Emissions

Tilenga Project Potential Impacts (Direct and Indirect)	Project's residual impact significance	Other developments and activities also affecting VEC and potential cumulative impacts	Magnitude of potential impact	Sensitivity	Significance
<p>Loss of carbon stocks due to clearance of vegetation and stripping of soils.</p> <p>Project related emissions from construction and operational activities including embodied carbon, transport, fuel consumption and energy generation.</p>	<p>Low adverse</p>	<p>Larger scale developments including the improved roads, extension to the Tilenga Project, the Industrial Park and Refinery, major hydropower projects, transmission lines, agricultural developments, will cumulatively result in large areas of vegetation loss or degradation (including areas of woodland) and therefore a considerable loss of carbon stocks. The extent of loss is not known but the loss from major hydro projects alone would be measures in 10s of square kilometres. Indirect effects associated with influx and population change will lead to further land use change and could result in forest loss /degradation at a regional level (see Sustainable Woodland below).</p> <p>Direct emission of GHGs will result from the construction and operation of industrial infrastructure including the refinery. The improvement of roads, combined with economic development and influx are expected to lead to greater transport related emissions of GHGs and increased demand for energy.</p> <p>Hydropower projects would potentially offset carbon emissions at a national level and assist in providing alternative energy sources helping to reduce demand for biomass collection. Other power generation projects (including surplus power exported by the Project) combined with improved grid infrastructure would also provide alternative energy sources to urban centres including Hoima.</p> <p>Based on the effects of the loss of carbon sinks and direct and indirect GHG emissions from cumulative development, there is a risk that threshold will not be met, or will be exceeded, and the sustainability of the VEC is therefore threatened.</p> <p>Taken together, and accounting for the large installed capacity of renewable energy proposals and transmission line upgrades, and the very low per capita rate of GHG emissions, there is a reduced risk that the potential cumulative effect of these developments will threaten the sustainability the VEC.</p>	<p>Low/ Moderate</p>	<p>Moderate</p>	<p>Low adverse/ Moderate adverse</p>

21.5.6 Sustainable Woodland

21.5.6.1 Description of VEC

Woodlands, wooded grasslands and thickets, and tropical high forests supply the majority of woody biomass in the Project Aol. This woody biomass is used as a fuel, food, and building material, and also provides certain traditional medicines. In addition, woodlands and/or individual trees frequently have spiritual and/or cultural value to local people. Woodlands and woody biomass are therefore an important feature of the Project Aol, with high levels of dependence on woody biomass as a fuel in particular.

21.5.6.2 Study Area for VEC

The Study Area for this VEC is wooded areas within the Project Aol.

21.5.6.3 Indicators of Baseline Conditions

21.5.6.3.1 Supply and demand of woody biomass

Current condition

Treweek et al. (Ref. 21-36) provide yield figures for the following habitat types:

Table 21-22: Annual yield of woody biomass from different habitat types in Aol

Habitat	Standing stock (tonnes)	Annual yield (tonnes)
Tropical high forest	29,944,544	1,356,153
Woodland	17,980,917	2,194,656
Riverine forest	2,584,624	191,763
Scrub/thicket	1,808,260	67,404
Wooded grassland	1,455,314	160,203
Subsistence farmland	1,210,913	523,044
Planted forest	108,044	14,820
Total	55,102,616	4,508,043

Trends and issues

Treweek et al. suggest that:

- The supply of woody biomass is declining across the Project Aol. Declines in supply are reflected in the area of forest, woodland, and wooded grassland in the Project Aol, which decreased by 89,444ha between 2007 and 2013. It is anticipated that these decreases will continue over the medium-term;
- Demand for woody biomass 'exceeded the theoretical total annual yield from all ecosystems that supply woody biomass outside of protected areas' in 2014 (Ref. 21-36). It is anticipated that this trend will have continued since 2014. Demand for woody biomass will therefore exceed the rate at which woody ecosystems can regenerate and is ultimately unsustainable; and
- Assuming that wooded ecosystems continue to decline in area at the same rate as they did between 2007 and 2013, and assuming population growth of ~4% per year at existing trends, the supply of woody biomass in the Project Aol will decline to zero by 2028.

21.5.6.3.2 Uses of woody biomass

Current conditions

Statistics relating to the uses of woody biomass by local people in the Project Aol suggest that:

- Wood is the primary fuel for cooking and heating in the majority of rural households. Electricity is generally unaffordable for these households and there is no grid connection;
- The other major cooking and heating fuel in the Project Aol is charcoal, which is also produced from woody biomass;
- Figures on the proportion of households that use charcoal and fuelwood in the Project Aol are limited to Hoima District (respectively 32% and 57% of households). However, it is possible to draw an analogy to the Project Aol with national-level statistics, which are likely to be comparable. Thus, at a national-level, woodfuel (charcoal and firewood) and agricultural wastes account for 93% of energy consumption, while 95% of wood supply goes toward energy consumption.

Trends and issues

Given the dependence of local people on woody biomass, only the widespread introduction of another energy source is likely to lead to a decrease in wood harvesting rates. As the emergence of alternative energy sources is considered unlikely in the short- to medium-term, it is anticipated that over-harvesting of woody biomass will continue in the foreseeable future.

21.5.6.3.3 Quantity of charcoal production and market price of charcoal

Current conditions

Charcoal is used as a cooking fuel by people living within the Project Aol, and is produced by burning wood in anoxic conditions.

The ecosystem service baseline surveys (see **Chapter 19: Ecosystem Services**) suggests that a mango tree approximately ten metres high can produce 8 to 20 bags of charcoal ranging in weight from 20kg to 50kg.

Estimates of prices per bag vary. However, most data suggest that a bag costs between UGX20,000-21,000, although the weight per bag at this price ranges from 20kg to 50kg. Annual income from charcoal production ranges between UGX200,000 and UGX400,000, suggesting annual charcoal production of at least 20 bags.

Charcoal production is an important livelihood in the Project Aol. In particular, it is a livelihood of 'last resort' that is a good cash generator and valuable in emergencies (e.g. payment of school fees).

Trends and issues

Given its importance to local incomes, rates of charcoal production are anticipated to continue at a similar or elevated level in the medium-term. Although estimates of the current rate of charcoal production are not available, it is likely that they are contributing to over-harvesting in the Project Aol. For instance, local people noted that they were travelling further than they had in the past to find trees suitable for charcoal production, a consequence of cutting down too many trees (See **Chapter 19: Ecosystem Services**).

21.5.6.4 Summary of VEC status, sensitivity and proposed threshold

Table 21-23: Summary of VEC Status, Sensitivity and Threshold for Sustainable Woodland

Indicator	Current status/trend without development	VEC sensitivity	VEC threshold
Supply of and demand for woody biomass	The supply of woody biomass is declining across the Project Aol. Declines in supply are reflected in the area of forest, woodland, and wooded grassland in the Project Aol, which decreased by 89,444ha between 2007 and 2013. This supply-demand imbalance is unsustainable.	High	No reduction in the area of woodland and wooded grassland.
Uses of woody biomass	Wood is the primary fuel for cooking and heating in the majority of rural households in the Project Aol. Electricity is generally unaffordable for these households and/or there is no grid connection available. Given the dependence of local people on woody biomass, it is anticipated that over-harvesting of woody biomass will continue for the foreseeable future.		
Quantity of charcoal production and price	Charcoal is used as a cooking fuel in the Project Aol. Rates of charcoal production are anticipated to continue at similar or higher levels in the medium-term.		

21.5.6.5 Cumulative Impacts on VEC

Table 21-24 presents the potential cumulative impacts on the VEC

Table 21-24: Assessment of Potential Cumulative Impacts: Sustainable Woodland

Tilenga Project Potential Impacts (Direct and Indirect)	Project's Residual impact significance	Other developments and activities also affecting VEC and potential cumulative impacts	Magnitude of potential impact	Sensitivity	Significance
<p>Increased demand for timber and woody biomass due to influx</p> <p>Improved access to areas of woodland</p>	<p>Low adverse</p>	<p>Other oil and gas related developments (the extension to the Tilenga Project, EACOP, Kingfisher Field, Kabaale Industrial Park, Kaiso-Tonya Field, UNRA roads, and waste management) as well as non-oil and gas developments (agricultural developments, and industrial developments) have the potential to contribute to influx into rural areas. In addition it is expected to contribute to influx to main urban centres within the region particularly Hoima town, Masindi town, Biiso town, Buliisa, and Pakwach town. The higher level of population growth triggered by potential cumulative effects with other developments has the potential to lead to an increase in the harvesting and woody biomass. In addition to areas outside of protected areas, this may increase the prevalence of such collection in protected areas such as MFPA and the protected areas in the vicinity of Hoima.</p> <p>Access enhancements facilitated by UNRA's roads, oil developments and development of other infrastructure and agricultural projects has the potential to lead to an increase in the number of people being able to access previously more difficult-to-reach areas of woodland, with associated increases in the collection of timber and woody biomass in these previously underutilised areas.</p> <p>The potential cumulative impacts of oil developments and development of other infrastructure and agricultural projects, including associated with road enhancements, new access routes and project rights of way may lead to direct impacts on key woodland corridors in the area. This has the potential to lead to the fragmentation of woodland connections, undermining the ability of key areas of woodland to regenerate.</p> <p>In consideration of the existing baseline trend, there is a high risk that the potential cumulative effect of these impacts on woodland will mean that the threshold will not be met, or will be exceeded, and the sustainability of the VEC is therefore threatened.</p>	<p>Moderate</p>	<p>High</p>	<p>High adverse</p>

21.5.7 Bushmeat

21.5.7.1 Description of VEC

Bushmeat is an important source of food and income in the Project Aol. However, it is sourced illegally by hunters operating within MFPA and other protected areas; their activities threaten a number of game animals, including several species of conservation concern. It is also a threat to nature-based tourism, whose continued viability depends on an abundance of game animals within MFPA and visitors' perception of wildlife conservation. There is therefore a tension between the beneficiaries of nature-based tourism, who are adversely affected by hunting, and people who consider the supply of bushmeat as a priority source of food and/or income.

21.5.7.2 Study Area for VEC

The Study Area for this VEC is the Project Aol affected by bushmeat collection with a focus on MFPA.

21.5.7.3 Indicators of Baseline Conditions

21.5.7.3.1 Poaching statistics

Current condition

The UWA's General Management Plan (Ref. 21-37) suggests that poaching is concentrated around MFPA, especially along the Murchison Falls-Albert Delta Ramsar site and the banks of the Albert Nile. The UWA's Community-Based Wildlife Crime Prevention Action Plan (Ref. 21-38) highlights that 40% of households are estimated to have hunted for commercial purposes at least once in 2015, increasing to over 50% in Purongo sub-county and parts of Kiryandongo district. This proportion reflects other studies undertaken in the area which have suggested that 35 per cent of households had been involved in subsistence hunting and 42 per cent in commercial hunting (Ref. 21-39). Illegal hunting may threaten the ongoing recovery of the game animals, whose numbers have generally steadily increased since dramatic declines in the 1970s.

Trends and issues

During interviews completed as part of the ESIA (See **Chapter 19: Ecosystem Services**), mixed views were provided about the future of hunting and its importance to local communities. Most FGD participants believed that it was easier to find and kill animals five years ago than it is today, and that the situation would continue to worsen.

Hunting is also under pressure from anti-illegal hunting activities by UWA. Hunting is an illegal activity in the MFNP which is seen as one of the key threats affecting the integrity of in the Park. Illegal hunting for both bushmeat and ivory in the National Park has increased recently (Ref 21-38), and is anticipated to continue rising as demand for bushmeat and ivory grow. In addition, illegal hunting has transformed from subsistence to a professional, commercially-focused activity, which increases the threat it poses to wild animal populations.

21.5.7.3.1.1 Household statistics

Current conditions

Figures from Treweek et al. (2015) (Ref.21-36) suggest that approximately 1/3 of households in the region eat bushmeat, and that within these households people prefer eating bushmeat compared to fish or livestock meat. In addition, there is a strong cultural attachment to bushmeat even though bushmeat is not an essential source of protein in local people's diets.

Trends and issues

- These preferences suggest that demand for bushmeat is unlikely ever to decrease in a meaningful way in the Project Aol. Indeed, there will be a 'base' level of demand – and therefore a 'base' level of illegal hunting - which will continue in the short- to medium-term at least; and

- Bushmeat demand is likely to grow as a result of in-migration and population growth. Hunting pressure will increase to meet this demand, and may be facilitated by improvements to the road network brought about by Project activities and associated facilities.

21.5.7.3.2 Price of bushmeat

Current condition

Interviews completed as part of the ESIA (See **Chapter 19: Ecosystem Services**), indicate that the price of meat per kilogram fluctuates in local markets in Wanseko, Buliisa and Kigwera and ranged between UGX 6,000 to 8,000. The most expensive meat, hippopotamus, fetches very high prices, with a small hippopotamus worth up to UGX1 million, which is comparable to a small to medium sized Ankole cow. The high price of hippopotamus meat seems to be a result of its scarcity and popularity.

Trends and issues

The study *An Analysis of Socio-Economics of Bushmeat Hunting at Major hunting Sites in Uganda* (Ref 21-40) provides prices for a wide range species. This includes 1,883 UGX per kg for Uganda kob, 1,700 UGX per kg for elephant, 3,400 UGX per kg for giraffe and 2,867 UGX per kg for hartebeest. Although there is no standard unit of measurement the figures suggest that prices of bushmeat have risen sharply since 2009.

21.5.7.3.3 Conservation status and populations of affected species

Current condition

The 2009 WCS (Ref. 21-40) study states that *'based on monthly returns of hunting incidences by key informers, thousands of individuals of at least 60 species were killed in the study sites for various reasons during the course of this study'*. The following species identified in Section 21.5.3 Critical and Natural Habitat have been used as indicators for bushmeat and illegal hunting:

- Uganda Kob;
- Elephant;
- Rothschild's Giraffe;
- Lelwel Hartebeest; and
- Chimpanzee.

Trends and issues

See Section 21.5.4 for trends and issues for key indicator species.

21.5.7.4 Summary of VEC Status, Sensitivity and Threshold

Table 21-25: Summary of VEC Status, Sensitivity and Threshold for Bushmeat

Indicator	Current status/trend without development	VEC sensitivity	VEC threshold
Illegal hunting statistics	Poaching pressure in MFPA is anticipated to grow in the short- and medium-term.	High	No decline in conservation status or population numbers of affected species.
Household statistics	Bushmeat is a popular meat amongst households in the Project Aol, eaten by roughly 1/3 of households. Demand for bushmeat is anticipated to grow in the short- and medium-term.		
Price of bushmeat	The price of bushmeat is similar to the prices of cattle and goat meat, and at a level that makes hunting attractive.		
Conservation status and populations of key indicator species	Key indicator species are threatened in part as a result of illegal hunting.		

21.5.7.5 Cumulative Impacts on VEC

Table 21-26 presents the potential cumulative impacts on the VEC.

Table 21-26: Assessment of Potential Cumulative Impacts: Bushmeat

Tilenga Project Potential Impacts (Direct and Indirect)	Project's Residual impact significance	Other developments and activities also affecting VEC and potential cumulative impacts	Magnitude of potential impact	Sensitivity	Significance
<p>Increase in the Study Area's population resulting from the Project leading to an increase in subsistence and commercial hunting, including both to meet basic needs and/or to generate a monetary income.</p> <p>Improved access leading to an increase in hunting, bushmeat and wildlife trade.</p>	<p>Low/ moderate adverse</p>	<p>Other oil and gas related developments (the extension to the Tilenga Project, EACOP, Kingfisher Field, Kabaale Industrial Park, Kaiso-Tonya Field, UNRA Roads, and waste management) as well as non-oil and gas developments (agricultural developments and industrial developments) have the potential to contribute to influx into the areas to the south and west of the MFPA. In addition it is expected to contribute to influx to main urban centres within the region particularly Hoima town, Masindi town, Biiso town, Buliisa town and Pakwach town.</p> <p>A cumulative increase in the human population resulting from these developments could lead to an increase in subsistence and commercial hunting, both to meet basic needs and/or to generate a monetary income. This is likely to take place due to a combination of an increase in the overall number of people engaged in hunting supported by an increase in demand for bushmeat from an enlarged population. This is particularly likely to affect availability of bushmeat in savannah and woodland ecosystems where hunting is most productive.</p> <p>In addition, an increase in exposure between the human population and biodiversity has the potential to lead to increased human-wildlife conflict, leading to an increase in reactive or pre-emptive hunting due to perceptions of livestock predation, crop raiding or social injustice.</p> <p>There is also risk that population growth and an increase in incomes has the potential to increase instances of commercial hunting of flagship species to support the wider national and international market for such activities. This has the potential to lead to increased hunting of such species, including within the MFPA and Bugungu Game Reserve, as well as other forest reserves in the wider Project AoI.</p> <p>Access enhancements facilitated by the oil developments and development of other infrastructure and agricultural projects has the potential to lead to an increase in the number of people being able to access previously more difficult-to-reach areas, with associated increases in the collection of hunting activities. This includes within the MFPA and Bugungu Game Reserve, as well as other forest reserves in the wider Area of Influence, including the Bugoma Forest Reserve.</p> <p>There is a risk that the potential cumulative effect of these impacts will mean that the threshold will not be met, or will be exceeded, and the sustainability of the VEC is therefore threatened.</p>	<p>Moderate</p>	<p>High</p>	<p>High adverse</p>

21.5.8 Lake Albert Capture Fisheries

21.5.8.1 Description of VEC

Lake Albert provides fish, shellfish and other resources that are of significant importance to local communities, and supports a capture fishery that engages many households in some capacity within lakeside communities, either as fishermen, fish traders, or lessors of boats and fishing equipment. The Lake Albert is the second most productive fishery in Uganda after Lake Victoria, and shares its waters with the DRC.

Lake Albert's capture fisheries are threatened by over-fishing, poorly enforced fisheries regulations, illegal fishing in fish nursery areas such as the Murchison Falls-Albert Delta Ramsar site, and landscape-level impacts from land-use change in the catchments of rivers that feed the Lake. These issues are exacerbated by in-migration and population growth (Ref. 21-41).

Research from the National Fisheries Resources Research Institute (NaFIRRI) (Ref. 21-42) suggests that Lake Albert is currently overfished, indicated by changes in species compositions, reduced species diversity in the Lake, reduced sizes and increases in the effort needed to catch the same number or biomass of fish over the last four decades.

21.5.8.2 Study area for VEC

The Study Area for this VEC is Lake Albert, the Victoria Nile and fishing communities in the AoI including Katanga, Katodio, Wanseko, Masaka and Kisansya West.

21.5.8.3 Indicators of Baseline Conditions

21.5.8.3.1 Species diversity

Current condition

A number of surveys of Lake Albert's fish species have been undertaken since the 1960s, with recent surveys by Taabu-Munyaho et al. (Ref. 21-41) and Mbabazi (Ref. 21-43). Treweek et al. (Ref. 21-36) also provide a detailed summary of changes in fish assemblages over the last 50 years. These sources suggest that:

- Two species – *Citharinus citharus* and *Hydrocynus vittatus* – are considered near-extinct in the Lake. Notably, *C. citharus* was one of the Lake's most important commercial species at the start of the 20th Century. It has therefore declined very significantly over the last 100 years; and
- Eight species in the lake are Endangered (*Lates macrophthalmus*, *Thoracochromis mahagiensis*, *T. ovim*, *T. loati*, *Hyperopisus bebe*, and *Synodontis victoriae*) or Critically Endangered (*Citharinus latus*, *Heterobranchus longifilis*).

Trends and issues

- The number of fish species in Lake Albert has fallen over time, from approximately 53 in the 1960s to 31 in 2015. Although ecological surveys may have missed some species (as a result of limitations with fishing equipment and/or 'bad luck'), the decline in overall species diversity is striking.
- Overall species diversity in Lake Albert is declining, with two species close to extinction. At least one of these species – *C. citharus* – was at one point the most important commercial species in the Lake.
- It is likely that over-fishing will have contributed to the near-extinction of species such as *C. citharus*.

21.5.8.3.2 Catch data

Current condition

Lake Albert is one of only a few lakes in Uganda that continues to support a multi-species fishery. However, the characteristics of the fishery have changed significantly in the last 60 years, with strong evidence of over-fishing and fishing down food chains. Research by the NaFIRRI (Ref. 21-42) suggests that:

- Lake Albert is over-fished (NaFIRRI report (Ref. 21-42) and D'Udine et al. (Ref. 21-44)). Over-fishing is indicated by changes in species composition, reduced species diversity in the Lake, reduced sizes and increases in the effort needed to catch the same number or biomass of fish. Nakiyende et al. (Ref. 21-43) report that there has been a shift in the species composition of commercial fisheries over last four decades; where in 1970, large, high-value species like *Citharinus citharus*, *Alestes baremose*, *Lates niloticus*, *Hydrocynus forskhalii* and *Disticodus niloticus* dominated commercial catches, catches today comprise smaller, lower-value species like *Brycinus nurse* and *Neobola bredoi*. Nakiyende et al. (Ref. 21-43) also estimate that there has been a twofold decline in *Alestes baremose* and *Hydrocynus forskhalii* since 1971, with the contribution of *A. baremose* and *H. forskhalii* to lake-wide annual catches falling from 42% to 1.3% and from 30.4% to 1%, respectively, between 1971 and 2007; and
- There has been a decrease in the size at which fish mature; in *Alestes baremose*, for example, size at maturity has fallen from 27cm to 16-18cm. In addition, there has been a change in the species most targeted by fishermen on the Lake. Catch statistics between the 1950s and 2008 suggest that fishermen now focus on small, pelagic species like *Brycinus nurse* and *Neobola bredoi*, whereas larger species like *Citharinus citharus* and *Lates niloticus* were the primary target species in the 1950s and earlier. This is consistent with over-fishing causing declines in large predatory species and necessitating a switch to species further down the food chain. The NaFIRRI report estimates that 43.9% of the commercial fish catch on Lake Albert in 2008 comprised *Brycinus nurse* (a small pelagic species), compared to less than 1% as recently as the 1990s.

Trends and issues

- Overall catches from Lake Albert are significantly above maximum sustainable yield, and there is no indication that catches will return to sustainable levels in the foreseeable future. The viability of Lake Albert's capture fisheries is therefore threatened by over-fishing;
- Declines in some large, predatory species such as *A. baremose*, most probably as a result of over-fishing, may have led to fishing down the food chain. There is no indication that large species will become relatively more abundant in the medium-term. It is therefore anticipated that fishing down the food chain will continue for the foreseeable future;
- As a result of fishing down the food chain, the *B. nurse* fishery is likely to continue growing and will in time represent more than 50% of total catch; and
- Declines in species at the bottom of Lake Albert food chains (e.g. *B. nurse*) may have impacts on the wider ecology of the Lake through trophic cascades and other phenomena.

21.5.8.3.3 Fishing effort

Current condition

The substantial increase in total catches from Lake Albert has been accompanied by an increase in fishing effort. Treweek et al. (2015) (Ref. 21-36) suggest that Catch per Unit Effort (CPUE) has fallen, a conclusion based on comments by participants at focus group discussions that the number of fish caught by a fleet of 15 boats fishing overnight has decreased from 500-600 fish in the 1980s to three to four fish.

Another proxy for fishing effort is the number of boats on the Lake. Figures from NaFIRRI suggest that the number of boats increased from approximately 1000 in the 1960s to 6000 in 2012, with the biggest change occurring in the last two decades (during which boat numbers increased from 2000 at the start of the 1990s). Although it is difficult to forecast future boat numbers accurately, it is likely that in-migration and population growth in the Project Aol will increase boat numbers further and therefore lead to a rise in fishing effort.

Trends and issues

- Declines in fish abundance as a result of over-fishing are likely to drive further increases in fishing effort, because more effort will be required to catch the same number of fish from relatively smaller stocks. It is therefore anticipated that boat numbers on Lake Albert will increase, while CPUE will decline;
- In-migration and population growth in the Project Aol are also likely to increase fishing effort; and
- Illegal fishing is undertaken in the Murchison Falls-Albert Delta Ramsar site (see **Chapter 19: Ecosystem Services**).

21.5.8.3.4 Fishing equipment

Current condition

Several different kinds of fishing equipment are used on Lake Albert, including:

- Gillnets;
- Seine nets;
- Fish traps; and
- Longlines.

Trends and issues

- Fishing effort on the lake is increasing. The number of multi-filament gillnets increased from 96,655 to 126,575 between 2007 and 2012, a rise of 31% (Ref 21-36). The number of seine nets also increased, from 1,619 in 2007 to 2,297 in 2012;
- Trends in the number of gill- and seine nets in use on the Lake mirror increases in other measures of fishing effort (e.g. number of fishing boats). It is therefore anticipated that the number of fishing nets will continue to increase as fishing effort expands; and
- The number of seine nets is likely to have increased substantially from 2012 levels, and will continue rising, as the *B. nurse* fishery grows.

21.5.8.4 Summary of VEC Status, Sensitivity and Threshold

Table 21-27: Summary of VEC status, Sensitivity and Threshold for Capture Fisheries

Indicators	Current status/trend without development	VEC sensitivity	VEC threshold
Species diversity	Over-fishing is a significant problem in Lake Albert, with several stocks already over-fished (e.g. <i>C. citharus</i> , which is now near-extinct in the Lake) and fishing pressure on other stocks increasing (e.g. <i>B. nurse</i>).	High	Fish populations should be maintained at or above the levels necessary to ensure productive and sustainability fisheries.
Catch size	Total catches are significantly above maximum sustainable yield. It is anticipated that they will continue to be above maximum sustainable yield in the medium-term as fishing effort increases.		
Fishing effort	Indicators of fishing effort such as number of fishing boats and number of fishing nets are expected to grow; CPUE is likely to decline.		
Fishing equipment	Trends in the number of gill- and seine nets is anticipated to increase as fishing effort expands.		

21.5.8.5 Cumulative Impacts on VEC

Table 21-28 presents the potential cumulative impacts on the VEC.

Table 21-28: Assessment of Potential Cumulative Impacts: Lake Albert Capture Fisheries

Tilenga Project Potential Impacts (Direct Indirect)	Project's residual impact significance	Other developments and activities also affecting VEC and potential cumulative impacts	Magnitude of potential impact	Sensitivity	Significance
<p>Over fishing in Lake Albert from in-migration and induced population growth as a result of Project activities.</p> <p>Increased demand for fisheries products from in-migration as a result of Project activities.</p> <p>Reduction in species diversity and catch size due to overfishing as a result of in-migration and population growth induced by Project activities.</p>	<p>Moderate adverse</p>	<p>Other oil and gas related developments (the extension to the Tilenga Project, EACOP, Kingfisher Field, Kabaale Industrial Park, Kaiso-Tonya Field, UNRA roads, and waste management) as well as non-oil and gas developments (agricultural developments, the railway and industrial developments) are likely to contribute to population growth on the eastern side of Lake Albert. Major developments are also likely to lead to influx into the main urban centres within the region, particularly Hoima town, Masindi town, Biiso town, and Pakwach town. These potential cumulative impacts are likely to lead to increases in regional demand for fisheries products.</p> <p>The cumulative and synergistic impacts of transport improvements, including upgrades to the roads, the railway, and infrastructure enhancements associated with the various projects taken forward in the region will enhance the ability to transport fish from Lake Albert to key markets. This is likely to further increase demand through increasing the availability and supply of fisheries products to key markets.</p> <p>Supported by the increase in demand for fisheries products outlined above, this is likely to have potential cumulative effects on over-fishing through increasing the number of people engaged in fisheries activities in the vicinity of Lake Albert. Given the distance fishing activities are undertaken from boat launching points, the Aols of the various projects are likely to overlap on Lake Albert.</p> <p>The significance of these potential impacts is increased through the recent declines in the overall species diversity of Lake Albert and fisheries already operating significantly above maximum sustainable yield. As such there is a high risk that existing threats to the sustainability of the VEC will be further exacerbated through the potential cumulative effects outlined above. This has the potential to reduce Lake Albert's continued ability to support a multi-species fishery.</p>	<p>High</p>	<p>High</p>	<p>High adverse</p>

21.5.9 Open-Access Grazing Land

21.5.9.1 Description of VEC

Livestock grazing is an important traditional livelihood in the Albertine, with 71% of households reporting that they rear at least one type of livestock and is a key aspect of cultural identity for many people particularly the Bugungu and Balaalo in Buliisa district. The existing system for rearing cattle depends on open access to communal grazing lands. Grazing lands are dispersed across the landscape though the overall availability of grassland has reduced significantly in the last thirty years (Ref.21-11). The process of land acquisition and compensation for developments in the area is causing land speculation that is exacerbating the trend for a transition from a communal ownership land tenure system to individual ownership, which risks fragmenting the existing communal grazing lands. Further pressure is also likely to be placed on grazing lands due to population growth, which is contributing to the expansion of crop farming areas into what was previously grazing land.

21.5.9.2 Study area for VEC

For this particular VEC only Buliisa and Hoima Districts are of concern as pastoralism is not a significant activity in other locations with the Project Aol.

21.5.9.3 Indicators of Baseline Conditions

21.5.9.3.1 Cattle numbers and ownership per household

Current conditions

Cattle are the most important kind of livestock in Buliisa and Hoima Districts and it is therefore proposed to be used as an indicator for this VEC. The most recently available surveys suggest that herds in Buliisa District comprise some 36,299 animals (Ref. 21-45). This is a decline from the 38,400 animals found during the Ugandan Bureau of Statistics' Livestock Census (UBOS) in 2008⁵. Of the 36,299 animals in Buliisa District, 26,976 (~74% of the total) are found within the Study Area. The total cattle (local and improved breeds) in Hoima District in 2011 was 120, 921 (Ref 21-46).

In Buliisa District cattle ownership is concentrated in households located within the rangelands of Kigwera sub-county. Conversely, cattle ownership in the crop producing areas of Ngwedo sub-county is less common. Households typically own between 3 and 130 animals, with an average herd size of 19. Significantly larger herds of up to 1,000 animals are also present in villages such as Kibambura, but these are an exception. The 2013 Lake Albert Region Social Baseline Assessment reports that 82.8% and 89% of surveyed households in Buliisa and Hoima District respectively did not own any cattle. The RAP1 Social Baseline Report reports that 55% of surveyed households own cattle. (Ref 21-47).

Trends and issues

According to the District Livestock Census 2008, the population of livestock in Hoima and Buliisa District increased between 2002 and 2008). Cattle numbers are anticipated to continue to grow in Buliisa and Hoima Districts over the foreseeable future. In particular, the overall development of the Albertine region may lead to increased demand for livestock products such as milk and meat, which will in turn drive increases in livestock numbers. Increases in livestock numbers will cause over-grazing of pasture areas. Many of these areas on the western side of Buliisa District near Lake Albert are already over-grazed and degraded.

Cattle ownership is likely to continue being concentrated in Kigwera sub-county for the foreseeable future, given the extent of rangelands in the area. Cattle in particular are a sign of wealth and source of prestige in Bugungu culture, and are also an important component of dowries. Rising incomes associated with economic development may therefore be invested in cattle in preference to other assets in the first instance.

⁵ It should be noted, however, that the UBOS Livestock Census results were based on estimations and not on a real physical census, which may explain the discrepancy

Cattle ownership at the household level is concentrated around rangelands in the Study Area, especially in Kigwera sub-county. It is anticipated that this ownership pattern will continue in the foreseeable future. Increases in cattle ownership in Ngwedo sub-county are unlikely because the land tenure system (customary individual tenure) and soil quality favours crop production rather than livestock pastoralism.

Herd sizes are anticipated to increase moderately as the overall number of cattle in the Study Area grows. Increases in herd sizes will occur in response not only to demographic trends (in-migration and population growth) but also cultural pressures (cattle as a source of wealth and prestige). The combination of these drivers makes increases in overall cattle numbers highly likely in the medium- to long-term.

21.5.9.3.2 Quality and quantity of grazing land

In Buliisa District grazing pasture extends from Lake Albert to the boundary with Ngwedo sub-county, where crop production begins to predominate. The Lake Albert shoreline is intensively grazed because herders frequently bring their animals to the Lake for watering. The pasture typically comprises two kinds of habitat: dry savannah and wetland vegetation (e.g. papyrus, reeds). The quality and availability of grazing pasture varies significantly between the dry and wet seasons; the extent and quality of pasture in the dry season is naturally smaller than in the wet season. Indeed, Balaalo and other herders struggle to access good quality pasture in the dry season.

The 2014 Social Baseline Assessment (covering License Area 2 and the southern part of Contract Area 1 in Hoima and Buliisa districts) reported that of surveyed households, 25.4% grazed their livestock on communal land, 2.5% on rented land, 7.1% on 'other' and 32.9% did not have grazing livestock (Ref. 21-46).

Trends and issues

It is anticipated that existing stressors including population change (natural population growth and in-migration) within of the Study Area will lead to significant changes in the quality and quantity of grazing land. It will also intensify grazing pressures on those areas of good quality pasture that are readily accessible. Population change is contributing to extension of crop farming areas in eastern Buliisa district and extension of residential areas on its western side, which are progressively reducing the availability of open access grazing land in central Buliisa district.

Secondly, changes to traditional land tenure systems will also impact the quality and quantity of grazing pasture. The 'individualisation' of land tenure within communal open access grazing areas is increasingly common, as community members sell plots within open access lands to individual investors. (These investors are often speculators seeking to benefit from rises in the price of land caused by land acquisition and compensation for development in the region.) These changes cause fragmentation and a decrease in the area of available open access pasture, and are anticipated to continue in the medium-term.

Decreased productivity of fishing in Lake Albert is leading fishermen to shift their livelihoods to land based activities, placing further pressure on land for farming and grazing.

21.5.9.4 Summary of VEC Status, Sensitivity and Threshold

Table 21-29: Summary of VEC Status, Sensitivity and Threshold for Open Access Grazing Land

Indicator	Current status/trend without development	VEC sensitivity	VEC threshold
Cattle number and ownership per household	Growth in cattle numbers is expected to meet increased demand for livestock products due to population growth. Some of the income increases projected for the area as a result of its overall development are also likely to be invested in livestock. Households typically own between 3 and 130 animals, with average herds numbering 19 animals.	Moderate	No deterioration in total quantity and quality of communal grazing land.
Quality and quantity of grazing land	In Buliisa District most pasture is held under a system of communal open access, and is located in an area stretching from the Lake Albert shoreline to agricultural areas in Ngwedo sub-county. Grazing land has been reducing due to expansion of crop farming activities onto land that was previously used for grazing. Finding good quality pasture is particularly challenging in the dry season.		

21.5.9.5 Cumulative Impacts on VEC

Table 21-30 presents the potential cumulative impacts on the VEC.

Table 21-30: Assessment of Potential Cumulative Impacts: Open-Access Grazing Land

Tilenga Project Potential Impacts (Direct and Indirect)	Project's residual impact significance	Other developments and activities also affecting VEC and potential cumulative impacts	Magnitude of potential impact	Sensitivity	Significance
Economic displacement of communities	Moderate adverse	<p>Other oil and gas related developments (the extension to the Tilenga Project, EACOP, Kingfisher Field, Kabaale Industrial Park, Kaiso-Tonya Field, Oil Roads, and Waste Management) as well as non-oil and gas developments (agricultural developments, and industrial developments) are likely to contribute to influx into the main urban centres within the region particularly Hoima town, Masindi town, Biiso town, and Pakwach town. As projects will all have different timelines, this may mean that cumulatively population growth is experienced over a longer period before it stabilises. There are also likely to be higher rates of population growth cumulatively than rates that would be associated only with the Tilenga project.</p> <p>The regional oil developments and development of other infrastructure and agricultural projects are expected to lead to greater stimulation to the local economy and increases in disposable incomes. Cattle ownership is traditionally an important indicator of social status and wealth therefore it is likely that some of the additional income earned by the local population will be invested in cattle. The growth in cattle numbers is likely to place additional pressure on pasture land.</p> <p>The higher level of population growth triggered by other developments will also exacerbate any conversion of land previously used for pastoralism to crop farming due to increased demand for farmland by migrants.</p> <p>The cumulative land take for all developments in the region will result in a reduction in the overall land available for pastoralism. Need for the grazing land can increase pressure on protected areas (MFPA, Bugungu Wildlife Reserve).</p> <p>There is a risk that the potential cumulative effect of these impacts on open-access grazing land will lead to a deterioration of the condition of the VEC to the extent that the threshold will not be met, or will be exceeded.</p>	High	Moderate	High adverse
Changes to traditional land tenure system	Moderate adverse				
Impacts on livestock and fodder/pastoralism	Low adverse				

21.5.10 Food Security

21.5.10.1 Description of VEC

Food security for the population depends on the provision of foods from farming, fishing and livestock keeping activities as well as ability to purchase food items. Food security is the condition in which all people, at all times, have physical, social and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life⁶ (Ref. 21-48).

21.5.10.2 Study Area for VEC

The Study Area for this VEC is the Project Aol for the social impact assessment as described in **Chapter 16: Social**.

21.5.10.3 Indicators of Baseline Conditions

21.5.10.3.1 Food Insecurity Situation

Current condition

In January 2017, around 10.9 million people in Uganda were facing acute food insecurity, 1.6 million of which were in a food crisis situation (a deteriorating diet and high malnutrition rates) (Ref. 21-49). The report finds that 69% of Uganda's total population have stable access to a variety of food, which is derived from both markets and households (in case of subsistence farming), while 26% of the population faces stressed food insecurity, which means they have an inadequate access to secure food sources (Ref. 21-49). The results from the Uganda National Household Survey (UNHS) (Table 21-31) show that persons in female-headed households (4%), those living in rural areas (2%) as well as those in the Northern region (5%) were more likely to be food poor compared to their counterparts in other regions.

During the 2014 Health Baseline Assessment (HBA) (Buliisa and Hoima) 31% of households reported occasions when they experienced food shortages in the past and about 3% reported starvation (Ref. 21-50). There were frequent anecdotal reports of food shortages made during the 2016 baseline survey (reports of food shortages were made in Buliisa district, Hoima district, and Masindi district but not in Nwoya or Nebbi). This was mostly attributed to poor harvests, blamed on crop diseases and changing weather patterns. In Masindi district, however, it was also related to an increasing trend to grow food for sale (both cash crops such as sugarcane but also traditional food crops) rather than subsistence consumption. Respondents alleged that this has resulted in poorer quality and lower volume of products available for consumption at household level.

Table 21-31: Distribution of the Food Poor and Food Energy Deficient Population in Uganda, 2013

Category		Food Poor	Food Energy Deficient ⁷
Sex of the Head of Household	Female	3.5%	38.6%
	Male	1.2%	38.1%
Residence	Rural	2%	37.8%
	Urban	1.3%	39.5%
Region	Central	0.8%	39.7%
	Eastern	1.3%	44%
	Northern	5.2%	45.3%
	Western	0.6%	21.8%
<i>Source: Ref. 21-51</i>		Uganda (national)	1.8%
			38.2%

⁶ As defined by the United Nations' Committee on World Food Security.

⁷ A household was considered food energy deficient if it consumed total Kilo calorie per adult equivalent per day of less than 2550

Trends and issues

Over a 50-year period (from 1961 to 2011) the overall potential food security and intake decreased from 1,173,000 kcal/cap/year to 850,000 kcal/cap/yr (Ref. 21-52). The biggest constraint for Uganda to resolve the issue of food security is its high population growth (real and expected) and its low agricultural productivity. Households which depend on subsistence farming face a higher risk of food insecurity.

According to a November 2017 report by Relief Web (Ref. 21-53), the food security situation in all regions of the country is improving. Immediate causes of food insecurity identified for Western Region and Acholi Region are reduced purchasing power due to food price increases coupled with low household incomes; prolonged dry spells; low agricultural production due to soil degradation, lack of inputs and tools, inadequate extension services, and poor post-harvest handling practices; limited diversification of livelihoods; crop and livestock diseases; human diseases especially malaria; and excessive sale of food. Poor food utilisation (poor food preparation practices, food preferences based on culture and poor hygiene practices constraining physical and biological utilization) in particular is considered a major limiting factor in Western Region and minor limiting factor in Acholi Region. Households in Buliisa District tend to face a number of constraints to food production, including poor soil fertility and quality, prolonged dry spells, wild animals attacks and crop encroachment by livestock, high cost of seeds, and crop diseases (Ref. 21-45). For further information see section 16.6.6.3.3 (Challenges in Crop Farming) in **Chapter: 16 Social**.

21.5.10.3.2 Extent of land available for growing food crops

Current condition

See **Chapter 16: Social** for a summary of the main land uses identified in the Study Area. Land in the eastern part of Buliisa District is predominantly used for crop farming (around 100 km²) and land in the central part as rangeland (around 180 km²). The western part has a mixed land use pattern (covering the lake shore area) with around 20 km² of semi-rural/urban areas and 35 km² of rangeland and 40 km² of wetland. There is extensive cultivatable land available in Nwoya and Masindi districts where agricultural development is an important part of local development plans. In Nwoya 90% of land is fertile although less than 10% is utilised yearly (Ref. 21-45). The RAP1 Baseline Report found that within the Industrial Area there was a two times increment in the amount of land being actively farmed between 2014 and 2017 (from 36.55 hectares to 68.03 hectares) (Ref. 21-47).

Approximately thirteen percent (517.1 km²) of land in Masindi District is classified in the District Development Plan as “dry land”. Budongo, Bwijanga and Pakanyi sub counties are identified as having fertile land available that is suitable for agriculture but not yet being farmed (Ref. 21-54).

Trends and issues

In the Project Aol population growth is reported to be leading to encroachment of crop farming into what were previously grazing areas as well as into protected areas. Between 1986 and 2013 there was an increase in small scale farming land use in Buliisa District of about 64%.

In Hoima Municipality there has been a recent change in the land use pattern around the suburbs of the municipality from farming to service industries meaning less food is grown in the suburbs than five to ten years ago. Field observations for the 2013 Lake Albert Regional Socioeconomic Assessment showed that several forests and wetlands in Hoima District had been cleared for cultivation and settlement. (Ref. 21-46),

The main land use change that is currently occurring in Nwoya District is the use of unexploited agricultural land for industrial purposes. This is occurring as a result of government policies, private investors, and population growth (see **Chapter 16: Social** for more information).

A national/ regional trend has been observed, of slowly moving from subsistence to commercial farming – this trend is evident in Nwoya and Masindi districts.

21.5.10.3.3 Average size of farm holdings and plots

Current condition

According to the HBA Report, 42% of households in the LA-2 area (covering Hoima and parts of Buliisa District only⁸) own between 1 and 3 acres of land, while 30% of households in the LA-2 area owned 5 acres or more. However, only slightly over half of the households that owned land used it for growing crops (Ref. 21-50). In Buliisa district the average size of cultivated land per household ranges from one to five acres, while a few individuals (generally businessmen or politicians) own larger plots of land that range between 20 and 100 acres. It is common for households to own more than one plot across different villages (see **Chapter 16: Social**, Section 16.5.6).

Trends and issues

In Nwoya district, the return of Internally Displaced Persons, development of tourism infrastructure and development of large scale industrial and agricultural projects by private investors are contributing to land pressure.

There is a gradual transition from subsistence to commercial farming in some parts of the Project Aol, particularly in Nwoya and Masindi districts. This is likely to increase the number of large plots. Population growth (natural and economically induced) and a trend towards increased commoditisation of land is likely to lead to smaller plot sizes as larger plots are broken up for inheritance or to sell or rent out. Decreased productivity of fishing in Lake Albert is leading fishermen to shift their livelihoods to land based activities, placing further pressure on land for farming and grazing.

21.5.10.3.4 Food prices

Current condition

Average prices for main crops grown in the Study Area and their processed products are given in Table 16-29 in **Chapter 16: Social**, Section 16.6.6.3.3.

Trends and issues

- Cost of food in Uganda increased by 9% in October 2017 over the same month in the previous year. Food inflation in Uganda has averaged about 6% from 1998 until 2017, reaching an all-time high of about 41% in July 2011 and a record low of about -11% in July 2005 (Ref. 21-55); and
- Food inflation (nationally) is expected to decrease to 7% by the end of 2018, and is projected to be around 6.5% by 2020 (Ref. 21-55).

21.5.10.3.5 Types of food most commonly consumed by household members/ children under 5

Current condition

The 2011 Uganda Nutrition Action Plan (UNAP) highlights that Ugandans predominantly have a monotonous and unvaried diet, which leads to issues of micronutrients deficiencies. The main staple food in Uganda is cassava (Ref. 21.56). Maize is also widely grown and is typically used as a complementary food crop to be eaten with breakfast or evening tea (Ref. 21-56). Along with cassava and maize, the Bugungu, Alur and Acholi traditionally also eat millet, sweet potatoes, beans, matooke (plantain), and fish (**Chapter 16: Social**).

In the Study Area, many households are dependent on subsistence farming and agriculture for food. Although subsistence farmers are likely to have the least diverse diet, consuming the highest percentage of staple foods, and the lowest level of meat, fish and fruits (Ref. 21-51), they still depend on livestock production and fishing for sources of protein.

⁸ The Study Area for the Health Baseline Assessment (Ref. 21-50) covered Ngwedo, Kihungya, Butiaba, Buliisa and Biiso sub counties and Buliisa Town Council in Buliisa District, and Kigorobya, Buseruka, Kabwoya, and Kyangwali sub counties and Hoima Municipality in Hoima District.

Fishing is the main livelihood activity for the lower lying areas of Buliisa and Hoima Districts and all villages along the Lake Albert shore (this includes Buliisa, Butiaba, Kabwoya and Ngwedo sub counties and lower altitude areas of Buseruka sub county). Fishing provides food for fishermen and their families and also generates cash income (Ref. 21-46).

The RAP 1 Baseline Report reports that in the six months preceding the survey, 35.2% of households reported availability of meat more than once a week while 28.3% and 25.1% reported access to meat once a week and once a month respectively. It was however observed that, 1.6% of households surveyed reported not having access to meat in the preceding 6 months. The majority (51.2%) of households had access to fish daily while 34.9% reported access to fish more than once a week. No household reported lack of access to fish. Access to fruits and vegetables was reported either daily or more than once a week in 39.3% and 34% households respectively. No household reported total lack of fruit/vegetable (Ref. 21-47).

Trends and issues

Declining fish catch for many villages along the lakeshore, due to over-fishing and project activities, is likely to impact subsistence farming households dependent on this for food as well as income (Ref. 21-36). In some parts of the Study Area (mainly parts of Masindi and Nwoya Districts) there is an increasing trend to sell food crops initially grown for personal consumption as cash crops, helping generate income at household level.

21.5.10.3.6 Households Reporting Hunger

The RAP 1 Social Baseline Report reports that in the months of March 2016 and June 2016, 20.1% and 21.1% of households reported feeling hungry⁹ respectively, representing the months with the highest number of households reporting hunger during the calendar year. Overall, more than 78% of households assessed reported no history of hunger (Ref. 21-47).

21.5.10.4 Summary of VEC status, sensitivity and proposed threshold

Table 21-32: Summary of VEC status, Sensitivity and Threshold for Food Security

Indicators	Current status/trend without development	VEC sensitivity	VEC threshold
Food insecurity situation	Part of Uganda’s population has stable access to a variety of food but there is still a large portion of the population which faces some form of food insecurity. Slow and insufficient agricultural progress to match rising population growth may put food availability and diversity at risk in the medium to long-term. Households which depend on subsistence farming face a higher risk of food insecurity. Cases of food shortages, hunger and starvation are still present in the Study Area and tend to be experienced by the most vulnerable groups.	Moderate	Availability, accessibility and adequacy ¹⁰ of food for individuals and households should be kept at or above levels to sustain adequate nutritional intake to live a healthy and active life.
Extent of land available for growing food crops	Approximately 100km ² of land is used for crop growing in Buliisa District. In Purongo and Got Apwoyo sub counties in Nwoya District the predominant land use is agriculture. Masindi District still has land available for further expansion of farming activity. Increasing economic activity in some parts of the districts within the Project Aol will likely reduce the extent of land available and used for subsistence farming, a trend that has already been observed around the suburbs of		

⁹ Hunger was described as; experiencing hunger or scarcity of food at least once a month

¹⁰ Adequacy can be understood as having access to sufficient, safe and nutritious food sufficient to meet one’s dietary needs and food preferences for an active and healthy life.

Indicators	Current status/trend without development	VEC sensitivity	VEC threshold
	Hoima Municipality.		
Average size of farm holdings per household	Most households in Hoima and Buliisa own less than three acres of land. However, there is a trend towards larger commercial scale farm holdings developed by private investors in Nwoya and Masindi districts which is likely to increase the number of large plots in the Project Aol.		
Food prices	National food inflation is expected to decrease to 7% by the end of 2018.		
Types of food	Subsistence farmers have the least diverse diet, consuming the highest percentage of staple goods, and the lowest level of meat, fish and fruits.		

21.5.10.5 Assessment of Cumulative Impacts on VEC

Table 21-33 presents the potential cumulative impacts on the VEC.

Table 21-33: Assessment of Potential Cumulative Impacts: Food Security

Tilenga Project Potential Impacts (Direct and Indirect)	Project's residual impact significance	Other developments and activities also affecting VEC and potential cumulative impacts	Magnitude of potential impact	Sensitivity	Significance
Economic displacement	Moderate adverse	<p>Other oil and gas related developments (extension to the Tilenga Project, EACOP, Kingfisher Field, Kabaale Industrial Park, Kaiso-Tonya Field, Oil Roads, and Waste Management) as well as non-oil and gas developments (agricultural developments, the railway and industrial developments) are likely to contribute to influx into the main urban centres within the region particularly Hoima town, Masindi town, Biiso town, and Pakwach town. As projects will all have different timelines, this may mean that cumulatively population growth is experienced over a longer period before it stabilises. There are also likely to be higher rates of population growth cumulatively than rates that would be associated only with the Tilenga project.</p> <p>The regional oil developments and development of other infrastructure and agricultural projects are expected to lead to greater stimulation to the local economy and increases in disposable incomes. The combination of influx and increased disposable incomes will likely exacerbate inflation pressures directly related to the Tilenga project due to increased demand for local goods and services. Increase in food prices, farmland (to purchase and rent) and other farming inputs is likely to increase cash poor households' exposure to food insecurity.</p> <p>The higher level of population growth is also likely to exacerbate pressure already being placed on agricultural land by Project-related influx, which may result in over-farming and soil degradation and greater fragmentation of farming areas (smaller plot sizes), all potentially resulting in reduced agricultural outputs.</p> <p>The higher level of population growth is also likely to lead to greater demand for fish and a greater number of people practicing fishing if they cannot find alternative employment in the Project Aol. This would further exacerbate pressure on fish stocks in Lake Albert leading to reduced fish catch and inflation in the price of fish.</p> <p>The combined cumulative land take for all developments in the region represents a minor reduction in the overall land available for crop farming and pastoralism, which is likely to minimally reduce the overall agricultural production in the region over the short to medium term at least.</p> <p>There is a risk that the potential cumulative effect of these impacts on food security will lead to a deterioration of the condition of the VEC to the extent that the threshold will not be met, or will be exceeded.</p>	Low	Moderate	Moderate adverse
Local price inflation	Moderate adverse				
Deterioration in nutritional status	Low adverse				
Impacts on crop production	Low adverse				
Impact on livestock and fodder/pastoralism	Low adverse				
Impact on capture fisheries	Moderate adverse				

21.5.11 Access to Safe Drinking Water Resources

21.5.11.1 Description of VEC

This VEC refers to the availability of safe drinking water and the human right to water, which is defined as “sufficient, safe, acceptable and physically accessible and affordable water for personal and domestic uses” (UN Resolution A/RES/64/292). In-migration and development could lead to increased pressure on drinking water resources and poorer sanitation practices that threaten water supplies. Sanitation is further discussed below under Community Health in Section 21.5.13.3.3.

21.5.11.2 Study Area for VEC

The Study Area of this VEC is the Project Aol.

21.5.11.3 Indicators of Baseline Conditions

21.5.11.3.1 Access to safe water source (percentage of population)

Current condition

According to the Uganda Water Supply Atlas, 2017 (Ref. 21- 57):

- 72% of the population in Buliisa District have access to safe water (urban – 95%; rural – 70%). Buliisa has 429 domestic water points and two piped water schemes, which serve a total of 92,580 people – 84,717 in rural areas. 101 water points have been non-functional for over 5 years and are considered abandoned;
- 83% of the population in Nwoya District has access to safe water (urban – 95%; rural – 82%). Nwoya has 534 domestic water points which serve a total of 123,119 people – 106,896 in rural areas. 137 water points have been non-functional for over 5 years and are considered abandoned;
- 70% of the population in Nebbi District has access to safe water (urban – 65%; rural – 71%). The access rates in Nebbi vary from 21% in Pakwach Town Council to 95 % in Nebbi and Nyaravur sub counties. Nebbi has 1,126 domestic water points and two piped water schemes, which serve a total of 293,325 people – 252,851 in rural areas. 268 water points have been non-functional for over 5 years and are considered abandoned;
- 59% of the population in Hoima District has access to safe water (urban – 28%; rural – 66%). The access rates in Hoima vary from 32 % in Kyangwali Sub-County to 95 % in Kyabigambire, Kitoba, Buhanka, Bugambe, Buhimba, and Kiziranfumbi sub counties. Hoima has 1,792 domestic water points and two piped water schemes, which serve a total of 379,394 people – 346,272 in rural areas. 286 water points have been non-functional for over 5 years and are considered abandoned; and
- 72% of the population in Masindi District has access to safe water (urban – 26%; rural – 94%). The access rates in Masindi vary from 74 % in Kimengo Sub-County to 95 % in Budongo, Pakanyi, Miirya, and Bwijanga sub counties. Masindi has 1,337 domestic water points and five piped water schemes, which serve a total of 216,565 people – 200,305 in rural areas. 157 water points have been non-functional for over 5 years and are considered abandoned.

Trends and issues

- The combined impacts of a growing population (~3–3.5% per annum) and urbanisation trends will see demand for water rising exponentially and it will place greater strains on existing water sources and infrastructure. It will be an increasing challenge to develop safe water sources to meet growing demand;
- There are wide discrepancies in access to safe water sources, between and within districts;

- Access to clean and safe water is a goal reflected in Uganda's Constitution and is also incorporated in the National Development Plan (NDP) as part of the objectives of the social sector. The MWE as part of the NDP aims to achieve access to safe water coverage of 79% in rural areas and 100% in urban areas by the year 2019/2020 (Ref. 21-58); and
- The main new technologies implemented to improve water supply in rural areas include deep boreholes (42%), shallow wells (25%), and protected springs (21%) and others including tap stands and kiosks of piped schemes and rainwater harvesting tanks (Ref. 21-59).

21.5.11.3.2 Functionality of water sources (proportion of improved water supply sources that are found working at the time of survey)

Current condition

The average functionality of urban water supply was 92% in 2015 (Ref. 21-59). Although urban areas tend to have better access to safe water sources, the functionality of rural water supply in Uganda has improved over two years, increasing from 84% in June 2013 to 88% in June 2015.

Water functionality varies in the Study Area (Ref. 21-57):

- Buliisa District: urban – 98%; rural – 69%;
- Nwoya District: urban – 49%; rural – 76%;
- Nebbi District: urban – 91%; rural – 77%;
- Hoima District: urban – 85%; rural – 84%; and
- Masindi District: urban – 92%; rural – 88%.

Trends and issues

- An improvement in the functionality of urban water sources and facilities has occurred as a result of increasing awareness and investment in this area. As part of the NDP, the MWE aims to achieve 95% effective use and functionality of water and sanitation facilities by 2019/2020; and
- The rate of improvement is slow and is a reflection of overall low levels of public funding, as well as a lack of operational clarity and direction on the national level (wsp.org). However, a number of internationally-funded initiatives are working towards developing better infrastructure and help local communities their water challenges (e.g. UN's WASH Initiative; Water for People, Uganda; WaterAid; etc.).

21.5.11.3.3 Distance to main source of water for drinking

Current condition

Approximately 56% of respondents to the 2015 SHBS Household Survey are within less than 500 m from an operating borehole, while 33% have to travel a long distance (up to 5 km) to reach the nearest borehole. The distances travelled to reach water sources increase during the dry season when boreholes dry up. See section 16.6.4.2.1 in the **Chapter 16: Social** for more information.

Trends and issues

Lack of investment in water infrastructure is a key barrier to reducing distances to main source of water adequate for drinking.

21.5.11.3.4 Water quality

Current condition

The water quality of surface water bodies within the Study Area is generally of good quality with the exception of some trace metals and few other constituents which slightly exceed acceptable limits (see **Chapter 10: Surface Water**).

Based on the results of the groundwater samples taken between 2014 and 2017, it is considered that the groundwater in the sedimentary aquifer in boreholes in the Northern and Southern Nile areas are generally of good quality.

For more information on the quality of water in the Study Area see section 16.6.4.2.1 Access to Water in the Primary Study Area in **Chapter 16: Social**, as well as **Chapter 9: Groundwater** and **Chapter 10: Surface Water**.

Trends and issues

Chapter 16: Social reports that 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. Increasing access to safe water and sanitation is a key priority across all district five year development plans in the Study Area.

21.5.11.4 Summary of VEC status, sensitivity and proposed threshold

Table 21-34: Summary of VEC Status, Sensitivity and Threshold for Access to Safe Drinking Water Resources

Indicators	Current status/trend without development	VEC sensitivity	VEC threshold
Access to safe water source (percentage of population)	Water and sanitation is unequally distributed throughout the Study Area. Increasing population levels will put greater pressure on existing water infrastructure, and without sufficient investment to improve the number and quality of water sources, it will likely decrease access to safe water sources in the medium to long term.	High	All individuals and households have access to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic use.
Functionality of water sources (proportion of improved water supply sources that are found working at the time of survey)	The functionality of rural water sources has improved in the last few years.		
Distance to main source of water for drinking	Approximately a third of households in Buliisa District have to travel up to 5km to reach the nearest water-source (borehole).		
Water quality	Factors such as increasing urbanisation, population growth, and anthropogenic activities have resulted in significant deterioration in the quality of both surface and groundwater in Uganda.		

21.5.11.5 Assessment of Cumulative Impacts on VEC

Table 21-35 presents the potential cumulative impacts on the VEC.

Table 21-35: Assessment of Potential Cumulative Impacts: Access to Safe Drinking Water Resources

Tilenga Project Potential Impacts (Direct Indirect)	Project's residual impact significance	Other developments and activities also affecting VEC and potential cumulative impacts	Magnitude of potential impact	Sensitivity	Significance
Displacement of public infrastructure due to land acquisition	Low adverse	<p>Construction activities for the extension to the Tilenga Project, the Tilenga Feeder Pipeline and UNRA roads have the potential to directly impact on water quality in the same communities as the Tilenga Project due to potential for groundwater and surface water contamination, and displacement of any public water infrastructure due to land acquisition and a potential reduction of the capacity of the environment to support water regulation due to a loss of vegetation and wetlands.</p> <p>Other oil and gas related developments (the extension to the Tilenga Project, EACOP, Kingfisher Field, Kabaale Industrial Park, Kaiso-Tonya Field, Oil Roads, and Waste Management) as well as non-oil and gas developments (agricultural developments, the railway and industrial developments) are likely to contribute to influx into the main urban centres within the region particularly Hoima town, Masindi town, Biiso town, and Pakwach town. As projects will all have different timelines, this may mean that cumulatively population growth is experienced over a longer period before it stabilises. There are also likely to be higher rates of population growth cumulatively than rates that would be associated only with the Tilenga project.</p> <p>The higher level of population growth will exacerbate any pressure already being placed on water resources by Project-related influx, meaning a larger number of people will be affected over a larger area and over a longer period. Sources of additional pressure on water resources due to higher levels of influx are likely to be:</p> <ul style="list-style-type: none"> • overcrowding in poor quality housing with improper sanitation and waste facilities leading to contamination of domestic water sources; • greater number of users per water point; and • increased forest and vegetation clearance for subsistence agriculture and residential structures may contribute to increased rates of soil erosion and levels of sediment in rivers and streams used for water supply. <p>There is a risk that the potential cumulative effect of these impacts on safe drinking water will lead to a deterioration of the condition of the VEC to the extent that the threshold will not be met, or will be exceeded.</p>	Moderate	High	High adverse
Increase in prevalence of water, sanitation and waste related disease	Low adverse				
Surface water contamination	Low adverse				
Changes in surface water quality	Low adverse				
Groundwater contamination	Low adverse				
Change in groundwater quality	Low adverse				

21.5.12 Community Health

21.5.12.1 Description of VEC

Health is broadly defined to include physical, mental, social and spiritual wellbeing and not just the absence of disease. However, when looking at the potential cumulative impacts on community health status the emphasis is on aspects of community health of most concern to stakeholders due to their potential to be significantly impacted (directly and indirectly) through multiple developments. This includes communicable disease, particularly HIV/AIDS, vector borne diseases, sanitation and hygiene related disease and access to health services. The main source of cumulative impacts on community health is likely to be the in-migration of workers and others seeking to benefit from indirect economic opportunities in the region. Increase in unsafe behaviours (alcoholism, prostitution) due to cumulative effect of mismanagement of cash compensation for economic and physical displacement could also lead to adverse health outcomes such as increase in HIV/AIDS and other Sexually Transmitted Infections (STI) and increase in violence.

21.5.12.2 Study Area for VEC

The Study Area for this VEC is Project Aol with a particular focus on expected migration hotspots (Buliisa town, Hoima town, Masindi town, Pakwach town).

21.5.12.3 Indicators of Baseline Conditions

21.5.12.3.1 Data on HIV, TB, Hepatitis B, malaria, respiratory infections

Current Conditions

Communicable diseases including malaria, respiratory infections, HIV/AIDS, and diarrheal illnesses, are the leading cause of morbidity and mortality in all regions in Uganda. Within the Study Area, the most common three causes of morbidity and mortality are still malaria, HIV and pneumonia. Malaria prevalence is also one of the top five diseases across Masindi, Hoima and Nebbi.

According to the most current statistics at the Ministry of Health (MoH) AIDS Indicator Survey, the prevalence of HIV in the western and mid-northern regions is higher than the national average (8.2% and 8.3%, compared to 7.3%), while the West Nile region recorded the second lowest prevalence at 4.9%. See section 18.5.3.2 Health Profile for Uganda in **Chapter 18: Community Health and Safety** for more information.

Respiratory infections are a very common cause of illnesses in Uganda and in the Study Area. According to Health Management Information System (HMIS) statistics up to 34% of all facility visits in Buliisa district in 2016 were for non-pneumonia cough or severe acute respiratory tract infections (SARIs). See section 18.5.3.3 Overview of Health Profile Study Area in **Chapter 18: Community Health and Safety** for more information.

Trends and Issues

HIV

While there is no empirical evidence of an increase in the burden of HIV in the Study Area, it was mentioned during several health worker interviews during the 2015 SHBS that there seems to be an increasing number of HIV confirmed cases in Buliisa district and the number of HIV confirmed patients enrolling into HIV care programs in Buliisa has steadily increased over the last two years. The perception that the prevalence of HIV and STI cases is increasing across other parts of the Study Area was also widely reported during interviews with district health teams and health facility workers during the 2016 baseline survey. Increasing numbers of sex workers and migrants seeking work in the area were considered to be two of the main reasons for the increase in the HIV burden.

Malaria

Malaria transmission occurs throughout the Study Area and throughout the year, but peaks in June to August and November to January during the rainy seasons. According to HMIS data the malaria case

load across all districts in the Study Area increased significantly between 2015 and 2016. In Buliisa District the reported number of confirmed malaria cases went from 17% to 40%; in Nwoya District it went from 18.7% to 42.5%; in Hoima from 8.8% to 21.1%; in Nebbi from 13.1% to 32.3% and in Masindi from 8.9% to 20.4% (Ref. 21-60).

TB

There was very limited information available on TB from health facilities surveyed as part of the 2015 SHBS. This is mainly because TB is only diagnosed and treated in accredited facilities, is under reported, and the data management system is separate from the HMIS. In the Study Area, HIV-related TB is commonly diagnosed and treated in the two large HIV/ART clinics in Buliisa District, Masindi District hospital, and Hoima Regional Referral Hospital (RRH). The spread of Multi-Drug Resistance (MDR) TB is a major public health concern, especially in the setting of high HIV prevalence and overcrowding. See **Chapter 18: Health and Safety** for more information.

Hepatitis B

- Although current data is lacking, hepatitis B (HBV) is historically prevalent in north-west Uganda, including Nwoya District;
- A 2004-2005 national population survey found that prevalence of HBV was 19.4% in north-central Uganda and 18.7% in West Nile region (national average was 10%);
- In 2015, an epidemic affected north and eastern Uganda, including Nwoya District; and
- Movement of commercial sex workers may have contributed to spread of HBV in Nwoya.

21.5.12.3.2 Data on epidemic diseases (cholera, measles, typhoid)

Current Conditions

There are frequent outbreaks of cholera in Buliisa and Hoima, especially areas along the lake shores. This is mainly attributed to poor hygiene, lack of safe water (see Section 21.5.12.3.3/4) and the shortage of toilet facilities along the lake shores.

While districts in the Study Area have not experienced haemorrhagic fever outbreaks, Kibaale, Bundibugyo, Wakiso and Luweero districts, have had recent haemorrhagic fever outbreaks including of Ebola (2007/2011/2012 – Kibaale and Luweero), Crimean-Congo haemorrhagic fever (August 2013, Wakiso) and Marburg haemorrhagic fever.

Recurrent measles outbreaks were reported in Hoima district in areas around Kyagwali, Subuta and Kabwoye sub-counties. According to HMIS data for 2015 and 2016 (Ref. 21-60), there were 1,600 measles cases treated in health facility outpatient departments in Hoima in 2016. In Nebbi and Masindi district there were approximately 600 cases but in Nwoya and Buliisa districts there were only 4 and 12 cases respectively.

There are frequent cases of typhoid reported across all districts in the Study Area. In 2016 there were 914 cases reported at health facility outpatient departments in Buliisa, 217 cases in Nwoya, 3964 in Hoima, 989 in Nebbi and 788 in Masindi.

Trends and Issues

- Since 1998, the cholera case fatality rate has steadily declined, remaining below 5,000 cases/deaths per year.
- At present, cholera is more prevalent in rural areas than in urban areas within Uganda. However, this may change if present urbanization trends continue to increase and if the maintenance and expansion of water and sanitation infrastructure cannot keep pace with the rapidly growing urban population (Ibid).
- Recent research has found that there is a strong correlation between high incidence of cholera with increased levels of rainfall and high temperatures (Ibid).

- The annual mortality rate for typhoid fever in Uganda has increased by 10.5% since 1990, an average of 0.5% a year.

21.5.12.3.3 Data on sanitation and hygiene related disease

Current Conditions

- Access to safe water and adequate hygiene sanitation provision and practice (e.g. use of handwashing facilities, pit latrines rather than open defecation and safe cooking practices) are important determinants of health, and in particular the avoidance of water borne diseases such as diarrhoea. The most common sanitation and hygiene related diseases reported in the Study Area include diarrhoea, intestinal worms, cholera, dysentery, typhoid and scabies;
- Acute diarrhoea accounted for between 5% of all health facility outpatient department visits in Buliisa district in 2016, 4% in Nebbi and Masindi districts, and 3% in Hoima and Nwoya districts;
- Children under 5 years are especially at risk; and
- In 2016, intestinal worms accounted for 3.5% of health centre outpatient department visits in Buliisa district, 4.5% in Nwoya district, 2.7% in Hoima district, 3.9% in Nebbi district and 3.4% in Masindi district.

Trends and Issues

A national sanitation programme, the Uganda Sanitation Fund Programme, which aims to work to end open defecation and reduce sanitation related disease, was due to be extended into Buliisa and Hoima districts from 2017-2020.

21.5.12.3.4 Availability of Community Health Infrastructure

Current Conditions

There are a total of 1,255 health facilities serving the Western Region, 817 serving the Northern region and 292 serving the West Nile region. See Table 18-8 and section 18.5.3.4.11 Health Services Infrastructure Capacity in **Chapter 18: Health and Safety** for more information on health service infrastructure in the Study Area.

Approximately 20% of district spending in Buliisa and Nwoya district is on health; however, annual budgets for Buliisa and Nwoya districts have had year on year reductions over the last three and four financial years respectively. See **Chapter 16: Social** for more information on district revenue and expenditure.

Trends and Issues

- Inadequate human resource capacity – nearly all public facilities lacked sufficient human resource capacity both in terms of numbers and training, despite growth in population and medical/ health needs. Staff inadequacies were mostly associated with poor remuneration;
- Inadequate accommodation facilities for health workers where several facilities had few staff houses, which made it difficult to have adequate numbers of staff on site. This further constrains the ability to deliver 24 hour emergency services, and to some extent the delivery of comprehensive healthcare services;
- Lack of transport facilities to conduct activities such as outreaches and follow-up of mothers on eMTCT11 and most importantly referral of emergency and complicated cases. The poor road network and poor road conditions in most parts of the Study Area causes delays in accessing and delivering healthcare services;

¹¹ Elimination of HIV transmission from mother to child

- Consistent stock-outs of medicines and supplies resulting from the inadequate stock supply from the National Medical Stores;
- Given the increasing in-migrations and out-migrations in the Study Area, language barriers between patients and service providers are on the increase especially in parts of Buliisa and Hoima dominated by the Alur;
- Shortages of safe and clean water were reported to affect service delivery;
- Inadequate financial support towards primary health care among lower level health facilities hinders the provision of comprehensive healthcare packages; and
- Doors and windows of most facilities generally lack screening from mosquitoes and none of the facilities have the resources to provide mosquito nets to patients. It is therefore likely that malaria transmission occurs commonly in health facilities, especially among admitted patients.

21.5.12.3.5 Drug availability in health centres

Current Conditions

Health facility pharmacies/ dispensaries/ drug stores were visited as part of the 2015 SHBS and 2016 assessment to verify the presence of medicines. Medicines were classified as present if they were observed and not expired. The key findings of these visits were:

- Medicine stock situations varied widely. However, almost all facilities had the basic medicines and critical tracers, including paracetamol, Oral Rehydration Salts, deworming medicines and measles vaccine;
- Likewise, almost all facilities had in stock the first line medicines for treating uncomplicated malaria. In contrast only 50% had injectable artesunate, the recommended first-line for complicated/ severe malaria; a major cause of mortality in Uganda; and
- Despite all facilities conducting deliveries, only 40% of health facilities had in stock injectable oxytocin, a life-saving medicine for the control of bleeding in women after delivery. Likewise almost none had magnesium sulphate, which is the recommended drug of choice for women with eclampsia or impending eclampsia (pregnancy-associated severe high blood pressure). Haemorrhage and hypertension are the leading causes of maternal mortality in sub-Saharan Africa and likely Uganda.

Trends and Issues

Health facilities often have drug stock-outs, which means patients have to buy drugs from private drug stores or use herbal medicines. The Buliisa District health team also noted that there is widespread advertising for traditional healers' services on radios and in print media. The limited availability of drugs will mean patients are more vulnerable to curable diseases.

21.5.12.3.6 Health Staffing Levels

Current Conditions

The health sector in Uganda has been faced with both acute and chronic staffing shortages. In 2011 the overall health worker to population ratio was estimated to be 1:1,298 as opposed to the WHO standard of 1:439. In the Study Area the biggest staffing deficiency was observed in Buliisa general hospital, with only 42 staff compared to the staffing norm of 170 people. See Table 18-14 and Section 18.5.3.4.11 Health Services Infrastructure Capacity (Staffing) in **Chapter 18: Health and Safety**.

Trends and Issues

Causes for understaffing of health facilities include:

- Remuneration: overall levels of remuneration for health workers in Uganda are low even when compared with regional standards. For example; in 2013 it was estimated that a doctor in Kenya was likely to earn up to four times more than his or her counterpart in Uganda;
- Lack of promotional opportunities at Local Government level: Opportunities for promotion and professional advancement are limited at the local Government (district) health facility level; and
- Shortage of staff housing: shortages of available staff housing at lower level health facilities have made staff both reluctant to either take up posts in these areas or to stay there – with high rates of absenteeism linked with staff residing in other areas (e.g. District Centres) and commuting to their more remote facilities.

21.5.12.4 Summary of VEC status, sensitivity and proposed threshold

Table 21-36: Summary of VEC Status, Sensitivity and Threshold for Community Health

Indicators	Current status/trend without development	VEC sensitivity	VEC threshold
Data on HIV, TB, Hepatitis B, malaria, respiratory infections	Communicable diseases are a significant health concern within the Study Area as the most common causes of morbidity and mortality are malaria, HIV and pneumonia. Social and environmental conditions, including inadequate health facilities and prime mosquito breeding grounds, are likely to continue to favour the spread of disease within the Study Area.	Moderate	No increase in the prevalence of disease and no deterioration in the capacity of health services in the Study Area (drug availability, staffing levels, ration of health centres to population etc).
Data on epidemic diseases (cholera, typhoid)	While outbreaks of epidemic diseases frequently occur in the Study Area, public health interventions – especially relating to safe water – have contributed to a decrease in their frequency.		
Data on sanitation and hygiene related disease	Inadequate facilities and behaviours pertaining to sanitation and hygiene contribute to water borne diseases in the Study Area.		
Availability of community health infrastructure	Health facilities in the Study Area are lacking in terms of infrastructure, human resource capacity, safe water and financial resources. Emerging issues such as language barriers arising from migration are likely to negatively affect service delivery. Further investment is needed in this area to improve the number, quality and access to community health facilities.		
Drug availability in health centres	Medicine stock situations vary widely. While most medical facilities in the Study Area had basic medicines, treatment options for major causes of mortality such as malaria and haemorrhaging during pregnancy were lacking.		
Health facility staffing levels	Health facilities, especially the Buliisa general hospital, are severely understaffed. Low remuneration, lack of opportunities for advancement and staff housing shortages are causes of understaffing.		

21.5.12.5 Assessment of Cumulative Impacts on VEC

Table 21-37 presents the potential cumulative impacts on the VEC.

Table 21-37: Assessment of Potential Cumulative Impacts: Community Health

Tilenga Project Potential Impacts, (Direct and indirect)	Project's residual impact significance	Other developments and activities also affecting VEC and potential cumulative impacts	Magnitude of potential impact	Sensitivity	Significance
Physical displacement	Low adverse	<p>Other oil and gas related developments (extension to the Tilenga Project, the Tilenga Feeder Pipeline, EACOP, Kingfisher Field, Kabaale Industrial Park, Kaiso-Tonya Field, Oil Roads, and Waste Management) as well as non-oil and gas developments (agricultural developments, the railway and industrial developments) are likely to contribute to influx into the main urban centres within the region particularly Hoima town, Masindi town, Biiso town, and Pakwach town. As projects will all have different timelines, this may mean that cumulatively population growth is experienced over a longer period before it stabilises. There are also likely to be higher rates of population growth cumulatively than rates that would be associated only with the Tilenga project.</p> <p>The higher level of population growth is likely to exacerbate any potential project-related impacts on community health linked to population growth including:</p> <ul style="list-style-type: none"> • Potential increase in spread of HIV/AIDS and other STIs due to greater number of casual and migrant workers in the area engaging in risky sexual behaviour; • Potential increase in communicable, vector, water, sanitation and waste related disease due to increase in overcrowding in poor quality housing with poor hygiene and sanitation provision and practices. • Potential Increased number of users of existing, already overstretch, health services leading to overburdening of health services infrastructure and delivery. <p>The regional oil developments and development of other infrastructure and agricultural projects are expected to lead to greater stimulation to the local economy and increases in disposable incomes. This is likely to exacerbate any project-related increase in demand for sex workers, and expenditure on drugs and alcohol, which will have negative community health outcomes such as increased practice of risky sexual behaviour resulting in increase in HIV/STIs and unwanted pregnancy; and potential increases in violence.</p> <p>There is a high risk that the potential cumulative effect of these impacts on community health will mean that the threshold will not be met, or will be exceeded, and the sustainability of the VEC is therefore threatened.</p>	High	Moderate	High adverse
Increased impoverishment following resettlement due to Indebtedness and lack of financial literacy	Low adverse				
Increase in malaria	Low adverse				
Increase in rates of TB and other respiratory disease	Low adverse				
Increased prevalence of HIV/AIDS and other STIs	Moderate adverse				
Increase in prevalence of water, sanitation and waste related disease	Low adverse				
Overburdening of health services infrastructure and delivery (including emergency services)	Low adverse				

21.5.13 Primary and Secondary School Education

21.5.13.1 Description of VEC

The completion of primary and secondary school is important for personal and community level development. Increased family incomes may help support children in the completion of schooling, but economic opportunities could also prompt some children to end education in favour of work.

21.5.13.2 Study Area for VEC

The Study Area for this VEC is the Project Aol with particular focus on migration hotspots (Hoima Town, Buliisa town, Masindi Town, Pakwach Town).

21.5.13.3 Indicators of Baseline Conditions

21.5.13.3.1 Teacher pupil ratios

Current condition

According to the 2014 Census (Ref. 21-75), the national pupil to teacher ratio for primary schools was 43:1 (one teacher for every 43 children). Buliisa, Nwoya and Nebbi Districts are below the national standard with 52, 54 and 62 pupils per teacher respectively. Hoima and Masindi are above the national average with 37 and 36 pupils per teacher. Despite education being identified as a primary target for district level budgets, the standards of education within the different districts are predominantly below the national standards. See Table 16-21 in **Chapter 16: Social** for more information.

For secondary education, the national pupil to teacher ratio was 21:1 (one teacher for every 21 children) and this is broadly similar across the districts; Buliisa (21:1), Nwoya (21:1); Hoima (26:1); Nebbi (21:1) and Masindi (23:1).

Trends and issues

- According to the 2015/16 Annual Performance Report from the Ministry of Education and Sports (Ref. 21-61), there is an issue related to teacher absenteeism, which is estimated at 20% and on average, a primary teacher is estimated to be absent for at least 2 days a week. Key reasons for this are related to budgetary constraints (low wages) which may disincentivise teachers;
- Population growth (estimated at 3.5% per annum) will put further pressure on existing resources and facilities. Uganda has one of the highest proportion of young children (age 0-14 years) currently estimated at 50% (2015/16 Annual Performance Report); and
- School enrolment in Buliisa and Nwoya districts has increased with the approval and passing of the national Universal Primary Education (UPE) Policy and the Universal Secondary Education (USE) Policy; however, this increased enrolment rates has increased pressure on limited educational services and infrastructure within the districts.

21.5.13.3.2 Number of schools

Current condition

According to the 2015 SHBS there are 44 primary and 3 secondary schools in Nwoya District, and 54 primary and 5 secondary schools in Buliisa District. There are 201 reported primary schools in Hoima District, 36 secondary schools and 4 technical institutions; and 121 primary and 24 secondary schools in Masindi District. Hoima and Masindi District reportedly show better educational infrastructure as well as performance than the other districts relevant to the Project Area. (See section 16.6.4.1. **Chapter 16: Social**.)

Trends and issues

Approximately 40% of district spending in Buliisa and Nwoya is on education; however, annual budgets for Buliisa and Nwoya districts have had year on year reductions over the last three and four financial years respectively. See **Chapter 16: Social** for more information on district revenue and expenditure.

21.5.13.3.3 Access to schools

Current condition

Improved enrolment rates have increased pressure on limited educational services and infrastructure within the districts. Access to school and transport costs make school attendance difficult and unaffordable for many families, with schools in the Primary Study Area typically between 2-8 km away and the only means of access being on foot, by bicycle or by vehicle (a one-way public taxi costs approximately UGX 4,000). Some schools are nominated as Universal Primary Education (UPE) Schools where attendance is free. Nevertheless high costs related to attending schools such as school supplies and books, exam fees, uniforms and daily transport costs can still affect children's access to schools.

Trends and issues

No significant changes reported in relation to costs associated with access to schools in the Study Area.

21.5.13.3.4 Highest school grade completed (15+ years)

Current condition

According to the 2014 Census, the majority of the working population in Uganda have only attained primary education, only 18.5% completed secondary and only 4.3% completed tertiary education (Ref. 21-75).

When broken down by district, 20% of the population 15 years and older in Buliisa District achieved secondary education in 2014¹². This is similar to Nwoya District at 21%. The highest educational attainment for 15+ years is in Masindi District at 32% and in Hoima at 27%, while the lowest is in Nebbi where only 10% of the population 15 years and older completed secondary education (Ref. 21-75). See section 4.3.4.1.1 Education and Skills in **Chapter 16: Social** for more information.

Trends and issues

The introduction of Universal Primary Education (UPE) has broadened access to basic, primary education – primary school enrolment in Uganda increased from 3.4 million in 1996 to 7.5 million in 2008, to 8.6 million in 2016. The Universal Secondary Education Programme launched several years after UPE, aimed to improve access to higher levels of education, however secondary education has been faced with a lower completion rate than primary education for both boys and girls primarily due to high education costs.

21.5.13.3.5 Enrolment and completion rates for girls

Current condition

In Buliisa district, the number of male pupils in primary school is slightly higher than female (52.8% and 47.2%). The difference between number of girls and boys enrolled is not significant, however, until P7. Recent data for secondary school enrolment rates was not available. Just over one in ten (11.5%) of respondents to the 2014 SBS (covering Hoima and Buliisa districts) cited pregnancy as a reason for school dropout. The perception that girls should not be given an education was also given as a reason for school dropout during FGDs with youth as part of the Tilenga ESIA SBS in 2017.

¹²This differs from the RAP1 Social Baseline Report, which found that 4% of adults and 0.5% of children of school going age had completed secondary education. (Ref. 21-47).

Trends and issues

The educational sector in Uganda continues to put in place strategies to enable increased participation for girls in education. Two initiatives which aim to promote girls' education are the 'National Strategy for Girls' Education (2014-2019)' and the 'Gender in Education Strategic Plan 2015-2020'.

21.5.13.3.6 Literacy rates

Current condition

In Buliisa District 47.6% of people above the age of 18 are literate, the literacy rate in Nwoya District is 53%, 60% in Hoima District, 26% in Nebbi and 59% in Masindi District. See the Educational Attainment and Literacy section in **Chapter 16: Social**.

Trends and issues

Currently there are three Early Grade Reading programmes being implemented in Uganda with the aim of improving reading and literacy level for primary school children. The main programme is being funded by USAID called the Uganda School Health and Reading Program (SHRP) which is being implemented by RTI International (2015/16 Annual Performance Report).

21.5.13.3.7 Percentage of population of children of school-age in school

Current condition

In 2016, 8.65 million students were enrolled in primary school, increasing by almost 4% since 2012 (8.33 million) (UBOS, 2017). Although primary school enrolment has increased over the years there has been a decrease in the number of children actually completing school, decreasing by 2.6% in 2014 compared to 2002 (Census, 2014).

There are a higher number of students concentrated in the first four primary school grades, and only 7% in the final primary school grade indicating high drop-out rates on a national level (UBOS, 2017).

Trends and issues

According to the 2015/16 Annual Performance Report, there has been a 6% decline in total enrolment to primary schools, decreasing from 8,772,655 in 2014/15 to 8,264,317 in 2015/16. A key reason for this decrease in enrolment rates is due to high dropout rates. The main reasons for dropping out of school include lack of resources to pay school fees and high domestic workload. Another challenge is linked to fishing and herding practices of communities (21-11). Around Lake Albert some families take their children in and out of school to help with fishing; some parents also expect the older children (beyond Primary Level 3) to play a full economic role and therefore see limited (or no) value in education once the child can earn a living fishing or herding. Early marriage and teenage pregnancy constitute additional factors for girls.

Another issue is pupil absenteeism. According to the 2015/16 Annual Performance Report it is noted that pupils tend to escape from school at lunch time, and others drop out of school due to hunger (21-61). It was further observed in RAP1 Social baseline report that female headed households have more children of school going age not attending school.

Additionally, there are a number of vulnerabilities which lead to educational disadvantage for young children, including children with HIV/AIDS, disabilities, orphans, child mothers, child-headed households and child labour (21-76).

21.5.13.4 Summary of VEC Status, Sensitivity and Proposed Threshold

Table 21-38: Summary of VEC Status, Sensitivity and Threshold for Primary and Secondary School Education

Indicators	Current status/trend without development	VEC sensitivity	VEC threshold
Teacher pupil ratios	Teacher to pupil ratios vary in within the Study Area but are broadly aligned or somewhat below national averages (1:43 based on the 2014 Census).	Low	No deterioration in: <ul style="list-style-type: none"> - Teacher: pupil ratio - Enrolment and completion rates for girls - Costs associated with school access.
Number of schools	The number of schools in the Study Area will not be sufficient to meet increasing population levels. There is a need to rehabilitate existing and establish new educational facilities to accommodate for increasing number of students, to provide education facilities in underserved areas such as rural regions, and to improve the quality of education services throughout the Study Area.		
Access to schools	Existing barriers to access to education will persist including travel distance and prohibitive costs associated with school fees, costs of materials and uniforms, exam fees and transport fees.		
Highest school grade completed (15+ years)	There is a low level of secondary education attainment, both nationally and in the Study Area.		
Enrolment and completion rates for girls	Although completion rates for primary education are broadly similar between male and female children, ~20% of girls still have not have completed any form of education. School dropout rates are high in the Study Area due to economic and cultural reasons.		
Literacy rates	Literacy rates vary across the districts in the Study Area and are below national averages.		
Percentage of population of children of school age in school	There has been a decrease in the number of students enrolling and completing primary education in Uganda.		

21.5.13.5 Assessment of Cumulative Impacts on VEC

Table 21-39 presents the potential cumulative impacts on the VEC.

Table 21-39: Assessment of Potential Cumulative Impacts: Primary and Secondary Education

Tilenga Project Impacts, (Direct and Indirect)	Project's residual impact significance	Other developments and activities also affecting VEC and potential cumulative impacts	Magnitude of potential impact	Sensitivity	Significance
Improved accessibility within the Project Area due to upgrading of access roads and construction of new roads	Moderate beneficial	<p>Other oil and gas related developments (extension to the Tilenga Project, the Tilenga Feeder Pipeline, EACOP, Kingfisher Field, Kabaale Industrial Park, Kaiso-Tonya Field, Oil Roads, and Waste Management) as well as non-oil and gas developments (agricultural developments, the railway and industrial developments) are likely to contribute to influx into the main urban centres within the region particularly Hoima town, Masindi town, Biiso town, and Pakwach town. As projects will all have different timelines, this may mean that cumulatively population growth is experienced over a longer period before it stabilises. There are also likely to be higher rates of population growth cumulatively than rates that would be associated only with the Tilenga project.</p> <p>The higher level of population growth is expected to exacerbate any project-related effects on access to primary and secondary education linked to population growth by increasing pressure on existing education facilities meaning worse teacher/pupil ratios, insufficient space in class rooms and insufficient materials for students to use. The regional oil developments and development of other infrastructure and agricultural projects will lead to greater stimulation to the local economy, more job creation and increases in disposable incomes. This is likely to have multiple potential cumulative effects including increase in demand for education facilities:</p> <ul style="list-style-type: none"> • Demand for skilled labour may increase the perceived value of having an education amongst local communities and therefore encourage students to remain in school for longer, placing a higher demand on education facilities. • Higher disposable incomes may be invested in children's education, placing a higher demand on education facilities. <p>The increase in demand for education facilities may be balanced by the following factors:</p> <ul style="list-style-type: none"> • Risk that incentives for girls and boys to drop out of school early will be increased due to greater demand for sex workers and greater availability of casual labour. • Increased national and local government revenue from the combined projects may be invested in improving public education infrastructure. <p>There is a risk that the potential cumulative effect of these impacts on primary and secondary education will mean that the condition of the VEC will deteriorate to the extent that the threshold will not be met or will be exceeded.</p>	Low	Moderate	Moderate adverse
Increase in prostitution	Moderate adverse				
Direct and indirect employment opportunities	High beneficial				
Development of more educated and skilled workforce	High beneficial				
Increased pressure on education facilities	Low adverse				

21.5.14 Access to Land and Shelter

21.5.14.1 Description of VEC

This VEC refers to the availability of affordable land for residence or livelihoods. Landlessness for poorer households was raised as a concern during stakeholder consultations. Poor housing due to influx and rapid, unplanned construction of settlements was also raised as a concern.

21.5.14.2 Study Area for VEC

The Study Area for this VEC is the Project Area of Influence.

21.5.14.3 Indicators of Baseline Conditions

21.5.14.3.1 Land use mapping

Current condition

The main land uses identified in the Buliisa District are:

- Crop farming (hills of Ngwedo sub-county and Biiso sub-county);
- Livestock grazing (flatlands close to Lake Albert);
- Commercial infrastructure (including trading centres, landing sites);
- Public infrastructure including schools, health centres and administrative units;
- Residential including private residences; and
- Protected areas (MFNP and Bugungu Wildlife Reserve), used for nature conservation and tourism activities (e.g. lodges, game drives, river cruises).

See section 16.6.7.4.1 Land Use in the Primary Study Area in **Chapter 16: Social** for more information.

In Hoima – a great portion of the municipality is under mixed use. Such uses include Agriculture–Residential covering 9253.9 hectares which is about 40.55 per cent of the municipality land and Commercial-Residential covering about 120.2 hectares which is 0.53 per cent (Ref. 21-62).

Masindi District covers an area of 3,927.4 km² of which 1,139.4 km² is Game Park (National park and Wildlife reserves), 818.9 km² is covered by forests, 2,271 Sq. km² is dry land and 517.1 km² is the area covered by water (Ref. 21-54). In Masindi Town Council land use comprises residential (low, medium and high density); commercial; light industrial; public and community infrastructure; recreational areas; natural forest; planted forest; wetland; and open space.

Trends and issues

- Population increase and demographic pressures imply a more intensive use of natural resources across the Study Area;
- The main land use change that is currently occurring in Nwoya District (Got Awpoyo and Purongo Sub County) is the use of unexploited agricultural land for industrial purposes. This is occurring as a result of government policies, private investors, and population growth (see **Chapter 16: Social**); and
- Land uses around some town centres in the Study Area (Buliisa and Hoima Town Centre) are changing from agricultural land to commercial/ light industrial due to expanding commercial and industrial activity at those locations.

21.5.14.3.2 Land values (purchase and rental)

Current condition

Land is more expensive in Buliisa than in Nwoya District and the price of land has been affected by oil and gas activities. Another factor determining the purchase and rental price of land is its fertility. In Buliisa District, the price per acre ranges from approximately UGX 600,000 to 1,000,000 (US\$ 164 to 275); with the most expensive land in Ngwedo and Buliisa sub-counties where demand is higher. In Nwoya District, the price per acre ranges from approximately UGX 350,000 to 600,000 (US\$ 95 to 165).

Trends and issues

Increasing land pressures due to demographic changes and increasing levels of population will hinder the supply of land and is likely to increase the value (purchase and rental) of land.

21.5.14.3.3 Land and property tenure status

Current condition

There are four types of tenure recognised in Uganda under the Constitution including customary tenure, freehold, mailo (a customary form of freehold tenure not thought to occur in the Study Area), and leasehold. Over 70% of land in Uganda falls under customary tenure. Most of the community members in the Study Area hold customary land under individual or communal tenure, and do not hold certificates of customary ownership (neither do they hold freehold titles). However, there is a move towards converting or trying to convert customary land into freehold or leasehold tenure. Please see section 16.6.7 Land Tenure and Land Use in **Chapter: 16 Social** for more information.

Trends and issues

- Changes in land-use patterns and increasing economic activity and investment in the Study Area is increasing the need to convert customary land into freehold or leasehold tenure; and
- Land-related sensitivities (and resulting conflict situations) tend to be high in the Study Area and have been increasing, with land (as property and as a resource) being one of the most important assets in the area.

21.5.14.3.4 Ownership of land by women

Current condition

In Uganda, only approximately 16% of women formally own land.

Customary laws and practices predominately shape individual's relationship with land and is traditionally largely influenced by societal norms and patriarchal conditions. Land ownership is passed to male heads, while women retain 'secondary' rights to land, which typically means gaining access to land through male family figures (e.g. fathers, husbands, brothers, etc.). Over 70% of all land in Uganda held under customary tenure, customary rules for land governance play a major role in determining women's land and property rights.

According to the Social Baseline (**Chapter 16: Social**), within the Study Area, although women and girls do not generally participate in taking land-related decisions and are excluded from land matters, some women have been identified as landowners. The Alur ethnic group practices matrilineal land inheritance and cases of women having inherited land from their fathers were encountered during the 2015 SHBS. Women can access land through purchase but this is not yet common. To date, only 8% of land applications registered at Buliisa District have been carried out by women. Women can also rent land and this option is generally seen as more affordable and less prone to land grabbing by male relatives.

Trends and issues

In 2013, a National Land Policy was approved by the Ugandan government which acknowledges the gap between women’s land rights in law and in practice. It provides guidance on ways in which legislation can be regulated to protect the right to inheritance and ownership of land for women and children, and to ensure equal land rights for men and women in marriage. It appeals for an overhaul of the Succession Act and revisions to the Land Act, and for the restoration of powers of land administration to traditional leaders, provided they are sensitive to the rights of vulnerable groups including women.

21.5.14.4 Summary of VEC status, sensitivity and proposed threshold

Table 21-40: Summary of VEC status, Sensitivity and Threshold for Access to Land and Shelter

Indicators	Current status/trend without development	VEC sensitivity	VEC threshold
Land use mapping	The main land uses identified in the Study Area are for agriculture purposes (crop farming and livestock grazing) and increasingly for commercial infrastructure. Population rise and increase in economic activity will change land-use patterns implying a more intensive use of natural resources and risk of land degradation over-time.	High	No deterioration in levels of access to land, land productivity, affordability of land, and ownership of land by women.
Land values (purchase and rental)	Increasing land pressures due to demographic changes, economic development and increasing levels of population will hinder the supply of land and is likely to increase the value (purchase and rental) of land in the medium to long-term.		
Land and property tenure status	The majority of land is held under customary tenure. Changes in land-use patterns and increasing economic activity in the Study Area are increasing the need to convert customary land into freehold or leasehold tenure.		
Ownership of land by women	A small portion of women formally own land. National land policies will need to enhance the rights of vulnerable groups such as women to improve the number of women owning land.		

21.5.14.5 Assessment of Cumulative Impacts on VEC

Table 21-41 presents the potential cumulative impacts on the VEC.

Table 21-41: Assessment of Potential Cumulative Impacts: Access to Land and Shelter

Tilenga Project Potential Impacts (Direct and Indirect)	Project's Residual impact significance	Other developments and activities also affecting VEC and potential cumulative impacts	Magnitude of potential impact	Sensitivity	Significance
Physical displacement	Low adverse	<p>Other oil and gas related developments (extension to the Tilenga Project, the Tilenga Feeder Pipeline, EACOP, Kingfisher Field, Kabaale Industrial Park, Kaiso-Tonya Field, Oil Roads, and Waste Management) as well as non-oil and gas developments (agricultural developments, the railway and industrial developments) are likely to contribute to influx into the main urban centres within the region particularly Hoima town, Masindi town, Biiso town, and Pakwach town. As projects will all have different timelines, this may mean that cumulatively population growth is experienced over a longer period before it stabilises. There are also likely to be higher rates of population growth cumulatively than rates that would be associated only with the Tilenga project.</p> <p>The higher level of population growth is expected to exacerbate any project-related effects on access to land and shelter linked to population growth by increasing demand for local land and housing, which is likely to push up prices.</p> <p>The regional oil developments and development of other infrastructure and agricultural projects are likely to fuel land speculation, which will again push up prices and exacerbate the commercialisation of land (i.e. transition from customary ownership systems to freehold or leasehold formal tenure systems). This transition to formal land tenure may exclude cash poor households from having continued access to land.</p> <p>Cumulative land take for all developments in the area will mean there is less land available for local communities for either residential or economic purposes.</p> <p>Greater stimulation of the local economy, more job creation and increases in disposable incomes from the development of projects in the region may also drive up prices for land and shelter as people might choose to invest their incomes in land and property. This is likely to exacerbate inequalities in access to land between cash poor, subsistence based households and households that benefit from earning a salary.</p> <p>There is a high risk that the potential cumulative effect of these impacts on access to land and shelter will mean that the condition of the VEC will deteriorate to the extent that the threshold will not be met or will be exceeded and therefore the sustainability of the VEC is threatened.</p>	Moderate	High	High adverse
Economic displacement	Moderate adverse				
Changes to traditional land tenure system	Moderate adverse				
Local price inflation	Moderate adverse				

21.5.15 Local Economic Stability

21.5.15.1 Description of VEC

This VEC refers to employment growth and stability, sustainability of local economic activities, inflation rates and income disparities within the local economy. Changes in VEC condition may be positive (e.g. new jobs and markets) or negative (e.g. increased cost of living, increased cost for labour, widening inequality as poorer and subsistence based households struggle to adapt to more cash based economy).

21.5.15.2 Study Area for VEC

The Study Area for this VEC is the Project AoI with particular focus on anticipated migration hot spots (including Buliisa town, Wanseko, Hoima Town, Masindi Town, Pakwach Town).

21.5.15.3 Indicators of Baseline Conditions

21.5.15.3.1 Percentage distribution of population by economic activities (including inactive) Current condition

Subsistence farming (including fishing and livestock keeping) is the primary source of income for the majority of households in the Study Area.

Within Hoima Municipality the main economic activity is commerce, with over half of Hoima Town employed in business. See **Chapter 16: Social** for breakdown of contribution of different sectors to local economy (agriculture, industry, services etc.) for more information related to the Study Area.

Trends and issues

Depleting fish stocks in Lake Albert are making fishing based livelihoods less sustainable in the Study Area (primarily affecting Buliisa and Hoima districts) and more people previously engaged in fishing are turning to land based subsistence livelihood activities. Formal sector employment is very low in the Study Area.

21.5.15.3.2 Cost of living indices

Current condition

Inflation in Q4 2017 was expected to be around 4.9%. Uganda experienced high inflation in 2012 when inflation rose to almost 25%, but since 2013 it has been relatively stable, fluctuating between 2.5 and 8%. The Consumer Price Index CPI is currently at 169, which implies that prices have increased by 69% since the base year – 2010, and food inflation is around 9%.

Per unit cost of clothes for adults ranges from UGX 45,000 to 67,000 (~USD \$13 – 16) while for children it is UGX 25,000 (~USD \$6). Costs for social services such as school fees are around UGX 123,000 (~ USD\$ 33) and health care fees are around UGX 40,000 (~ USD\$ 11). Key costs of other household items and social services are presented in Table 16-36 in **Chapter: 16 Social**.

Trends and issues

Inflation was 4.9% for Q4 2017, and it is forecasted to increase to 6 by 2020, however food inflation is forecasted to decrease from 8.81 in Q4 2017, to 7 by the end of 2018 and to 6.5 in 2020 (Ref. 21-55).

21.5.15.3.3 Cost of labour

Current condition

- Real wage (monthly) of a low skilled employee in Uganda is between UGX 171,010 – 412,415 (~\$46 – 111);
- Real wage (monthly) of a medium skilled employee in Uganda is between UGX 429,135 – 762,084 (~\$116 – 206); and

- Real wage (monthly) of a high skilled employee in Uganda is between UGX 601,519 – 1,216,624 (~\$162 – 328) (Ref 21-63). (Figures as of February 2018).

Trends and issues

The UBOS Statistical Abstract for 2016 reports that overall, the median monthly earnings for workers in paid employment in Uganda increased from UGX 80,000 in 2009/10 to UGX 110,000 in 2012/2013. This was a 37.5 percent increase in nominal terms. However in real terms (CPI 2012/13=200.2, CPI 2009/10=144.0 for 2005/2006=100) the median monthly earnings almost remained the same over the survey periods (Ref. 21.64).

21.5.15.3.4 Household incomes (level and sources)

Current condition

According to the 2012/13 National Survey, the average monthly income (derived from income sources including both cash and in-kind earnings) was UGX 453,000 (\$120) in nominal terms. Kampala had the highest average monthly income of about UGX 980,000 (~\$265), while the urban monthly household income was more than double that of rural households (UGX 772,000 vs UGX 325,000) (Ref. 21-51).

On a national level, subsistence farming was the main source of income for households (42.4%), followed by wage-employment (24.1%); non-agricultural income (23.9%) and others (Ref. 21-51).

Livelihoods in the Study Area are also predominately centred on agricultural activities which include crop and livestock production, herding, fishing and increasingly apiculture, with subsistence farming being the primary source of income for the majority of households in the Study Area (Nwoya – 97%; Nebbi – 85%; Hoima – 68%; Masindi – 67%; Buliisa – 66.7%) (Ref. 21-75).

Trends and issues

Income related to subsistence farming has decreased by almost 7% in 2013 compared to 2006 – indicating a shift away to other income-generating activities (Ref. 21-51). This is also exemplified by the fact that wage employment increased by 3.3% and non-agricultural enterprises by almost 4% in that same time period.

21.5.15.3.5 Size and skill level of regional labour force

Current condition

According to the 2015 Urban Labour Force Survey (ULFS, 2015), the working age population (14 – 64 years) was 1.997 million of which the active labour force was 1.443 million. The labour force participation rate in 2015 was 72.3%, with men participating more than women in the labour force (men – 80.8%; women – 64.7%). Additionally, the majority of the working population in Uganda is in the informal sector; informal employment as a percentage of total employment was 87.2% in 2015 with women more likely to be working in an informal occupation (men – 85.3% and women – 89.5%) (Ref. 21-65).

There is a clear gender distinction within the labour force, male workers participating in the labour force being 10.6% better educated than women (Ref. 21-65). Furthermore, the percentage of workers with a technical skill; specialization; or both was at 30.9%; 15.1%; and 13.8% in 2015, while workers with no technical skills/ specialization accounted for 40.3% of the workforce.

According to World Bank statistics (Ref. 21-66) total unemployment was 2.28% in 2016 (men – 2.68%; women – 1.85%), decreasing by 1.06% since 2006.

The working population in Buliisa District are generally unskilled; however, some of the population report skills in construction, carpentry and in weaving of fishing nets (mostly males); 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 (**Chapter 16: Social**). This is assumed to be representative of other districts in the Study Area.

Trends and issues

- Uganda's labour force is anticipated to double within the next 15 to 20 years which will be impacted and driven by increasing population rates;
- Employment in Uganda has expanded in low-productivity sectors such as subsistence agriculture and low-scale trade;
- Only 11% of the labour force is engaged in non-agricultural wage employment as their primary income generating activity¹³ (Ref. 21-64);
- Unemployment tends to be higher among high-skilled workers as skill-intensive sectors have not grown as fast as lower skilled sectors;
- Youth unemployment and underemployment are expected to increase due to lack of employable skills;
- Stringent regulatory requirements and high levels of corruption have hindered the development of new firms and demand for new employment and the need to up-skill the labour force;
- The Ugandan 2011 National Employment Policy lists youth employment as a policy priority action area. However, the implementation of the employment policy has had limited developments; and
- A program named "Skilling Uganda" to address unemployment attempts to streamline skills development efforts by bringing stakeholders together, e.g. trade unions, FUE, Private Sector Foundation and Uganda Manufactures Association, etc.

*21.5.15.3.6 Contribution of different sectors to local economy (agriculture, industry, services etc.)**Current condition*

The services sector had the highest GDP contribution at 50.3% in 2012/13, followed by agriculture at 23.5% and industry at 18.4% (Ref. 21-67). Tourism is also a relevant service sector in Uganda and in 2014, it accounted for 9.9% of GDP amounting to USD 1.8 billion, and contributed to 590,000 jobs (direct and indirect) (Ref. 21-68). It should be noted that in the Study Area tourism is not a big source of local employment as most people working in the tourism industry are recruited from Kampala. The ICT sector in Uganda has steadily been growing, with an average annual growth of 19.7%.

More information on relevant sectors in section 16.6.6.2 Key Economic Sectors in **Chapter 16: Social**.

Subsistence farming is the primary source of income for the majority of households in the Study Area (Nwoya – 97%; Nebbi – 85%; Hoima – 68%; Masindi – 67%; Buliisa – 66%). Trading and commercial services are varied within the Study Area; commerce is the main economic activity in Hoima Municipality whereas it accounts for only 11.2% in Masindi District. Businesses within Buliisa District relate to dealing in agricultural, livestock and fishing produce, leisure, sale of general merchandise in retail and wholesale shops, groceries, drug shops, hair salons and video halls, and tend to be concentrated along the lake shores where populations are more concentrated. However, as identified in RAP1 there is also limited entrepreneurship in the area with only 1.1% of the total surveyed population claiming a business or trade as their primary occupation. Trade is likely to form a secondary livelihood linked to the sale of crop and livestock surplus. Small business and trade are an important source of livelihoods in Pakwach TC. For more information on key sources of livelihoods in the Study Area see **Chapter 16: Social**.

Income generation and household subsistence are supported by a number of complementary livelihood practices in the Study Area, most of which are natural resources based. Significant complementary activities include sand mining and sea shell collection along the shores of Lake Albert,

¹³ This differs from the RAP1 Social Baseline Report, which found that Employment and casual labour is the primary occupation of only 1.8% of the surveyed population. (Ref. 21-47)

charcoal burning, papyrus harvesting and grass harvesting. See **Chapter 16: Social** for more information on other income-generating activities in the Study Area.

Tourism is growing in significance and potential in the Study Area. The District Development Plans indicate that there are a number of tourism attractions that could be developed such as nature based, faith based, culture and heritage, and eco-tourism (Masindi District Plan; Hoima District Plan). At present, however, tourism is not a big source of local employment.

Trends and Issues

According to the 'Uganda 2040 Vision' agriculture will remain central to Uganda's aspirations to boost economic growth and reduce poverty. Emphasis will be placed on harvesting Cotton, Coffee, Tea, Maize, Rice, Cassava, Beans, Fish, Beef, Milk, Citrus and Bananas. These enterprises were selected for a number of reasons including, high potential for food security (maize, beans, Cassava, Bananas); and high contribution to export earnings. Core projects will include:

- 1. Agriculture Cluster Development Project (ACDP);
- 2. Markets & Agriculture Trade Improvement Project (MATIP II);
- 3. Farm Income Enhancement and Forest Conservation II;
- 4. Storage Infrastructure; and
- 5. Phosphate Industry in Tororo Tourism Development Priority Area (Ref. 21-67).

In order to increase agricultural production and productivity in the next five years, the Masindi District Local Government will focus on factors such as enhancing agricultural extension services, provision of improved and high yielding agricultural technologies, up scaling the transfer and utilization of food-production and labour-saving and cost effective technologies for farmers; promoting sustainable land use and soil management and increasing access to agricultural finance (Masindi District Plan).

Hoima District Local Government identifies similar interventions for the agricultural sector. The following are identified in the Hoima DDP 2015-2020: identifying and building key human resource capacity; technology adaptation at the farm level including modern irrigation technologies; up scaling the transfer and utilization of food-production and labour-saving technologies for women farmers; enhancing extension services; increasing access to and use of critical farm inputs; promoting sustainable land use and soil management; increasing access to agricultural finance; improving road infrastructure to enhance transportation of agricultural products; and improving stock and quality of storage facilities (Ref. 21-62).

The Buliisa DDP Production and Marketing Department outlines the following objectives for agriculture in the Buliisa DDP 2015-2020: a) Provide farmers with high yielding, disease resistant crop varieties, and animal breed and fish stocks b) Develop and maintain infrastructure for diseases, pests and vector control and quality assurance services c) Intensify technical back stopping, mentoring and supervision of field extension staff to strengthen agriculture advisory services delivery d) Promotion of the use of low cost irrigation technologies e) Setting up multiplication sites for improved / productivity-enhancing technologies at farmers level f) Lobbying and advocacy for increased funding to the sector g) Mobilization of farmers for improved/collective marketing h) Sensitization and training of farmers on increased agricultural production and productivity i) Linkage of all farmers to zonal research organizations j) Technology promotion and multiplication, on revolving fund basis k) Staff capacity building to develop competences in pest, disease, vector control, quality assurance, gender, HIV/AIDs and Environmental Management l) Mobilization and sensitization of farmers on pest diseases, vector control, quality assurance for crops, animal and fisheries m) Carry out Agricultural need assessment and compile the inventory of all existing agricultural statistics and its status n) Promotion of technologies for primary Agro-processing and value addition o) Promotion of group formation (SACCOs) to enable credit accessibility and easy training p) Promotion of apiculture and sericulture (Ref. 21-69).

Forecasts for the tourism industry for 2025 show substantial increases from 2014 in absolute numbers for revenues, visitors, employment and investment (Table 16-27, Source: Ref. 21-67). However, with broader economic growth expected to occur, tourism's relative contribution to GDP and jobs is

expected to increase only marginally. Investment in tourism will be based on the value chain whose major stages are: Pre-visit Services, Transportation; Information and Reception; Hospitality, as well as, Tourists' Attractions and Amenities (NPA). Core project will include: Tourism Marketing and Product Development Project (Namugongo, Kagulu Hills and Source of the Nile) (NPA).

Minerals, oils and gas development: this sector has been recognised as having significant potential to contribute to economic growth and poverty alleviation through mineral exports, use of oil and gas for local consumption/ generation of electricity, commercial opportunities in and near the Albertine region, and employment creation (NPA). For example, the Masindi District Development Plan acknowledges that there is a strong commercial opportunity it can tap into a result of being close to oil-rich Districts of Buliisa and Hoima (Masindi District Plan).

21.5.15.3.7 Asset ownership

Current condition

On a national level, almost 80% of houses occupied were owned by household members, with 47% of houses being owned individually while 32% of houses being owned jointly by household members (UNHS, 2013). With regards to owning land, 77% of households owned land with 29% jointly owned. Almost 60% of households owned mobile phones and slightly more males (58%) owned mobile phones individually than females (46%). Radios are also a very important communication tool and were owned by 60% of households in 2013 (UNHS, 2013). Males were more likely to own radios jointly (23%) than females (5%).

In the Study Area, approximately half of all households in Buliisa and Nwoya districts have a radio. A greater proportion of households own a bike or a motorbike in Nwoya District compared to Buliisa District. The ownership of a mosquito net is high in Buliisa District (94.9%) but much lower in Nwoya District, with only 12.2%. See Table 16-38 **Chapter 16: Social** for more information on household assets in key districts and sub-counties.

Trends and issues

Ownership of key household assets is likely to increase with the rise in incomes.

21.5.15.4 Summary of VEC Status, Sensitivity and Proposed Threshold

Table 21-42: Summary of VEC Status, Sensitivity and Threshold Local Economic Stability

Indicators	Current status/trend without development	VEC sensitivity	VEC threshold
Percentage distribution of population by economic activities (including inactive)	Crop farming is likely to remain the primary economic activity in the Study Area. Livestock ownership will be also present but the pattern will continue in the foreseeable future.	Moderate	Factors influencing economic development will be maintained at or above the levels necessary to ensure sustainable economic growth. Factor to be Considered include (non-exhaustive):
Cost of living indices	Uganda experiences high inflation rates, although they have been relatively stable since 2013. Projections for 2020 indicate an increase in inflation but a decrease in food inflation.		- Local cost of living remains in line with national trends
Cost of labour	A highly skilled employee is likely to earn more than four times as much as a low skilled employee. While national and regional income inequalities exist, conditions are expected to improve over time.		- Local inflation rates remain in line with national trends
Household incomes (level and sources)	Urban incomes were more than double that of rural households. Subsistence farming was the main source of income at the national level, although a recent decrease indicates a shift towards other income-generating activities such as wage employment.		- No drop in household income levels for lowest earning and subsistence based

Indicators	Current status/trend without development	VEC sensitivity	VEC threshold
Size and skill level of regional labour force	National labour force participation is greater for men than women, with the majority of the population working in the informal sector. The labour force is expected to double within 20 years as the population grows. Emerging issues include high unemployment rates for skilled workers due to the underdevelopment of high-skill industries and youth unemployment due to lack of marketable skills.		households
Contribution of different sectors to local economy (agriculture, industry, services etc.)	The services sector contributes around half of GDP with agriculture and industry also being important economic sectors. Agriculture is the main source of employment nationally and in the Study Area. Agriculture, resource extraction and tourism are expected to contribute to economic development in the Study Area.		
Value of household assets	In the Study Area, ownership of indicators of household wealth such as radios, bikes and mosquito nets varied between districts.		

21.5.15.5 Assessment of Cumulative Impacts on VEC

Table 21-43 presents the potential cumulative impacts on the VEC.

Table 21-43: Assessment of Potential Cumulative Impacts: Local Economic Stability

Tilenga Project Potential Impacts (Direct and Indirect)	Project's Residual impact significance	Other developments and activities also affecting VEC and potential cumulative impacts	Magnitude of potential impact	Sensitivity	Significance
Economic displacement	Moderate adverse	<p>The regional oil developments and development of other infrastructure and agricultural projects will lead to greater stimulation of the local economy, more job creation, business opportunities, and increases in disposable incomes. The combined taxes and revenues from all developments are expected to be an important contributor to local and national government revenue, some of which is likely to be spent on improving public infrastructure and services, which should further help to sustain economic growth.</p> <p>The higher level of influx associated with developments of other oil and non-oil projects in the region, as well as the increase in disposable incomes and the demand for goods and services from the projects themselves will, cumulatively, place potential greater inflationary pressures on local goods, services, wages and land. While this may benefit some (such as business owners, landlords, waged workers), it risks greater impoverishment of subsistence based households who are cash poor. This in turn risks widening income and economic inequalities within local communities.</p> <p>The cumulative land take for all projects will lead to a conversion of what was previously agricultural (farming and pastoralism) land to industrial or commercial land use. It is possible that a number of economically displaced households may not return to their previous livelihood activities following displacement, and are likely to try and find work in urban and semi-urban areas (including Buliisa TC, Hoima TC, Masindi TC, Pakwach TC) or on the projects being developed in the region. This would contribute to changes in livelihood and employment patterns in the region with both positive and negative effects. On the positive side, for those who are able to enter the formal job market, it may provide an opportunity to earn more income for the household and to upskill. On the negative side, for those unable to find alternative employment, it may lead to greater household insecurity and impoverishment.</p> <p>The development of hydropower projects in MFNP and oil roads is likely to exacerbate project related impacts on tourism revenue as the physical presence of the projects may deter visitors to the park, and the projects may also have an impact on the wildlife and habitats in the park, which is one of the main tourist attractions.</p> <p>The potential cumulative impacts on local economic stability are both positive and negative. On balance, it is considered that VEC conditions are predicted to improve and the threat to the sustainability of the VEC reduced.</p>	High	Moderate	Beneficial effect
Increased impoverishment following resettlement due to Indebtedness and lack of financial literacy	Low adverse				
Improved accessibility within the Project Area due to upgrading of access roads and construction of new roads	Moderate beneficial				
Direct and indirect employment opportunities	High beneficial				
Increased demand for goods and services stimulating economic growth	High beneficial				
Development of more educated and skilled workforce	High beneficial				
Local price inflation	Moderate adverse				
Loss of tourism revenue	Moderate adverse				

21.5.16 Safe Communities

21.5.16.1 Description of VEC

Community safety relates to the local populations' exposure to risks to their wellbeing from, for example, theft, sexual assault, traffic accidents and perceived anti-social behaviours such as substance abuse and prostitution.

21.5.16.2 Study Area for VEC

The study area for this VEC is the Project Aol.

21.5.16.3 Indicators of Baseline Conditions

21.5.16.3.1 Crime rates and types

Current Conditions

The most commonly reported crimes in the Study Area are domestic violence, petty theft and land related disputes¹⁴. Child labour is also an issue at fish landing sites and in Pakwach TC where children work in petty trade and as casual labourers in fishing and agriculture. There are very few reported cases of rape but this is thought to be due to reluctance of victims to report the crime due to fear of family break-up and intimidation from elders or others in the community. Defilement cases (sex with a minor) are common.

Crime rates are higher in commercial centres and around fish landing sites. Victims of crime are mainly women and girls and perpetrators are generally youth, apart from crimes related to land disputes, which mainly involve older generations and clan elders. See **Chapter 16: Social**, for more information about crime in the Study Area.

Trends and Issues

Child and Family Protection Units at district level police stations deal with cases of domestic violence. Cases of domestic violence increase around festive times (attributed in part to allegations of men taking all the money generated from the harvest period). Land related disputes have increased over recent years as land speculation has grown with the increased demand for land for oil and gas and other developments in the region.

21.5.16.3.2 Numbers of road traffic accidents

Current Conditions

According to the 2015 Global Status Report on Road Safety, there were 2,937 reported road traffic fatalities in Uganda in 2013, and a road fatality rate of 27.4 deaths per annum per 100,000 population (men – 79%; women – 21%), improving slightly compared to 2010 data (28.9 deaths per 100,000 population) (Ref. 21-70). The majority of road traffic fatalities were pedestrians (40%), followed by riders in 2 or 3- wheel motorised vehicles (30%) and cyclists (8).

Roads in the Study Area are generally in poor condition. Most of the accidents reported in the Study Area are due to speeding, however other causes were said to include built up areas along highways, narrow roads and roads in bad condition (Tilenga ESIA SBS December 2016). In addition to unsafe road conditions in Uganda, there is poor pedestrian awareness of road safety, as well as poor medical emergency response and emergency care.

¹⁴ The causes of land related disputes are complicated and include challenges with the formal land administration system, which enhances risk of speculation (unregistered land can be registered without due process and consent of all those who have customary rights to the land but do not have access to the land administration system). Cultural dynamics and changing demographic factors such as migrations and land subdivision also play a factor in land disputes between individual, family and clan, as these processes have diluted the recognised customs in which land can be held.

Trends and Issues

- Poor road networks were also reported to increase the cost to farmers and other business due to increased travel time and are perceived to be a major cause of traffic road accidents;
- Roads are poorly maintained, inadequately marked, and poorly illuminated. Street signs are also lacking in certain areas, which can add to the difficulty of finding one's way in unfamiliar areas;
- Most roads in Nwoya District are earth or dirt roads and tend to be quite dangerous during the rainy seasons as the roads become increasingly slippery or muddy, and do not allow the passage of vehicles; and
- Speeding is reported to have increased on roads recently upgraded with new surfaces.

21.5.16.3.3 Incidence of violence and accidents that can be linked to alcohol or drugs

According to the WHO report Global Status on Alcohol and Health 2014, Uganda is the highest consumer of alcohol per capita in the East Africa region, with an annual per capita alcohol consumption of 23.7 litres. Alcohol is typically consumed at important cultural and social events such as weddings, births, funerals, deaths and circumcision ceremonies, with the exception of certain groups of people who are prohibited to drink due to religious or cultural reasons (Ref. 21-71).

The consequences of alcohol abuse include:

- Diseases attributable to alcohol consumption, such as cirrhosis, cardiovascular diseases, birth defect and foetal alcohol syndrome;
- Risk of road traffic accidents (boda-boda motorcycles, bicycles, pedestrians and vehicles);
- High risk behaviours, such as unprotected sex with commercial sex workers (risk of HIV/AIDS infection);
- Social disorder (fighting);
- Domestic violence and family disruption (separation and divorce); and
- Lower productivity (for instance in crop fields) and absenteeism from work.

See **Chapter 16: Social**, for more information about alcohol use and abuse in the Study Area.

After alcohol, the most common substance used by the young in Uganda is Kuber 10.8%, Khat 10.5%, Aviation fuel 10.1%, Cannabis 9.2% and cigarettes 5.9%. Different illicit drugs have different impacts and as such some drugs may be related to violence more than others; however there is no data on the occurrence of violence and accidents that are directly attributable to drug use.

Trends and Issues

- There are a number of factors which can contribute to use and over-use of alcohol and substances such as sex, age, religion and occupation. The 2010 GENACIS Report suggests that people aged 30+ were nearly twice as likely to drink frequently as the young; women were much less likely to drink frequently than men; and Muslims were much less likely to be frequent drinkers than Catholics.;
- There are regional disparities regarding alcohol consumption. According to the 2010 GENACIS Report people in the northern region of Uganda were twice as likely to be heavy drinkers as those in the central region. Other studies have shown that higher alcoholism rates have been found in the war-torn regions of northern and eastern than in other regions in Uganda; and
- There were reports that money from compensation paid to men during previous resettlement processes in the region was often spent on alcohol.

21.5.16.3.4 Level of prostitution

Current Conditions

Commercial sex is present in the Study Area, especially in towns such as Hoima, Pakwach, and Masindi and in villages and towns along the lake shores or more populated trading centres. Fish landing sites are well known commercial sex and HIV transmission “hotspots”. Fishing communities, (female and male) sex workers, boda-boda drivers and truck drivers are among the most vulnerable groups (See **Chapter 16: Social**).

Commercial sex work is generally practiced in particular bars or hotels (sex workers indicated that being in the same place as fellow prostitutes afford them a level of protection). In Pakwach TC, sex workers also find customers along the road, at the truck trailer park and at work sites. Sex workers in Hoima estimated that they can earn a gross income of approximately UGX 150,000 a week but their net income after deducting expenses (including rent for the rooms they use) is closer to UGX 10,000.

See section 16.6.3.3.1 Social Disorders (Commercial Sex) in **Chapter 16: Social** for more information.

Trends and Issues

Sex work in the Study Area is widely reported from primary and secondary sources to have increased over recent years.

21.5.16.4 Summary of VEC status, sensitivity and proposed threshold

Table 21-44: Summary of VEC status, sensitivity and proposed threshold for Safe Communities

Indicators	Current status/trend without development	VEC sensitivity	VEC threshold
Crime rates and types	The most commonly reported crimes in the Study Area are petty theft, land related disputes and domestic violence. Crime rates tend to be higher around festive times.	Moderate	No change, or an improvement, in the incidence of crime.
Numbers of road traffic accidents	Most traffic accidents reported in the Study Area are due to speeding; however, poor road conditions are also a key contributor. The likelihood of accidents is expected to increase due to the expected increase in traffic due to increased economic activity in the Study Area.		
Incidence of violence and accidents that can be linked to alcohol or drugs	Uganda is the highest per capita consumer of alcohol in the East Africa region. Alcohol abuse is prevalent nationally and in the Study Area and is related to damage to personal finances, adverse health outcomes and risky behaviours. Men and older people are more likely to be heavy drinkers.		
Level of prostitution	Commercial sex is present in the Study Area, especially in more heavily populated areas. Reports indicate that sex work has increased with the influx of workers and local income generated by oil activities.		

21.5.16.5 Assessment of Cumulative Impacts on VEC

Table 21-45 presents the potential cumulative impacts on the VEC.

Table 21-45: Assessment of Potential Cumulative Impacts: Safe Communities

Tilenga Project Potential Impacts (Direct and Indirect)	Project's Residual impact significance	Other developments and activities also affecting VEC and potential cumulative impacts	Magnitude of potential impact	Sensitivity	Significance
Physical displacement	Low adverse	<p>Other oil and gas related developments (extension to the Tilenga Project, the Tilenga Feeder Pipeline, EACOP, Kingfisher Field, Kabaale Industrial Park, Kaiso-Tonya Field, Oil Roads) as well as non-oil and gas developments (agricultural developments, the railway and industrial developments) are likely to contribute to influx into the main urban centres within the region particularly Hoima town, Masindi town, Biiso town, and Pakwach town. As projects will all have different timelines, this may mean that cumulatively population growth is experienced over a longer period before it stabilises. There are also likely to be higher rates of population growth cumulatively than rates that would be associated only with the Tilenga project.</p> <p>The higher level of population growth is expected to exacerbate any potential project-related effects on crime linked to population growth including prostitution, increase in alcohol and drug consumption and associated anti-social behaviours, increased pressure on police and potential increase in community tensions expressed through violence or criminal damage.</p> <p>The regional oil developments and development of other infrastructure and agricultural projects combined with a weak land administration system and a low rate of land registration in the Project Aol could also fuel land speculation, which may exacerbate land related disputes and crimes.</p> <p>At least some of the increased disposable income in the region associated with job growth and compensation payments for resettlement for all developments is likely to be spent on alcohol and prostitution. Increases in household incomes may also cause tension between household members and within communities between the 'haves' and 'have-nots', which may be expressed through violence or criminal damage.</p> <p>There is a moderate risk that the potential cumulative impacts on crime levels will mean that the condition of the VEC will deteriorate to the extent that the threshold will not be met or will be exceeded.</p>	Low	Moderate	Low/Moderate adverse
Economic displacement	Moderate adverse				
Social disarticulation and increased community and family conflict	Moderate adverse				
Increased pressure on police	Low adverse				
Increase in crime rate due to project induced in-migration and increased wealth generation	Low adverse				
Increase in prostitution	Moderate adverse				

21.5.17 Social Cohesion

21.5.17.1 Description of VEC

Social cohesion refers to the nature of relationships within a community and incorporates aspects such as levels of marginalisation or inequality within the community (based on income, gender, ethnic group, migrant status etc.), levels of trust, and adherence to shared values and identity.

21.5.17.2 Study area for VEC

The Study Area for this VEC is the Project Aol.

21.5.17.3 Indicators of Baseline Conditions

21.5.17.3.1 Reported conflicts and disputes

Current Conditions

The majority of disputes within the Study Area are related to land such as disputes over land boundaries, issues around land inheritance and land partitioning among heirs, fraud over illegal land purchasing, exclusion of women from land ownership. While tensions over land existed in the past, the presence of oil companies and resulting expectations for compensation payments and/ or royalty benefits are reported to have intensified land disputes (see **Chapter 16: Social**).

There are also various forms of family conflict within the Study Area, relating to land, poverty, alcoholism, early marriage, polygamy and in-migration which are also seen as contributing factors to domestic violence and marriage breakdown (**Chapter 16: Social**). Competition over land based resources is also a source of conflict.

Conflicts sometimes manifest in a violent way including with use of weapons, trespassing and destruction of crops or property, but this is reportedly not very common. Conflicts are mediated through the local sub county leadership structures, Area Land Committees, village LC1s, clan elders and through NGOs such as BIRUDO.

See **Chapter 16: Social**, sections 16.6.3.3.4 Land Disputes, 16.6.3.3.3 Inter-Ethnic Relations, 16.6.3.3.5 Family Conflict and 16.6.3.3.6 Integration of Migrants for further information on reported conflicts and disputes in the Study Area.

Trends and Issues

- Increasing pressures on existing land, natural resources and infrastructure due to population increase may lead to further disputes, on a family and community and intra-community level; and
- There is a lack of institutional resources and capacity to address the sources of disputes (e.g. weak management of the land administration system is a source of land disputes) and also to resolve disputes (e.g. absence of District Land Tribunals and lack of access to formal justice system). See **Chapter 16: Social** for more information on challenges facing local governments and access to justice.

21.5.17.3.2 Institutional Resources and Capacity for Avoidance and Management of Crime and Conflict.

Current Conditions

The local governments of Buliisa and Nwoya are relatively newly established and still have limited capacity, limited infrastructure, and staffing, making public infrastructure and services delivery a challenge. The Buliisa District Land Board (DLB) has reported that they lack resources of both staff and funds to carry out their due diligence and administrative procedural work. District Land Tribunals have never been created as they should have been according to the Land Act. Land disputes/ issues are handled mainly through the judiciary system instead. See **Chapter 16: Social** for more information on capacity challenges for local governments.

Both formal and informal arbitration systems are used by local communities. Local conflicts, especially family and civil matters, are usually resolved using the LC1, elders and clan leaders. Generally it is only when these institutions fail that disputes are taken through the formal judicial system.

The Social Baseline (**Chapter 16: Social**) notes that across the Primary and Secondary Study Area, stakeholders reported capacity challenges within community leadership structures, sub county and district administrative structures to proactively and expeditiously handle social conflicts. General knowledge of court processes and trust in the formal justice system were also found to be low.

Chapter 16: Social further notes that a lack of transport and logistical support (including lack of vehicles, lack of fuel and lack of mechanics to repair broken vehicles) is the main challenge currently facing local police. In Buliisa, for example, the police only had one working vehicle at the time of the survey. Another challenge noted in Pakwach was a lack of accommodation for officers.

Trends and Issues

There has been a lot of sensitisation done by civil society organisations working in the Study Area to raise awareness of the land administration system, land rights, and processes for dispute resolution. There have also been efforts to improve capacity of local leaders in handling disputes. Resource and capacity constraints remain an issue for local government, however. Annual district budgets in Buliisa and Nwoya district have had year on year reductions over the last three and four financial years respectively.

21.5.17.3.3 Incomes/ living standards disparities

Current Conditions

Uganda has had a strong poverty reduction performance in the past two decades, experiencing almost a 2% annual decrease in poverty between 1993 and 2006 (Ref. 21-72). In 2016 there was a 2.7% decrease in the number of people living on less than US\$1.90 per day, which is the second fastest poverty reduction in Sub-Saharan Africa in 2016.

There are large and increasing regional variations in poverty with most of the poor concentrated in the north and the east, while central and western regions have experienced more rapid reduction in poverty (ref. 21-72). Poverty in the Western and Central regions of Uganda is estimated to be 9% and 5% respectively, whereas in the Eastern and Northern regions it is much higher, at 25% and 44% respectively (Ref. 21-67).

In the Study Area, poverty is still widespread but the percentage of the population living below the poverty line has decreased. Both Buliisa and Nwoya districts have approximately 35% of the population living below the poverty line. In Hoima District approximately 24.5% of the population were living below the poverty line in 2015; and in Masindi District 9.8% of the population were below the poverty line in 2013 (recent data was not available for Nebbi District) (Ref. 21-62 and Ref. 21-54).

Income inequality in Uganda has improved nationally overtime – however it still exists with strong regional disparities in levels of income. According to the Hoima Municipality Development Plan (Ref. 21-62), the gap between the rich and the poor is increasingly widening. Some people have benefited from the sale of assets such as land, for which there is high demand as a result of the ongoing developments in the oil and gas sector in the Albertine Graben.

Trends and Issues

- Uganda had one of the best poverty reduction performances in the world since 1993 which was a result of transformation of household livelihood portfolios, strong growth of private wage and salary employment as well as non-agricultural businesses and wages, and increased agricultural productivity among agricultural households. It is one of the few countries in Sub-Saharan Africa that has met the Millennium Development Goal of halving the proportion of people living in poverty. Yet income inequality has remained elevated over the same period;
- Rising income inequality in urban areas, particularly visible in the capital city. This is likely due to rapid urbanisation and development which has left many 'behind'; and

- Large disparities in education may further enhance disparities in income.

21.5.17.3.4 Population change and demographic composition

Current Conditions

The total population in Uganda in 2014 was 34.6 million (Ref. 21-75). Approximately 6.4 million people live in urban areas and of this 1.5 million people live in the capital, Kampala. The majority of the population, 27.2 million, live in rural areas. Uganda has one of the youngest populations in the world with 78% of the population below the age of 30.

The size of villages in Study Area varies considerably from 200 to 2,000 residents and the average population size of villages is 150 households and 1,000 people. The smallest villages include Paara, Kigwera North East and Muvule Nunda with 40 – 80 households. The largest, with more than 2,000 residents (between 250 and 550 households) are Bugana-Kichoke and Kabolwa in Buliisa Sub-county.

See Table 21-44 for population statistics for the Study Area and see **Chapter 16: Social**, Section 16.6.2.2 Study Area Population for more information on population in the Study Area.

Table 21-46: Population Statistics in Study Area

District	Population (2014)	Population growth rate (2000 – 2014)	Number of households	Average household size
Buliisa	113,161	4.86%	21,704	5.3
Nwoya	133,506	9.5%	24,571	5
Hoima	572,986	-4.3%	125,554	4.5
Nebbi	396,794	-3.3%	77,397	5.1
Masindi	291,113	-2.8%	64,935	4.3

Source: Ref. 21-75

Urban populations within the Study Area have increased rapidly, especially at Buliisa and Nwoya. This is a result of migration into the district due to economic opportunities, a porous international border, cultural ties (e.g. marriage), and violence and conflict in neighbouring countries. The continued return of Internally Displaced Peoples following the end of the conflict in Northern Uganda is also a driver of population growth in Nwoya District.

Trends and Issues

- See **Chapter 16: Social**, Figure 16-11 for projected population increase for districts in the Study Area ; and
- The ratio of males to females from 2015 to 2018 is projected to increase in Hoima, Masindi, Nebbi and Nwoya districts by approximately one (101.3 to 102.2 in Hoima; 103.8 to 104.7 in Masindi; 92.9 to 93.9 in Nebbi; 97.8 to 98.7 in Nwoya) and in Buliisa District it is expected to increase by almost three points from 105.4 to 108.2.

21.5.17.3.5 Description and status of local clan structures

Current Conditions

The traditional systems of leadership include the council of elders and the clan leaders. Leadership positions are either elected or hereditary depending on the kingdom and cultural institutions.

The Project falls within the Acholi Chieftdom and the Bunyoro-Kitara Kingdom: two of 12 traditional cultural institutions recognised by the government. Clan leaders and elders still play an important role in communities, especially around governance, land related issues, mediation of family conflicts, maintaining community cohesion and community decision making.

See section 16.6.1.9.1 Traditional Kingdoms and 16.6.1.9.2 Role of Elders and Clan Leaders for more information on the structure and role of transitional leadership systems in the Study Area.

Trends and Issues

Declining role of clans: during community meetings in November-December 2016 some stakeholders noted that confidence in elders' ability to mediate land disputes is beginning to weaken, as they are perceived as being open to corruption from land speculation (**Chapter 16: Social**).

21.5.17.3.6 Incidence of gender based violence (GBV)

Current Conditions

Women in Uganda are more than twice as likely to experience sexual violence as men. Approximately 21% of women age 15-49 report that they have experienced sexual violence at some point in their lives, compared to 8% of men. This rate is higher according to the UN's Global Database on Violence against Women, which reports that 51% of women in Uganda experience lifetime physical and/or sexual violence, 35% of which experienced this type of violence in the last 12 months.

According to the UDHS Survey (Ref. 21-51), about 58% of women surveyed believe that violence against women is justified for at least one of the following reasons; if she burns the food, if she argues with him, if she goes out without telling him, if she neglects the children, and if she refuses to have sexual intercourse with him. This percentage shows significant improvement from the 2006 UDHS results where 70% of women agreed that at least one those reason was sufficient justification for wife beating and other forms of violence against women.

There are regional discrepancies regarding gender-based violence, with the highest level of physical violence being reported in Eastern Uganda (East 66.4% and Central-East 61.9%), followed by Northern (60.6%), South West (57.1%), West Nile (56.4%) and Central Uganda (54%) (Ref. 21-73).

Gender-based violence is also prevalent across religions; physical violence is highest among the Pentecostals (60.5%), followed by Protestants (56%), Catholics (55.7%) Muslims (54.2%), Seventh Day Adventists (SDA) and 'Other' (48.3%). Sexual violence is highest among Muslims (30.2%), followed by Catholics (28.6%), SDA and 'Other' (28.3%), Pentecostals (26.6%) and Protestants (26.1%) (Ref. 21-73).

On average between 2008 and 2011 there were 165 deaths in Uganda per year which resulted from domestic violence (Ref. 21-73). However, the data does not disaggregate by gender, age or ethnicity of the victims, and generally the data on this issue is limited.

Trends and Issues

- There are different initiatives in place which are trying to tackle gender-based violence including programmes such as the Irish Aid supported GBV Joint Programme between MGSLD and CSOs (CEDOVIP/ UWONET/ MIFUMI), and the DFID funded UN Gender Joint Programme on gender Equality (UNJPGE).
- Domestic Violence Act was developed in 2011, however, operationalization of the Domestic Violence Act still lags behind partly due to the high costs associated with its implementation (Ref. 21-73).
- In the Project AoI there are reports that the incidence of GBV increased during previous phases of oil and gas activities. The reason was linked to household disputes over use of compensation payments, increase in infidelity and increase in alcohol consumption by men who had access to increased disposable incomes from casual labour and compensation payments.

21.5.17.4 Summary of VEC status, sensitivity and proposed threshold

Table 21-47: Summary of VEC Status, Sensitivity and Threshold for Social Cohesion

Indicators	Current status/trend without development	VEC sensitivity	VEC threshold
Reported conflicts and disputes	The majority of disputes within the Study Area are related to land. Disputes also arise over the use of land based resources and family matters. Increased pressure on land due to demographic change and growing commercial and economic activities may intensify disputes.	Moderate	No change, or an improvement, in incidence of disputes, level of inequality and incidence of GBV.
Incomes/ living standards disparities	Uganda has among the best poverty reduction performances in the world, although poverty rates are higher in the Study Area than the national average. Continued growth is expected to further reduce poverty.		
Population change and demographic composition	The population of Uganda which is mostly rural and among the world's youngest, is expected to grow further at a rate between 3 – 3.5 %. Migration to the Study Area has rapidly increased the urban population, and growth is projected to continue.		
Description and status of local clan structures	The Project falls within the Acholi Chiefdom and the Bunyoro-Kitara Kingdom: two of 12 traditional cultural institutions recognised by the government. Clan leaders and elders still play an important role in communities, especially around governance, land related issues and community decision making.		
Incidence of gender based violence	Gender based violence is common in Uganda and perpetrators are usually known to the victim (e.g. spouse or family member). Several initiatives, including national legislation, aim to reduce gender based violence but cultural norms remain an obstacle.		

21.5.17.5 Assessment of Cumulative Impacts on VEC

Table 21-48 presents the potential cumulative impacts on the VEC.

Table 21-48: Assessment of Potential Cumulative Impacts: Social Cohesion

Tilenga Potential Impacts (Direct and Indirect)	Project Impacts	Project's Residual impact significance	Other developments and activities also affecting VEC and potential cumulative impacts	Magnitude of potential impact	Sensitivity	Significance
Physical displacement		Low adverse	<p>Other oil and gas related developments (extension to the Tilenga Project, the Tilenga Feeder Pipeline, EACOP, Kingfisher Field, Kabaale Industrial Park, Kaiso-Tonya Field, Oil Roads, and Waste Management) as well as non-oil and gas developments (agricultural developments, the railway and industrial developments) are likely to contribute to influx into the main urban centres within the region particularly Hoima town, Masindi town, Biiso town, and Pakwach town. As projects will all have different timelines, this may mean that cumulatively population growth is experienced over a longer period before it stabilises. There are also likely to be higher rates of population growth cumulatively than rates that would be associated only with the Tilenga project.</p> <p>The higher level of population growth is expected to exacerbate any project-related effects on social cohesion linked to population growth including increased tension between migrants and local communities (due to perceived differences in value systems, social beliefs, competition over jobs/resources, introduction of illicit behaviours).</p> <p>The regional oil developments and development of other infrastructure and agricultural projects are likely to create changes to existing employment and livelihood patterns, which is likely to lead to changes in existing social and household power structures and relationships as some people become more economically empowered and educated, and others are excluded from this. Traditional leadership structures are linked to control over land and resources, therefore transition away from land based livelihoods and the increasing transition from customary land tenure to formal tenure systems (driven by land speculation and land acquisition for the multiple project developments) is also likely to change the role and influence of traditional leadership structures.</p> <p>Some of the increased disposable income in the region associated with job growth and compensation payments for resettlement for all developments is likely to be spent on alcohol and prostitution. Increases in household incomes may also cause tension between household members and within communities between the 'haves' and 'have-nots', which is likely to further change existing social dynamics.</p> <p>There is a risk that the potential cumulative effect of these impacts on social cohesion will mean that the condition of the VEC will deteriorate to the extent that the threshold will not be met or will be exceeded.</p>	Moderate	Moderate	Moderate adverse
Economic displacement		Moderate adverse				
Changes to traditional land tenure exacerbating land conflict		Moderate adverse				
Increased impoverishment following resettlement due to Indebtedness and lack of financial literacy		Low adverse				
Social disarticulation and increased family and community conflict		Moderate adverse				
Changes to traditional way of life leading to loss of sense of place and community		Moderate adverse				

21.6 Mitigation and Management of Cumulative Impacts

21.6.1 Mitigation Requirements

With respect to the mitigation and management of potential cumulative impacts, IFC guidance (Re 20-3) distinguishes between what is 'required' and where the project sponsor should 'make best efforts':

- There is a requirement to '*design environmental and social management plans and procedures to appropriately mitigate the Project's contributions. In this case, the developer should be accountable only for the design and implementation of mitigation measures commensurate with the magnitude and significance of its contribution to the cumulative impacts*'; and
- However, '*individual sponsors should use their best efforts to engage other developers, governments, and other stakeholders in acknowledging the cumulative impacts and risks and in designing coherent management strategies to mitigate them*'.

This section describes the mitigation strategies that are relevant to the identified potential cumulative impacts on VECs set out in Section 21.4 above. It is recognised that Government has ultimate responsibility for CIA and that measures to address cumulative impacts are often beyond the capacity of the Project to implement in isolation. This section therefore proposes a possible collaborative approach to implement mitigation to address cumulative impacts.

21.6.2 Approach to the Mitigation of Potential Cumulative Impacts

Noting the IFC guidance, a Project Proponent can mitigate potential cumulative impacts in the following ways:

- By informing project level mitigation to address the first requirement, to mitigate the Project's contribution to potential cumulative impacts;
- By identifying the Project level mitigation measures that could also be applied to other developments that will have the same types of potential impact. Project developers and Government agencies can then support the mitigation of cumulative impacts by promoting common standards and approaches; and
- By identifying opportunities to scale up specific, priority Project level mitigation strategies by inviting other developers or Government agencies to contribute funding (or some other form of support) in order that the initiative can be extended to other areas or communities.

The CIA can also support the mitigation of potential cumulative effects by identifying and promoting possible supervision mechanisms to implement measures that are beyond the capacity of the Project to implement in isolation. To this end, the CIA promotes the establishment of a Regional Cumulative Impacts Management (RCIM) initiative as described in Section 21.6.5 below.

21.6.3 Project Level Mitigation Measures and the Promotion of Common Standards and Approaches

Project level mitigation measures are set out in each of the technical chapters of the ESIA and brought together in the ESMP Mitigation Checklist in Appendix T. These measures both mitigate the Project's contribution to potential cumulative impacts and could be applied, where relevant, to other developments that will have the same types of impact. The Project Proponents for oil and gas developments (Joint Venture Partners) are in agreement for implementing common approaches on the developments over which they have responsibility. The Project Proponents are also committed to promoting common standards and approaches to mitigation that should be applied to other developments through the RCIM as described in Section 21.6.5 below.

21.6.4 Priority Project Level Mitigation that should be Scaled-up to Mitigate Cumulative Effects

The Project's residual impacts on priority VECs were used as the starting point for identifying potential cumulative impacts. The likely potential impacts of other defined development were then considered together with the Project's impacts to determine the significance of potential cumulative impacts, as set out in Section 21.5 above. The identification of mitigation measures also started with the agreed Project level mitigation. The rationale for this is that the types of impact resulting from the Project on VECs are the same as those considered cumulatively (although on a greater scale) and therefore Project level mitigation will also be suitable for cumulative impacts (but again, on a greater scale). The objective has been to identify common types of mitigation that apply to multiple developments, recognising that many measures require a collaborative approach to their implementation. Building on Project level mitigation, for which there is a commitment to funding, increases the likelihood that other parties will be willing to collaborate to address cumulative impacts.

Table 21-49 provides a summary of key mitigation measures that are proposed to address potential cumulative impacts. To be successful, as previously mentioned, all of them require multi-stakeholders collaboration. The table:

- Provides a summary of the potential cumulative effects on each VEC (as identified in Section 21.5 above);
- Identifies the key Project level mitigation that addresses potential cumulative effects, and describes how other developers could participate in their implementation;
- Identifies which developments are most relevant to the mitigation strategies for each VEC; and
- Identifies which government agencies are most relevant to the mitigation strategies for each VEC. The Ministry of Energy and Mineral Development, being a lead agency for oil and gas development and hydro-power projects, is an Agency relevant to all proposed mitigation measures.

Table 21-49: Summary Key Mitigation that Address Cumulative Impacts

Summary of potential cumulative impacts on VEC	Summary of key mitigation measures and how they could be developed to address potential cumulative impacts in collaboration with other developers	Other developments that may support collaborative mitigation	Key Government agencies that may support collaborative mitigation
Nature-based tourism in protected areas			
<ul style="list-style-type: none"> Reduction of MFPA's reputation for remoteness and wildness and visitor experience. Loss or degradation of habitats as a result of direct and indirect impacts Increased commercial hunting of key 'flagship' species. Increased commercial hunting of Chimpanzee in the Budongo Forest Reserve. 	<p>Tourism Management Plan - Sets out objectives and procedures for managing relationships with and working with key tourism stakeholders to minimise potential negative effects of the Project on tourism and maximising benefits will be developed by the Project Proponents. The following aspects could involve collaboration with other developers:</p> <ul style="list-style-type: none"> Feasibility study of alternative tourism routes: any new routes should take into account the other developments within the MFPA. Visitor Centre: other developers whose projects have effects in the National Park could contribute to the visitor facility. Educational visits: educational opportunities for students and other technical specialists could be extended to other developments within the MFPA. Tourism promotion strategy: other developers could contribute to the strategy to support promotion of tourism nationally and internationally through a communication campaign that advertises the areas of MFPA unaffected by project activities as well as the wider area's attractions e.g. Ramsar sites. Monitoring: collaboration on the monitoring of impacts on tourism where developments are likely to affect the same receptors. Support for UWA: If significant impacts on tourism which result in loss of revenue are identified (through a detailed assessment conducted by a suitable and qualified organization), options to provide in-kind support to UWA in the management of MFNP could be collaboratively assessed. <p>Also see mitigation for Critical and Natural Habitat, Bushmeat and Sustainable Woodlands.</p>	<p>Primarily, development which would have direct impacts on the MFPA would be the extension to the Tilenga Field, UNRA roads, and the proposed large hydropower Projects (Oriang, Ayago, Kiba, and Murchison).</p> <p>Multiple other developments will contribute to indirect effects, (including an increase in biomass collection, bushmeat, community wildlife conflict).</p>	<p>Ministry of Tourism Wildlife and Antiquities Uganda tourism Board Uganda Wildlife Authority Wetlands Management Department</p>
Critical and Natural Habitat and key indicator species			
<ul style="list-style-type: none"> Loss or degradation of species habitats as a result of direct impacts Disturbance as a result of construction or operation of development, including increased traffic Barrier impacts caused by 	<p>Measures to reduce human pressures and increase resilience of the MFPA: through enhanced park protection and community-based management. This will also include measures to protect and maintain connectivity of the savanna corridor outside the MFNP and including Bugungu Wildlife Reserve: manage in-migration impacts to savanna habitat and associated species by addressing threats and maintaining connectivity within and around Bugungu Wildlife Reserve. Other developments could contribute to the following (Subject to feasibility study):</p> <ul style="list-style-type: none"> In-kind Support to UWA e.g. for: equipment needed to enhance its ability to 	<p>Primarily, developments which would have direct impacts on the MFPA would be the extension to the Tilenga Field, UNRA roads, and the proposed large hydropower Projects (Karuma, Oriang, Ayago, Kiba, and Murchison).</p>	<p>National Environment Management Authority Uganda Wildlife Authority Ministry of Agriculture, Animal Industry and Fisheries Ministry of Lands, Housing and Urban Development</p>

Summary of potential cumulative impacts on VEC	Summary of key mitigation measures and how they could be developed to address potential cumulative impacts in collaboration with other developers	Other developments that may support collaborative mitigation	Key Government agencies that may support collaborative mitigation
<p>construction or presence of development</p> <ul style="list-style-type: none"> Loss, degradation or fragmentation of species habitats as a result of indirect impacts linked to influx 	<p>protect the MFPA; recruitment, training and deployment of a rapid reaction team (RRT) for MFPA; training in community conservation; and strategic and tactical support to UWA including training, capacity building and independent data management, analysis and reporting.</p> <ul style="list-style-type: none"> Community-based interventions including: establishing community governance structures such as Village Saving and Loans Associations (VSLAs) and Community Land Associations (CLAs) assisting local communities to establish and develop PES or micro-credit schemes or animal husbandry and, where appropriate, to promote alternative wildlife-friendly enterprises; recruitment and training of village wildlife scouts to empower and involve communities in park management; promotion of alternative fuel use and clean cook stoves to reduce level of fuelwood harvesting; identify areas with high incidence of human-wildlife carnivore conflict and assess means to address this, for example community-based insurance schemes linked to land-use planning; and assist local communities to establish and develop simple wildlife-friendly management plans. <p>Measures to conserve and restore forests and forest connectivity along the eastern shore of Lake Albert (including Budongo and Bugoma FRs): As part of reduction effort of in-migration impacts on forests, in order to maintain and restore key forest corridors and enhance protection of threatened species; the following will be considered (Subject to feasibility study):</p> <ul style="list-style-type: none"> Establishing agroforestry systems (combining shrub/tree planting with agricultural practices to create more diverse, healthy, productive and profitable sustainable land-use; Support establishment of CLAs through which to coordinate and implement PES and micro-credit schemes to support livelihood diversification; Provision of alternative fuel use and clean cookstoves to reduce rate of fuelwood harvesting; Establishing nurseries for community reforestation and sustainable resource extraction (e.g. wood production and NTFPs); Specific activities to target the conservation of high priority species (e.g. actions to reduce hunting pressures (e.g. removal of snares) and activities that combat illegal hunting and trading will be important); and Enhanced management of existing FRs will require support to the Government for enforcement activities (e.g. improved patrolling and boosting community conservation efforts). 	<p>Multiple developments will contribute to both direct and indirect effects on woodland. Key contributors would include EACOP. Kaiso-Tonya Field Development (LA-2 South), Kingfisher Development, Kabaale to Kampala Pipeline, road network enhancement projects, and the proposed large hydropower Projects.</p>	<p>National Forestry Authority Ministry of Lands, Housing and Urban Development</p>

Summary of potential cumulative impacts on VEC	Summary of key mitigation measures and how they could be developed to address potential cumulative impacts in collaboration with other developers	Other developments that may support collaborative mitigation	Key Government agencies that may support collaborative mitigation
	<p>Actions to manage and restore wetlands along the southern shore of the Albert Delta Ramsar site: manage anticipated impacts of in-migration on wetland habitat, fisheries and associated biodiversity around the Albert Delta Ramsar site through community-based management. The following will be considered (Subject to feasibility study):</p> <ul style="list-style-type: none"> • Organisation/establishment of wetland user groups/management committees; • Developing agreed community management rules and regulation approaches; • Environmental awareness raising in local communities; • Establishing nurseries for revegetation of papyrus (and/or applying ecological engineering approaches to restoration); • Participatory monitoring and evaluation of wetland areas and resources; and • Micro-credit schemes to support livelihood diversification. <p>Community Environmental Conservation Plan</p> <p>A number of environmental conservation initiatives will be undertaken in partnership with local communities, UWA, environmental and tourism organisations, following feasibility studies, to mitigate the project impacts and to give communities a sense of ownership over the management of their local environment and natural resources. Options that will be considered, that other developers could contribute to include:</p> <ul style="list-style-type: none"> • Extension of tree nurseries; • Promotion of alternative fuel use e.g. solar technology, briquettes, fuel saving/ efficient cooking stoves business development; • Sensitisation on poaching and illegal fishing; • Community based fisheries management and monitoring programme that will entail engagement of communities through BMUs or other suitable local structures engaged in fisheries management e.g. beach landing sites to give them a sense of ownership over the management of their local environment and natural resources. Engage with UWA, National Fisheries Resources Research Institute (NaFirri), Ministry Agriculture, Animal Industry and Fisheries and Ministry of Defence to discuss options to support management and monitoring of fishing activities in Lake Albert and rivers within the Project Area e.g. through establishment and better management of protected zones, provision of equipment, advice on 	<p>With respect to the Murchison Falls – Albert Delta Wetland System Ramsar Site, primarily, developments which would have direct impacts on the Ramsar site would be proposed large hydropower Projects (Karuma, Oriang, Ayago, Kiba, and Murchison).</p>	<p>Wetlands Management Department Ministry of Agriculture National Fisheries Resources Research Institute Department of Water Resources Management</p>

Summary of potential cumulative impacts on VEC	Summary of key mitigation measures and how they could be developed to address potential cumulative impacts in collaboration with other developers	Other developments that may support collaborative mitigation	Key Government agencies that may support collaborative mitigation
	<p>designing and implementing monitoring systems, joint training of communities on monitoring and conservation activities;</p> <ul style="list-style-type: none"> • Sensitisation on the environmental consequences of deforestation, overgrazing, and over-harvesting of natural resources;and • Community based tourism and conservation programs to develop alternative forms of income; and • Joint planning with environment and social teams to look at opportunities for both community forest use and use of tree plantations for conservation and to provide buffers around protected areas. This will draw on existing research. <p>See also mitigation for: Sustainable woodland, Bushmeat and Lake Albert Catch Fisheries.</p>		
Climate change linked to carbon emissions			
<ul style="list-style-type: none"> • Loss of carbon stocks due to clearance of vegetation and stripping of soils. • Project related emissions from construction and operational activities including embodied carbon, transport, fuel consumption and energy generation. 	<p>Community Environmental Conservation Plan: See Critical and Natural habitat above. Includes mitigation applicable to reducing and offsetting carbon emissions such as community forests and alternative fuel use. Other developers could contribute to these initiatives.</p> <p>National and Community Content Programme: Encourages the use of local labour, goods and services. This will also reduce transport GHG emissions.</p> <p>Conserving and Restoring Forests and Forest Connectivity: see Critical and Natural Habitat above)) aims to promote reforestation which will also have benefits in increasing carbon stocks but also identifying alternative livelihoods to reduce pressure on forests. Other developers could contribute to these initiatives.</p> <p>Influx Management Strategy: in summary, to contribute to a broader strategy, including measures to mitigate impacts of influx.</p> <ul style="list-style-type: none"> • Working with local government in in-migration hot spots and building their capacity in dealing with impacts. • Measures to mitigate impacts of population growth. • Reviewing the range of management plans which will deal with in-migration impacts on protected areas, fisheries, grazing land and in relation to increased demand for crop, fibres and ornamental products. • Monitor in-migration impacts with regulatory agencies and continue to 	<p>Developments that would result in carbon emissions including oil & gas infrastructure and the Industrial Park at Kabaale.</p> <p>Developments that would result in the loss of carbon stocks through clearance of vegetation (including woodland).</p> <p>Multiple other developments will contribute to indirect effects relating to influx and the subsequent increase in biomass collection.</p>	<p>Ministry of Water and Environment National Forestry Authority</p>

Summary of potential cumulative impacts on VEC	Summary of key mitigation measures and how they could be developed to address potential cumulative impacts in collaboration with other developers	Other developments that may support collaborative mitigation	Key Government agencies that may support collaborative mitigation
	<p>provide capacity building support and report on findings to the authority.</p> <ul style="list-style-type: none"> Rolling out a series of education campaigns and capacity-building training to communities. Support Central Government working together with Buliisa, Hoima, Nwoya, Masindi and Kiryandongo District in implementation of a robust policing system to curtail the increasing criminal tendencies associated to increased influx. 		
Sustainable woodland			
<ul style="list-style-type: none"> Increased demand for timber and woody biomass due to influx Improved access to areas of woodland 	<p>Conserving and Restoring Forests and Forest Connectivity: see Critical and Natural Habitat above); aims to promote reforestation which will contribute to sustainable woodland but also identifying alternative livelihoods to reduce pressure on forests. Other developers could contribute to these initiatives.</p> <p>Community Environmental Conservation Plan: See Critical and Natural Habitat above. Includes mitigation applicable to reducing and offsetting carbon emissions such as community forests and alternative fuel use. Other developers could contribute to these initiatives.</p> <p>Influx Management Strategy: See Climate Change linked to carbon emissions above. Other developers could contribute to building up a broader strategy, including measures to mitigate impacts of population growth on increased biomass collection activities.</p>	<p>Multiple developments will contribute to indirect effects.</p> <p>Key contributors would include proponents of regional oil and gas developments, including the extension to the Tilenga field, the Tilenga Feeder Pipeline, EACOP. Kabaale to Kampala Pipeline, Kaiso-Tonya Field Development (LA-2 South) Kingfisher Development, road network enhancement projects, and the proposed large hydropower Projects.</p>	<p>National Forestry Authority Forestry Sector Support Department</p>
Bushmeat			
<ul style="list-style-type: none"> Increase in population leading to an increase in subsistence and commercial hunting, including both to meet basic needs and/or to generate a monetary income. Improved access leading to an increase in 	<p>The community-wildlife conflict prevention program will align with the goals and actions set out in the Community-Based Wildlife Crime Prevention Action Plan (2017-2023) prepared by UWA (April 2017). Specific actions that other developments could also contribute include:</p> <ul style="list-style-type: none"> Monitoring during all phases in support of rules enforcement; Partnering with UWA to raise awareness of MFNP rules amongst local communities especially in Nwoya district; Monitoring of the movement of key will be undertaken. If it is found that 	<p>Multiple developments will contribute to indirect effects (including through contributing to community-wildlife conflict, increased demand for bushmeat and increased instances of hunting).</p> <p>Key contributors would include</p>	<p>Uganda Wildlife Authority National Forestry Authority</p>

Summary of potential cumulative impacts on VEC	Summary of key mitigation measures and how they could be developed to address potential cumulative impacts in collaboration with other developers	Other developments that may support collaborative mitigation	Key Government agencies that may support collaborative mitigation
<p>hunting, bushmeat and wildlife trade.</p>	<p>species are encroaching into community areas outside the park suitable additional mitigation will be investigated and implemented. Any additional mitigation to address this issue will be developed in consultation with UWA and local communities.</p> <p>Influx Management Strategy: See Climate change linked to carbon emissions above: contribute to a broader strategy, including measures to mitigate impacts of population growth on increased hunting activities.</p> <p>Measures to reduce human pressures and increase resilience of the MFPA: see Critical and Natural Habitat and key indicator species above.</p> <p>Community Environmental Conservation Plan: See Critical and Natural habitat above. Other developers could contribute to these initiatives.</p>	<p>proponents of regional oil and gas developments, including the extension to the Tilenga field, the Tilenga Feeder Pipeline, EACOP. Kabaale to Kampala Pipeline, Kaiso-Tonya Field Development (LA-2 South) Kingfisher Development, road network enhancement projects, and the proposed large hydropower Projects.</p>	
Lake Albert capture fisheries			
<ul style="list-style-type: none"> Over fishing in Lake Albert from in-migration and induced population growth Reduction in species diversity and catch size due to overfishing as a result of in-migration and population growth induced by Project activities. 	<p>Community Environmental Conservation Plan: See Critical and Natural habitat above. Other developers could contribute to these initiatives relating to fisheries.</p> <p>Influx Management Strategy: See Climate change linked to carbon emissions above. Contribute to a broader strategy, including measures to mitigate impacts of population growth on fisheries.</p> <p>Actions to manage and restore wetlands along the southern shore of the Albert Delta Ramsar site. See Critical and Natural Habitat above.</p>	<p>Proponents of regional oil and gas developments located to the east of Lake Albert, including in particular those relating to Kaiso-Tonya Field Development (LA-2 South) and Kingfisher Development, and Tilenga Feeder Pipeline. Multiple other developments will contribute to influx and subsequent impacts on demand for fish.</p>	<p>Ministry of Agriculture, Animal Industry and Fisheries National Fisheries Resources Research Institute</p>
Open-access grazing land			
<p>Potential for reduced access to communal grazing land due to:</p> <ul style="list-style-type: none"> Influx leading to loss of, fragmentation and degradation of grazing land Increase in cattle numbers leading to overgrazing Changes in land use 	<p>Livelihood Restoration Plans - In consultation with local communities, government and civil society, consider investments in capacity development programmes for existing economic activities such as fishing, crop farming, livestock farming, and trade, as well as programmes that support economic diversification. Other developers can support the expansion of these programmes to other communities through joint funding. They can also apply lessons learned from the programmes in the design of their own, similar programmes.</p>	<p>Multiple developments will contribute to impacts on grazing land. Key contributors would include proponents of regional oil and gas developments, including in particular to the Tilenga Feeder Pipeline, Kaiso-Tonya</p>	<p>Ministry of Lands, Housing and Urban Development Ministry of Agriculture, Animal Industry and Fisheries National Agricultural Research Organisation</p>

Summary of potential cumulative impacts on VEC	Summary of key mitigation measures and how they could be developed to address potential cumulative impacts in collaboration with other developers	Other developments that may support collaborative mitigation	Key Government agencies that may support collaborative mitigation
<p>patterns</p>	<p>Land Use Planning –provide support to the Ministry Lands Housing and Urban Development and Bullisa District Government to develop a District Land Use Plan through financing of a study that can be used as basis of such planning. This can be expanded to other districts within the AoI for Cumulative Impacts in participation (i.e. joint funding) with other developers and local governments in those districts.</p> <p>Community Environmental Conservation Plan: See Critical and Natural Habitat above. Other developers could contribute to these initiatives relating to fisheries.</p> <p>Influx Management Strategy: See Climate Change linked to carbon emissions above. Contribute to a broader strategy, including measures to mitigate impacts of population growth on grazing land.</p>	<p>Field Development (LA-2 South), and the development of the Industrial Park in Hoima as well as road network enhancement projects.</p>	<p>National Agricultural Advisory Services District Physical Planning Committee</p>
<p>Food security</p>			
<p>Increased vulnerability to food insecurity due to:</p> <ul style="list-style-type: none"> • Economic displacement • Local price inflation • Deterioration in nutritional status • Impacts on crop production • Impact on livestock and fodder/pastoralism • Impact on capture fisheries 	<p>RAPs for Future Land Acquisition: Development of further RAPs consistent with the goals, objectives, principles and processes described in the LARF and continuously drawing on lessons learned from RAP1. Developers of Oil and Gas Developments in the region will develop RAPs in line with the LARF. Other developers can also follow this example and learn from lessons shared on the Tilenga project particularly in relation to livelihood restoration and mitigation of economic displacement. Government can enforce this in the review and approval process for future RAPs.</p> <p>Land Use Planning: See Open-access grazing land above.</p> <p>Influx Management Strategy: See Climate Change linked to carbon emissions above.</p> <p>Financial literacy training and access to financial services. Inclusive training in basic financial literacy will be provided for men and women that will assist amongst others in managing price inflation. Other developers could contribute to this initiative and extend the training to encompass other communities within their areas of influence.</p> <p>See also Capture Fisheries for mitigation relating to fisheries, and Access to Grazing Land for mitigation for livestock and pastoralism.</p>	<p>Multiple developments will contribute to impact on food security linked to influx and land acquisition. Key contributors would include proponents of regional oil and gas developments, including those relating to the extension to the Tilenga Field, the Tilenga Feeder Pipeline, EACOP, Kaiso-Tonya Field Development (LA-2 South), Kingfisher Development and the development of the Industrial Park in Hoima as well as road network enhancement projects. North of the Nile the development of the railway as well as agricultural projects will also likely to contribute to influx.</p>	<p>Ministry of Lands, Housing and Urban Development District Physical Planning Committee</p>

Summary of potential cumulative impacts on VEC	Summary of key mitigation measures and how they could be developed to address potential cumulative impacts in collaboration with other developers	Other developments that may support collaborative mitigation	Key Government agencies that may support collaborative mitigation
		Large scale agricultural developments may also contribute to this impact due to land use change (subsistence to commercial agriculture).	
Access to safe drinking water resources			
<p>Potential for reduced access to safe drinking water sources due to:</p> <ul style="list-style-type: none"> • Potential for contamination of water sources during construction activities of other developments • Influx placing pressure on existing water sources 	<p>Management of influx hotspots through support of public infrastructure: The Project Proponents will, in consultation with local communities and government, consider investments in public infrastructure particularly in influx hotspots for key services including health, water, sanitation, education. Investments will be based on feasibility studies and will align with government development plans. Up-keep and maintenance of all infrastructure will be the responsibility of local government and/ or community associations with potential support from donor organisations. Other developers can support this programme through joint funding and can also replicate this type of investment in their areas of influence.</p> <p>Land Use Planning: See Open-access grazing land above.</p> <p>Influx Management Strategy: See Climate Change linked to carbon emissions above.</p> <p>Access to Water: This is an embedded mitigation on the Tilenga Project. Since 2012, TEP Uganda has been supporting initiatives to help mitigate the impacts of its work and enhance benefits through a programme of social investments. This has been undertaken through a partnership approach with clear terms that indicate that the community and government will have a long term partnership. TEP Uganda seeks to contribute to the achievement of the government’s National Development Plan (NDP) and Vision 2040 and not to replace the role of the state government in service delivery. One of the existing programmes is Access to Water. The goal of this programme has been to contribute to the improvement of the water and sanitation situation particularly in Ngwedo and Kigwera sub counties. A Memorandum of Understanding (MoU) was signed with Buliisa District Local Government explaining the roles of each party for this initiative. This programme could be expanded to other communities within the Project Aol through replication and/ or joint funding by other developers.</p>	<p>Multiple developments will contribute to impacts on access to safe drinking water. Key contributors would include proponents of regional oil and gas developments, including in particular those relating to the extension to the Tilenga Field, the Tilenga Feeder Pipeline, EACOP, Kaiso-Tonya Field Development (LA-2 South), Kingfisher Development, the Pipeline From Kaable to Kampala, the development of the Industrial Park in Hoima as well as road network enhancement projects. North of the Nile - the development of the railway as well as agricultural projects will also likely to contribute to influx,, Construction activities for the extension to the Tilenga Project, the Tilenga Feeder Pipeline and UNRA oil roads could have direct cumulative</p>	<p>Directorate of Water Resources Management Directorate of Water Development</p>

Summary of potential cumulative impacts on VEC	Summary of key mitigation measures and how they could be developed to address potential cumulative impacts in collaboration with other developers	Other developments that may support collaborative mitigation	Key Government agencies that may support collaborative mitigation
		impacts on water sources within the Project Aol.	
Community health			
<p>Potential deterioration in community health due to:</p> <ul style="list-style-type: none"> • Influx leading to increased spread of communicable disease and HIV/AIDS and other STIs and placing increased pressure on existing health infrastructure • Increase in disposable incomes leading to increased spending on behaviours contributing to ill health e.g. alcohol and drug use 	<p>Health and Wellness Education and Communication Campaigns for Local Communities: The Project Proponents will work with local government, the Ministry of Health, District Health Teams and selected NGO partners to deliver education and communication on key public health issues in PACs using media advertisements and talk shows on FM radio, through village health teams, placing posters and banners in public places (such as in health centres, local government offices, schools, police stations). Other developers can support the expansion of these campaigns to other communities through joint funding. Government can also replicate the programmes more widely through local health structures e.g. village health teams.</p> <p>Infection Prevention and Control Plan: The Project Proponents will develop an Infection Prevention and Control Plan to minimise the transmission of infectious diseases and to prepare for and prevent disease outbreaks. Other developers can support the expansion of this plan in other communities by adopting some of the plans measures in project level management strategies (e.g. screening of workers, sensitisation of workers, and disease surveillance). Government can enforce these measures during their review and approval of project environmental and social management plans for other developers. Local government and joint developers can also share results of disease surveillance to allow for rapid identification of emerging issues across a wider area and joint response planning.</p> <p>HIV Workplace Policy: All developers will be required to design and implement a HIV workplace policy in line with Ugandan regulations.</p> <p>Health Monitoring and Reporting: Disease cases amongst the Project workforce will be monitored and procedures will be put in place for notification to relevant government health agencies and programmes of cases (including the National TB Control Program, Malaria Control Program, AIDS Control Program, and Onchocerciasis Program); Developers can work together to align their disease monitoring and reporting requirements and processes to allow for a joined up approach that is easy for government to oversee and, if necessary, respond to in a timely manner.</p> <p>Access to Infrastructure: See Open-access grazing land above.</p>	<p>Multiple developments will contribute to impacts on community health linked to influx and economic development. Key contributors would include proponents of regional oil and gas developments, including in particular those relating to extension to the Tilenga Field, the Tilenga Feeder Pipeline, EACOP, Kaiso-Tonya Field Development (LA-2 South), Kingfisher Development, Pipeline from Kabaale to Kampala, the development of the Industrial Park in Hoima as well as road network enhancement projects. North of the Nile the development of the railway as well as agricultural projects will also likely to contribute to influx.</p>	<p>Ministry of Health Community Health Department District Health teams Ministry of Works and Transport Ministry of Gender Labour and Social Development</p>

Summary of potential cumulative impacts on VEC	Summary of key mitigation measures and how they could be developed to address potential cumulative impacts in collaboration with other developers	Other developments that may support collaborative mitigation	Key Government agencies that may support collaborative mitigation
	<p>Influx Management Strategy: See Climate Change linked to carbon emissions above which contribute to a broader strategy, including measures to mitigate impacts of population growth on community health.</p> <p>Access to Water: See Access to safe drinking water resources above.</p>		
Primary and secondary school education			
<p>Deterioration in VEC status due to:</p> <ul style="list-style-type: none"> • Influx leading to increased pressure on education facilities • Increased demand for education facilities as a result of increased incomes and changed perceptions about the value of investing in education 	<p>Support to education to increase youth employability and improve adult literacy and numeracy: The Project will work with government to support adult and children educational services provision in Buliisa, Nwoya, Hoima to deal with the predicted growth in population and to enhance participation of the local population in the Project workforce and supply chain. Other developers can support the expansion of this programme to other communities through joint funding.</p> <p>Access to Education: This is an embedded mitigation on the Tilenga project. Since 2012, TEP Uganda has been supporting initiatives to help mitigate the impacts of its work and enhance benefits through a programme of social investments. This has been undertaken through a partnership approach with clear terms that indicate that the community and government will have a long term partnership. TEP Uganda seeks to contribute to the achievement of the government’s National Development Plan (NDP) and Vision 2040 and not to replace the role of the state government in service delivery. One of the existing programmes is: Access to Education. The strategic objectives of this programme are to: Create sustainable relations with Universities; Promote more local employees; Anticipate the need for skilled and unskilled manpower. This programme could be expanded to other communities within the Aol through replication and/ or joint funding by other developers.</p>	<p>Multiple developments will contribute to impacts on education linked to influx. Key contributors would include proponents of regional oil and gas developments, including in particular those relating to extension to the Tilenga Field, the Tilenga Feeder Pipeline, EACOP, Kaiso-Tonya Field Development (LA-2 South), Kingfisher Development, Pipeline from Kabaale to Kampala, and the development of the Industrial Park in Hoima as well as road network enhancement projects. North of the Nile the development of the railway as well as agricultural projects will also likely to contribute to influx.</p>	<p>Ministry of Education and Sports Ministry of Gender Labour and Social Development</p>
Access to land and shelter			
<p>Deterioration in VEC status due to:</p> <ul style="list-style-type: none"> • Influx leading to increased demand for local land and housing 	<p>RAPs for Future Land Acquisition: See Food security above.</p> <p>Land Use Planning: See Open-access grazing land above.</p> <p>Influx Management Strategy: See Climate Change linked to carbon</p>	<p>Multiple developments will contribute to influx and land acquisition. Key contributors would include proponents of regional oil and gas</p>	<p>Ministry of Lands, Housing and Urban Development District Physical Planning Committee</p>

Summary of potential cumulative impacts on VEC	Summary of key mitigation measures and how they could be developed to address potential cumulative impacts in collaboration with other developers	Other developments that may support collaborative mitigation	Key Government agencies that may support collaborative mitigation
<ul style="list-style-type: none"> Increased land speculation Land take for all developments Local price inflation 	<p>emissions above. In addition there will be provision for monitoring of local inflation e.g. price index - feasibility of extending the tool (Price indices) to Buliisa will be investigated.</p> <p>Financial literacy training and access to financial services (See Food security above).</p>	<p>developments, including in particular those relating to extension to the Tilenga Field, the Tilenga Feeder Pipeline, EACOP, Kaiso-Tonya Field Development (LA-2 South), Kingfisher Development, Pipeline from Kabaale to Kampala, and the development of the Industrial Park in Hoima as well as road network enhancement projects. North of the Nile the development of the railway as well as agricultural projects will also likely to contribute to influx.</p>	
Local economic stability			
<p>Positive and negative effects on VEC status due to:</p> <ul style="list-style-type: none"> Increased stimulation of regional economy Local price inflation Increased formal employment Reduction in tourism in MFNP 	<p>Financial literacy training and access to financial services: See Food security above.</p> <p>Livelihood support programme: See Open-access grazing land above.</p> <p>Economic Planning: Support capacity building for economic development planning, in partnership with international donors, to help national and local government plan the use of oil revenues during production to finance investments that will allow diversified economic growth. This programme can be expanded to other local governments through joint funding and sharing of expertise by other developers.</p> <p>Influx Management Strategy: See Climate Change linked to carbon emissions above. In addition project developers will include provisions to implement Mechanism (under Labour Management Plan) to verify where job applicants come from (e.g. checking ID cards) so that jobs prioritised for members of local communities are not given to in-migrants.</p>	<p>Multiple developments will contribute to influx and all projects will contribute to economic stimulation. Key contributors would include proponents of regional oil and gas developments, including in particular those relating to the extension to the Tilenga Field, the Tilenga Feeder Pipeline, EACOP, Kaiso-Tonya Field Development (LA-2 South), Kingfisher Development, Pipeline from Kaable to Kampala the development of the Industrial</p>	<p>Office of the Prime Minister Ministry of Finance, Planning and Economic Development Ministry of Lands, Housing and Urban Development Ministry of Gender Labour and Social Development</p>

Summary of potential cumulative impacts on VEC	Summary of key mitigation measures and how they could be developed to address potential cumulative impacts in collaboration with other developers	Other developments that may support collaborative mitigation	Key Government agencies that may support collaborative mitigation
	<p>National and Community Content Programme: A National and Community Content Programme (NCCP) for the Project is under development, which aims to increase local economic participation and increase local business access to contract opportunities. Learning from this programme can be shared and taken up by other developers. Aspects of the plan can also be expanded to other communities through joint support and funding of the programmes by other developers including for:</p> <ul style="list-style-type: none"> • Educational and capacity building development planning • Measures to engage marginalised and vulnerable groups • Skills training programmes • Technology transfer initiatives • Supplier development program • Supplier linkage program • Promotion of Industrial Enhancement Centre • Labour & Supplier Mobility Strategies 	<p>Park in Hoima as well as road network enhancement projects. North of the Nile the development of the railway as well as agricultural projects will also likely to contribute to influx.</p>	
Safe communities			
<p>Increased risk to community wellbeing as a result of:</p> <ul style="list-style-type: none"> • Physical displacement • Economic displacement • Social disarticulation and increased community and family conflict • Increased pressure on police • Increase in crime rate due to project induced ased wealth generation • Increase in prostitution 	<p>RAPs for Future Land Acquisition: See Food security above.</p> <p>Child and Gender Based Violence Prevention Programme. Training to prevent child and gender based violence could be expanded through support from other developers to reach a larger audience within areas where cumulative effects will occur.</p> <p>Legal Aid. The Project Proponents will investigate options to facilitate increased access to quality legal aid services within Buliisa District in partnership with a suitable and qualified organisation. Emphasis of legal aid provision should be to sensitise communities about their rights and the formal justice system and should avoid risk of trapping clients in court cases. This measure could be supported by other developers to extend the training to other communities in other districts within the Aol of cumulative impacts.</p> <p>Financial literacy training and access to financial services: See Food security above.</p> <p>Conflict Resolution & Crime Prevention Capacity Building programmes for local communities and local institutions: One of the components of the <i>Institutional Capacity Building Programmes</i> for local institutions will focus on conflict resolution. Initiatives undertaken for this component can be supported</p>	<p>Multiple developments will contribute impacts on community wellbeing. Key contributors would include proponents of regional oil and gas developments, including in particular those relating to the extension to the Tilenga Field, the Tilenga Feeder Pipeline, EACOP, Kaiso-Tonya Field Development (LA-2 South), Kingfisher Development, Pipeline from Kaable to Kampala, the development of the Industrial Park in Hoima as well as road network enhancement projects. North of the Nile the development of the railway as</p>	<p>Ministry of Lands, Housing and Urban Development Uganda National Roads Authority Ministry of Works and Transport, Office of the Prime Minister Ministry of Gender Labour and Social Development District Police</p>

Summary of potential cumulative impacts on VEC	Summary of key mitigation measures and how they could be developed to address potential cumulative impacts in collaboration with other developers	Other developments that may support collaborative mitigation	Key Government agencies that may support collaborative mitigation
	<p>by other developers to expand the programme into their areas of influence. Specifically, other developers can support funding to:</p> <ul style="list-style-type: none"> • train community organisations, local leaders and police in mediation mechanisms and conflict resolution through suitable partners; • build the capacity of local government and security forces; and • establish a conflict monitoring programme. <p>Road Safety and Transport Management Plan. The Project Proponents will establish a Project Road Safety and Transport Management Plan. Other developers could contribute in joint planning of the following initiatives with local government and other relevant stakeholders to (i) optimise traffic flows in consideration of required vehicle movements for all developments (ii) jointly invest expertise and/ or resources to enhance the capacity of local traffic police (iii) jointly invest expertise and/ or resources to implement a road safety campaign within local communities and (iv) provide a platform to share ‘lessons learned’ in relation to vehicle and traffic management.</p> <p>Influx Management Strategy – (See Climate Change linked to carbon emissions above).</p> <p>Community Cohesion Programme: Since 2012, TEP Uganda has been supporting initiatives to help mitigate the impacts of its work and enhance benefits through a programme of social investments. This has been undertaken through a partnership approach with clear terms that clearly indicate that the community and government will have a long term partnership. TEP Uganda seeks to contribute to the achievement of the government’s National Development Plan (NDP) and Vision 2040 and not to replace the role of the state government in service delivery. One of the programmes is focused on community cohesion. This programme is focused on fostering interaction and relationships with local communities through sports. This programme could be expanded to other communities within the AoI through replication and/ or joint funding by other developers.</p>	<p>well as agricultural projects will also likely to contribute to influx.</p>	
Social cohesion			
<p>Reduced social cohesion due to:</p> <ul style="list-style-type: none"> • Influx leading to increased tension between migrants and host community • Changing community 	<p>Child and Gender Based Violence Prevention Programme: See Safe Communities above.</p> <p>Legal Aid: See Safe Communities above.</p> <p>Community Cultural Heritage & Archeology: support to cultural activities</p>	<p>Multiple developments will contribute to factors affecting social cohesion, including influx, land acquisition and job creation.</p>	<p>Office of the Prime Minister Ministry of Lands, Housing and Urban Development</p>

Summary of potential cumulative impacts on VEC	Summary of key mitigation measures and how they could be developed to address potential cumulative impacts in collaboration with other developers	Other developments that may support collaborative mitigation	Key Government agencies that may support collaborative mitigation
<p>dynamics (for example changing livelihood patterns effecting existing power structures)</p> <ul style="list-style-type: none"> Increased spending on alcohol and prostitution due to increased disposable incomes 	<p>and enhance the preservation and awareness of cultural heritage and traditions including language. The focus of programme activities will be identified through consultation with local communities and cultural leaders and will take into consideration recommendations included in the 2017 'guidelines by cultural institutions for oil and gas'. This programme can be expanded to other communities through support and joint funding from other developers.</p> <p>Financial literacy training and access to financial services. See Food security above.</p> <p>Conflict Resolution: See Safe Communities above.</p> <p>Influx Management Strategy: See Climate Change linked to carbon emissions above.</p> <p>Community Cohesion Programme: See Safe Communities above.</p>	<p>Key contributors would include proponents of regional oil and gas developments, including in particular those relating to extension to the Tilenga Project, the Tilenga Feeder Pipeline, EACOP, Kaiso-Tonya Field Development (LA-2 South), Kingfisher Development, Pipeline from Kabaale to Kampala and the development of the Industrial Park in Hoima as well as road network enhancement projects. North of the Nile the development of the railway as well as agricultural projects will also likely contribute to influx.</p>	<p>Ministry of Gender Labour and Social Development</p>

21.6.5 Approach to Implementation of Collaborative Mitigation

This section sets out the actions that the Project Proponents will take to promote a collaborative approach to implement the mitigation strategies set out above to address cumulative impacts. It addresses the following matters:

- Principles for the implementation of collaborative mitigation;
- The promotion of RCIM through establishment of a Government led management group; and
- The actions necessary to establish the RCIM and facilitate the implementation collaborative approaches to mitigation.

21.6.5.1 Principles for the Implementation of Collaborative Mitigation

The key principles for collaborative management are that:

- The process is Government led. IFC guidance (Ref. 21-3) recognises that Government and regional planners have ultimate responsibility for CIA including supervising the process of implementation. Government has authority to influence or control the permitting of individual developers, provide oversight of multiple developments simultaneously, and facilitate collaboration;
- Each developer retains responsibility for the direct effects of their project(s) but there is a need for full extent of cumulative effects to be established and each project developer is responsible for the mitigation of their project's contribution to cumulative effects. With respect to other oil and gas development including the Tilenga Feeder Pipeline, EACOP and KFPA, UNRA Oil Roads, separate ESIA's and CIA's are being prepared. Other major developments including the large hydropower projects in MFNP may also be subject to CIA. The limitations of this single project level CIA are summarised in Section 21.2 above. There is a need to review and collate the results of the separate studies to understand the full extent of cumulative effects on VECs in order that comprehensive mitigation strategies can be developed and implemented;
- It requires a willingness to collaborate. There is no obligation on individual developers to collaborate and they are only likely to do so if there are benefits to their projects. The RCIM therefore needs to promote the benefits of collaboration e.g. reduced permitting risks by adopting common standards, cost savings through shared mitigation implementation; and
- It should link into existing plans, strategies and structures. The RCIM should complement existing strategies that are being implemented, some of which have their own structures. Other studies that are of relevance to this process that have been prepared include:
 - Strategic Environmental Assessment (SEA) of Oil and Gas activities in the Albertine Graben of Uganda (Ref. 21-4). The SEA recommends mitigation measures that should be considered by oil & gas developments, and also identifies the need for an Integrated Management Plan (IMP). The IMP is to be prepared by Government in order to provide strategic guidance for development with a focus on protected areas (such as MFPA).
 - The Environmental Sensitivity Atlas for the Albertine Graben (2010) (Ref. 21-74). identifies important social, environmental and cultural values which have either been affected by oil and gas development already, or are considered at risk of impacts in future.
 - The Environmental Monitoring Plan for the Albertine Graben 2012 – 2017 (Ref. 21-6) sets out an inter-governmental/agency collaborative approach for environmental monitoring;
 - The Strategic Plan for the Northern Albertine Rift of Uganda 2011 – 2020 (Ref. 21-5) aims to develop a common management approach to the landscape of the northern Albertine Rift based on the vision that it is conserved in a partnership between Government, communities and other stakeholders to ensure protection of biodiversity, functional habitat connectivity and contribution to sustainable livelihoods.

- District level development plans for Buliisa, Hoima and Masindi (Refs. 21-69, 21-62, 21-54).

Given the above, the Project Proponents identified the need for collaboration in order to define a framework for the sustainable management of the VECs. This is referred to as RCIM, as described below.

The Project Proponents have currently identified the SEA as the most appropriate route to sustainably manage the cumulative impacts of the Tilenga development and others, however there seem to be currently limited opportunity for Projects Proponents' involvement in the SEA. To remain sustainable the RCIM initiative should be closely linked to national and district planning as well as existing Government Management Plans (e.g. MFNP MP). It should be noted that the Project Proponents are already in discussions with other developers in the area such as UNRA in order to optimise synergies and align as much as practicable.

21.6.5.2 Promotion of Regional Cumulative Impacts Management Initiative

The Project Proponents will liaise with Government and other stakeholders to implement RCIM initiative, a regional mechanism for the sustainable management of priority VECs. The RCIM initiative envisages that priorities would be defined and mitigation measures designed and implemented collectively by developers, and other stakeholders, under GoU's leadership. The primary objectives of the initiative are to:

- Create a governance structure to provide leadership, oversight and foster collaboration;
- Promote common standards and approaches to mitigation;
- Foster /facilitate collaboration with a focus on developing strategic mitigation and management measures. With respect to the cumulative impacts assessed in this CIA, strategic mitigation measures are identified in Table 21-49 above; and
- Co-ordinate monitoring activities.

21.6.5.3 Monitoring activities

The Project Proponents' monitoring program shall take into consideration cumulative impacts as identified above in order to assess potential changes within the Project's Aol and the efficiency of mitigation measures. As indicated under 21.6.5.4. this should form part of the tasks defined under the RCIM structure so that appropriate contribution is provided and collaborative sharing of information promoted amongst RCIM participants.

21.6.5.4 Actions to Establish the RCIM and Facilitate the Collaborative Approaches to Mitigation of Cumulative Effects

The first stage in the implementation process will be to establish the RCIM in liaison with Government and other stakeholders and agree its objectives and priorities. The table below sets out the initial actions that will be taken by the Project Proponents to kick-start the RCIM. Once agreement with Government and other participants is confirmed, the RCIM will subsequently develop detailed strategies and actions for the implementation of collaborative mitigation.

Table 21-50: Initial Actions for Establishment of RCIM

Rf.	Action	Responsibility	Timescale
1	Allocate appropriate resources to support establishment of RCIM.	The Project Proponents	2018 ¹⁵
2	Design a draft roadmap or framework for the Regional Sustainable Development Initiative.	The Project proponents	
3	Map and engage stakeholders. Identify stakeholders both institutional and from civil society relevant to the RCIM. To include other Government Departments, district authorities in Albertine Graben, NGOs, and project developers.	The Project Proponents	
4	Liaise with all stakeholders to confirm willingness to participate in RCIM initiative.	The Project Proponents on behalf of Government	
5	Liaise with Government to agree to implement the RCIM and confirm leadership and management structure.	The Project Proponents and appropriate Government agencies	
6	Once structure identified, prepare meeting with stakeholders and agree: <ul style="list-style-type: none"> Objectives and terms of reference for RCIM. Communication protocol to foster collaboration between stakeholders. Mechanism for sharing information about developments and baseline data. Priority VECs relevant to the RCIM. The Project ESIA can be used to test mechanisms that link RCIM with other ESIA and CIAs. A mechanism to participate in / review the impacts on VECs for each project within the region and the results of multiple CIAs. This is to ensure alignment and optimise the mitigation and monitoring efforts. To promote common standards and approaches to project level mitigation. To prioritise mitigation strategies that should be scaled-up and who should participate including their planning. The Project CIA (Table 21-49) can be used as a starting point for discussion. Approaches, roles and responsibilities for collaborative monitoring linked to project monitoring activities. The indicators identified in the Project CIA can be used as a starting point for discussion. Schedule for future meetings and activities. 	To be organised by The Project Proponents on behalf of Government, and chaired by lead Government agency	
7	Participate / lead regular meetings with the RCIM structure to advance agreed actions.	To be led by Government	Ongoing, specific dates to be agreed
8	Participate/lead specific initiatives for collaborative mitigation.	Government agency to provide oversight and foster collaboration between stakeholders. The Project Proponents would lead on specific measures relevant to the Project's cumulative effects.	Ongoing, specific dates to be agreed

¹⁵ Action Rf 6 implementation would depend on successful collaboration and implementation of actions 1-5

21.7 Conclusion

Table 21-51 summarises the predicted impact significance for each of the priority VECs as a result of cumulative impacts from the multiple developments. Impacts are a result of a combination of both direct impacts (e.g. physical footprint and presence of **multiple developments** leading to direct loss or degradation of land, habitat, social infrastructure) and indirect impacts (e.g. induced population influx leading to an increase in resource demands). In the context of this CIA, population influx has been a primary cause of impacts on VECs as it is predicted to result in increased demands on social infrastructure (such as health, education, access to clean water) and ecosystem services (such as grazing land, fisheries, bushmeat, woodfuel) which in turn will impact on other VECs including critical and natural habitat.

Table 21-51: Summary of Potential Cumulative Impacts

VEC	Potential Impact Significance	VEC	Potential Impact Significance
Nature Based Tourism in Protected Areas	Moderate to High Adverse	Food Security	Moderate Adverse
Critical and Natural Habitat and Associated Species	High Adverse	Primary and Secondary School Education	Moderate Adverse
Sustainable Woodland	High Adverse	Safe Communities	Low to Moderate Adverse
Open-Access Grazing Land	High Adverse	Climate Change linked to Carbon Emissions	Low to Moderate Adverse
Access to Safe Drinking Water Resources	Moderate Adverse	Access to Land and Shelter	High Adverse
Local Economic Stability	Beneficial Effect	Community Health	High Adverse
Lake Albert Capture Fisheries	High Adverse	Social Cohesion	Moderate Adverse
Bushmeat	High Adverse		

IFC guidance recognises that Government has ultimate responsibility for CIA and that measures to address potential cumulative impacts are often beyond the capacity of the Project to implement in isolation. The CIA therefore proposes a possible collaborative approach to implement mitigation to address potential cumulative impacts.

Project level mitigation measures (as set out in each of the technical chapters of the ESIA and brought together in the ESMP Mitigation Checklist in Appendix T) also mitigate the Project's contribution to cumulative impacts and could be applied, where relevant, to other developments that will have the same types of impact. The oil and gas developments Project Proponents are committed to implementing common approaches on the developments over which they have responsibility including Associated Facilities. The Project Proponents are also committed to promoting common standards and approaches to mitigation that should be applied to other developments. In addition, there is an opportunity to scale up specific, priority Project level mitigation strategies (linked to the significance of predicted impacts) by inviting other developers or Government agencies to contribute funding (or some other form of support) in order that the initiative can be extended to other areas or communities.

In order to promote and implement collaboration between developers the Project Proponents will promote the RCIM initiative; a regional mechanism for the sustainable management of priority VECs. The RCIM initiative envisages that mitigation measures would be designed and implemented collectively by developers, and other stakeholders, under GoU's leadership. The first stage in the implementation process will be to establish the RCIM in liaison with Government and other stakeholders and agree its objectives and priorities. Once agreement with Government and other participants is confirmed, the RCIM will subsequently develop detailed strategies and actions for the

implementation of collaborative mitigation. The effectiveness of the identified mitigation measures will depend on the success of the collaborative efforts to reduce potential adverse impacts.

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22 – Transboundary Impact Assessment

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22 Transboundary Impact Assessment

22.1 Introduction

This Environmental and Social Impact Assessment (ESIA) Chapter presents an assessment of the Transboundary impacts of the Project. Transboundary impacts may be considered as “*impacts that extend to multiple countries, beyond the host country of the project, but are not global in nature. Examples include air pollution extending to multiple countries, use or pollution of international waterways, and transboundary epidemic disease transmission*” (Ref. 22-1).

22.2 Legislative framework

22.2.1 National Legislative framework

The need for a transboundary assessment is dependent upon a number of factors, including the type, nature, and location of a project. The Government of Uganda (GoU) Environmental Impact Assessment (EIA) Regulations (1998) (Ref. 22-2) make reference to transboundary impacts, but no specific guidance is included on how they should be assessed.

In 2005, the East Africa Community (EAC) produced a guidance document relevant to the assessment of transboundary impacts (Ref. 22-3) which has been considered in this assessment; however, this document only included three partner states (Kenya, Uganda, and Tanzania). The East African Community Transboundary Ecosystems Management Bill (Ref. 22-4) was therefore enacted in 2010 to include all member states (of the African Community). The Project falls under Schedule 1 of the Bill (categories 8, 16, 26, 27, 28, 54, 58, 63, 68, and 70), and therefore requires consideration of transboundary impacts. Schedule 2 of the Bill lists the Albertine Rift ecoregion as a terrestrial ecosystem that is an “*Identified and Designated Continuous Trans-Boundary Ecosystems of the Community*”. No other terrestrial ecosystems or any of the aquatic ecosystems listed in Schedule 2 have been identified as having potential to be affected by the Project in Chapters 6-20 of this ESIA.

In addition, the ‘Environmental Impact Assessment Guidelines for water resources related projects in Uganda’ issued in 2011 by the Ministry of Water and Environment (Ref. 22-5) highlights the need to consider a transboundary impact assessment for projects that may have a transboundary impact on water resources. It also highlights the process that will be followed by NEMA in case the Authority considers there may be transboundary effects arising; including consultation with affected neighbouring countries. Whilst the Project is not strictly speaking a “*water resources related project*”, the guidelines are considered relevant in view of the Project location and activities as well as the environmental context.

22.2.2 International Standards and Guidelines

The Nile Basin Initiative (NBI) is an intergovernmental partnership of ten Nile Basin countries (Rwanda, Burundi, Democratic Republic of Congo (DRC), Tanzania, Kenya, Uganda, Ethiopia, Sudan, South Sudan, and Egypt) with Eritrea participating as an observer. It was formed to provide a forum for consultation and coordination among the Basin States for the sustainable management and development of the shared Nile Basin water and related resources. The NBI Act 2002 (Ref. 22-6) mandates the NBI as a key stakeholder in the management of transboundary water resources, particularly for projects that could have an impact on the Nile River.

The NBI has set up a Nile Basin Sustainability Framework (NBSF) which has been considered during the assessment process. The NBSF, which was approved in 2011, lays down NBI’s approach to developing guiding principles for water resource management and development across the Nile Basin countries. While it is not a legal framework, the NBSF provides a suite of policies, strategies, and guidance documents which seek to act as guides to national policy and planning process development.

As an important upstream nation, Uganda is a member of the NBI and subject to its policies, which includes the Wetland Management Strategy and the NBI Environmental and Social Policy.

IFC Performance Standard (PS) 1 ‘*Assessment and Management of Environmental and Social Risks and Impacts*’ (Ref. 22-7) recognises the need to consider transboundary impacts, as follows: “*The*

risks and impacts identification process will consider the ... potential transboundary effects, such as pollution of air, or use or pollution of international waterways”.

22.3 Spatial and Temporal Boundaries

22.3.1 Spatial Boundaries

Uganda is a landlocked country that shares its borders with Kenya to the east, Tanzania and Rwanda to the south, South Sudan to the north, and the DRC to the west. The Project is within Uganda, with the closest international border being the DRC, approximately 15 km away. The Project is located approximately 200 km from South Sudan, 250 km from Kenya, and 400 km from either Tanzania or Rwanda. The site in context of international boundaries is illustrated in Figure 22-1.

The Albertine Rift ecoregion listed in Schedule 2 of the East African Community Transboundary Ecosystems Management Bill forms the key spatial boundary.

The Lake Albert shares international boundaries with Uganda and the DRC, meaning any detrimental impacts on this lake could theoretically affect DRC if they are sufficiently substantial in scale and magnitude. The Nile River also flows from Lake Albert through South Sudan, Sudan, and into Egypt.

Figure 22-1 illustrates the Project location and Area of Influence (Aoi), as defined by the technical impact assessments in Chapters 6-19 of this ESIA, which includes part of Lake Albert within DCR and the Albertine Rift ecoregion. It is not anticipated that any impacts would be of sufficient magnitude and severity to affect the Nile River as far as South Sudan, Sudan, or Egypt.

22.3.2 Temporal Boundaries

The proposed timescales for the Project are set out in **Chapter 4: Project Description and Alternatives** and the majority of the impacts will occur during this period. However, if not adequately mitigated, some impacts may outlast the lifetime of the Project; for example, changes to flora and habitat (see **Chapter 13: Terrestrial Vegetation**, **Chapter 14: Terrestrial Wildlife** and **Chapter 15: Aquatic Life**), or unplanned events (see **Chapter 20: Unplanned Events**). Embedded and additional mitigation have therefore been incorporated in Chapters 6-20 to minimise the significance of residual impacts and ensure there is adequate monitoring and management in place to reduce the temporal boundaries.

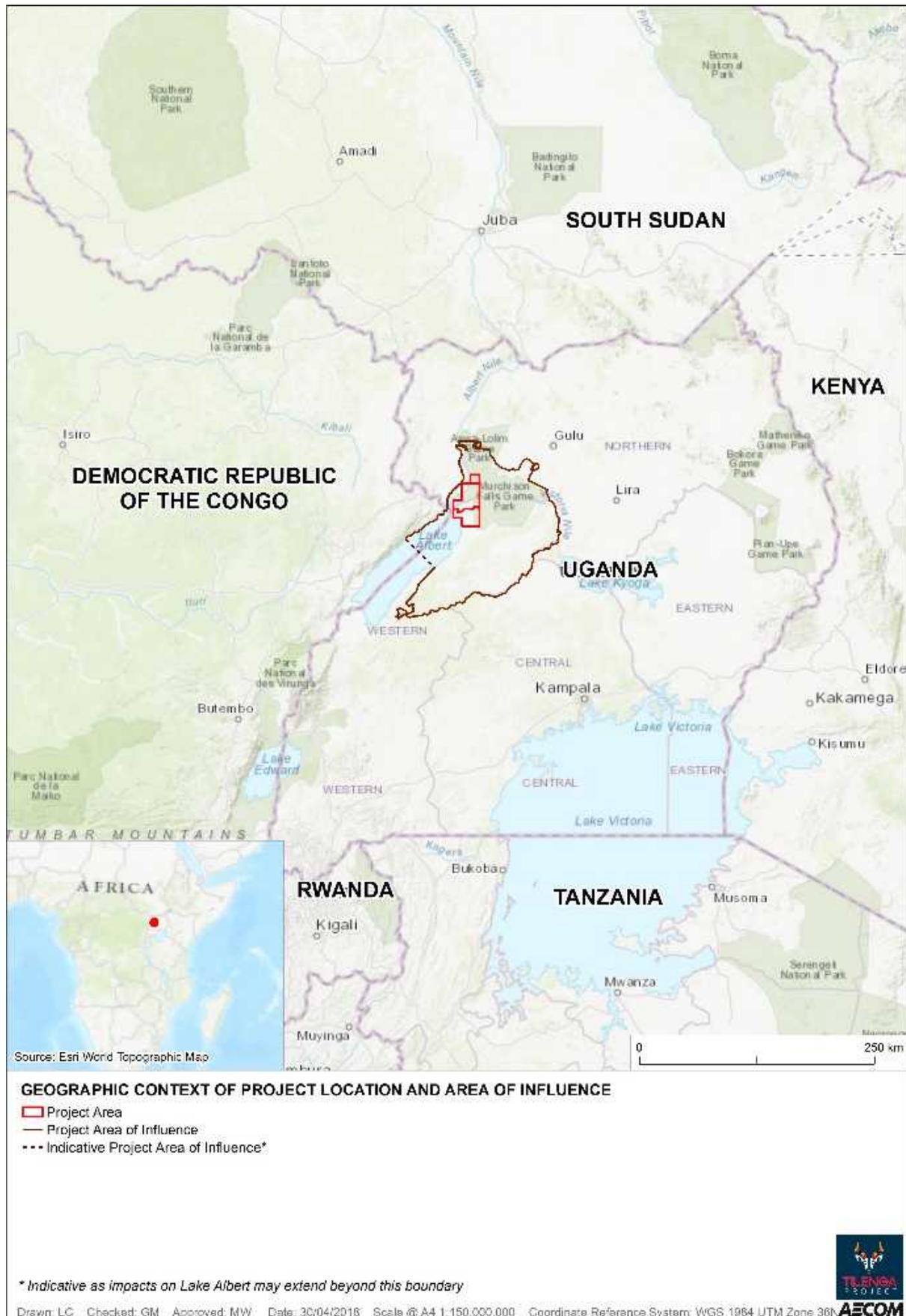


Figure 22-1: Geographical Context of the Project Location and Area of Influence

22.4 Impact Assessment and Mitigation

22.4.1 Impact Assessment Method

The methodology presented in this chapter broadly aligns with **Chapter 3: ESIA Methodology**. The key difference is the attention given to baseline conditions and receptor sensitivity:

- Where the magnitude of the transboundary impact is considered to be Negligible, it has not been deemed necessary to determine the receptor sensitivity. Table 3-1 in **Chapter 3: ESIA Methodology** shows that the residual transboundary impact from a negligible magnitude would inherently be *Insignificant* (or *Low* in some extreme cases).
- Where the magnitude of the transboundary impact is Low, the receptor sensitivity has only been determined where it is Moderate or High sensitivity. Where the sensitivity is Negligible or Low, the significance of the transboundary impact is classified as *Insignificant or Low*, according to Table 3-1.
- Where the magnitude of the transboundary impact is Moderate or High, there is a greater likelihood of the impact being of *Moderate* or *High* significance, and therefore the receptor sensitivity has been discussed and defined.

Where **Chapter 21: Cumulative Impact Assessment** has identified impacts from development interacting with the Project AoI and relevant valued environmental and social components (VECs), as having the potential to cause transboundary impacts, these are also discussed below.

22.4.2 Potential Transboundary Impacts

Potential transboundary effects were identified through the ESIA process, including the review of baseline data (as described in each of the relevant technical chapters identified below) and stakeholder consultations (as summarised in **Chapter 5: Stakeholder Engagement**). The Project Proponents also met with the Uganda Secretariat of the NBI on 12 February 2018 (see **Chapter 5: Stakeholder Engagement** and **Chapter 15: Aquatic Life**) to discuss potential interactions between the Project and Nile Basin.

A number of potential transboundary impacts have been identified during the ESIA process, and mitigation measures have been embedded into the design as far as practicable. These are incorporated in the list of potential transboundary impacts identified below.

Unplanned events also have the potential to cause transboundary impacts, and are discussed in more detail in **Chapter 20: Unplanned Events**.

22.4.2.1 Potential Impacts on Transboundary Ecosystems

A number of impacts with the potential to cause transboundary impacts on ecosystems identified in Schedule 2 of in the EAC Transboundary Ecosystems Management Bill or located in a neighbouring country outside Uganda have been identified, as follows:

- **Land take in the Albertine Rift Ecosystem:** The Project will involve some direct land take in the Albertine Rift ecosystem, which comprises an interconnected system of savanna, forest and woodland habitats. It is also expected to lead to some potential indirect impacts through the loss of habitat due to firewood or plant collection, fire setting, illegal hunting activities, land clearance and settlement activity due to influx, for example. **Chapter 13: Terrestrial Vegetation** and **Chapter 14: Terrestrial Wildlife** discuss the embedded and additional mitigation measures that have been designed to protect the ecosystem, and which are expected to reduce impacts to being *Low* to *Moderate* significance. Impacts on this Schedule 2 ecosystem are not expected to be of sufficient magnitude however to lead to any noticeable transboundary impacts; the magnitude of impact is considered to be *Negligible* and the significance of the potential impact is therefore **Insignificant**.
- **Water Abstraction in Lake Albert:** A Water Abstraction System will be installed in Lake Albert to provide water for the Commissioning and Operations Phase of the Project, including for re-injection, construction, and other industrial uses. If required, water may also be abstracted from

Lake Albert during Site Preparation and Enabling Works and Construction and Pre-Commissioning Phases.

Lake Albert is situated in Uganda and DRC and is a dynamic freshwater system that is a habitat for some Endangered and Critically Endangered species on the International Union for Conservation of Nature (IUCN) Red List, including *Lates macrophthalmus* (the Albert lates, a fish species endemic to Lake Albert), and snail species *Gabbiella candida* and *Bellamyia rubicunda*. **Chapter 15: Aquatic Life** provides more detail on the baseline conditions.

A series of design control measures have been built into the Project's design to limit the amount of water required, and to ensure water is re-used wherever possible.

The total volume of abstraction is not expected to affect the lake's water levels or hydrodynamic regime (the peak water abstraction volume is estimated to be 13 million m³/annum, which equates to around 0.034% of the annual outflow from Lake Albert). The impact on Lake Albert and the ecosystem it sustains is therefore expected to be insignificant and unlikely to cause impacts on DRC or any countries the Nile River flows into such as South Sudan, Sudan, or Egypt.

The construction of the Lake Water Abstraction System and pipeline will lead to noise and direct lakebed interference. Inbuilt design mitigation will include inlet filters on the abstraction pipe to prevent aquatic animals being caught in the pipeline and abstraction system. **Chapter 9: Hydrogeology**, **Chapter 10: Surface Water** and **Chapter 15: Aquatic Life** provide an assessment of the impacts from the construction and operations of the Water Abstraction System and demonstrate that, although localised impacts are possible, with the embedded and additional mitigation measures in place, the residual impacts are not expected to be significant and are therefore unlikely to affect DRC or other neighbouring countries. There will also be no discharge into the lake from the Project.

The magnitude of transboundary impacts associated with water abstraction from Lake Albert is expected to be *Negligible* in magnitude and therefore potential impact is assessed to be **Insignificant**.

- **Sustainable Fisheries:** Any potential impacts affecting the freshwater environment and fish abundance in Lake Albert would have a knock on impact relating to fisheries and fishermen. Any population increase in the local area as a result of the Project and induced in-migration could also put added pressure on existing fish resources. Potential cumulative impacts on fisheries are assessed in **Chapter 21: Cumulative Impact Assessment** and direct and indirect impacts are assessed in **Chapter 15: Aquatic Life** and **Chapter 19: Ecosystem Services**.

The Project is predominantly onshore and remote from the Nile or Lake Albert with the exception of a few components (Water Abstraction System, Victoria Nile Ferry Crossing, and Victoria Nile HDD Crossing). Where works are happening within the water or shoreline they will be relatively localised and unlikely to affect fisheries in the region or in neighbouring countries. Additional fishing activity in the river or lake occurring as a result of in-migration and population pressures is expected to be small relative to the size of these waterbodies. Although the impact from the Project on capture fisheries is predicted to have Moderate significance (**Chapter 19: Ecosystem Services**), and potential cumulative impacts High significance (**Chapter 21: Cumulative Impact Assessment**), they would be localised within the Project Aol in Uganda and small in scale, and there would be a low potential for transboundary impacts on fisheries.

As well as fishing, accidental spills could also affect fish stocks. However, with appropriate control measures and monitoring in place, the probability of unplanned events, including accidental spillages is reduced. Details of the potential impact as a result of unplanned events and appropriate mitigation measures are addressed in **Chapter 20: Unplanned Events**.

The magnitude of transboundary impacts associated with increased fishing in Lake Albert is expected to be *Low* magnitude and of **Low Adverse** significance.

22.4.2.2 Potential Impacts on Other Ecosystems

There is the potential for environment and social impacts downstream if water quality degradation, sedimentation, accidental pollution, or water abstraction occur within the Nile Basin in Uganda due to activities associated with the Project. The following impacts on other ecosystems not listed in the East African Community Transboundary Ecosystems Management Bill or with a footprint in a neighbouring country have been identified:

- *Deterioration of Water Quality in the Nile Basin:* Any water abstraction beyond the recharge capacity would represent a major risk to the Project. However, the Nile Basin has a large recharge capacity and massive dilution effects, due to the distance of travel and the number of tributaries. It is anticipated that water may be abstracted from the Victoria Nile during the Construction and Pre-Commissioning Phase. The potential water quantity impacts as a result of the proposed abstractions from the Victoria Nile River will be negligible as the abstractions will constitute less than 0.0001% of the availability of water resources in the Victoria Nile River. There are no planned discharges into the Victoria Nile River or Lake Albert from the Project activities. The transboundary magnitude of impact is considered to be to be *Negligible*, and therefore potential impact is assessed to be **Insignificant**.

Any minor spills are unlikely to cause noticeable change to the surface water conditions. Major accidental spills could affect water quality. However, with appropriate control measures and monitoring in place, the probability of unplanned events, including accidental spillages is reduced. Details of the impact as a result of unplanned events and appropriate mitigation measures are addressed in **Chapter 20: Unplanned Events**. The magnitude of impact on the Nile Basin is considered to be *Negligible*, and therefore potential impact is assessed to be **Insignificant**.

- *Abstraction from groundwater aquifers and accidental spills:* There is a groundwater aquifer in the Lake Albert area that is shared between Uganda and DRC, however in consideration of quantities for abstraction, distance from the Project components, and recharge rates it is not anticipated that there would be any significant impacts on the groundwater aquifer. Therefore potential impact is assessed to be **Insignificant**. A programme of groundwater level and quality monitoring will be carried out to establish any impacts of the Project operations on groundwater level and quality and to identify the need for any remedial measures, to support the Project needs in a sustainable manner (as discussed in **Chapter 9: Hydrogeology**). If insufficient groundwater exists the Project water shall be abstracted from Lake Albert, as discussed in Section 22.4.2.1.

Any minor spills are unlikely to cause noticeable change to the groundwater conditions. Details of the potential impact on water resources as a result of unplanned events such as blow outs, or fuel, oil and chemical spillages and appropriate mitigation measures are addressed in **Chapter 20: Unplanned Events**. The viscosity of the oil should slow its rate of percolation and transport, facilitating the pumping of oil from the groundwater and disposal to an onshore licenced hazardous waste facility, should such measures be required. Due to the distances involved and dispersion that would be expected, it is not considered that any significant transboundary impacts will occur as a result of impacts on the groundwater aquifer. The transboundary magnitude of impact is considered to be to be *Negligible*, and therefore potential impact is assessed to be **Insignificant**.

22.4.2.3 Potential Impacts on People and Communities

The following activities with the potential to affect people and communities outside of Uganda have been identified:

- *Air quality and greenhouse gas (GHG) emissions:* The Project will emit atmospheric pollutants including GHG, as described in **Chapter 6: Air Quality and Climate**. Air pollutants tend to impact the near environment, within the first couple of kilometres of the source, or up to 10 km for emission sources with high exit temperatures and velocities, such as gas turbines and flares.

Chapter 6: Air Quality and Climate has identified that fugitive emissions are most likely to be dispersed a distance of up to 350 m; the impact on neighbouring countries' air quality would therefore be insignificant, and are not considered to be a transboundary issue. Stationary

combustion source emissions have been modelled using detailed dispersion modelling tools and shown to lead to Negligible magnitude of impact in neighbouring countries, which is Insignificant.

GHG emissions however have the potential to contribute to climate change on a national and global scale, and are a well-documented transboundary issue. **Chapter 6: Air Quality and Climate** estimates the total lifecycle Project GHG emissions to be around 24 MtCO₂e, which it considers to range between an Insignificant impact during Site Preparation and Enabling Works and a Moderate significance impact during Commissioning and Operations. However, taking a conservative assumption that the atmosphere and climate is of high sensitivity to change in GHG emissions, as suggested by the general scientific community, this impact has been judged to be Moderate adverse in a national context, against the Ugandan national annual emissions target for 2030; the impact on neighbouring countries will be indirect and cannot be quantified. In-built design measures, such as appropriate stack heights, implementation of no operational flaring, and ensuring that emission sources have high efficiency will minimise the Project's GHG emissions and related impacts. The planned restoration of the affected land within the Project Area after Project completion should help offset some of the adverse impacts as this would reintroduce vegetation cover that will act as a future carbon stock source. The reinstatement of the sites, although not included in the calculations, is a commitment by the Project Proponents and will be managed through the implementation of the Environmental Management Plan and associated restoration plans. Taking this into consideration, the potential transboundary impact associated with GHG emissions is considered to be **Low Adverse** significance.

- **Community Health:** It is inevitable that some of the specialised labour and management roles will be imported, with a proportion of the workforce expected to originate from abroad. As mentioned in **Chapter 16: Social**, the Project will aim to achieve an average of 70% Ugandan nationals in the workforce, meaning that in the order of 30% will be achieved through in-migration. The Project may therefore attract workers from abroad, including neighbouring countries. Labour and social migration through the Project has the potential to increase the prevalence of communicable diseases and sexually transmitted infections (influx is likely to increase the presence of commercial sex workers and increase risk taking behaviour between workers, migrants, and host communities, which can lead to increased transmission of disease).

Transboundary epidemic disease transmission is well known and has been observed in many settings. Many infectious diseases, such as cholera, influenza and meningitis, can be rapidly and easily spread across national borders, particularly when a project attracts a large influx of potential job seekers during a construction phase. In some situations, the disease spectrum of the imported workers may be quite different than the host country and/or the project's affected communities. Mobile communities, including fishermen, are considered one of the most at risk populations. There is a risk that illnesses and disease will be passed between communities in Uganda and the DRC.

Potential impacts are assessed in **Chapter 16: Social**, **Chapter 18: Health** and unplanned events such as health epidemics are assessed in **Chapter 20: Unplanned Events**. The Project Proponents will prepare a series of management plans that will aim to safeguard community health, namely an Influx Management Strategy, Community Impact Management Strategy, and National and Community Content Strategy / Framework. The Project Proponents will work with local government, the Ministry of Health, District Health Teams and selected NGO partners to deliver education and communication on key public health issues. Following implementation of control measures outlined in **Chapter 16: Social** and **Chapter 18: Health**, it is considered the potential transboundary risk and impacts to community health are Low magnitude and of **Low Adverse** significance.

- **Increase in Road Traffic:** As Uganda is a land-locked country the nearest entryway by sea for materials coming from abroad is through East African coast lines where Mombasa Port in Kenya and Dar es Salaam Port in Tanzania are located. Onward travel by road or rail transport will then be used. As shown in **Chapter 4: Project Description and Alternatives**, there are two main routes through Kenya from Mombasa and an alternative route from Tanzania. It is estimated that

there would be a maximum of around 123 vehicle movements per day (3,690 a month) on the Ugandan road network within the Project area during the Construction and Pre-Commissioning phase (see Table 4-30), which is when the most transboundary journeys are expected. Most of these movements will be within Uganda, for example travelling between the site and supporting camps at the start or end of each day, or between local borrow pits and water sources to working areas. Approximately 95% of these trips constitute transport of materials, sands, concrete, gravel, food, fuel, and water, which are expected to be sourced from within Uganda. Even if assuming, conservatively, that double this (10% of these movements) arrive via Kenya, with two routes planned from Mombasa on major roads, an additional 12 vehicle movements per day would equate to only approximately 1 movement per hour. Given the roads are major routes through Kenya it is expected that they are already well used by thousands of vehicles per day; hence the Project related traffic is not expected to significantly increase the road traffic numbers. The magnitude of potential impact is therefore expected to be *Low* magnitude and of **Low Adverse** significance.

- *Waste disposal*: In case waste export to another country is required it would be carried out in compliance with the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (Ref. 22-8), and will require the notification and approval of both NEMA (the Competent Authority in Uganda) and the Competent Authority of the state of import. Consequently, no potentially significant transboundary impacts are predicted and the magnitude of impact is considered to be Negligible, with the transboundary impact significance **Insignificant**.

22.4.2.4 Summary of Potential Transboundary Impacts

Table 22-1 tabulates the embedded mitigation measures outlined in **Chapter 4: Project Description and Alternatives** and technical chapters 6-19 in this ESIA. It also presents the anticipated potential transboundary impacts following consideration of the embedded mitigation, and the relevant technical chapter where the assessment is presented. The potential transboundary impacts are all anticipated to be **Low** or **Insignificant** significance.

Table 22-1: Potential Transboundary Impacts

Potential Impacts	Embedded Mitigation Measures
Land take in the Albertine Rift Ecosystem	As described in Chapter 4: Project Description and Alternatives , the design has minimised land take in the Albertine Rift Ecosystem to prevent segregation of habitats within this ecosystem and reinstatement of affected areas.
Water Abstraction in Lake Albert	Embedded design measures to prevent pollution, such as adherence with NBI policies, and filters to prevent aquatic animals being caught in the pipeline and abstraction system.
Sustainable Fisheries	In-built, embedded design measures to prevent pollution, such as adherence with NBI policies, as described in Chapter 4: Project Description and Alternatives , Chapter 9: Hydrogeology , Chapter 10. Surface Water , and Chapter 16: Aquatic Life
Deterioration of Water Quality in the Nile Basin	In-built, embedded design measures to prevent pollution, such as adherence with NBI policies, as described in Chapter 4: Project Description and Alternatives , Chapter 9: Hydrogeology , Chapter 10. Surface Water and Chapter 16: Aquatic Life Preparation of a Spill Prevention Plan, Oil Spill Contingency Plan, Emergency Preparedness and Response Plan, and Blow Out Contingency Plan (see Chapter 23: Environmental and Social Management Plan)
Abstraction from groundwater aquifers and accidental spills	In-built, embedded design measures to prevent pollution, such as adherence with NBI policies, as described in Chapter 4: Project Description and Alternatives , Chapter 9: Hydrogeology , Chapter 10. Surface Water and Chapter 16: Aquatic Life . The installation of boreholes across the Project Area is subject to the outcome of the Water Abstraction Feasibility Study currently being undertaken by the Project Proponents.

Potential Impacts	Embedded Mitigation Measures
Impacts on community health	Chapter 4: Project Description and Alternatives refers to the Construction Camps including medical facilities and the Operational Camp including a permanent medical facility.
Impact on air quality and greenhouse gases (GHG's)	Diesel generator(s) will be located in the Industrial Area for the provision of power and small diesel generator packages will be used for all other work sites to provide power for small items of equipment such as pumps/compressors. There will be no routine flaring during normal operations. A flow meter will be integrated into the flare design to monitor flow and a sample point will be integrated to monitor composition. A Vapour Recovery Unit will be located at the CPF to process gases generated.
Increase in road traffic	Road transport will be the preferred transportation option, however rail will also be used.
Waste disposal	A Waste Management Plan will be developed and maintained to cover the duration of the Project; and will address the anticipated waste streams, likely quantities and any special handling requirements. The Project Proponent's will implement a waste tracking system to ensure traceability of all wastes removed off site.

22.4.3 Additional Mitigation

The potential impacts (following consideration of the embedded mitigation presented in **Chapter 4: Project Description and Alternatives** and the technical chapters (6-19) and **Chapter 20: Unplanned Events** are considered to be *Low to Insignificant* significance.

The mitigation measures identified in this ESIA (chapter 6-20) will be implemented and will be further developed when required, as described in **Chapter 23: Environmental and Social Management Plan**. The ESMP will be supplemented by supporting plans discussed in Chapter 23, which includes a Spill Prevention Plan, Oil Spill Contingency Plan, Influx Management Strategy, Labour Management Plan, Community Health, Safety and Security Plan, Community Impact Management Strategy, National and Community Content Programme, Emergency Preparedness and Response Plan, and Blow Out Contingency Plan.

As discussed in **Chapter 5: Stakeholder Engagement**, stakeholders, including project affected communities will continue to be engaged on a periodic basis, in order to provide updates and address concerns. If engagements with the NBI representatives are required, it is expected that government will perform those engagements on behalf of the Project Proponents in order to present any updates related to the Project.

In addition, the Project Proponents will liaise with the International Groundwater Resources Assessment Centre (IGRAC), which specialises in regional and transboundary-level assessment and monitoring of ground water resources to better understand the characteristics of the underground aquifer and its interaction with the Project, if any.

It has therefore not been considered necessary to develop any additional mitigation to further reduce the significance of the transboundary impacts.

22.4.4 Residual Impacts

The residual impacts are unchanged from the potential impacts, given no additional mitigation have been suggested, and remain **Low to Insignificant** significance.

22.5 Conclusions

There are several potential pathways for transboundary impacts on neighbouring countries; however, due to the nature and type of the Project and the effectiveness of the embedded and additional mitigation, it is unlikely to significantly impact upon other countries and states. Where applicable, monitoring has been committed to (in technical chapters 6-20) to check and validate the predictions in this ESIA and will be further defined in the environmental and social management plans which are currently being prepared.

Project activities take place in a sensitive transboundary ecosystem including international water bodies, which could also bring a potential reputational risk to the Project Proponents.

Mitigation measures have been presented in Chapters 6-20 of this ESIA to reduce potential impacts to acceptable levels which should therefore minimise the potential transboundary impacts. Additionally, international policies and treaties, such as the NBI Environmental and Social Policy and the Basel Convention, will be adhered to.

Table 22-1 identifies relevant embedded mitigation measures which will mitigate potential transboundary impacts resulting from the Project. It has not been deemed necessary to identify additional mitigation given that the potential transboundary impacts are insignificant. The residual impact is identified to be **Low or Insignificant**.

22.6 References

- Ref. 22-1 IFC Guidance Note 1: Assessment and Management of Environmental and Social Risks and Impacts, (2012).
- Ref. 22-2 The Government of Uganda, Environmental Impact Assessment Regulations (1998).
- Ref. 22-3 East Africa Community, Regional Environment Assessment Guidelines for Shared Ecosystems in East Africa, (2005)
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- Ref. 22-5 Ministry of Water and Environment, Environmental Impact Assessment Guidelines for water resources related projects in Uganda', 2011
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- Ref. 22-8 United Nations Environment Programme, Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, (1992).



23 – Environmental and Social Management Plan

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23 Environmental and Social Management Plan

23.1 Introduction

This Environmental and Social Impact Assessment (ESIA) chapter presents a framework for the preparation development of the Project Environmental and Social Management Plan (ESMP). It outlines the requirements and standards of the Management System, its structure, discusses the roles and responsibilities of key members of the Project personnel, and outlines the environmental and social documentation and compliance procedures that will be required. Supporting plans to be prepared in parallel with the ESMP are also listed and an outline provided. The respective strategies, plans and programmes will be updated or developed prior to Project implementation.

The Project is a complex development that will require a rigorous management and control system to ensure that legislative requirements and the Project Proponents commitments are met. The Project Proponents existing Health Safety, Security, Social and Environmental Integrated Management System (HSSSE-IMS) will be reinforced by a number of Project specific management strategies and plans, which will describe mitigation measures and actions that have arisen as a result of the ESIA process. These strategies and plans will apply across the Project, to both Project staff and contractors. The successful implementation of these management strategies and plans will depend on joint and effective collaboration with regulatory agencies, local governments and other developers.

The embedded and the additional mitigation measures outlined in each of the technical chapters of this ESIA have been collated into an ESMP Table (also referred to as aspect/impact register), Table 23-2 and a Mitigation Checklist, which is presented in Appendix T and should be read in conjunction with this chapter. The ESMP table provides a list of mitigation per technical chapter (e.g. air quality, noise, etc.) with details on responsibilities related to implementation and the related monitoring mechanisms. The Appendix T lists each embedded and additional mitigation measure per Project phase and highlights their relevance to each technical chapter of the ESIA. Mitigation measures presented are required to be implemented by the Project to ensure the residual impacts outlined in **Chapter 24: Residual Impact Assessment and Conclusions** are adhered to.

The ESMP will be a 'live' document, meaning that it will be reviewed, amended, and updated by the Project Proponents and the appointed contractor(s) as the Project design develops and more detailed information becomes available and as a result of monitoring (adaptive management). This will allow for continuous improvement of the Project's environmental and social performance. The ESMP Table shall be expanded in line with National Environment Management Authority (NEMA) approval conditions following submission of this ESIA and prior to the start of any work to provide more detail on mitigation and monitoring, and roles and responsibilities, also in relation to the production of detailed and dedicated Project management plans.

Consultation with stakeholders has been ongoing and will continue with the disclosure of the ESIA, as outlined in **Chapter 5: Stakeholder Engagement**. This includes incorporation of stakeholder recommendations in the mitigation, where applicable as part of this ESIA. Similar to the practice that took place during exploration phase, the Project Proponents will hold regular update meetings with lead agencies, local area leaders, and community members, and obtain feedback on the effectiveness of the measures being implemented for the Project. This will further ensure that feedback from stakeholders is incorporated in the implementation of the mitigation and enhancement measures during the Project life.

23.2 ESMP Requirements and Standards

An ESMP is required by NEMA and International Finance Corporation (IFC) prior to commencement of Project activities onsite.

The ESMP will be designed to be in compliance with the Government of Uganda (GoU) Environmental Impact Assessment Regulations, S.I. No 13/1998 (provided under section 107 of the National Environmental Act Cap 153 (Ref. 23-1). In particular it will seek to assist in the compliance of Part VIII: Post Assessment Environmental Audits of the regulations, and specifically to help identify the relevant mitigation to be implemented ('Regulation 33. Mitigation measures') and also include details on how the measures will be implemented and monitored ('Regulation 31 Self-Auditing' and 'Regulation 32 Audit by the Authority').

Further information and guidance for detailed ESMPs are provided within the Environmental and Social Impact Assessment Guidelines for the Energy Sector in Uganda, NEMA (2014) (Ref. 23-2).

According to *IFC Performance Standard (PS) 1* (Ref. 23-3), a project's proponent should establish and maintain an environmental management system (EMS) appropriate to the nature and scale of the project and commensurate with the level of social and environmental risks and impacts.

PS1 provides a guideline for the content of the ESMP. The ESMP must contain:

- Identification of the potential adverse environmental impacts and social risks;
- Design of the appropriate mitigation hierarchy to respond to these impacts and the operational procedures to avoid or reduce the risks. Where avoidance is not possible, an appropriate schedule of the compensation/offsets must be provided;
- Determination of requirements for ensuring that those responses are made effectively and in a timely manner; and
- Description of the means for meeting those requirements.

This chapter and associated appendices provide a detailed list of the identified mitigation and enhancement measures which the Project will implement to help minimise adverse impacts and enhance any beneficial impacts.

The mitigation measures are the outcome of the ESIA process, which has been undertaken in accordance with Ugandan legislation and IFC PSs applicable to this Project as discussed in **Chapter 2: Policy, Regulatory and Administrative Framework**.

In consideration of the Project's location in a sensitive ecosystem, the mitigation measures are intended, in aggregate, to be sufficient to achieve No Net Loss and a Net Gain to biodiversity, and therefore adhere with *IFC PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources* (Ref. 23-4). Long term monitoring of agreed indicators will be required to ensure that the identified requirements for no net loss / net gain and fulfilment of all defined mitigation management objectives have been achieved.

23.3 Project Proponents' Environmental and Social Management System

The ESMP will form part of the wider Project Proponents' HSSE-IMS (which achieves the objectives of an EMS), developed in line with international standards such as (but not limited to) International Organisation for Standardisation (ISO) 14001:2015 and Health and Safety Assessment Series (OHSAS) 18001:2007 and based on 10 key principles as shown in Figure 23-1 and further detailed in Table 23-1. The management system is in line with the PDCA principle (plan–do–check–act) as defined below and shown in Figure 23-1:

- **PLAN:** define the policy and conduct planning as to effectively consider within the context of the operation the hazards and risks, the legal and other requirements, the Project Proponents' objectives and targets, and the requirements for management programs;
- **DO:** execute the plan and to take steps in an organised way to enact the management programs in line with the policy, objectives and targets;
- **CHECK:** to conduct monitoring and measurement, to deal with non-conformities, in order to take preventive and corrective actions, audits, and inspections; and
- **ACT:** following a systematic review of performance, to take action to standardise, or improve the process.

PDCA Principles are described in more details in section 23.3.1.



Figure 23-1: Project Proponents PDCA Principles

23.3.1 Overview of Company HSSSE IMS

The Project Proponents’ HSSSE-IMS provides a framework to protect the environment, health and safety of employees, and respond to changing environmental conditions in balance with socio-economic need. Currently, the Project Proponents HSSSE-IMS Manual describes the core elements of the organisations EMS and their interaction. Figure 23-2 provides an overview of the Project Proponents’ current management system that the Project ESMP will be part of.

The key principles of the Management System define the Project Proponents' commitments to address issues of:

- Occupational Safety;
- Environment;
- Major risks;
- Hygiene;
- Security; and
- Society.

These principles and processes are defined in Table 23-1 and will be the basis for the implementation of the activities to ensure that Project impacts are adequately managed and addressed, for the life of the Project. The processes apply to all Project workers, including Contractors and Suppliers.

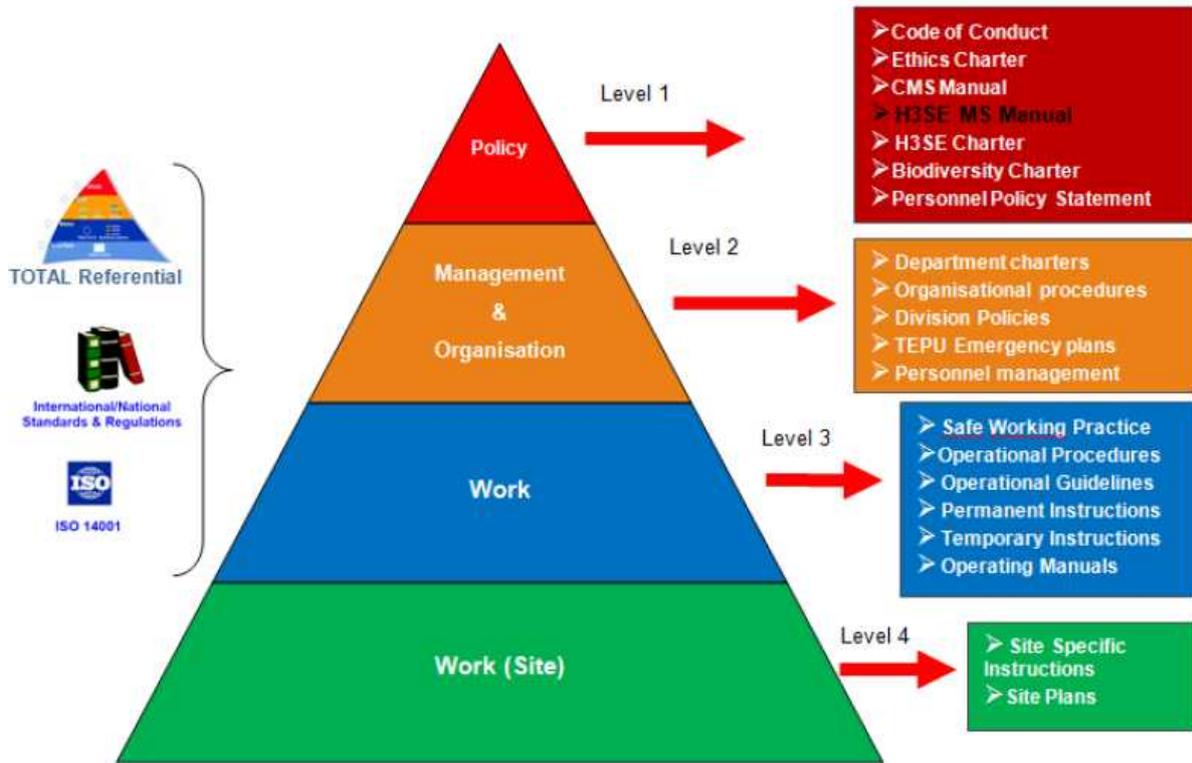


Figure 23-2: Overview of the Project Proponents HSSE IMS

Table 23-1: Principles of Proponents HSSE IMS

HSE Principle	Commitment
01. Management Leadership and Commitment	Management at all levels demonstrate exemplary conduct, rigor, vigilance and professionalism regarding HSE in all their activities. The visible commitment to HSE performance is part of the overall assessment of all managers. HSE performance is evaluated for everyone.
02. Compliance with Laws, Regulations and Group Requirements	In all activities, the entities act in compliance with applicable laws, regulations, relevant industry standards, Group’s voluntary commitments, and other specific principles and requirements at the Group and branch level.
03. Risk Management	For any activity the hazards to which people, the environment, and assets are exposed are systematically identified, the associated risks assessed, and the measures for reducing them defined and implemented. The risk level and risk reduction measures are periodically reassessed, at a minimum with each change of an activity or a process. In particular, the potential risks to human health, the technological risks, and the potential significant environmental impacts are managed as per this principle.
04. Operational Accountability	It is the duty of each and every one, at their own particular level, to manage the risks and limit the impacts inherent to their specific activity and to the activity of their own team.
05. Contractors and Suppliers	Contractors and suppliers are assessed and selected by considering their HSE performance, their ability to implement an HSE policy conforming to the entity policy, and to control the risks inherent to the activities under contract. Obligations and responsibilities in terms of HSE are clearly defined in the contracts and the entity ensures that these stipulations are respected throughout the duration of the contract.
06. Competencies and Training	For all activities, the competencies required are defined, taking into account HSE aspects. Competencies of personnel are regularly assessed, and training and development plans are implemented to ensure that competencies are appropriate for the tasks to be performed.

HSE Principle	Commitment
07. Emergency preparedness	<i>The emergency situations potentially critical for people, the environment, and assets are identified based on a risk assessment. An organisation is set up to ensure that emergency plans, appropriately-trained personnel and suitable equipment necessary for dealing with such situations are constantly on hand. Emergency and associated external assistance plans are drawn up, tested during periodic exercises and updated on a regular basis. Where appropriate, these emergency plans take into account local communities, mutual aid organisations, and authorities. All employees, contractors, suppliers and visitors are informed about what to do in the event of an emergency.</i>
08. Learning from Events	<i>All incidents are reported and analysed. Those with significant actual or potential severity are further analysed in depth to determine their root causes. All corrective actions and preventive measures are defined and appropriately prioritised. The results of the analyses are reported to all interested parties that may benefit from the lessons learned. All employees have a duty to report without delay, any dangerous situation or any deviation from HSE rules.</i>
09. Monitoring, audit, and Inspection	<i>Management is responsible for the implementation of the HSE policy, and regularly assesses its performance through monitoring, audits and inspections. Any shortfalls in regard to the set objectives are analysed and corrective actions and/or an improvement plan are subsequently defined, implemented, and monitored through to closure.</i>
10. Performance Improvement	<i>In order to improve performance, HSE action plans are regularly reviewed within each activity. HSE management system effectiveness is analysed during management reviews and monitored through key performance indicators, both quantitative and qualitative. Actions are prioritised according to the risk level or associated impact and are incorporated within the entity's action plan.</i>

The Project Proponents have a legal PLANC (Permits Licenses, Authorisations, Notifications and Consents) and legal Register both of which will be kept up to date in line with applicable requirements. The Health, Safety, Environment and Quality (HSEQ) and Biodiversity Charters detail high level commitments and are endorsed by the Project Proponents' management; more details are in **Chapter 2: Policy, Regulatory and Administrative Framework** and in section 23.3.1.2. These are existing documents that are being reviewed on a regular basis, and it is expected that these will be revisited as part of the preparation towards upcoming project phase. The efficiency of the management system is formally being reviewed twice a year by the Project Proponents HSE Board, in consideration of annual objectives set by the Project Proponents. The management review is carried out by Senior Management in consultation with the Project Proponents HSE Manager and based largely on the findings of monitoring, inspections, and audits. Interim reviews will be done on the ESMP based on ongoing monitoring and as part of the adaptive management referred to under section 23.3.1.

23.3.1.1 Project Proponents Environmental Management System

The Project Proponents' EMS forms part of the overall HSSSE-IMS and is organised around the principles of ISO14001:2015 and around objectives defined in Figure 23-3.

23.1.1.1.1 Environmental Approach

Since the start of its activities in Uganda, the Project Proponents have implemented several rules on environmental aspects. The rules include:

- Developing an EMS with defined objectives for improvement of the environmental performance;
- An initial environmental status shall be undertaken and then at regular intervals throughout Project's Life of Field;
- Risks and Impacts have to be identified prior the activities start and appropriate management measures defined;
- Management Plans and procedures have to be developed in order to implement measures identified;
- A preparedness and response system needs to be implemented and maintained to respond adequately to accidental spills; and

- A system needs to be in place to allow for quantification and reporting on environmental performance.



Figure 23-3: Project Proponents' EMS Principles

23.1.1.1.2 Biodiversity Approach

The Project Proponents environmental framework incorporates the following core principles for action:

- Deploy the mitigation hierarchy “avoid-mitigate-compensate” - the Project Proponents will apply this approach for the duration of its project lifecycle to minimise the impact of its activities on biodiversity;
- Take into consideration the sensitivity of ecosystems in the course of its business - the Project Proponents will identify and take into account the diversity and sensitivity of various environments in terms of biodiversity;
- Manage the biodiversity - the Project Proponents will incorporate the biodiversity impact and risk management into their EMS and refer to good practices within the industry;
- Report - The Project Proponents will report to stakeholders on biodiversity performance; and
- Improve knowledge of biodiversity - The Project Proponents will participate in the improvement of knowledge of biodiversity and ecosystems as well as managing the stakeholders involved, through Research and Development initiatives taken with local and international partners and professional associations.

The Project Proponents will conduct sensitivity and impact analysis for the development of the Project. A Biodiversity Action Plan will be developed for operated production sites located in the most sensitive protected areas.

In addition to applying the general principles of the TOTAL Group's biodiversity policy, the Project Proponents have committed to meeting the IFC PSs, in order to take the particularly sensitive

biodiversity of certain sites into consideration. In this respect, the Project Proponents have set a target of a net gain in biodiversity due to the possible impacts of this project on critical habitats. Teams manned by specialists in biodiversity and ecosystem services have been formed to focus on environmental and social matters.

These commitments are translated in the Project Proponents' Biodiversity Charter. In line with it, the Project Proponents in their work within MFNP and the surrounding landscape are fully committed to carrying out activities in accordance with the following principles:

- 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.

Further, in consideration of the sensitive environmental context, the Project Proponents have defined the following vision for this project: *to leave the Murchison Falls National Park and, where feasible, its surrounding landscape in better ecological condition than if the Project had not taken place, by achieving a positive effect for biodiversity.*

In addition, a specific independent Biodiversity and Livelihood Advisory Committee (BLAC) has been set up with external stakeholders from national and international organisations, who are specialised in the protection of nature and relations between communities and the wild fauna. This committee is tasked with ensuring that best practices are properly implemented by the Project Proponents in Project operations, so that it achieves its targets of net gains in biodiversity, which are currently one of the best biodiversity management practices.

23.3.1.2 Project Proponents Social Approach

Since the start of its activities in Uganda, the Project Proponents have implemented several rules on social aspects. Maintaining an open and ongoing dialogue is key to the success of the Project and to the consideration of social factors. The rules include:

- The Project Proponents will identify external stakeholders and engage with them in accordance with the Project Stakeholder Engagement Plan;
- A social baseline study and social impact assessment will be conducted before any new activity;
- The Project Proponents will develop a societal strategy tailored to the risks and opportunities linked to its business and societal context;
- An analysis of the system effectiveness shall be carried out periodically;
- A Community Impact Management Strategy will be developed;
- The Project Proponent will require its contractors to address societal issues;
- The Project Proponent will put in place a reporting system; and
- The Project Proponent will put in place its governing system.

These rules are illustrated below in Figure 23-4.



Figure 23-4: Social Approach

23.3.1.3 Interface Project Proponents - Contractors

The contracting and supplier companies involved in the Project development activities will be required to have a management system in place in line with the Project Proponents' requirements. This will need to address the 10 areas defined in Figure 23-1. The Principal Contractor (for each phase) is expected to develop its own set of plans with respect to the activities, location, and expected level of interaction with the community and in line with the requirements in the ESMP (Table 23-2) and Project Proponents' management plans. The Management Plans will be built around a common framework defined by Project Proponents and will need formal approval by the Project Proponents before works can start.

Prior to commencement of works, contractors will be responsible for developing their own HSSSE-IMS which should be commensurate to the level of risk of the works performed. Contractors will reflect at least on the following areas in their management systems and associated management plan:

- Responsibilities;
- Risk evaluation and management;
- Respect for the environment;
- Respect for the local community;
- Safeguarding of health;
- Competency and training;
- Emergency Preparedness;
- Auditing, inspections and investigations; and
- Security.

Further details on responsibilities are provided under section 23.4.

23.3.2 Project ESMP

23.3.2.1 Introduction

An overview of the ESMP and how it relates to the Project Proponents' HSSSE-IMS is presented in Figure 23-5. The Project Proponents have taken commitments for the Project to be implemented in line with internal, national, and international standards (i.e., IFC) and good international industry practices (GIIP). This includes developing and implementing the project in line with the impacts mitigation hierarchy (i.e. avoid, minimise, restore, offset/compensate).

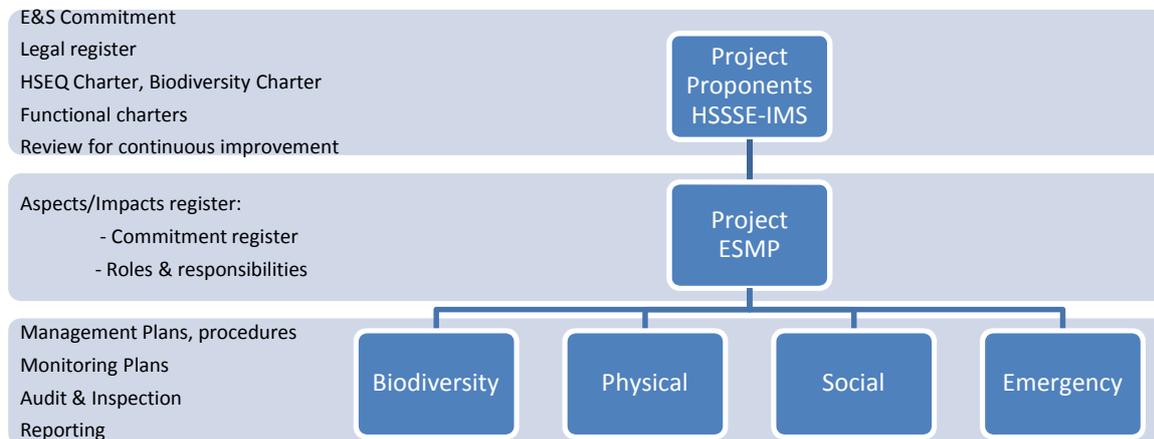


Figure 23-5: Overview of the Project ESMP relative to the Project Proponents' HSSSE-IMS

The ESMP will be implemented to contribute to meeting the objectives defined above; in consideration of project activities and associated impacts as well as stakeholders' expectations. It is organised around four main pillars which are:

- Biodiversity;
- Physical environment;
- Social; and
- Emergency.

The ESMP will be supplemented by a set of supporting strategies and plans which will provide procedures, guidelines and protocols for the day to day activities to be carried out during the Project to manage identified risks and impacts, and to implement project controls and mitigation measures. These were identified as being required by the ESIA process and are described in section 23.5. The management system will provide an overarching mechanism for the implementation of the ESMP, including related strategies and plans. It will also provide overarching mechanisms associated with monitoring, inspection and auditing, non-compliances and incidents reporting; including for definition of corrective actions which will be necessary to address new hazards or changes to hazards, inadequate implementation of control and mitigation measures, and non-compliances or non-conformances with the requirements defined for the Project.

Each main contractor shall prepare corresponding ESMP with supporting strategies and plans relative to their scope of work and submit it to the Project Proponents for review and approval prior to start of each phase.

The strategies and plans shall be developed in consultation with NEMA and other lead agencies such as Petroleum Authority of Uganda (PAU), Ugandan Wildlife Authority (UWA), Directorate of Water Resources Management (DWRM), Ministry of Gender, Labour and Social Development, (MGLSD) and Ministry of Tourism, Wildlife and Antiquities (MTWA), and District Local Governments as required, prior to commencement of the activities to ensure consistent application of mitigation measures. The project ESMP is presented in Table 23-2 below.

23.3.2.2 Estimated costs

Preliminary estimates are presented for costs associated with the implementation of the ESMP during the Site Preparation and Enabling Works, and Construction and Pre-Commissioning until first oil (where most mitigation are to be implemented due to types of impacts and works intensity), and are included in the Project Proponents Long Term Planning for the Tilenga Project. They exclude costs associated with development and implementation of embedded mitigations (which are mainly design-related and form part of the scopes assigned to the Tilenga engineering and drilling contractors), those related to Human Resources and the global Emergency Preparedness and Response as these are catered for aside.

The ESMP development and implementation is associated with costs presented hereafter:

- Environment: about 4.5M\$/year
- Social (incl. RAP): about 14M\$/year

Some programs are expected to cut across environment and social, and some relate to the outcome of feasibility studies therefore adaptive management is expected to ensure the Project objectives are met (incl. No Net Loss / Net Gain); which may impact on cost estimates presented here. In addition, as indicated in this Chapter, the implementation of the ESMP will form part of the HSSSE-IMS, which itself is subject to continuous improvement. It is expected that costs associated with the Commissioning and Operations are lower as works intensity will have reduced and related mitigation and monitoring will be more routine, however the detail will be assessed closer to that stage.

23.3.2.3 Decommissioning

It should be noted that mitigation associated with the decommissioning phase have been presented at high level in general as details regarding such activities will be defined at a later stage. It is proposed that a review of relevant studies, if necessary, will be undertaken during the Commissioning and Operations Phase to confirm that the planned decommissioning activities utilise good industry practices and are the most appropriate to the prevailing circumstances and future land use.

In general, the following principles will be adopted where practicable and will be subject to detailed assessment prior to decommissioning:

- Above ground infrastructure will be removed to 0.5 m below ground level and backfilled and vegetated;
- Access roads may be left in place depending upon the subsequent use of the land;
- Shallow foundations for infrastructure may be excavated, demolished and disposed of;
- Where piled foundations exist, these may be excavated to a depth of 1 m below the existing ground level and removed;
- Excavations resulting from the removal of foundations will be backfilled;
- It is expected that pipelines will be cleaned, capped and let in situ, to prevent disturbing the reinstated habitats; and
- Where the environment assessment identifies it is acceptable, in some locations pipeline sections may be cleaned, reclaimed and re-used.

Before decommissioning, a Decommissioning Management Plan will be prepared and agreed with NEMA and other relevant agencies prior to the commencement of any on-site works. It will include details on the methods and activities associated with the decommissioning of the infrastructure, including the transportation and final disposal or re-use strategy for Project components and wastes. Completion criteria will be detailed in the management plans.

The Project Proponents will obtain all relevant approvals and authorisations for all decommissioning activities from the GoU departments responsible at the time.

Table 23-2: Tilenga development ESMP

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
AIR QUALITY												
x	x		x	Storage, handling, and manipulation of potentially dusty materials and movement of construction vehicles on public roads	Fugitive emissions of dust and PM10	<p>For work activities located close to dust sensitive receptors, mitigations will be considered to minimize the dust emissions. A range of specific dust suppression measures shall be implemented to minimise potential impacts. Such measures shall be implemented on a case by case basis and may include the use screens covers and/or barriers.</p> <p>Implementation of a Dust Control Plan, which will include:</p> <ul style="list-style-type: none"> o Measures to include the application of dust suppressants (including water), on potentially dust generating sources, including on site and off site roads used by Project vehicles and material stockpiles; o Water will be sprayed onto the roads and work sites to suppress dust generation, where necessary. Water will be provided at the work sites and mobile water bowsers will be available to control dust generation, if required; o Activities likely to generate dust (e.g. drilling powders use and transfer) will be enclosed and dust catchers in place when practicable; o Trucks carrying potentially dusty material will be covered, to reduce fugitive dust emissions from the materials being transported; o Roads used by Project vehicles will be maintained, to the extent that this is possible, to reduce fugitive dust emissions associated with surface dust being disturbed by the passing of traffic; and o Concrete batching materials to be stored in sealed silos with the batching area regularly watered down to suppress dust emissions. <p>Use enclosed chutes and conveyors and covered skips, where practicable</p> <p>Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate</p> <p>Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods</p> <p>Re-vegetate exposed areas/soil stockpiles to stabilise surfaces as soon as practicable</p> <p>Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place</p> <p>Use water-assisted dust sweeper(s) on the tarmacked access roads, to remove, as necessary any material tracked out of the site as required</p> <p>Vehicle access points to be sited at suitable locations and where possible, away from receptors to limit impacts from dust generation</p> <p>Plan site layouts so that machinery and dust causing activities (such as stockpiles) are located away from the nearest dust sensitive receptors (typically residential properties located closest to the construction worksite boundaries), as far as is practicable</p>		x	Dust Control Plan	<p>Monitoring Mechanism:</p> <ul style="list-style-type: none"> - Air quality monitoring of dust particulates, PM10, PM2.5, NO2, SO2, O3, VOCs (frequency depending on monitoring means - passive sampling at main sites, daily checks at sites where majority of dust will be generated to start with) - Weekly site inspections and audits (as per annual audit plan) - Recording of exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book - Periodic inspections, where receptors are nearby, to visually monitor dust for soiling checks of surfaces on personal property such as houses and vehicles within 100 m of boundaries of the worksites - Stakeholder Engagement and Grievance Mechanism - Maintenance of the equipment and vehicles - Flow meters on all 	Project Proponents and Project Contractors Relevant Government bodies who may conduct independent monitoring or review the data include: NEMA, District Environment Officer, PAU	Low Adverse (Fugitive emissions of: dust and PM10, combustion emissions, VOCs, odours; Controlled emissions of NO2, PM10, PM2.5 and exhaust emissions) Moderate Adverse (Greenhouse gases emissions)
x	x		x	Operation of Non-Road Mobile	Fugitive combustion emissions	<p>Prohibit the unnecessary idling of plant</p> <p>Enforcement of a low speed limit for NRMM, such as 10 kilometres per hour (kph) within working areas</p>	x	x	Physical Environment Monitoring Plan			

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*	
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor					
				Machinery (NRMM)		Regular servicing and maintenance of NRMM plant to ensure they are operating as per manufacturer's specification		x		refuelling points to monitor usage - Maintenance and calibration of the flowmeters			
						Allowing only trained and accredited (as required) personnel in the use of NRMM		x					
						Phased planning of construction activities on the worksites so that NRMM plant are not regularly located in close proximity to nearby sensitive receptors		x					
x	x			Well pad construction and commissioning activities paint and coating activities	Fugitive emissions of VOCs	Majority of coating and painting activities shall be done at the Construction Support Base in dedicated buildings On site painting and coating shall be limited to touch up and roller application Mud Products will comply with Uganda's Health, Safety and Environment Regulations. Only Chemicals ranked E or D in the OCNS (Oil Chemical National Scheme classification) will be allowed to be used; • All products for completion and drilling fluids will be free of chlorides; the upper limit will be 2% by weight; • All Products entering in the mixing of drilling, completion and cementing will be free of aromatic Hydrocarbon, the upper limit is fixed at 300 parts per million (ppm); • No asphalt, no gilsonite, nor equivalent so called "black" products will be permitted in the drilling fluids and cementing formulations.		x	Chemical Management Plan	Performance Indicators: - Air quality and air emissions monitoring records - Stakeholder Engagement conducted - Number of exceptional incidents recorded - Number of fugitive emissions measurement and leak detection campaigns held - Records of site odour condition - Maintenance and calibration records - Number of grievances (received / addressed) related to dust, fugitive emissions, odour, flaring			
			x	Depressurisation of plant and pipework		All spray applications will normally be carried out in the enclosed blast and paint shop, which will be fitted with the necessary air filters to prevent fugitive emissions to air and will use non-toxic paint, where available, and containment practices to stop overspray		x					
		x		Operational well pads and the Central Processing Facility		Implementation of a fugitive emissions measurement program and leak detection system	x		Physical Environment Monitoring Plan				
x	x	x		Paint and coating activities and the storage of waste material prior to removal for the Project Area	Fugitive emissions of odour	The opening of waste storage vessels for limited periods of filling and emptying The positioning of potentially odorous waste storage vessels at locations as far away from odour sensitive receptors as practically possible The removal of potentially odorous waste from the Project Area at appropriate time and frequency All spray applications will normally be carried out in the enclosed blast and paint shop, which will be fitted with the necessary air filters to prevent fugitive emissions to air and will use non-toxic paint, where available, and containment practices to stop overspray	x	x	Waste Management Plan Physical Environment Monitoring Plan				
			x	Chemicals and the purging of pipework prior to removal		Ensure spill response equipment (including sampling and personal protective equipment) is readily available on site to contain and clean any spillages as soon as reasonably practicable after the event	x	x	Spill Prevention Plan Oil Spill Contingency Plan				
x	x		x	Vehicle movements	Controlled emissions of NO2, PM10 and PM2.5	Prohibit the unnecessary idling of Project vehicles Regular servicing and maintenance of Project vehicles to ensure they are operating as per manufacture's specification Allowing only trained personnel to drive Project vehicles As far as possible, sourcing material from locations close to the Project Area to reduce haulage distances, and therefore the exposure to noise and emissions from traffic	x	x	Road Safety and Transport Management Plan Physical Environment Monitoring Plan				

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						Optimising the logistics to maximise use of available vehicles, reduce number of trips and reduce movements on more sensitive routes where possible; using convoys when appropriate (e.g. via using one shared logistics service provider who can ensure appropriate planning across all parts of the Project and ensure efficiencies are made)	x	x				
						All transportation will be compliant with applicable road transport regulations. In the Project Area, routine transportation operations will normally only occur in day light. Deliveries of equipment and the movement of people will be scheduled in convoys, where practicable	x	x				
						Developing and implementing a Road Safety and Transport Management Plan that will outline speed limits and setting and enforcing traffic management measures (e.g. 40 km/hr), and indicating vehicles should be driven at steady speeds observing the speed limit and not making unnecessary noise, such as sounding horns, etc.	x	x				
x	x		x	Construction energy generation plant located at the Construction Support Base and well pad generators	Controlled exhaust emissions	During Site Preparation and Enabling Works, diesel generator(s) will be located in the Industrial Area for the provision of power and small diesel generator packages will be used for all other work sites to provide power for small items of equipment such as pumps/compressors		x	Physical Environment Monitoring Plan			
				For power generation, centralised diesel generator package including back up facilities will be located at the Industrial Area Construction Support Base to service the construction and pre-commissioning activities within the Industrial Area. Dedicated generator packages of varying sizes will also be mobilised to provide the power requirements for the construction and pre-commissioning of at discrete locations including the Lake Water Abstraction System, well pads and pipeline installation sites. Separate independent packages will be mobilised with the drilling rig to service the power requirements for the drilling activities			x					
				Decommissioning: For power generation, a centralised diesel generator package including back up facilities will be located at the Construction Support Base to service the decommissioning activities within the Industrial Area. Dedicated generator packages of varying sizes will also be mobilised to provide the power at discrete locations including the Lake Water Abstraction System, well pads and pipeline decommissioning sites;		x	x					
				Operating the energy generation plant as and when required, and at the load required to meet the energy demand of the worksite/activity at that time			x					
				Ensuring the energy generation plant is well maintained and used in accordance with manufacturer's specification		x	x					
		x		Energy generation plant located at the Central Processing Facility		During normal operations, power will be provided by the CPF; there will be no back-up generators other than black-start and emergency generators.	x			Monitoring mechanism (on top of relevant ones presented above): Fuel and Flare metering: - Flow meters on all refuelling points to monitor usage. - Flow meter to monitor flare flow - Metering system		
				There will be no routine flaring during normal operations	x							
				A Vapour Recovery Unit will be located at the CPF to process gases generated	x							

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						There will be no routine well testing after wells are completed	x			integrated into the main power generation system package Gas composition: - Flare and fuel gas composition from sampling (quarterly) - Main power generation exhaust sampling		
* Showing the most significant one												
NOISE												
x	x		x	Site clearance, use of construction plant and vehicles (all sites), excavation from borrow pits, power generation, waste water treatment plant	Generation of noise	Operating the energy generation plant as and when required, and at the load required to meet the energy demand of the worksite/activity at that time		x	Physical Environment Monitoring Plan	Monitoring Mechanism: - Noise and vibration monitoring (levels of noise and vibration at the Project site borders and sensitive receptors), once a week for a month at beginning of each activity and then frequency adjusted based on the noise generated / receptors sensitivity - Weekly site inspections and audits (as per annual audit plan)	Project Proponents and Project Contractors Relevant Government bodies who may conduct independent monitoring or review the data include: NEMA, District Environment Officer, UWA, OSH Department - MGLSD	Low Adverse
				The use of centralised power generation will be implemented on the Construction Support Base to minimise the number of discrete diesel generators required to support construction activities at the Industrial Area			x					
				Regular servicing and maintenance of plant to ensure they are operating as per manufacturer's specification			x					
				Prohibit the unnecessary idling of plant			x	x	Noise and Vibration Management Plan	Recording of exceptional incidents that cause noise in excess of the permitted levels, either on- or offsite, and the action taken to resolve the situation in the log book		
				During Site Preparation and Enabling Works, diesel generator(s) will be located in the Industrial Area for the provision of power and small diesel generator packages will be used for all other work sites to provide power for small items of equipment such as pumps/compressors				x				
				Decommissioning: For power generation, a centralised diesel generator package including back up facilities will be located at the Construction Support Base to service the decommissioning activities within the Industrial Area. Dedicated generator packages of varying sizes will also be mobilised to provide the power at discrete locations including the Lake Water Abstraction System, well pads and pipeline decommissioning sites;			x	x	Labour Management Plan			
				For work activities located close to noise sensitive receptors, mitigation measures will be implemented to minimise the impact. A range of specific noise mitigation measures shall be implemented to minimise impacts. Such measures shall be implemented on a case by case basis and may include the use of temporary abatement such as dampening and shielding techniques, noise barriers, and mufflers. Specific noise regulations and thresholds will be specified in the Noise and Vibration Management Plan				x				
				Where possible, selection of low-noise rated machinery and generators				x	Road Safety and Transport Management Plan	- Maintenance of the equipment and vehicles - Stakeholder Engagement and Grievance Mechanism		
				As per base case, there will be no routine night shift activities associated with the Site Preparation and Enabling Works Phase				x				
				All transportation will be compliant with applicable road transport regulations. In the Project Area, routine transportation operations will normally only occur in day light. Deliveries of equipment and the movement of people will be scheduled in convoys, where practicable			x	x				
				As far as possible, sourcing material from locations close to the Project Area to reduce haulage distances, and therefore the exposure to noise and emissions from traffic				x				

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
					Construction activities for the Production and Injection Network will be contained within the permanent RoW which will have a 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)			x	Site Clearance Plan Physical Environment Monitoring Plan	Performance Indicators: - Noise and vibration monitoring records - Maintenance records - Stakeholder Engagement conducted - Number of incidents or grievances (received / addressed) related to noise		
					With the exception of drilling and HDD construction activities there will be no permanent night time working in the MFNP	x		x	Noise and Vibration Management Plan			
					During detailed engineering phase the present noise study will be refined by the selected engineering company and drilling contractor(s) and based on selected vendor data and mitigations will be addressed accordingly to minimise the noise impact at receptors at acceptable noise levels			x				
					An additional detailed review of the noise generated by various project activities at each key Project component will be undertaken when the construction and drilling contractors are defined. Should significant potential impacts be identified, appropriate mitigation measures will be undertaken			x				
					Avoiding activities which generate high noise levels during night-time work during construction (except for some drilling activities which due to the technical requirements have to be continuous until the well is developed)			x				
					Loud music is not to be played.	x		x				
	x			Well drilling	Generation of noise	Where possible, selection of low-noise rated machinery and generators			Noise and Vibration Management Plan	Moderate Adverse (Night-time, South Victoria Nile)		
					During detailed engineering phase the present noise study will be refined by the selected engineering company and drilling contractor(s) and based on selected vendor data and mitigations will be addressed accordingly to minimise the noise impact at receptors at acceptable noise levels	x		x				
					Noise abatement of drilling equipment, for example by use of mufflers, or noise barriers and enclosures where appropriate, especially during night time operations			x				
					Multiple drilling activities close to identified sensitive receptors should be avoided where practicable	x		x				
					Loud music is not to be played.	x		x				
					Piling and other activities generating noise and vibration will be 'ramped up' (slow started) to allow wildlife to move away in good time			x				
	x			Horizontal Directional Drilling for the Victoria Nile crossing	Generation of noise	Where possible, selection of low-noise rated machinery and generators			Noise and Vibration Management Plan	Low Adverse**		
					An additional detailed review of the noise generated by various project activities at each key Project component will be undertaken when the construction and drilling contractors are defined. Should significant potential impacts be identified, appropriate mitigation measures will be undertaken	x		x				
					Noise abatement of drilling equipment, for example by use of mufflers, or noise barriers and enclosures where appropriate, especially during night time operations							
					Loud music is not to be played.	x		x				
					Piling and other activities generating noise and vibration will be 'ramped up' (slow started) to allow wildlife to move away in good time			x				
		x		Use of industrial plant (such as compressors, pumps, turbines)	Generation of noise	There will be no routine flaring during normal operations	x		Noise and Vibration Management Plan	Moderate Adverse (CPF Option 2; Emergency flaring)		
					With the exception of drilling and HDD construction activities there will be no permanent night time working in the MFNP			x				

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
				and generators), flaring		For the CPF, equipment will be designed to achieve occupational noise level compliance of 85dBA at 1 metre (which is an industry accepted standard) where practicable Additional noise modelling should be undertaken during detailed engineering. Noise modelling will include finalised locations of plant items and detailed Sound Power Levels based on manufacturer's data. A mitigation strategy will be developed to minimise the impact upon nearby sensitive receptors. In principle, during ramp up power will be provided from power generation sources (within the Industrial Area and at each well pad); there will be no additional generators used during this activity Loud music is not to be played.		x				at night with elevated flare)
		x		Well interventions	Generation of noise	Where possible, selection of low-noise rated machinery and generators Loud music is not to be played. Piling and other activities generating noise and vibration will be 'ramped up' (slow started) to allow wildlife to move away in good time		x	x	Noise and Vibration Management Plan		Moderate Adverse (Night-time, South Victoria Nile)
		x		Traffic	Generation of noise	Regular servicing and maintenance of vehicles to ensure they are operating as per manufacture's specification Prohibit the unnecessary idling of vehicles Developing and implementing a Road Safety and Transport Management Plan that will outline speed limits and setting and enforcing traffic management measures (e.g. 40 km/hr), and indicating vehicles should be driven at steady speeds observing the speed limit and not making unnecessary noise, such as sounding horns, etc. The base case for Tilenga is that there will be no night driving. However, night driving may be permitted in exceptional circumstances and with internal derogation where it is deemed safe and practicable to do so The ferry will operate for 8 hours a day and will be dedicated to Project use only. There will be no ferry movements during night time hours except in exceptional circumstances and with internal derogation Optimising the logistics to maximise use of available vehicles, reduce number of trips and reduce movements on more sensitive routes where possible; using convoys when appropriate (e.g. via using one shared logistics service provider who can ensure appropriate planning across all parts of the Project and ensure efficiencies are made) Construction and upgrading of roads used as haul routes should be undertaken using best practice to ensure that there are no surface irregularities that may result in increased noise emissions from tyre/ road interactions Roads will be well maintained to minimise noise generated from surface irregularities	x	x		Road Safety and Transport Management Plan Journey Management Plan Physical Environment Monitoring Plan		Low Adverse
x	x	x		Piling (Victoria Nile ferry crossing construction), borehole drilling, Construction/up grades (roads, Bugungu airstrip, Masindi Vehicle checkpoint);	Generation of vibration	Piling and other activities generating noise and vibration will be 'ramped up' (slow started) to allow wildlife to move away in good time To avoid nuisance and potential damage to nearby structures from drilling activities, an assessment of potential vibration levels will be undertaken to determine impacts (if any) to nearby receptors. Investigations will be based well locations, manufacturers' vibration data for equipment and vibration risk criteria as per industry guidance. Should at risk receptors be identified from the assessment, further vibration mitigation measures will be developed and applied on a case by case basis			x	Noise and Vibration Management Plan		Low Adverse

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
				Well drilling; Horizontal Directional Drilling for the Victoria Nile crossing								
x	x	x	x	All above	Where generation of noise or vibration in excess of regulatory limits is deemed unavoidable, the Project Proponents will obtain a licence to permit noise or vibration in excess of permissible limits	x						n/a
* Showing the most significant one												
** Moderate adverse for HDD Option 1, which is not the favoured option												
GEOLOGY AND SOILS												
x	x	x	x	Movement of heavy machinery and equipment	Soil Compaction, which may result in changes to physical, chemical and biological properties of soils	A Road Safety and Transport Management Plan will be developed prior to commencing the Construction and Pre-Commissioning Phase Optimising the logistics to maximise use of available vehicles, reduce number of trips and reduce movements on more sensitive routes where possible; using convoys when appropriate (e.g. via using one shared logistics service provider who can ensure appropriate planning across all parts of the Project and ensure efficiencies are made) Sensitise drivers (as part of training), emphasising the need to adhere to designated routes and speed limits, and to avoid making wide turns at the edges of the site, as far as reasonably practicable Fixed traffic routes (one-track or single-track policy): Fixed traffic routes will limit the development of extensive braided tracks. Where reasonably feasible, vehicles will be limited to signposted, flagged and fixed routes in order to prevent cross-country driving and the use of shortcuts. This will assist in reducing soil cover erosion Works and traffic/plant movement will maintain strict adherence to agreed footprint design including access roads and other infrastructure Decommissioning activities will be confined within the Project footprint as much as practicable	x	x	Road Safety and Transport Management Plan Journey Management Plan Physical Environment Monitoring Plan	Monitoring mechanisms: - Soil quality monitoring (chemical, physical and biological) parameters (annual to start with) - Oil seeps monitoring where appropriate - Surface and Ground water quality monitoring (as defined in Surface water and Hydrogeology ESMPs) - Drainage quality monitoring (as defined in Surface water ESMP) - Site clearance activities monitoring (as defined in Biodiversity chapters ESMP) - Sewage discharge quantity and quality monitoring (As defined in Surface water ESMP) - Site restoration monitoring (as defined in Biodiversity chapters ESMP) - Weekly site	Project Proponents and Project Contractors Relevant Government bodies who may conduct independent monitoring or review the data include: NEMA, DWRM, PAU, District Environment Officer	Low Adverse
x	x			Earthworks and site clearance	Soil Compaction, which may result in changes to physical, chemical and biological properties of soils	(Wellpads) There will be a 15 m wide buffer from the perimeter security structure, which will be cleared of vegetation. All site clearance activities will be undertaken in line with the Site Clearance Plan which will be developed by the Contractor(s) prior to commencing the Site Preparation and Enabling Works Phase to limit extent of vegetation clearance, wherever possible Undertake scarification after compaction to avoid long term compaction of the affected areas, only where necessary and where it would not adversely affect existing vegetation Restore affected areas after completion of works; break-up compacted surfaces/replace topsoil Depending on the final land use agreed with the Ugandan authorities, all or part of the site may need to be rehabilitated. In such circumstances, the Project Proponents will also develop a monitoring programme for completion criteria to verify that the sites are being returned to the agreed representative state.		x	Site Clearance Plan Site Restoration Plan Landscape Management Plan			

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
x	x		x	Storage of equipment and materials	Soil Compaction, which may result in changes to physical, chemical and biological properties of soils	Topsoil shall be stockpiled separately from subsoil with all soils being reinstated in the reverse order to that in which they have been removed in order to initiate rehabilitation. All stockpiles shall be stabilised, not be higher than 3 m, and must blend in with the surrounding topography. Topsoils will also be monitored (e.g. for organic content)		x		inspections and audits (as per annual audit plan), including of machinery and chemical storage tanks to identify early signs of failure; checks around the construction areas for signs of erosion, blocked water courses, and localised flood. If encountered, undertake corrective measures		
					Topsoil shall only be handled when necessary such as during excavation and reinstatement activities		x					
x	x	x	x	Movement of vehicles, heavy machinery and equipment**	Soil Erosion	Care will be taken not to cause compaction of ground near wetlands resulting in hydrological or hydrogeological changes that may affect those habitats Any work in watercourses and wetlands will be avoided as far as is practicable in periods of heavy rainfall		x	Wetland Management Plan	- Soil testing prior to release of land within the Project Area for agricultural purposes, to ensure the soils comply with the Minimum Standards for Management of Soil Quality (National Environment Regulations, 2001) and the baseline conditions as a minimum. Performance Indicators: - Results of soil quality monitoring - Results of oil seeps monitoring - Results of ground/surface water and drainage quality monitoring - Results of sewage discharge monitoring, waste transfer notes - Restoration follow-up: - Percentage of areas		Low Adverse
x	x	x		Earthworks and site clearance, maintaining pipeline RoW	Soil Erosion	All site clearance activities will be undertaken in line with the Site Clearance Plan which will be developed by the Contractor(s) prior to commencing the Site Preparation and Enabling Works Phase to limit extent of vegetation clearance, wherever possible		x	Site Clearance Plan			
						Construction activities for the Production and Injection Network will be contained within the permanent RoW which will have a 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)		x				
						During site clearance, vegetation stripping will be undertaken using a phased approach to minimise sediment pollution from runoff		x				
						The topsoils will be removed to a required depth; material will be temporarily stored areas within designated areas		x				
						It is planned to reuse removed soil onsite wherever possible. Through detailed design, the Project will ensure the generation of excess material is minimised as far as practicable and reused, wherever possible	x	x				
						Laydown areas at each of the well pad sites will be located within the footprint of the well pad; there will be no additional site clearance required outside the well pad footprint during the Construction and Pre-Commissioning Phase		x				
						Material from trenching activities will be stored within the pipeline RoW and used as backfill. Excess material will be reused on site where possible. Options for the reuse of uncontaminated excess subsoil material will be assessed during detailed engineering e.g. borrow pit restoration	x	x				
						The permanent RoW will be kept clear of trees, deep rooting vegetation, poles, structures and graves. Regular monitoring will be undertaken, which will include removal of vegetation overgrowth and uprooting tree seedlings	x	x				
						Roads will be designed so that their permanent and construction footprint will be minimised		x				
						All temporary land required associated with the construction of the roads will be restored following construction in line with the Site Restoration Plan as developed by the Contractor specifically for the roads		x		Site Restoration Plan		
Unused material will be reused within the Project footprint or used to restore the borrow pits as much as practicable		x										
All borrow pits and quarries used by Project Proponents will be re-habilitated following completions of extraction in line with the Site Restoration Plan as developed by the Contractor	x	x										

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						The Production and Injection Network RoW will be restored in line with the Site Restoration Plan as developed by the Contractor specifically for the RoW	x	x		no longer used by the Project that have been restored - Level of success of restored sites in comparison with pre-project conditions (incl. drainage) - Areas of wetlands rehabilitated		
						The temporary land required for the HDD Construction Areas roads will be restored following construction in line with the Site Restoration Plan as developed by the Contractor	x	x				
						Decommissioning work at the Buliisa Camp, Bugungu Camp and 17 ha of the Tangi Camp will be undertaken at the end of the Construction and Pre-Commissioning Phase. The land will be restored in line with the Site Restoration Plan as developed by the Contractor	x	x				
						Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods		x	Dust Control Plan		- Chemicals, fuel and waste inventory	
						Minimise stockpile and laydown areas for storage of equipment and materials in the area of works		x			- Number of spill and emergency response exercises	
						Exposed slopes shall be minimised as part of the design. Where slopes created are steep, appropriate design shall be installed and additional anti-erosion mechanisms implemented (such as knocking in stakes, installing gabions, geotextiles or similar).		x			- Number of trained personnel	
						Terracing will be used at Industrial Area to reduce exposure along slopes, depending on the site terrain. Other measures such as use of gabions, stone pitching and interlocking blocks should be considered depending on the site terrain		x			- Number of non-compliances during site clearance activities	
x	x		x	Storage of equipment and materials	Soil Erosion	Protecting all stockpiled material including construction material from being washed away by rain run-off and wind by covering the stockpiles with tarpaulin (or equivalent), bunding the edges, vegetating and not storing in areas susceptible to erosion		x		- Number of incidents during transportation/handling of chemicals, fuel or waste		
						Avoid stockpiling near watercourses, within floodplains or unstable slopes		x		- Number of grievances (received / addressed) related to site clearance, restoration, related to surface run off or waste management		
						(Site preparation and Enabling Works, Construction and Pre-Commissioning): Surface water will be managed via temporary sustainable drainage systems (SuDS) to manage flood and contamination risk. The requirements for construction SuDS will be adapted depending on the nature of the activities		x	Surface Run Off and Drainage Management Plan			
x	x	x	x	Drainage	Soil Erosion	The drainage arrangement of the CPF will be designed to segregate clean and potentially contaminated effluent streams. The drainage for the CPF will be segregated as follows: • Untaminated Drains will manage clean surface water from uncontaminated areas via suitably designed SuDS (network of filter drains and soakaways).	x	x	Physical Environment Monitoring Plan			
						All dewatering from excavations or isolated work areas will be provided with appropriate level of treatment prior to discharge		x				
						Avoid unnecessary changes and minimise disturbance to natural drainage patterns, where possible. Consider topography and natural drainage patterns in drainage design for roads, well pads, Industrial Area. Existing artificial drainage to be diverted maintaining gravity flows		x				
						Drainage will be designed to avoid concentrating flows and increasing runoff velocities, where feasible		x				
						Access and servitude roads should be designed to drain efficiently through formalised storm water crossings comprising an earth berm and causeway. The placement of these should be assessed per road portion		x				

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						Storm water must be directed to areas of high stability (i.e. not prone to erosion) with the ability to reduce storm water velocity		x				
						Changes in natural gradients due to construction activities should be avoided where possible and minimised where unavoidable		x				
						Engineer slopes and drainage to minimise erosion and slope failure		x				
						Contouring and minimising length and steepness of slopes, to aid slope stabilisation and minimise erosion potential		x				
						Use perimeter drainage ditches and design for storm conditions		x				
						Make adequate drainage considerations during design in accordance with industry recognised design standards such as: use of cut-of drains, box culverts along flood plains, adoption of appropriate diameters, openings and strength of the hydraulic drainage structures		x				
						Drainage channels will be installed along the edges of the upgraded roads to prevent excessive runoff and cross drainage culverts will be installed, where appropriate. All drainage infrastructure will be designed taking into account the Uganda Ministry of Works and Transport - Road and Bridge Works Design Manual for Drainage (January 2010) (Ref. 4.2)		x				
						Incorporate erosion protection measures through reuse of cleared material, scours checks, silt traps lining of drains and stepped drains in areas of steep gradient, vegetation cover, and slope protection		x				
						Where required, settlement areas and silt traps will be provided downstream of the construction areas to remove or filter out sediment originating from access tracks or construction site drainage and protect water courses, wetlands, drainages and riparian areas. The most appropriate sedimentation and siltation control measures will be designed prior to excavation during the construction period, and will be dependent on site-specific characteristics		x				
						Design and management of site drainage to reduce risk of soil erosion in exposed subsoil areas or in stockpiles		x				
						Maintain a buffer of vegetation around the site (particularly in the lower lying areas) to prevent any eroded soil from leaving the site and being deposited in downstream water sources		x				
						Use sediment control measures such as straw bales or silt curtains, where required. Permeable check dams, made from coarsely graded rock fill, will be used to slow the discharge velocity in the drainage channels. Particular care will be taken at and close to watercourse crossings, and when construction is located close to watercourses		x				
x	x	x	x	Accidental surface release (i.e. spillage and leakage) of chemicals, fuels or wastes	Degradation of soil quality	All fuels and hazardous materials will be stored within appropriate bunds and drip trays, providing appropriate containment, where practicable	x	x	Spill Prevention Plan			Low Adverse
						Chemicals and hazardous liquids will be supplied in dedicated tote tanks made of sufficiently robust construction to prevent leaks/spills. Dedicated procedures will be developed for fuel and hazardous material transfers and personnel will be trained to respond. Spill kits will be available at all storage locations	x	x	Oil Spill Contingency Plan			

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
					<p>Main refuelling facilities will be located within the Industrial Area, the camps and the Masindi Vehicle Check Point. Facilities will be located within bunded areas with appropriate capacity (110% tank containment). The refuelling pumps will be equipped with automatic shut off and there will be dedicated procedures and spill kits available. Bunds will be designed to minimise ingress of surface water, facilities roofed where practicable and any contaminated water collected will be trucked off site for disposal</p>	x	x	Chemicals Management Plan				
				Contaminated run off will be minimised by ensuring adequate storage facilities are in place for materials stockpiles, waste, fuels/chemicals/hazardous materials, vehicles/washing areas, parking facilities		x						
				Synthetic Based Muds will be transferred from the Liquid Mud Plant to the well pads via truck in dedicated sealed containers to reduce the risk of spillage during storage, handling and transportation operations		x						
				<ul style="list-style-type: none"> Mud Products will comply with Uganda's Health, Safety and Environment Regulations. Only Chemicals ranked E or D in the OCNS (Oil Chemical National Scheme classification) will be allowed to be used; All products for completion and drilling fluids will be free of chlorides; the upper limit will be 2% by weight; All Products entering in the mixing of drilling, completion and cementing will be free of aromatic Hydrocarbon, the upper limit is fixed at 300 parts per million (ppm); and No asphalt, no gilsonite, nor equivalent so called "black" products will be permitted in the drilling fluids and cementing formulations. 		x						
				For any chemical usage [with respect to pre-commissioning], a thorough Chemical Risk Assessment will be undertaken and lowest toxicity chemicals will be used wherever possible	x	x						
				The chemicals used for polymer injection will be subject to detailed environmental risk assessment prior to use taking into account all chemical /biological properties and the specific requirements for early oil recovery use	x	x						
				<p>During the Decommissioning Phase the following assumptions are applicable regarding supporting facilities:</p> <ul style="list-style-type: none"> Localised effluent collection facilities will be provided for chemical storage, hazardous materials storage, liquid waste storage, tanks, and fuelling facilities. Such containment will include impermeable areas, kerbing, bunding and drip trays as appropriate; 	x	x						
				Majority of coating and painting activities shall be done at the Construction Support Base in dedicated buildings		x						
				On site painting and coating shall be limited to touch up and roller application		x						
				Ensure spill response equipment (including sampling and personal protective equipment) is readily available on site to contain and clean any spillages as soon as reasonably practicable after the event	x	x						
				Vehicle/equipment maintenance should only be done in designated areas	x	x						
				Allow only trained and accredited (as required) personnel in the use of machines	x	x						
				Ensure proper handling of fuels and hazardous materials. Handling as per Materials Safety Data Sheets (MSDS) guidelines	x	x						
				Educate workers (as part of training provided) about the potential for environmental contamination and communicate expectation that suspected areas of potential contamination should be reported	x	x						

Project Phase					Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning	Company				Contractor					
						A Chemical Management Plan will be developed that will describe the selection, transport, storage and usage processes as well as mitigation measures against releases or toxic effects and spill contingency measures in case of spills. The plan will be based on the results of Chemical Risk Assessment	x	x					
						Develop and implement a Spill Prevention Plan, incorporating secondary containment as far as practicable for liquids contained on site	x	x					
						An Oil Spill Contingency Plan to be established. This will define notification procedure, response strategy, means, and post-spill actions such as clean-up, monitoring, etc. in the event of uncontrolled/accidental discharge	x	x					
						Plan site layouts so storage and refuelling areas are located away from the nearest ground and surface water receptors, as far as is practicable	x	x					
						Remove contaminated soils that result from recent spills from work site for storage and subsequent treatment and/or disposal at an appropriate licensed facility	x	x					
						MSDS for any chemicals are to be displayed at the point of storage	x	x					
						Drilling fluids are to be stored in tanks. Drilling fluids will not be stored in below ground pits		x					
						Have adequate sumps and drainage around construction areas which are subject of possible pollution to capture spills	x	x					
						Halt hydro-testing if leakage is detected and remediate as far as practicable any pollution of soil or water	x	x					
						Prior to decommissioning, an intrusive ground investigation will be carried out as deemed necessary based on historical site data and monitoring data done throughout the life of the field	x	x	Physical Environment Monitoring Plan				
						Design, management and monitoring of hydrotest carried out in line with the appropriate Hydrotest Specification for Pipeline hydrotesting	x	x					
						All drill cuttings from borehole drilling activities will be collected and disposed of appropriately. Disposal methods will be pre-agreed with NEMA prior to commencement of activities		x					
						Disposal of drill cuttings will be in accordance with Ugandan Legislation and IFC Environmental Health and Safety (EHS)		x					
						Spent muds will be temporary stored in containers prior to removal by a vacuum truck, waste cuttings will collected via augers to the Roll-on Roll-off (Ro-Ro) skips (or equivalent) and transferred off the well pad for treatment and disposal		x					
						Any residues and wastes generated from pre-commissioning activities will be managed in accordance with the site Waste Management Plan		x		Waste Management Plan			
						For the Masindi Vehicle Check Point, waste will be collected and transferred to an approved waste treatment facility for recycling, treatment, recovery and/or disposal		x					
						During the Commissioning and Operations Phase waste will be stored and processed at the Integrated Waste Management Area located south of Victoria Nile. There will be no waste management facility located north of the Victoria Nile within the MFNP		x					
						[Decommissioning of Masindi Vehicle Check Point] All wastes will be removed and disposed of at dedicated waste treatment facilities in accordance with the Waste Management Plan. A detailed Decommissioning Plan will be developed for the works during the Site Preparation and Enabling Works Phase of the Project	x	x					

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						Commissioning tests will be undertaken using feedstock oil, natural gas, methanol and chemicals. All commissioning fluids will be managed either at CPF or transferred off site for disposal		x				
						During the Decommissioning Phase the following assumptions are applicable regarding supporting facilities: <ul style="list-style-type: none"> No water used for decommissioning activities will be discharged to the environment; Waste will be segregated and managed in accordance with a Waste Management Plan. 	x	x				
						Ensure adequate controls are in place for the movement of drill cuttings from well pads to waste consolidation area and final treatment/disposal facility including use of trucks with sealed bodies to prevent spillage		x				
						A Waste Management Plan will be developed and maintained to cover the duration of the Project; and will address the anticipated waste streams, likely quantities and any special handling requirements. The Project Proponent's will implement a waste tracking system to ensure traceability of all wastes removed off site.	x	x				
						Regular inspection, servicing and maintenance of vehicles and plant to ensure they are operating as per manufacture's specification. Use manufacturer approved parts to minimise potentially serious accidents caused by equipment malfunction or premature failure	x	x	Road Safety and Transport Management Plan			
x	x	x	x	Drainage	Degradation of soil quality	With the exception of the CPF which has a bespoke drainage arrangement, drainage arrangements for the permanent facilities will be as follows: <ul style="list-style-type: none"> Potentially contaminated areas (i.e. fuel and chemical storage areas) will be provided with local effluent collection (sumps, kerbing and bunding) whereby the potentially contaminated water will be collected and removed by road tanker to a licenced waste disposal facility; and Uncontaminated areas which will drain naturally to the environment via Sustainable Drainage System (SuDS) comprising filter drains and soakaways. The SuDS design is subject to further detailed design. Sampling points will be established for all potentially contaminated areas to enable samples to be collected for analysis 	x	x	Surface Run Off and Drainage Management Plan			

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						<p>The drainage arrangement of the CPF will be designed to segregate clean and potentially contaminated effluent streams. The drainage for the CPF will be segregated as follows:</p> <ul style="list-style-type: none"> Continuously Contaminated Drains will collect hazardous fluids from process and utility equipment. All effluent collected in the closed drainage system will be returned back to the oil treatment trains. There will be no discharge to environment from the closed drains system; Potentially Contaminated Drains will collect rainfall, wash-water or fire water that falls on paved process and equipment areas that could contain contaminants such as hydrocarbons, metals and solids. Drip pans and kerbs will be provided below every process or utility system that may potentially leak or overflow. Any drips or leaks will be routed to the open drain system via a sump. Roofing will be provided where practicable to prevent surface water ingress. During normal operating conditions, rainwater from potentially contaminated areas will be directed to an the oil water separator prior to discharge to environment in accordance with applicable discharge standards as presented in Chapter 10: Surface Water. When the oil-water separator is full, it will overflow to an associated storm basin via an overflow diverter which will act as a buffer. When the level in the separator falls, the water collected in the storm basin will be sent by storm water pumps back to the overflow diverter and on to the separator. The storm water basin will be sized to withstand a 1 in 100 year event. An oil in water analysers will be installed on the discharge point of the potentially contaminated drains to provide continuous monitoring of the discharge; 	x	x				
					(Site preparation and Enabling Works, Construction and Pre-Commissioning): Clean surface water will be diverted away from exposed soils with use of diversion drains and bunds							
					During the Decommissioning Phase the following assumptions are applicable regarding supporting facilities: <ul style="list-style-type: none"> Drainage systems will remain until sites are free of contamination. SuDS will also manage flood risk during this phase of work; 	x	x					
x	x	x	x	Sewage discharge	Degradation of soil quality	<p>The existing camps have operating Waste Water Treatment Plants (WWTPs). Sewage produced from the camps will be treated at the WWTPs in compliance with regulatory requirements (refer to Chapter 10: Surface Water). Sewage from other Project Areas (e.g. road work sites) will be collected and transferred to WWTPs and/or suitably licensed treatment facilities for processing and disposal. All sewage sludge will be removed periodically from WWTPs and transferred off site for disposal</p>	x	x	Waste Management Plan			Low Adverse
					Sewage produced from the camps and other Project Areas will be treated at the WWTPs located at the camps in compliance with regulatory requirements. Wastewater from the well pads will be collected and transferred by tanker to the nearest WWTPs	x	x					
					For the Masindi Vehicle Check Point, sewage will either be treated by a wastewater treatment plant on site and discharged in accordance with the wastewater treatment standards or transferred to the Masindi sewage treatment plant for processing (depending on capacity and approval)	x	x					
					For the well pads, Victoria Nile Ferry Crossing Facility and the Lake Water Abstraction System, sewage will be collected and transferred to suitably licensed treatment facilities for processing and disposal	x	x					

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						During the Decommissioning Phase the following assumptions are applicable regarding supporting facilities: • Sewage will be treated by existing wastewater treatment plants (WWTPs) and discharged in accordance with wastewater treatment standards or collected and transferred to suitably licensed treatment facilities for processing and disposal	x	x				
* Showing the most significant one ** Mitigation relevant to both compaction and erosion have been presented once only Some aspects presented under "Unplanned events" have not been repeated here however are relevant to mitigating potential impacts on geology and soils												
HYDROGEOLOGY												
x	x	x	x	Groundwater abstraction	Reduction in groundwater availability	Abstraction and discharge permits will be obtained, as required	x		Water Management Plan	Monitoring mechanisms: The Environment Monitoring Programme will draw on the results of other ongoing studies and will include: 1. review of the suitability of existing water quality baseline information and whether there is need to update it; 2. establishment of water monitoring in the Project Area and implementation of an 'early warning' system when the concentration of certain pollutants rises above a threshold value; and 3. assessment of the effectiveness and success of water conservation measures.	Project Proponents and Project Contractors Relevant Government bodies who may conduct independent monitoring or review the data include: NEMA, DWRM, PAU, District Environment Officer	Insignificant
						Ensuring compliance to the abstraction and discharge limits permitted	x	x				
						The Project Proponents are aware of the need to employ water efficiency measures throughout the lifetime of the Project; they will consider water reduction measures, where feasible	x	x				
						Implement efficient water use by sensitising workers (as part of training) about the importance of efficient water use, adopting suitable water conservation techniques such as water re-use measures and training all contractors working on the Project to implement working methods that control water consumption and ensure water is used efficiently during the Project life	x	x				
						The installation of boreholes across the Project Area is subject to the outcome of the Water Abstraction Feasibility Study currently being undertaken by the Project Proponents	x					
						Additional water supply boreholes will be installed during the Site Preparation and Enabling Works Phase and will be drilled to target deep water aquifer zones using water and bentonite		x				
						Testing of new abstraction boreholes. For all new groundwater abstraction boreholes, it is recommended that pumping tests are undertaken to provide site-specific hydrogeological properties of the sand aquifer and refine distance-drawdown estimates. If necessary, the impact assessment on existing water supply boreholes in the area should be repeated to identify the need for any additional mitigation	x	x				
x	x		x	Earthworks and construction	Reduction in groundwater flow	Care will be taken not to cause compaction of ground near wetlands resulting in hydrological or hydrogeological changes that may affect those habitats		x	Wetland Management Plan	- Groundwater quality and quantity monitoring (Flow meters will be installed on all boreholes to measure flow (daily records), water level (weekly) and allow for		Insignificant
						Construction techniques will allow unimpeded shallow groundwater and surface water flow where they have to cross seasonal watercourses (for example between JBR-01 & JBR-10/Nile crossing; JBR-03 & JBR-04; around JBR-09; between JBR-08 and JBR-09), through use of culverts and permeable layers, avoiding compaction of soils		x	Surface Run Off and Drainage Management Plan			
						Pipeline trenches will be designed to ensure that they do not become preferential flow paths for groundwater, particularly where they cross seasonal wetland areas or terrain, which comprises catchment for wallows or waterholes. This could comprise placement of impermeable backfill (clay or similar) at certain locations within the trench to prevent lateral movement of water within the pipeline alignment		x				

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
					Construction activities for the Production and Injection Network will be contained within the permanent RoW which will have a 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)				Site Clearance Plan Physical Environment Monitoring Plan	sampling to define biological, physical and chemical parameters) (Monthly sampling to start with). The location of groundwater monitoring points and criteria for monitoring shall be selected based on receptor sensitivity and impact magnitude.		
				Depending on the final land use agreed with the Ugandan authorities, all or part of the site may need to be rehabilitated. In such circumstances, the Project Proponents will also develop a monitoring programme for completion criteria to verify that the sites are being returned to the agreed representative state.	x	x		Site Restoration Plan				
x	x	x	x	Accidental surface release (i.e. spillage and leakage) of chemicals, fuels or wastes	Degradation of groundwater quality	All fuels and hazardous materials will be stored within appropriate bunds and drip trays, providing appropriate containment, where practicable	x	x	Spill Prevention Plan Oil Spill Contingency Plan Chemicals Management Plan	<ul style="list-style-type: none"> - Drainage quality monitoring (as defined in Surface water ESMP) - Sewage discharge quantity and quality monitoring (As defined in Surface water ESMP) - Weekly site inspections and audits (as per annual audit plan), including of machinery and chemical storage tanks to identify early signs of failure; checks around the construction areas for signs of erosion. If encountered, undertake corrective measures - Maintenance and calibration of meters <p>Performance Indicators:</p> <ul style="list-style-type: none"> - Results of groundwater abstraction quantity and quality monitoring - Results of drainage quality monitoring - Results of sewage discharge monitoring, waste transfer notes 	Low Adverse	
				Chemicals and hazardous liquids will be supplied in dedicated tote tanks made of sufficiently robust construction to prevent leaks/spills. Dedicated procedures will be developed for fuel and hazardous material transfers and personnel will be trained to respond. Spill kits will be available at all storage locations	x	x						
				Drilling fluids are to be stored in tanks. Drilling fluids will not be stored in below ground pits		x						
				Main refuelling facilities will be located within the Industrial Area, the camps and the Masindi Vehicle Check Point. Facilities will be located within bunded areas with appropriate capacity (110% tank containment). The refuelling pumps will be equipped with automatic shut off and there will be dedicated procedures and spill kits available. Bunds will be designed to minimise ingress of surface water, facilities roofed where practicable and any contaminated water collected will be trucked off site for disposal	x	x						
				Contaminated run off will be minimised by ensuring adequate storage facilities are in place for materials stockpiles, waste, fuels/chemicals/hazardous materials, vehicles/washing areas, parking facilities		x						
				Synthetic Based Muds will be transferred from the Liquid Mud Plant to the well pads via truck in dedicated sealed containers to reduce the risk of spillage during storage, handling and transportation operations		x						
				<ul style="list-style-type: none"> • Mud Products will comply with Uganda’s Health, Safety and Environment Regulations. Only Chemicals ranked E or D in the OCNS (Oil Chemical National Scheme classification) will be allowed to be used; • All products for completion and drilling fluids will be free of chlorides; the upper limit will be 2% by weight; • All Products entering in the mixing of drilling, completion and cementing will be free of aromatic Hydrocarbon, the upper limit is fixed at 300 parts per million (ppm); and • No asphalt, no gilsonite, nor equivalent so called “black” products will be permitted in the drilling fluids and cementing formulations. 		x						
				For any chemical usage [with respect to pre-commissioning], a thorough Chemical Risk Assessment will be undertaken and lowest toxicity chemicals will be used wherever possible	x	x						
				The chemicals used for polymer injection will be subject to detailed environmental risk assessment prior to use taking into account all chemical /biological properties and the specific requirements for early oil recovery use	x	x						
				During the Decommissioning Phase the following assumptions are applicable regarding supporting facilities: <ul style="list-style-type: none"> • Localised effluent collection facilities will be provided for chemical storage, hazardous materials storage, liquid waste storage, tanks, and fuelling facilities. Such containment will include impermeable areas, kerbing, bunding and drip trays as appropriate; 	x	x						

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
					Majority of coating and painting activities shall be done at the Construction Support Base in dedicated buildings		x		- Meters maintenance and calibration records - Chemicals, fuel and waste inventory - Number of spill and emergency response exercises - Number of trained personnel - Number of non-compliances to the abstraction and discharge limits permitted - Number of incidents during transportation/handling of chemicals, fuel or waste - Number of grievances (received / addressed) related to groundwater, surface run off or waste management			
					On site painting and coating shall be limited to touch up and roller application		x					
					Ensure spill response equipment (including sampling and personal protective equipment) is readily available on site to contain and clean any spillages as soon as reasonably practicable after the event	x	x					
					Vehicle/equipment maintenance should only be done in designated areas	x	x					
					Allow only trained and accredited (as required) personnel in the use of machines	x	x					
					A Chemical Management Plan will be developed that will describe the selection, transport, storage and usage processes as well as mitigation measures against releases or toxic effects and spill contingency measures in case of spills. The plan will be based on the results of Chemical Risk Assessment	x	x					
					Develop and implement a Spill Prevention Plan, incorporating secondary containment as far as practicable for liquids contained on site	x	x					
					An Oil Spill Contingency Plan to be established. This will define notification procedure, response strategy, means, and post-spill actions such as clean-up, monitoring, etc. in the event of uncontrolled/accidental discharge	x	x					
					Plan site layouts so storage and refuelling areas are located away from the nearest ground and surface water receptors, as far as is practicable	x	x					
					Remove contaminated soils that result from recent spills from work site for storage and subsequent treatment and/or disposal at an appropriate licensed facility	x	x					
					Have adequate sumps and drainage around construction areas which are subject of possible pollution to capture spills	x	x					
					Halt hydro-testing if leakage is detected and remediate as far as practicable any pollution of soil or water	x	x					
					Prior to decommissioning, an intrusive ground investigation will be carried out as deemed necessary based on historical site data and monitoring data done throughout the life of the field	x	x	Physical Environment Monitoring Plan				
					Design, management and monitoring of hydrotest carried out in line with the appropriate Hydrotest Specification for Pipeline hydrotesting	x	x					
					All drill cuttings from borehole drilling activities will be collected and disposed of appropriately. Disposal methods will be pre-agreed with NEMA prior to commencement of activities		x	Waste Management Plan				
					Disposal of drill cuttings will be in accordance with Ugandan Legislation and IFC Environmental Health and Safety (EHS)		x					
					Spent muds will be temporary stored in containers prior to removal by a vacuum truck, waste cuttings will collected via augers to the Roll-on Roll-off (Ro-Ro) skips (or equivalent) and transferred off the well pad for treatment and disposal		x					
					Any residues and wastes generated from pre-commissioning activities will be managed in accordance with the site Waste Management Plan		x					
					For the Masindi Vehicle Check Point, waste will be collected and transferred to an approved waste treatment facility for recycling, treatment, recovery and/or disposal		x					

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						During the Commissioning and Operations Phase waste will be stored and processed at the Integrated Waste Management Area located south of Victoria Nile. There will be no waste management facility located north of the Victoria Nile within the MFNP		x				
						[Decommissioning of Masindi Vehicle Check Point] All wastes will be removed and disposed of at dedicated waste treatment facilities in accordance with the Waste Management Plan. A detailed Decommissioning Plan will be developed for the works during the Site Preparation and Enabling Works Phase of the Project	x	x				
						Pre-commissioning water (used for pipeline cleaning and hydrostatic tests) will be reused wherever practicable on multiple pipelines. The base case for management of hydrostatic test water is for the treated water to be left in situ until start up. Final disposal will be determined and selected depending on water quality and available discharge options. The base case for ESIA is that water left in the pipeline from hydrotesting will be disposed via the Produced Water Treatment Train and transferred back via the Production and Injection Network to the well pads for re-injection, subject to further technical assessment		x				
						Commissioning tests will be undertaken using feedstock oil, natural gas, methanol and chemicals. All commissioning fluids will be managed either at CPF or transferred off site for disposal		x				
						During the Decommissioning Phase the following assumptions are applicable regarding supporting facilities: <ul style="list-style-type: none"> No water used for decommissioning activities will be discharged to the environment; Waste will be segregated and managed in accordance with a Waste Management Plan. 	x	x				
						Ensure adequate controls are in place for the movement of drill cuttings from well pads to waste consolidation area and final treatment/disposal facility including use of trucks with sealed bodies to prevent spillage		x				
						A Waste Management Plan will be developed and maintained to cover the duration of the Project; and will address the anticipated waste streams, likely quantities and any special handling requirements. The Project Proponent's will implement a waste tracking system to ensure traceability of all wastes removed off site.	x	x				
						Regular inspection, servicing and maintenance of vehicles and plant to ensure they are operating as per manufacture's specification. Use manufacturer approved parts to minimise potentially serious accidents caused by equipment malfunction or premature failure	x	x	Road Safety and Transport Management Plan			
x	x	x	x	Drainage	Degradation of groundwater quality	(Site preparation and Enabling Works, Construction and Pre-Commissioning): Surface water will be managed via temporary sustainable drainage systems (SuDS) to manage flood and contamination risk. The requirements for construction SuDS will be adapted depending on the nature of the activities		x				
						The drainage arrangement of the CPF will be designed to segregate clean and potentially contaminated effluent streams. The drainage for the CPF will be segregated as follows: <ul style="list-style-type: none"> Uncontaminated Drains will manage clean surface water from uncontaminated areas via suitably designed SuDS (network of filter drains and soakaways). 	x	x	Surface Run Off and Drainage Management Plan			Low Adverse
						All dewatering from excavations or isolated work areas will be provided with appropriate level of treatment prior to discharge		x				

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
					Drainage channels will be installed along the edges of the upgraded roads to prevent excessive runoff and cross drainage culverts will be installed, where appropriate. All drainage infrastructure will be designed taking into account the Uganda Ministry of Works and Transport - Road and Bridge Works Design Manual for Drainage (January 2010) (Ref. 4.2)		x					
					With the exception of the CPF which has a bespoke drainage arrangement, drainage arrangements for the permanent facilities will be as follows: <ul style="list-style-type: none"> • Potentially contaminated areas (i.e. fuel and chemical storage areas) will be provided with local effluent collection (sumps, kerbing and bunding) whereby the potentially contaminated water will be collected and removed by road tanker to a licenced waste disposal facility; and • Uncontaminated areas which will drain naturally to the environment via Sustainable Drainage System (SuDS) comprising filter drains and soakaways. The SuDS design is subject to further detailed design. Sampling points will be established for all potentially contaminated areas to enable samples to be collected for analysis 	x	x					
					The drainage arrangement of the CPF will be designed to segregate clean and potentially contaminated effluent streams. The drainage for the CPF will be segregated as follows: <ul style="list-style-type: none"> • Continuously Contaminated Drains will collect hazardous fluids from process and utility equipment. All effluent collected in the closed drainage system will be returned back to the oil treatment trains. There will be no discharge to environment from the closed drains system; • Potentially Contaminated Drains will collect rainfall, wash-water or fire water that falls on paved process and equipment areas that could contain contaminants such as hydrocarbons, metals and solids. Drip pans and kerbs will be provided below every process or utility system that may potentially leak or overflow. Any drips or leaks will be routed to the open drain system via a sump. Roofing will be provided where practicable to prevent surface water ingress. During normal operating conditions, rainwater from potentially contaminated areas will be directed to an the oil water separator prior to discharge to environment in accordance with applicable discharge standards as presented in Chapter 10: Surface Water. When the oil-water separator is full, it will overflow to an associated storm basin via an overflow diverter which will act as a buffer. When the level in the separator falls, the water collected in the storm basin will be sent by storm water pumps back to the overflow diverter and on to the separator. The storm water basin will be sized to withstand a 1 in 100 year event. An oil in water analysers will be installed on the discharge point of the potentially contaminated drains to provide continuous monitoring of the discharge; 	x	x					
					During the Decommissioning Phase the following assumptions are applicable regarding supporting facilities: <ul style="list-style-type: none"> • Drainage systems will remain until sites are free of contamination. SuDS will also manage flood risk during this phase of work; 	x	x					
x	x	x	x	Sewage discharge	Degradation of groundwater quality	The existing camps have operating Waste Water Treatment Plants (WWTPs). Sewage produced from the camps will be treated at the WWTPs in compliance with regulatory requirements (refer to Chapter 10: Surface Water). Sewage from other Project Areas (e.g. road work sites) will be collected and transferred to WWTPs and/or suitably licensed treatment facilities for processing and disposal. All sewage sludge will be removed periodically from WWTPs and transferred off site for disposal	x	x	Waste Management Plan			Low Adverse

Project Phase					Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning	Company				Contractor					
						Sewage produced from the camps and other Project Areas will be treated at the WWTPs located at the camps in compliance with regulatory requirements. Wastewater from the well pads will be collected and transferred by tanker to the nearest WWTPs	x	x					
						For the Masindi Vehicle Check Point, sewage will either be treated by a wastewater treatment plant on site and discharged in accordance with the wastewater treatment standards or transferred to the Masindi sewage treatment plant for processing (depending on capacity and approval)	x	x					
						For the well pads, Victoria Nile Ferry Crossing Facility and the Lake Water Abstraction System, sewage will be collected and transferred to suitably licensed treatment facilities for processing and disposal	x	x					
						During the Decommissioning Phase the following assumptions are applicable regarding supporting facilities: • Sewage will be treated by existing wastewater treatment plants (WWTPs) and discharged in accordance with wastewater treatment standards or collected and transferred to suitably licensed treatment facilities for processing and disposal	x	x					

* Showing the most significant one

Some aspects presented under "Unplanned events" have not been repeated here however are relevant to mitigating potential impacts on hydrogeology

SURFACE WATER

Project Phase					Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning	Company				Contractor					
x	x	x	x	Surface water abstraction	Reduction in surface water availability	Abstraction and discharge permits will be obtained, as required	x		Water Management Plan	Monitoring mechanisms: The Environment Monitoring Programme will draw on the results of other ongoing studies and will include: 1. review of the suitability of existing water quality baseline information and whether there is need to update it; 2. establishment of	Project Proponents and Project Contractors Relevant Government bodies who may conduct independent monitoring or review the data include: NEMA, DWRM, PAU, District	Insignificant	
					Ensuring compliance to the abstraction and discharge limits permitted	x	x						
					The planned water abstraction rate will be agreed with regulators and confirmed as sustainable based on studies performed	x							
					The installation of boreholes across the Project Area is subject to the outcome of the Water Abstraction Feasibility Study currently being undertaken by the Project Proponents	x							
					The Project Proponents are aware of the need to employ water efficiency measures throughout the lifetime of the Project; they will consider water reduction measures, where feasible	x	x						
					Implement efficient water use by sensitising workers (as part of training) about the importance of efficient water use, adopting suitable water conservation techniques such as water re-use measures and training all contractors working on the Project to implement working methods that control water consumption and ensure water is used efficiently during the Project life	x	x						

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						Livelihood Restoration Plan (for PAPs) and the Community Content, Economic Development and Livelihood Plan (for PACs) will include improvement of access to water programme subject to feasibility studies	x			water monitoring in the Project Area and implementation of an 'early warning' system when the concentration of certain pollutants rises above a threshold value; and 3. assessment of the effectiveness and success of water conservation measures.	Environment Officer	
x	x	x	x	Site clearance, earthworks and construction, footprint and drainage	Change in surface water geomorphology or hydrology; loss in water storage	Care will be taken not to cause compaction of ground near wetlands resulting in hydrological or hydrogeological changes that may affect those habitats		x	Wetland Management Plan	- Surface water quality and quantity monitoring (Flow meters will be installed on abstraction points (daily records), water levels will be monitored (daily) and sample point established to allow for sampling to define biological, physical and chemical parameters (monthly sampling to start with). The location of surface water monitoring points and criteria for monitoring shall be selected based on receptor sensitivity and impact magnitude	Environment Officer	Moderate Adverse (Victoria Nile Ferry crossing, subject to further detailed design)
					Construction activities within 200 m for lake (Lake Albert) and 100 m for a river (River Nile) will be avoided as far as practicable. Should they be unavoidable, a permit for use of river banks and lake shores will be applied for activities within those zones (for Water Abstraction System, HDD crossing, Nile River Ferry Crossing)	x	x					
					For sections of pipelines that cross seasonal wetlands/streams, pipeline construction works will take place in the dry season where possible. This is to prevent disruption of surface water / shallow groundwater flow thus affecting habitats as well as disturbing the animals relying on those wetlands		x					
					For areas of the Project that cross seasonal wetlands/streams decommissioning works will take place in the dry season where possible. Where not possible, additional mitigation measures will need to be defined		x					
					Buffer zones will be established to protect watercourses and habitats	x	x					
					Construction techniques will allow unimpeded shallow groundwater and surface water flow where they have to cross seasonal watercourses (for example between JBR-01 & JBR-10/Nile crossing; JBR-03 & JBR-04; around JBR-09; between JBR-08 and JBR-09), through use of culverts and permeable layers, avoiding compaction of soils		x					
					In locations where tracks, roads and/or pipelines cross smaller surface water bodies such as the River Tangi, crossing options/methods (e.g. bridges, culverts etc.) will be assessed and the most appropriate implemented		x		Surface Run Off and Drainage Management Plan			
					Further mitigation for the pipeline across the seasonal river between JBR-09 and JBR-08 will be considered. This is a deep gully and bridging may be required		x					
					Avoid unnecessary changes and minimise disturbance to natural drainage patterns, where possible. Consider topography and natural drainage patterns in drainage design for roads, well pads, Industrial area. Existing artificial drainage to be diverted maintaining gravity flows		x			- Oil seeps monitoring where appropriate		
					Construction activities for the Production and Injection Network will be contained within the permanent RoW which will have a 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)		x		Site Clearance Plan Physical Environment Monitoring Plan	- Drainage quality monitoring (daily visual and in-situ check during rainy periods, monthly analysis). For CPF drainage (during operations), an oil in water analysers will be installed on the discharge point of the potentially contaminated drains to provide continuous		
					Depending on the final land use agreed with the Ugandan authorities, all or part of the site may need to be rehabilitated. In such circumstances, the Project Proponents will also develop a monitoring programme for completion criteria to verify that the sites are being returned to the agreed representative state.	x	x		Site Restoration Plan			
					Reinstate streams disturbed by Project activities as close to original condition as possible		x					
					(Wellpads) There will be a 15 m wide buffer from the perimeter security structure, which will be cleared of vegetation.		x		Site Clearance Plan			
					Further geomorphology studies are currently being undertaken in relation to the Water Abstraction point in order to further define the design of the scheme	x	x		Waste Management Plan			

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						The design of Victoria Nile ferry crossing jetty should take into consideration flood risk and consider flood compensatory storage if required	x	x	Physical Environment Monitoring Plan	monitoring of the discharge. - Sewage discharge quantity and quality monitoring (A flow meter will be integrated at the discharge point of the WWTPs to record to all discharges (daily records), and a sample point will be established to collect spot samples for analysis) (monthly analysis)		
						The design of the Victoria Nile ferry crossing jetty should take into account the sensitivity of the Ramsar wetland downstream to ensure impacts on hydrology and morphology are minimised as much as possible	x	x				
						During site clearance, vegetation stripping will be undertaken using a phased approach to minimise sediment pollution from runoff		x				
x	x	x	x	Drainage, storage of equipment and materials	Change in surface water hydrology, degradation of surface water quality	Protecting all stockpiled material including construction material from being washed away by rain run-off and wind by covering the stockpiles with tarpaulin (or equivalent), bunding the edges, vegetating and not storing in areas susceptible to erosion		x	Physical Environment Monitoring Plan	- Weekly site inspections and audits (as per annual audit plan), including of machinery and chemical storage tanks to identify early signs of failure; checks around the construction areas for signs of erosion. If encountered, undertake corrective measures - Maintenance and calibration of meters and Oil in Water analyser Performance Indicators: - Results of surface water abstraction quantity and quality monitoring - Results of oil seeps monitoring - Results of drainage quality monitoring e.g. suspended solids within water leaving the footprint area do not		Low Adverse
						Avoid stockpiling near watercourses, within floodplains or unstable slopes		x				
						With the exception of the CPF which has a bespoke drainage arrangement, drainage arrangements for the permanent facilities will be as follows: • Potentially contaminated areas (i.e. fuel and chemical storage areas) will be provided with local effluent collection (sumps, kerbing and bunding) whereby the potentially contaminated water will be collected and removed by road tanker to a licenced waste disposal facility; and • Uncontaminated areas which will drain naturally to the environment via Sustainable Drainage System (SuDS) comprising filter drains and soakaways. The SuDS design is subject to further detailed design. Sampling points will be established for all potentially contaminated areas to enable samples to be collected for analysis	x	x				
						(Site preparation and Enabling Works, Construction and Pre-Commissioning): Surface water will be managed via temporary sustainable drainage systems (SuDS) to manage flood and contamination risk. The requirements for construction SuDS will be adapted depending on the nature of the activities		x				
						(Site preparation and Enabling Works, Construction and Pre-Commissioning): Clean surface water will be diverted away from exposed soils with use of diversion drains and bunds		x				
						All dewatering from excavations or isolated work areas will be provided with appropriate level of treatment prior to discharge		x				
						Any ingress of water into excavations will be removed/ discharged immediately in a condition appropriate to meet the requirements of NEMA or other acceptable standard		x				
						Minimise construction impacts on receiving water bodies by implementing Surface Runoff and Drainage Management Plan which should include best management practice	x	x				
						Ditch plugs will be installed on all trenches to prevent the pooling of water in the trenches		x				
						Design and management of site drainage to reduce risk of soil erosion in exposed subsoil areas or in stockpiles		x				
Drainage channels will be installed along the edges of the upgraded roads to prevent excessive runoff and cross drainage culverts will be installed, where appropriate. All drainage infrastructure will be designed taking into account the Uganda Ministry of Works and Transport - Road and Bridge Works Design Manual for Drainage (January 2010) (Ref. 4.2)		x										

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*	
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor					
					Use sediment control measures such as straw bales or silt curtains, where required. Permeable check dams, made from coarsely graded rock fill, will be used to slow the discharge velocity in the drainage channels. Particular care will be taken at and close to watercourse crossings, and when construction is located close to watercourses								
					During the HDD works at the Victoria Nile River crossing, adequate temporary measures should be put in place mainly at the entrance of the tunnel area to ensure surface water runoff does not enter the pipeline trenches and tunnel excavation sites								
					<p>The drainage arrangement of the CPF will be designed to segregate clean and potentially contaminated effluent streams. The drainage for the CPF will be segregated as follows:</p> <ul style="list-style-type: none"> Continuously Contaminated Drains will collect hazardous fluids from process and utility equipment. All effluent collected in the closed drainage system will be returned back to the oil treatment trains. There will be no discharge to environment from the closed drains system; Potentially Contaminated Drains will collect rainfall, wash-water or fire water that falls on paved process and equipment areas that could contain contaminants such as hydrocarbons, metals and solids. Drip pans and kerbs will be provided below every process or utility system that may potentially leak or overflow. Any drips or leaks will be routed to the open drain system via a sump. Roofing will be provided where practicable to prevent surface water ingress. During normal operating conditions, rainwater from potentially contaminated areas will be directed to an the oil water separator prior to discharge to environment in accordance with applicable discharge standards as presented in Chapter 10: Surface Water. When the oil-water separator is full, it will overflow to an associated storm basin via an overflow diverter which will act as a buffer. When the level in the separator falls, the water collected in the storm basin will be sent by storm water pumps back to the overflow diverter and on to the separator. The storm water basin will be sized to withstand a 1 in 100 year event. (...); and Uncontaminated Drains will manage clean surface water from uncontaminated areas via suitably designed SuDS (network of filter drains and soakaways). 								
					During the Decommissioning Phase the following assumptions are applicable regarding supporting facilities:								
					<ul style="list-style-type: none"> Drainage systems will remain until sites are free of contamination. SuDS will also manage flood risk during this phase of work; 								
					The drainage system of any bunded area should be sealed to prevent discharge of potentially contaminated water								
x	x	x	x	Accidental release (i.e. spillage and leakage) of chemicals, fuels or wastes	Degradation of surface water quality	All fuels and hazardous materials will be stored within appropriate bunds and drip trays, providing appropriate containment, where practicable	x	x	Spill Prevention Plan				
						Chemicals and hazardous liquids will be supplied in dedicated tote tanks made of sufficiently robust construction to prevent leaks/spills. Dedicated procedures will be developed for fuel and hazardous material transfers and personnel will be trained to respond. Spill kits will be available at all storage locations	x	x	Oil Spill Contingency Plan			Low Adverse	

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
					Main refuelling facilities will be located within the Industrial Area, the camps and the Masindi Vehicle Check Point. Facilities will be located within bunded areas with appropriate capacity (110% tank containment). The refuelling pumps will be equipped with automatic shut off and there will be dedicated procedures and spill kits available. Bunds will be designed to minimise ingress of surface water, facilities roofed where practicable and any contaminated water collected will be trucked off site for disposal	x	x	Chemicals Management Plan	water, surface run off or waste management			
				Contaminated run off will be minimised by ensuring adequate storage facilities are in place for materials stockpiles, waste, fuels/chemicals/hazardous materials, vehicles/washing areas, parking facilities		x						
				Synthetic Based Muds will be transferred from the Liquid Mud Plant to the well pads via truck in dedicated sealed containers to reduce the risk of spillage during storage, handling and transportation operations		x						
				<ul style="list-style-type: none"> Mud Products will comply with Uganda's Health, Safety and Environment Regulations. Only Chemicals ranked E or D in the OCNS (Oil Chemical National Scheme classification) will be allowed to be used; All products for completion and drilling fluids will be free of chlorides; the upper limit will be 2% by weight; All Products entering in the mixing of drilling, completion and cementing will be free of aromatic Hydrocarbon, the upper limit is fixed at 300 parts per million (ppm); and No asphalt, no gilsonite, nor equivalent so called "black" products will be permitted in the drilling fluids and cementing formulations. 		x						
				For any chemical usage [with respect to pre-commissioning], a thorough Chemical Risk Assessment will be undertaken and lowest toxicity chemicals will be used wherever possible	x	x						
				The chemicals used for polymer injection will be subject to detailed environmental risk assessment prior to use taking into account all chemical /biological properties and the specific requirements for early oil recovery use	x	x						
				During the Decommissioning Phase the following assumptions are applicable regarding supporting facilities: <ul style="list-style-type: none"> Localised effluent collection facilities will be provided for chemical storage, hazardous materials storage, liquid waste storage, tanks, and fuelling facilities. Such containment will include impermeable areas, kerbing, bunding and drip trays as appropriate; 	x	x						
				Majority of coating and painting activities shall be done at the Construction Support Base in dedicated buildings		x						
				On site painting and coating shall be limited to touch up and roller application		x						
				Ensure spill response equipment (including sampling and personal protective equipment) is readily available on site to contain and clean any spillages as soon as reasonably practicable after the event	x	x						
				Vehicle/equipment maintenance should only be done in designated areas	x	x						
				Allow only trained and accredited (as required) personnel in the use of machines	x	x						
				Ensure proper handling of fuels and hazardous materials. Handling as per Materials Safety Data Sheets (MSDS) guidelines	x	x						
				Educate workers (as part of training provided) about the potential for environmental contamination and communicate expectation that suspected areas of potential contamination should be reported	x	x						

Project Phase					Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning	Company				Contractor					
						A Chemical Management Plan will be developed that will describe the selection, transport, storage and usage processes as well as mitigation measures against releases or toxic effects and spill contingency measures in case of spills. The plan will be based on the results of Chemical Risk Assessment	x	x					
						Develop and implement a Spill Prevention Plan, incorporating secondary containment as far as practicable for liquids contained on site	x	x					
						An Oil Spill Contingency Plan to be established. This will define notification procedure, response strategy, means, and post-spill actions such as clean-up, monitoring, etc. in the event of uncontrolled/accidental discharge	x	x					
						Plan site layouts so storage and refuelling areas are located away from the nearest ground and surface water receptors, as far as is practicable	x	x					
						All works carried out during the construction and installation of the Water Abstraction System and Victoria Nile Ferry Crossing should follow best practices in order to avoid /reduce release of contamination such as cement and other associated hazardous chemical (e.g. paint, fuels, oil) into the lake or river		x					
						Have adequate sumps and drainage around construction areas which are subject of possible pollution to capture spills	x	x					
						All drill cuttings from borehole drilling activities will be collected and disposed of appropriately. Disposal methods will be pre-agreed with NEMA prior to commencement of activities		x					
						Disposal of drill cuttings will be in accordance with Ugandan Legislation and IFC Environmental Health and Safety (EHS)		x					
						Spent muds will be temporary stored in containers prior to removal by a vacuum truck, waste cuttings will be collected via augers to the Roll-on Roll-off (Ro-Ro) skips (or equivalent) and transferred off the well pad for treatment and disposal		x					
						Any residues and wastes generated from pre-commissioning activities will be managed in accordance with the site Waste Management Plan		x					
						For the Masindi Vehicle Check Point, waste will be collected and transferred to an approved waste treatment facility for recycling, treatment, recovery and/or disposal		x					
						Pre-commissioning water (used for pipeline cleaning and hydrostatic tests) will be reused wherever practicable on multiple pipelines. The base case for management of hydrostatic test water is for the treated water to be left in situ until start up. Final disposal will be determined and selected depending on water quality and available discharge options. The base case for ESIA is that water left in the pipeline from hydrotesting will be disposed via the Produced Water Treatment Train and transferred back via the Production and Injection Network to the well pads for re-injection, subject to further technical assessment		x					
						[Decommissioning of Masindi Vehicle Check Point] All wastes will be removed and disposed of at dedicated waste treatment facilities in accordance with the Waste Management Plan. A detailed Decommissioning Plan will be developed for the works during the Site Preparation and Enabling Works Phase of the Project	x	x					

Project Phase					Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning	Company				Contractor					
						Pre-commissioning water (used for pipeline cleaning and hydrostatic tests) will be reused wherever practicable on multiple pipelines. The base case for management of hydrostatic test water is for the treated water to be left in situ until start up. Final disposal will be determined and selected depending on water quality and available discharge options. The base case for ESIA is that water left in the pipeline from hydrotesting will be disposed via the Produced Water Treatment Train and transferred back via the Production and Injection Network to the well pads for re-injection, subject to further technical assessment	x	x					
						Commissioning tests will be undertaken using feedstock oil, natural gas, methanol and chemicals. All commissioning fluids will be managed either at CPF or transferred off site for disposal		x					
						During the Decommissioning Phase the following assumptions are applicable regarding supporting facilities: <ul style="list-style-type: none"> No water used for decommissioning activities will be discharged to the environment; Waste will be segregated and managed in accordance with a Waste Management Plan. 	x	x					
						A Waste Management Plan will be developed and maintained to cover the duration of the Project; and will address the anticipated waste streams, likely quantities and any special handling requirements. The Project Proponent's will implement a waste tracking system to ensure traceability of all wastes removed off site.	x	x					
						Regular inspection, servicing and maintenance of vehicles and plant to ensure they are operating as per manufacture's specification. Use manufacturer approved parts to minimise potentially serious accidents caused by equipment malfunction or premature failure	x	x	Road Safety and Transport Management Plan				
						Appropriate tunnelling and slurry management practice for HDD to stabilise soil and minimise slurry loss from the tunnel into surrounding aquifers/surface waters		x	Physical Environment Monitoring Plan				
x	x	x	x	Sewage discharge	Degradation of surface water quality	The existing camps have operating Waste Water Treatment Plants (WWTPs). Sewage produced from the camps will be treated at the WWTPs in compliance with regulatory requirements (refer to Chapter 10: Surface Water). Sewage from other Project Areas (e.g. road work sites) will be collected and transferred to WWTPs and/or suitably licensed treatment facilities for processing and disposal. All sewage sludge will be removed periodically from WWTPs and transferred off site for disposal	x	x	Waste Management Plan			Low Adverse	
					Sewage produced from the camps and other Project Areas will be treated at the WWTPs located at the camps in compliance with regulatory requirements. Wastewater from the well pads will be collected and transferred by tanker to the nearest WWTPs	x	x						
					For the Masindi Vehicle Check Point, sewage will either be treated by a wastewater treatment plant on site and discharged in accordance with the wastewater treatment standards or transferred to the Masindi sewage treatment plant for processing (depending on capacity and approval)	x	x						
					For the well pads, Victoria Nile Ferry Crossing Facility and the Lake Water Abstraction System, sewage will be collected and transferred to suitably licensed treatment facilities for processing and disposal	x	x						

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						During the Decommissioning Phase the following assumptions are applicable regarding supporting facilities: • Sewage will be treated by existing wastewater treatment plants (WWTPs) and discharged in accordance with wastewater treatment standards or collected and transferred to suitably licensed treatment facilities for processing and disposal	x	x				
* Showing the most significant one												
Some aspects presented under "Unplanned events" have not been repeated here however are relevant to mitigating potential impacts on surface water												
LANDSCAPE AND VISUAL												
x	x			Land acquisition and site clearance, new roads	Change in the landscape character; Change to the existing view (due to land opening)	All site clearance activities will be undertaken in line with the Site Clearance Plan which will be developed by the Contractor(s) prior to commencing the Site Preparation and Enabling Works Phase to limit extent of vegetation clearance wherever possible		x	Site clearance plan	Physical Environment Monitoring Plan	Project Proponents and Project Contractors	Moderate Adverse (LCA-07; MFNP North, Savanna Plateau)
					The top soils will be removed to a required depth; material will be temporarily stored within designated areas.		x					
					Laydown areas at each of the well pad sites will be located within the footprint of the well pad; there will be no additional site clearance required outside the well pad footprint during the Construction and Pre-Commissioning Phase		x				Relevant Government bodies who may conduct independent monitoring or review the data include: Ministry of Tourism Wildlife and Antiquities (MTWA)	High Adverse (VP-1 Kimoli)
					Construction activities for the Production and Injection Network will be contained within the permanent RoW which will have a 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)		x	Biodiversity and Ecosystem Services Action Plan		- Site restoration monitoring (monthly follow-up, monitoring may be adjusted based on site specifics)		
					The pipe laying and backfill activity is to be conducted as soon as practicable after the trench excavation utilising standard pipe laying cranes and earthmoving equipment.		x	Road Safety and Transport Management Plan		- Site weekly inspection including landscape Management monitoring	Restoration: Relevant Government bodies who may conduct independent monitoring or review the data include: NEMA, UWA, WMD, District Environment Officer	
					Avoid introduction of roads at right angles to existing roads, where practicable		x			- Regular visits and records at VPs visited during baseline (once per VP per phase to start with)		
					All temporary land required associated with the construction of the roads will be restored following construction in line with the Site Restoration Plan as developed by the Contractor specifically for the roads		x	Site Restoration Plan		- Restoration follow-up: - Percentage of areas no longer used by the Project that have been restored - Level of success of restored sites in comparison with pre-project conditions (incl.		
					The Production and Injection Network RoW will be restored in line with the Site Restoration Plan as developed by the Contractor specifically for the RoW		x					
					The temporary land required for the HDD Construction Areas roads will be restored following construction in line with the Site Restoration Plan as developed by the Contractor		x					
					Decommissioning work at the Buliisa Camp, Bugungu Camp and 17 ha of the Tangi Camp will be undertaken at the end of the Construction and Pre-Commissioning Phase. The land will be restored in line with the Site Restoration Plan as developed by the Contractor		x					
					At the end of the Construction and Pre-Commissioning Phase the C1 road will be restored in accordance with a Site Restoration Plan by the Contractor		x					
					All borrow pits and quarries used by Project Proponents will be re-habilitated following completions of extraction in line with the Site Restoration Plan as developed by the Contractor.	x	x					

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						Depending on the final land use agreed with the Ugandan authorities, all or part of the site may need to be rehabilitated. In such circumstances, the Project Proponents will also develop a monitoring programme for completion criteria to verify that the sites are being returned to the agreed representative state.	x	x		drainage) - Areas of wetlands rehabilitated		
						Any areas of land which are disturbed during construction should be restored to help prevent any erosion	x	x		- Records of visits at VPs		
x	x		x	Civil works, roads upgrade and construction; construction and drilling, decommissioning	Change in the landscape character; Change to the existing view (due to change in land use and increase in traffic)	Materials required for roads shall meet the material specifications and mechanical properties required for the class of road. However, where possible, material selection shall also take into account aesthetic aspects to blend in with existing landscape subject to technical constraints and availability		x	Road Safety and Transport Management Plan Journey Management Plan	- Number of non-compliances related to landscape management - Number of grievances (received / addressed) related to visual disturbance		High Adverse (LCA-07; MFNP North, Savanna Plateau) High Adverse (VP-1 Kimoli; VP-13 Buligi Track, delta track Junction, VP-14 Albert track; VP-18 Buligi Track (Pakuba Airfield))
						All construction vehicles/equipment will be kept on site when not in use	x	x				
						Roads will be well maintained to keep the roads usable. Responsibilities for roads maintenance will be defined with relevant authorities. A dedicated handover plan for roads will be implemented with the relevant Authorities when the Construction and Pre-commissioning Phase is complete. The handover plan will be subject to consultation and agreement with the authorities and shall specify the long term arrangements and responsibilities to be adopted**	x	x				
						The base case for Tilenga is that there will be no night driving. However, night driving may be permitted in exceptional circumstances and with internal derogation where it is deemed safe and practicable to do so**	x	x				
						The ferry will operate for 8 hours a day and will be dedicated to Project use only. There will be no ferry movements during night time hours except in exceptional circumstances and with internal derogation**	x					
						Vegetating stockpiles of material remaining on site for a significant amount of time to merge with the surroundings as much as practicable	x	x				
						Landscaping, including earth bunds around well pads within the park will be established, and will be covered with topsoil and plants associated with the immediate vicinity and monitored and maintained to ensure success and stability of these bunds. Consideration will be given to the need to avoid attracting animals (e.g. the oasis effect in dry seasons)	x	x				
						Lighting will be reduced to the minimum without impacting safety and security. Where feasible, the light will be directed inwards the facilities and will be of a warm / neutral colour so as to limit nuisance to the surrounding communities and to avoid attracting animals. **	x	x				
						Use of lights, for example on well pads, will be minimised, and light spill controlled (e.g. restricted lighting height, shading light sources and/or direct them onto site areas)**	x	x				
						During the Decommissioning Phase the following assumptions are applicable regarding supporting facilities: • Lighting will be reduced to the minimum without impacting safety and security. Where feasible the light will be directed inwards the facilities and will be of a warm / neutral colour so as to limit nuisance to the surrounding communities and to avoid attracting animals. There will be no night activities associated with this Phase except in case of emergency;	x	x				
As per base case, there will be no routine nightshift activities associated with the Site Preparation and Enabling Works Phase		x	Labour Management Plan Noise and Vibration Management Plan									
						With the exception of drilling and HDD construction activities there will be no permanent night time working in the MFNP**	x	x				

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
		x		Commissioning and operations activities (including flaring) , wellpads maintenance	Change in the landscape character; Change to the existing view (due to change in land use)	Design the Project to use colours that match the surroundings for the infrastructure and fencing. This includes a blend of subtle light browns, pastel greens, rust, and greys		x	Landscape Management Plan			Moderate Adverse (LCA-01 Buliisa Lowland Pastoral Farmland; LCA-02 LCA 02 - Buliisa Lowland Rolling Farmland; LCA-07; MFNP North, Savanna Plateau) Moderate Adverse (VP-1 Kimoli; VP-13 Buligi Track, delta track Junction, VP-14 Albert track; VP-17 Kasinyi (East); VP-18 Buligi Track (Pakuba Airfield))
						Design the Project to use materials on the infrastructure that will minimise glare, as much as practicable		x				
						Material finishes to buildings to be non-reflective and muted colour palette		x				
						Consideration shall be given to planting naturalistic woodland/bush to blend subject to site specific conditions		x	Physical Environment Monitoring Plan			
						Soften boundary edges of Industrial Area/CPF with native planting which could also benefit the community (formation of allotments/gardens and /or tree or plant nurseries)	x	x				
						The Production and Injection Network outside the Industrial Area will be buried at least 0.8m below the ground surface; markers will be used to denote the location (including the water abstraction pipeline in Lake Albert)		x	Emergency Preparedness and Response			
						International Civil Aviation Organization (ICAO) lighting and marking are required for structures over 45 m and as such both the radio mast and the elevated flare will have appropriate warning lighting	x					
						There will be no routine flaring during normal operations	x		Physical Environment Monitoring Plan			
						The permanent RoW will be kept clear of trees, deep rooting vegetation, poles, structures and graves. Regular monitoring will be undertaken, which will include removal of vegetation overgrowth and uprooting tree seedlings	x	x	Site Clearance Plan			
				There will be no permanent access restrictions to the pipeline RoW	x		Community Content, Economic Development and Livelihood Plan (CCEDLP)					
* Showing the most significant one												
** Also relevant to mitigate potential impacts associated with commissioning and operations activities (including flaring); and well pads maintenance												
WASTE												
x	x	x	x	Waste generation	Impact associated with waste treatment and disposal, including improper waste management practices which may result in nuisances to the surrounding environment and in some cases degradation of the soil, water quality	Minimisation: • Mud Products will comply with Uganda’s Health, Safety and Environment Regulations. Only Chemicals ranked E or D in the OCNS (Oil Chemical National Scheme classification) will be allowed to be used; • All products for completion and drilling fluids will be free of chlorides; the upper limit will be 2% by weight; • All Products entering in the mixing of drilling, completion and cementing will be free of aromatic Hydrocarbon, the upper limit is fixed at 300 parts per million (ppm); • No asphalt, no gilsonite, nor equivalent so called “black” products will be permitted in the drilling fluids and cementing formulations.			Chemicals Management Plan	Monitoring mechanisms: - An Environmental Monitoring Programme will be established. This will include comprehensive monitoring associated with water, noise, air quality, etc. - Waste records (Waste tracker and transfer notes, treatment/destruction certificates)	Project Proponents and Project Contractors Relevant Government bodies who may conduct independent monitoring or review the data include: NEMA, DWRM, PAU	Low Adverse (Hazardous waste) Insignificant (Non-Hazardous waste)
						It is planned to reuse removed soil onsite wherever possible. Through detailed design, the Project will ensure the generation of excess material is minimised as far as practicable and reused, wherever possible	x	x				
						Drilling muds will be reused, wherever possible		x				
						Trees stripped of their branches will either be stacked alongside the track, or transported to pre-determined locations within the working area for disposal or reuse		x				

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						Unused material will be reused within the Project footprint or used to restore the borrow pits as much as practicable		x		- Sewage discharge quantity and quality monitoring - Weekly site inspections, audits (as per annual audit plan) of the Project waste storage facilities and waste management companies - Calibration and certification of weighbridges/weighing scales, meters Performance Indicators: - Waste inventory - Quantities and types of waste generated, treated and disposed of - % of waste reused and recycled - Results of sewage discharge monitoring - Quality of physical environment parameters (e.g. water, soil) with comparison to pre-project conditions - Records of site odour condition - Calibration and certification records - Number of incidents during transportation/handling of waste - Number of grievances (received / addressed)		
						Material from trenching activities will be stored within the pipeline RoW and used as backfill. Excess material will be reused on site where possible. Options for the reuse of uncontaminated excess subsoil material will be assessed during detailed engineering e.g. borrow pit restoration		x				
						Consideration will be given to making cleared wood from the Industrial Area, from well pads and flowline wayleaves, available to the local community to help lower the need and demand for wood from protected areas. However it will be communicated to local communities that this supply will not remain during Operations Phase in order not to create expectations		x				
						Pre-commissioning water (used for pipeline cleaning and hydrostatic tests) will be reused wherever practicable on multiple pipelines. The base case for management of hydrostatic test water is for the treated water to be left in situ until start up. Final disposal will be determined and selected depending on water quality and available discharge options. The base case for ESIA is that water left in the pipeline from hydrotesting will be disposed via the Produced Water Treatment Train and transferred back via the Production and Injection Network to the well pads for re-injection, subject to further technical assessment		x				
						Completion of comprehensive waste mapping exercise for each project phase during FEED to accurately identify waste types, quantities, transportation, treatment and disposal options	x	x				
						Waste mapping information will be shared as part of the ongoing waste management competitive call for tender to determine available expertise and capacity of prospective waste management providers	x					
						Proposals will be developed to address any gaps related to expertise and capacity of waste management providers	x					
						Detailed information regarding facility compliance with Uganda national regulatory requirements, IFC and GIIP will be obtained as part of a series of site visits for prospective waste management providers	x					
						LSA/NORM monitoring strategy shall be developed and implemented for development drilling and production phases. In the event that presence is detected, a suite of management procedures shall be developed to ensure that any LSA/NORM contaminated materials and wastes are stored and managed appropriately **	x					
x	x	x	x	Waste management (storage, transport); accidental releases	Improper waste management practices may result in nuisances to the surrounding environment and in some cases degradation of the soil, water quality	Prior to transfer offsite to a licensed waste treatment facility, waste materials will be segregated and stored in appropriate containers to prevent: <ul style="list-style-type: none"> • Accidental spillage or leakage; • Contamination of soils and groundwater; • Corrosion or wear of containers; • Loss of integrity from accidental collisions or weathering; • Theft; and • Odour and scavenging by animals. 	x	x	Waste Management Plan		Low Adverse	
						All drill cuttings from borehole drilling activities will be collected and disposed of appropriately. Disposal methods will be pre-agreed with NEMA prior to commencement of activities		x				
						Disposal of drill cuttings will be in accordance with Ugandan Legislation and IFC Environmental Health and Safety (EHS)		x				

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						Spent muds will be temporary stored in containers prior to removal by a vacuum truck, waste cuttings will be collected via augers to the Roll-on Roll-off (Ro-Ro) skips (or equivalent) and transferred off the well pad for treatment and disposal		x		related to waste management		
						Any residues and wastes generated from pre-commissioning activities will be managed in accordance with the site Waste Management Plan		x				
						For the Masindi Vehicle Check Point, waste will be collected and transferred to an approved waste treatment facility for recycling, treatment, recovery and/or disposal		x				
						During the Commissioning and Operations Phase waste will be stored and processed at the Integrated Waste Management Area located south of Victoria Nile. There will be no waste management facility located north of the Victoria Nile within the MFNP		x				
						[Decommissioning of Masindi Vehicle Check Point] All wastes will be removed and disposed of at dedicated waste treatment facilities in accordance with the Waste Management Plan. A detailed Decommissioning Plan will be developed for the works during the Site Preparation and Enabling Works Phase of the Project	x	x				
						Commissioning tests will be undertaken using feedstock oil, natural gas, methanol and chemicals. All commissioning fluids will be managed either at CPF or transferred off site for disposal		x				
						During the Decommissioning Phase the following assumptions are applicable regarding supporting facilities: <ul style="list-style-type: none"> No water used for decommissioning activities will be discharged to the environment; Waste will be segregated and managed in accordance with a Waste Management Plan. 	x	x				
						Ensure adequate controls are in place for the movement of drill cuttings from well pads to intermediate waste consolidation area or final treatment/disposal site, including use of trucks with sealed bodies to prevent spillage		x				
						Contaminated run off will be minimised by ensuring adequate storage facilities are in place for materials stockpiles, waste, fuels/chemicals/hazardous materials, vehicles/washing areas, parking facilities		x				
						A Waste Management Plan will be developed and maintained to cover the duration of the Project; and will address the anticipated waste streams, likely quantities and any special handling requirements. The Project Proponent's will implement a waste tracking system to ensure traceability of all wastes removed off site.	x	x				
						With the exception of the CPF which has a bespoke drainage arrangement, drainage arrangements for the permanent facilities will be as follows: <ul style="list-style-type: none"> Potentially contaminated areas (i.e. fuel and chemical storage areas) will be provided with local effluent collection (sumps, kerbing and bunding) whereby the potentially contaminated water will be collected and removed by road tanker to a licenced waste disposal facility; and 	x	x	Surface Run Off and Drainage Management Plan			
x	x	x	x	Sewage discharge	Degradation of surface water quality	The existing camps have operating Waste Water Treatment Plants (WWTPs). Sewage produced from the camps will be treated at the WWTPs in compliance with regulatory requirements (refer to Chapter 10: Surface Water). Sewage from other Project Areas (e.g. road work sites) will be collected and transferred to WWTPs and/or suitably licensed treatment facilities for processing and disposal. All sewage sludge will be removed periodically from WWTPs and transferred off site for disposal	x	x	Waste Management Plan			

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						Sewage produced from the camps and other Project Areas will be treated at the WWTPs located at the camps in compliance with regulatory requirements. Wastewater from the well pads will be collected and transferred by tanker to the nearest WWTPs	x	x				
						For the Masindi Vehicle Check Point, sewage will either be treated by a wastewater treatment plant on site and discharged in accordance with the wastewater treatment standards or transferred to the Masindi sewage treatment plant for processing (depending on capacity and approval)	x	x				
						For the well pads, Victoria Nile Ferry Crossing Facility and the Lake Water Abstraction System, sewage will be collected and transferred to suitably licensed treatment facilities for processing and disposal	x	x				
						During the Decommissioning Phase the following assumptions are applicable regarding supporting facilities: • Sewage will be treated by existing wastewater treatment plants (WWTPs) and discharged in accordance with wastewater treatment standards or collected and transferred to suitably licensed treatment facilities for processing and disposal	x	x				
* Showing the most significant one												
** Also relevant to mitigate potential impacts associated with waste management (storage, transport)												
TERRESTRIAL VEGETATION												
x	x			Land acquisition and site clearance, new roads	Habitat or ecosystem loss, fragmentation; direct loss of plant species	All site clearance activities will be undertaken in line with the Site Clearance Plan which will be developed by the Contractor(s) prior to commencing the Site Preparation and Enabling Works Phase to limit extent of vegetation clearance, wherever possible		x	Site Clearance Plan	Monitoring Mechanisms: The ECO will be present on site during the site Preparation and Enabling Works and Construction and Pre-Commissioning phases where site clearance and excavations are required (e.g. Construction of flow lines) to oversee the Works and ensure compliance- Compliance and site clearance activities monitoring (continuous presence on site during clearance)- Site restoration monitoring (monthly follow-up, monitoring may be adjusted based on site specifics) Key Performance Indicators: - Restoration follow-up: - Percentage of areas no	Project Proponents and Project contractors Relevant Government bodies who may conduct independent monitoring or review the data include: NEMA, UWA, WMD, District Environment Officer, NaFIRRI	Low Adverse (species and threatened ecosystems) Moderate Adverse (Protected Areas: MFNP and Karuma Wildlife Reserve)
					The Site Clearance Plan will be developed to structure and schedule clearly site clearance activities, noting any constraints		x					
					Laydown areas at each of the well pad sites will be located within the footprint of the well pad; there will be no additional site clearance required outside the well pad footprint during the Construction and Pre-Commissioning Phase		x					
					The permanent RoW will be kept clear of trees, deep rooting vegetation, poles, structures and graves. Regular monitoring will be undertaken, which will include removal of vegetation overgrowth and uprooting tree seedlings	x	x					
					Provision will be made for - the recruitment of Ecological Compliance Officers (ECOs); and - the training and capacity building of the ECOs.	x		Labour Management Plan				
					Workers' instructions (e.g. either in the Labour Management Plan or in staff training/induction) will state that no plants are to be picked or collected at any time	x	x					
					Biodiversity codes of conduct for workers will be developed, which can be disseminated to economic dependents and others that may be able to enter Protected Areas. This may require punitive measures if not complied with	x	x					
					Workers will be prohibited from collecting shells, timber, firewood, fibres and other plant based resources. Fishing by workers will not be permitted. Ensure control at the camps and work sites	x	x					
					Access to areas outside of site boundaries by workers will be prohibited within the park	x	x					

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
					A Site Restoration Plan for the Project will be developed and will be updated prior to commencement of every stage of the Project		x		Site Restoration Plan	longer used by the Project that have been restored - Level of success of restored sites in comparison with pre-project conditions (incl. drainage) - Areas of wetlands rehabilitated- Number of wetlands indirectly impacted Project- Number of non-compliances during site clearance activities- Number of incidents or grievances (received / addressed) related to site clearance and restoration		
				The detailed Site Restoration Plan will be implemented and at each site this will be monitored for success of vegetation establishment (i.e. where plants do not take successfully), erosion issues and presence of invasive species to ensure that all sites are effectively restored. Where such problems are encountered, further planting, site re-profiling and other remedial measures will be taken to ensure that site restoration is completed satisfactorily to the agreed standard or coverage and plant composition, which should match reasonably the sounding vegetation by the end of the restoration process	x	x						
				All temporary facilities, including temporary access roads, will be restored as soon as practicable after they are no longer required after use; in line with Site Restoration Plan	x	x						
				All temporary land required associated with the construction of the roads will be restored following construction in line with the Site Restoration Plan as developed by the Contractor specifically for the roads		x						
				Unused material will be reused within the Project footprint or used to restore the borrow pits as much as practicable		x						
				All borrow pits and quarries used by Project Proponents will be re-habilitated following completions of extraction in line with the Site Restoration Plan as developed by the Contractor	x	x						
				Construction activities for the Production and Injection Network will be contained within the permanent RoW which will have a 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)		x						
				The temporary land required for the HDD Construction Areas roads will be restored following construction in line with the Site Restoration Plan as developed by the Contractor	x	x						
				At the end of the Construction and Pre-Commissioning Phase the C1 road will be restored in accordance with a Site Restoration Plan by the Contractor		x						
				Depending on the final land use agreed with the Ugandan authorities, all or part of the site may need to be rehabilitated. In such circumstances, the Project Proponents will also develop a monitoring programme for completion criteria to verify that the sites are being returned to the agreed representative state.	x	x						
				Topsoil shall be stockpiled separately from subsoil with all soils being reinstated in the reverse order to that in which they have been removed in order to initiate rehabilitation. All stockpiles shall be stabilised, not be higher than 3 m, and must blend in with the surrounding topography. Topsoils will also be monitored (e.g. for organic content)		x						
				Materials used in restoration will be locally sourced, where possible (i.e. materials used in the MFNP should be from other sites within the MFNP, where practicable), but away from sensitive biodiversity areas. Plants will be transplanted from nurseries to the site being restored (or from adjacent areas, as appropriate)	x	x						
				A pilot scheme for wetland restoration will be linked to the Restoration Plan - developed in partnership with WMD and DWRM	x			Wetland Management Plan				
				A Wetland Management Plan will be established to ensure no disruption to wetland areas. The main measures will comprise avoiding and minimising impacts on wetlands and restricted exclusion zones	x	x						

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
					Pre-construction surveys will be performed to confirm the extent and state of identified wetlands	x						
					Construction activities within 200 m for lake (Lake Albert) and 100 m for a river (River Nile) will be avoided as far as practicable. Should they be unavoidable, a permit for use of river banks and lake shores will be applied for activities within those zones (for Water Abstraction System, HDD crossing, Nile River Ferry Crossing)	x	x					
					Buffer zones will be established to protect watercourses and habitats	x	x					
					For works taking place in or near the Ramsar site, where feasible, a buffer will be established around identified sensitive features where no works will take place, as defined in the Avoidance Protocol		x					
					Material from trenching activities will be stored within the pipeline RoW and used as backfill. Excess material will be reused on site where possible. Options for the reuse of uncontaminated excess subsoil material will be assessed during detailed engineering e.g. borrow pit restoration	x	x	Waste Management Plan				
					A Biodiversity and Ecosystem Services Management Plan (BMP) will be developed, ensuring that impacts of site clearance on plant species of conservation concern will be minimised	x	x					
					If there are proposed changes to locations, alignment, working areas or footprint of Project components, the Avoidance Protocol, including site selection survey and mapping, will be carried out before determining the configuration of these components	x	x					
					Plant nurseries will be established to provide plant materials (e.g. seedlings and/or seeds) for restoration of impacted sites, as well as for replacement of felled trees as appropriate. This will include trees as well as common herbaceous species (i.e. grasses, herbs, etc.) for general coverage	x						
					Prior to site clearance each site will be surveyed for the presence of plant species of conservation concern, as listed in the BMP. If any such species are found, these will be recorded and if possible either avoided or transplanted to similar habitat under supervision of a botanist/ecologist. This is important because there may be considerable time between baseline/avoidance surveys and actual site works and species may move into the area (also animals) that were not present during baseline surveys	x	x	Biodiversity and Ecosystem Services Management Plan				
					Where trees are to be felled, the species will be identified and recorded by a competent ecologist. Where recorded trees are listed in the schedules to the National Forestry and Tree Planting Act, the appropriate licences will be applied for prior to removal of trees	x		Biodiversity and Ecosystem Services Action Plan				
					Where it is necessary to remove trees (i.e. Mature trees of threatened species, NFA reserved trees and socially important trees) these will be identified to species level before felling. A replacement tree (or trees, or in some cases seedlings) of that species as much as practicable will be planted at a suitable location to be agreed with UWA and/or NFA and other relevant stakeholder. The planted trees will be monitored to check that they have developed successfully and any failed trees will be replaced. Any additional requirement will be defined as part of the BMP to achieve NNL/NG	x						
					The footprint of the HDD will be minimised to avoid unnecessary loss of wetland/riparian habitat		x					
					Decommissioning activities will be confined within the Project footprint as much as practicable	x	x	Physical Environment Monitoring Plan				

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						Roads will be designed so that their permanent and construction footprint will be minimised		x	Road Safety and Transport Management Plan			
x	x	x	x	Use of equipment, plant and material as well as third party events may be the source of fire	Habitat or ecosystem loss, fragmentation; direct loss of plant species	There will be no smoking outside of any designated areas due to risk of fire and consequently loss of adjacent habitats	x	x	Emergency Response Plan	<p>Monitoring Mechanisms:</p> <ul style="list-style-type: none"> - An Environmental Monitoring Programme will be established. This will include comprehensive monitoring associated with water, noise, air quality, etc. - Weekly site inspections, audits (as per annual audit plan), including of machinery and chemical storage tanks to identify early signs of failure; checks around the construction areas for signs of erosion, blocked water courses, and localised flood. If encountered, undertake corrective measures <p>Key Performance Indicators:</p> <ul style="list-style-type: none"> - Quality of physical environment parameters (e.g. water, soil) with comparison to pre-project conditions - Results of discharge water quality monitoring - Results of sewage discharge monitoring, 	Project Proponents and Project contractors	Low Adverse (species and threatened ecosystems)
					Burning of vegetation waste following site clearance will be prohibited within MFPA but could be considered in areas outside MFPA when no other appropriate alternative has been identified, to avoid air emissions and reduce the risk of fires. This requirement will be included in the Site Clearance Plan		x	Site Clearance Plan				
					During site clearance, vegetation stripping will be undertaken using a phased approach to minimise sediment pollution from runoff		x	Site Clearance Plan				
					The topsoils will be removed to a required depth; material will be temporarily stored areas within designated areas		x	Site Clearance Plan				
					It is planned to reuse removed soil onsite wherever possible. Through detailed design, the Project will ensure the generation of excess material is minimised as far as practicable and reused, wherever possible	x	x	Site Clearance Plan				
					Temporary 'bogmats', riprap bridges and other measures to reduce compaction or erosion of soils and habitat degradation during wet conditions will be utilised		x	Physical Environment Monitoring Plan				
					Soil spill, where soil spreads beyond the defined boundary of the component footprint, from well pad or other construction areas, will be minimised		x	Physical Environment Monitoring Plan				
					Use of concrete or other impermeable surfacing material at sites will be minimised. These materials will be used only at those areas that absolutely require it		x	Physical Environment Monitoring Plan				
					Engineer slopes and drainage to minimise erosion and slope failure		x	Physical Environment Monitoring Plan				
					Changes in natural gradients due to construction activities should be avoided where possible and minimised where unavoidable		x	Physical Environment Monitoring Plan				
					Incorporate erosion protection measures through reuse of cleared material, scours checks, silt traps lining of drains and stepped drains in areas of steep gradient, vegetation cover, and slope protection		x	Physical Environment Monitoring Plan				
					Maintain a buffer of vegetation around the site (particularly in the lower lying areas) to prevent any eroded soil from leaving the site and being deposited in downstream water sources		x	Surface Run Off and Drainage Management Plan				
					Use perimeter drainage ditches and design for storm conditions		x	Surface Run Off and Drainage Management Plan				
					Where required, settlement areas and silt traps will be provided downstream of the construction areas to remove or filter out sediment originating from access tracks or construction site drainage and protect water courses, wetlands, drainages and riparian areas. The most appropriate sedimentation and siltation control measures will be designed prior to excavation during the construction period, and will be dependent on site-specific characteristics		x	Surface Run Off and Drainage Management Plan				
				Movement of vehicles, heavy machinery and equipment, Earthworks and site clearance, maintaining pipeline RoW, Storage of equipment and materials, Water abstraction, Drainage, Sewage Discharge	Habitat degradation (e.g. due to erosion, dust, compaction, drainage, water use and effluents discharge)				Physical Environment Monitoring Plan	Relevant Government bodies who may conduct independent monitoring or review the data include: NEMA, UWA, DWRM, District Environment Officer, PAU	Moderate Adverse (Protected Areas: MFNP and Karuma Wildlife Reserve)	

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning	Company				Contractor					
						<p>With the exception of the CPF which has a bespoke drainage arrangement, drainage arrangements for the permanent facilities will be as follows:</p> <ul style="list-style-type: none"> • Potentially contaminated areas (i.e. fuel and chemical storage areas) will be provided with local effluent collection (sumps, kerbing and bunding) whereby the potentially contaminated water will be collected and removed by road tanker to a licenced waste disposal facility; and • Uncontaminated areas which will drain naturally to the environment via Sustainable Drainage System (SuDS) comprising filter drains and soakaways. The SuDS design is subject to further detailed design. Sampling points will be established for all potentially contaminated areas to enable samples to be collected for analysis 	x	x		waste transfer notes - Chemicals inventory - Number of spill and emergency response exercises - Number of trained personnel - Number of incidents during transportation/handling of chemicals or waste - Number of incidents or grievances (received / addressed) related to surface run off or waste management			
					The drainage arrangement of the CPF will be designed to segregate clean and potentially contaminated effluent streams.	x	x						
					Drainage channels will be installed along the edges of the upgraded roads to prevent excessive runoff and cross drainage culverts will be installed, where appropriate. All drainage infrastructure will be designed taking into account the Uganda Ministry of Works and Transport - Road and Bridge Works Design Manual for Drainage (January 2010) (Ref. 4.2)		x						
					(Site preparation and Enabling Works, Construction and Pre-Commissioning): Surface water will be managed via temporary sustainable drainage systems (SuDS) to manage flood and contamination risk. The requirements for construction SuDS will be adapted depending on the nature of the activities		x						
					Ditch plugs will be installed on all trenches to prevent the pooling of water in the trenches		x						
					All dewatering from excavations or isolated work areas will be provided with appropriate level of treatment prior to discharge		x						
					(Site preparation and Enabling Works, Construction and Pre-Commissioning): Clean surface water will be diverted away from exposed soils with use of diversion drains and bunds		x						
					Pipeline trenches will be designed to ensure that they do not become preferential flow paths for groundwater, particularly where they cross seasonal wetland areas or terrain, which comprises catchment for wallows or waterholes. This could comprise placement of impermeable backfill (clay or similar) at certain locations within the trench to prevent lateral movement of water within the pipeline alignment		x						
					Construction techniques will allow unimpeded shallow groundwater and surface water flow where they have to cross seasonal watercourses (for example between JBR-01 & JBR-10/Nile crossing; JBR-03 & JBR-04; around JBR-09; between JBR-08 and JBR-09), through use of culverts and permeable layers, avoiding compaction of soils		x						
					Further mitigation for the pipeline across the seasonal river between JBR-09 and JBR-08 will be considered. This is a deep gully and bridging may be required		x						
					Implementation of a Dust Control Plan, which will include: measures to include the application of dust suppressants (including water), on potentially dust generating sources, including on site and off site roads used by Project vehicles and material stockpiles.	x	x	Dust Control Plan					

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						Dust control measures will be implemented at each site and access road to prevent smothering of adjacent habitats. Dust emissions will be strictly controlled via adhering to the operating procedures set out in the Dust Control Plan						
						Sewage produced from the camps and other Project Areas will be treated at the WWTPs located at the camps in compliance with regulatory requirements. Wastewater from the well pads will be collected and transferred by tanker to the nearest WWTPs	x	x	Waste Management Plan			
						Works and traffic/plant movement will maintain strict adherence to agreed footprint design including access roads and other infrastructure	x	x	Road Safety and Transport Management Plan			
						Water abstraction and activities at other locations will ensure that they do not affect groundwater base-flow to wetlands (including wallows and watering holes) and other habitats resulting in degradation of those habitats. Flow rates and residual recharge rates will be sufficient to sustain sensitive habitats. To achieve this, water abstraction points will be carefully selected. In addition, all water abstraction activities will comply with the requirements of water abstraction permits	x	x	Water Management Plan Wetland Management Plan			
						Care will be taken not to cause compaction of ground near wetlands resulting in hydrological or hydrogeological changes that may affect those habitats		x				
						For sections of pipelines that cross seasonal wetlands/streams, pipeline construction works will take place in the dry season where possible. This is to prevent disruption of surface water / shallow groundwater flow thus affecting habitats as well as disturbing the animals relying on those wetlands		x				
						Construction of access roads and other infrastructure will be similarly sequenced as much as practicable to restrict disturbance to a discrete areas at any one time. For areas of Project that cross seasonal wetlands/streams pipeline construction works will take place in the dry season where possible. This is to prevent disruption of surface water / shallow groundwater flow thus affecting habitats as well as disturbing the animals relying on those wetlands		x				
						For areas of the Project that cross seasonal wetlands/streams decommissioning works will take place in the dry season where possible. Where not possible, additional mitigation measures will need to be defined		x				
x	x	x	x	Accidental release (i.e. spillage and leakage) of chemicals, fuels or wastes	Habitat degradation, direct loss of plant species	All fuels and hazardous materials will be stored within appropriate bunds and drip trays, providing appropriate containment, where practicable	x	x	Spill Prevention Plan			
						Chemicals and hazardous liquids will be supplied in dedicated tote tanks made of sufficiently robust construction to prevent leaks/spills. Dedicated procedures will be developed for fuel and hazardous material transfers and personnel will be trained to respond. Spill kits will be available at all storage locations	x	x				
						Main refuelling facilities will be located within the Industrial Area, the camps and the Masindi Vehicle Check Point. Facilities will be located within bunded areas with appropriate capacity (110% tank containment). The refuelling pumps will be equipped with automatic shut off and there will be dedicated procedures and spill kits available. Bunds will be designed to minimise ingress of surface water, facilities roofed where practicable and any contaminated water collected will be trucked off site for disposal	x	x	Oil Spill Contingency Plan			
						Contaminated run off will be minimised by ensuring adequate storage facilities are in place for materials stockpiles, waste, fuels/chemicals/hazardous materials, vehicles/washing areas, parking facilities		x				

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor					
						The pipelines will comprise carbon steel with adequate corrosion allowance built into material specifications (wall thickness) to prevent leaks.		x					
						An Oil Spill Contingency Plan to be established. This will define notification procedure, response strategy, means, and post-spill actions such as clean-up, monitoring, etc. in the event of uncontrolled/accidental discharge	x	x					
						Develop and implement a Spill Prevention Plan, incorporating secondary containment as far as practicable for liquids contained on site	x	x					
						Ensure spill response equipment (including sampling and personal protective equipment) is readily available on site to contain and clean any spillages as soon as reasonably practicable after the event	x	x					
						Additional water supply boreholes will be installed during the Site Preparation and Enabling Works Phase and will be drilled to target deep water aquifer zones using water and bentonite		x	Water management Plan				
						For any chemical usage [with respect to pre-commissioning], a thorough Chemical Risk Assessment will be undertaken and lowest toxicity chemicals will be used wherever possible	x	x	Chemical Management Plan				
						Any residues and wastes generated from pre-commissioning activities will be managed in accordance with the site Waste Management Plan		x					
						A Waste Management Plan will be developed and maintained to cover the duration of the Project; and will address the anticipated waste streams, likely quantities and any special handling requirements. The Project Proponent's will implement a waste tracking system to ensure traceability of all wastes removed off site.	x	x	Waste Management Plan				
x	x	x	x	Use of construction equipment and power generation equipment, traffic, import of material (incl. construction materials) may lead to the accidental introduction of alien / invasive species	Habitat or ecosystem loss, direct loss of plant species	A risk-based Alien/Invasive Species Management Plan will be developed and implemented	x	x					
						Materials to be used in forming platforms, bund walls and other site preparation works within Protected Areas will be locally sourced as much as possible (i.e. materials used in the MFNP should be from other sites within the MFNP), but away from sensitive biodiversity areas where practicable	x	x					
						Where unavoidable, soil and/or other materials shall be brought from outside of Protected Areas for use within the Protected Areas only upon approval by the responsible government agency (i.e. UWA or NFA), and this process will be subject to a risk assessment process as described in the scope for the Alien/Invasive Species Management Plan	x	x	Alien/Invasive Species Management Plan				
						The design of the bund walls in the park will be optimised to minimise requirement for materials taken from outside of the park		x					
						Herbicide will not be used at any Project location. Control of 'weeds' will be undertaken by hand weeding or use of permeable matting or other standard weed control measures	x	x	Landscape Management Plan				
						Landscaping, including earth bunds around well pads within the park will be established, and will be covered with topsoil and plants associated with the immediate vicinity and monitored and maintained to ensure success and stability of these bunds. Consideration will be given to the need to avoid attracting animals (e.g. the oasis effect in dry seasons)	x	x					
										<p>Monitoring Mechanisms:</p> <ul style="list-style-type: none"> - Site restoration monitoring - Weekly site inspections <p>Key Performance Indicators:</p> <ul style="list-style-type: none"> - Changes in the extent and density of previously existing alien/invasive species populations - Occurrence of alien/invasive species attributed to the Project; - Occurrences of newly introduced alien/invasive species - Unexpected changes in alien/invasive species control activity, e.g., off-target damage, invasion by other 	Project Proponents and Project Contractors	Relevant Government bodies who may conduct independent monitoring or review the data include: UWA, NFA, WMD	

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
										species - Undesirable changes in the condition and extent of native vegetation that may be attributed to invasive		
x	x			PAPs resettlement in relation to land acquisition	Habitat or ecosystem loss, fragmentation; direct loss of plant species	Ensure that the Resettlement Action Plan (RAP) does not increase pressure on natural or critical habitats by moving people into or where practicable closer to sensitive habitats or Protected Areas	x		Resettlement Action Plan	Rf. To ESMP associated with RAP in Social section		
						Resettlement Action Plans will include livelihood restoration and will also provide alternative livelihoods/ income diversification programmes to ease dependence on natural resources or protected areas as a source of livelihood	x					
						A Community Environmental Conservation Plan will be developed which will contain educational/information programmes to highlight importance of protected areas, identify plant species of conservation concern (and why they are important), and to explain how pressure on those will be alleviated	x		Community Environmental Conservation Plan	Monitoring Mechanisms: Specific monitoring & evaluation framework to measure project-induced in-migration trends, hotspots extent rates and key impacts to be proposed as part of Influx Management Strategy Regular monitoring of the extent and impacts of in-migration, generally on natural resources, will be carried out as part of the Biodiversity Monitoring and Evaluation Plan, including regular acquisition and analysis of satellite imagery to assess landuse/landcover changes. Data to be acquired annually until the end of construction. At least annual joined meeting with local and regional authorities and other stakeholders to regularly evaluate the extent of indirect effects and adapt the	Project proponents Strategic collaboration platforms will be established with local and regional authorities, UWA, NFA development and conservation NGOs and other stakeholders as appropriate to regularly evaluate and review the extent of indirect effects, share understanding of causes and identify adapted or additional mitigation requirements Relevant Government agencies who may conduct independent monitoring or review the data include: District Physical Planning Department, Ministry of Lands, Housing and Urban Planning,	Low Adverse (species) Moderate Adverse (Threatened Ecosystems Forest-Savanna Mosaic) Moderate Adverse (Protected Areas: MFNP and Karuma Wildlife Reserve, Bugungu and Budongo Wildlife Reserves, Forest reserves in Masindi Area and Bugoma forest)
				The Community Environmental Conservation Plan will consider (but not be limited to) community based programmes, following feasibility studies, for extension of tree nurseries, promotion of alternative fuel use, fisheries management and monitoring programme that will entail engagement of communities through BMUs in fisheries management	x							
				Nurseries will be developed, and where possible plantations, to propagate plants/trees of economic importance to alleviate pressure on natural and protected environments for those resources in line with the Community Environmental Conservation Plan and at a scale and intensity proportional to Project impacts. This is not intended as a replacement for species lost during site clearance but as a measure to relieve pressure on natural resources within existing forests and other protected areas	x							
				The Community Environmental Conservation Plan will include programmes for promotion of alternative fuel use (e.g. briquettes, solar technology) and clean cook-stoves through partnership with local organisations and social enterprises. Support schemes to find alternative fuel sources, reduce reliance on charcoal will be developed. The potential to involve communities in biodiversity conservation as alternative livelihood options will be explored	x							
x	x	x	x	Influx contributing to population growth (indirect impact)	Habitat or ecosystem loss, fragmentation; direct loss of plant species	The Community Environmental Conservation Plan will include programmes for promotion of alternative fuel use (e.g. briquettes, solar technology) and clean cook-stoves through partnership with local organisations and social enterprises. Support schemes to find alternative fuel sources, reduce reliance on charcoal will be developed. The potential to involve communities in biodiversity conservation as alternative livelihood options will be explored	x		Influx management strategy			
						An Influx Management Strategy will be developed to mitigate in-migration impacts and maximise benefits for local communities. Implementation of the strategy will depend on joint coordination between the Project, government, other project developers, local communities and civil society. The Strategy will build on the recommendations provided in the In-Migration Risk Assessment (Ref. 16-11) and will set out the overarching approach and objectives for mitigating the negative impacts of influx and enhancing the benefits. The strategy will make reference to more detailed actions and procedures contained within other environmental and social management plans that are relevant to addressing influx. The strategy will also propose a specific monitoring & evaluation framework to measure project-induced in-migration trends, hotspots and key impacts. The Influx Management Strategy will include (but not to be limited to) monitoring and management of impacts jointly with local government in in-migration hot spots, education campaigns and capacity building on in-migration impacts	x	x				

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						The Influx Management Strategy will also consider potential impacts of increased pressure on natural resources due to population growth including looking at ways to provide alternative sources of fuel, building materials, farming land and food (particularly protein)	x			mitigation accordingly. Key Performance Indicators: - Number of meetings held on indirect effects monitoring with local and regional authorities - Changes in land-use - KPIs related to species populations and habitats, as defined in the Biodiversity and Ecosystem Services Action Plan	Ministry of Internal Affairs NEMA, UWA, NFA, WMD, DWRM, Regulatory agencies responsible for infrastructure.	
					The in-migration risk assessment will be regularly updated based on monitoring data to assess which protected areas, species and habitats are most at risk of indirect impacts, both imminently and in the foreseeable future	x						
					Project Recruitment Centres locations should be defined in consideration of potential impacts it may generate on protected areas and unprotected forest areas	x	x					
					The Community Content, Economic development and Livelihood Plan will consider measures, following feasibility studies, aimed at mitigating impact of population growth such as increased demand for fibres, increased pressure on fisheries resources including looking at ways of providing a registration scheme for the fishing industry	x		Community Content, Economic Development and Livelihood Plan				
					Project Proponents will provide support to the Ministry of Lands Housing and Urban Development and Buliisa District Government to develop a District Land Use Plan through financing of a study that can be used as basis of such planning. The study will consider existing land use and land tenure, trends in land use, and future land use requirements including for Project infrastructure and for any mitigations required to off-set Project impacts, e.g. relocation land and land for biodiversity offsetting. The study will also identify areas that will benefit from improved accessibility across Buliisa District	x						
x	x			Influx contributing to population growth (indirect impact), in-combined and cumulative effects	Habitat or ecosystem loss, fragmentation; direct loss of plant species	Strategic collaboration platforms will be established with local and regional authorities, UWA, NFA development and conservation NGOs and other stakeholders as appropriate to regularly evaluate and review the extent of indirect effects, share understanding of causes and identify adapted or additional mitigation requirements	x		Stakeholders Engagement Plan			
					Relevant authorities will be engaged with and consideration will be given to fostering development of a plan with them to strengthen the protection of Bugungu Wildlife Reserve and adjacent areas of transitional habitat with direct community involvement. The objective will be to provide legal safeguard for wildlife populations and maintain an effective north-south savanna corridor in the landscape	x						
x	x	x	x	Additional mitigation - working towards Net Gain		Discussions will be held with UWA regarding the MFPA Management Plan in consideration of O&G development, burning regimes and animal species management initiatives to minimise further loss of suitable habitat and improve habitat quality in surrounding areas of habitat, similar to that which is lost	x		Biodiversity and Ecosystem Services Management Plan	Monitoring Mechanisms: - Surveys related to habitat quality assessment - Monitoring of the progress in the	Project Proponents Relevant Government bodies who may conduct	No Net Loss / Net Gain
					A Biodiversity (and Ecosystem Services) Action Plan (BAP) will be developed in line with relevant IFC Performance Standards, and will include key mitigation actions aiming at achieving No Net Loss/Net Gain to biodiversity	x		Biodiversity and Ecosystem Services Action Plan				

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
					<p>Measures to conserve and restore forests and forest connectivity along the eastern shore of Lake Albert (including Budongo and Bugoma FRs): As part of reduction effort of in-migration impacts on forests, in order to maintain and restore key forest corridors and enhance protection of threatened species; the following will be considered (Subject to feasibility study).</p> <ul style="list-style-type: none"> • Establishing agroforestry systems (combining shrub/tree planting with agricultural practices to create more diverse, healthy, productive and profitable sustainable land-use; • Support establishment of community land associations through which to coordinate and implement PES and micro-credit schemes to support livelihood diversification; • Promotion of alternative fuel use and clean cookstoves fuel-efficient stoves to reduce rate of fuelwood harvesting; • Establishing nurseries for community reforestation and sustainable resource extraction (e.g. wood production and NTFPs); • Specific activities to target the conservation of high priority species (e.g. actions to reduce hunting pressures (e.g. removal of snares) and activities that combat illegal hunting and trading will be important); and • Enhanced management of existing Forest Reserves will require support to the Government for enforcement activities (e.g. improved patrolling and boosting community conservation efforts). 	x			<p>implementation (will be defined in the programs implementation schedule) - this will consider both internal and external monitoring to obtain an independent assessment of the No Net Loss / Net Gain progress and achievements.</p> <ul style="list-style-type: none"> - Annual EMS review <p>Key Performance Indicators:</p> <ul style="list-style-type: none"> - Progress of programs implementation <p>Natural Habitats:</p> <ul style="list-style-type: none"> - Tropical High Forest: Stable or greater extent and average quality within PAs, similar habitats maintained in strategic location outside PAs, restoration progress (maintaining connectivity) - Grassland/Wooded grassland/Woodland: Stable or greater extent and average quality within PAs, improved quality outside PAs - Wetlands: Stable or greater extent and average quality within MFPA, similar habitats maintained in strategic location outside MFPA with quality improved, - Lake Albert, Victoria Nile and other associated freshwater features: similar/improved freshwater quality of Lake Albert 	<p>independent monitoring or review the data include: NEMA, UWA, WMD, NFA, PAU</p>		
					<p>Measures to reduce human pressures and increase resilience of the MFPA: through enhanced park protection and community-based management. This will also include measures to protect and maintain connectivity of the savanna corridor outside the MFNP and including Bugungu Wildlife Reserve: manage in-migration impacts to savanna habitat and associated species by addressing threats and maintaining connectivity within and around Bugungu Wildlife Reserve. the following will be considered (Subject to feasibility study) :</p> <p>1) In-kind Support to UWA for:</p> <ul style="list-style-type: none"> - equipment needed to enhance its ability to protect the MFPA; - Recruitment, training and deployment of a rapid reaction team (RRT) for MFPA; - Training in community conservation; and - Strategic and tactical support to UWA including training, capacity building and independent data management, analysis and reporting. <p>2) Community-based interventions including:</p> <ul style="list-style-type: none"> - Establishing community governance structures such as Village Saving and Loans Associations (VSLAs) and Community Land Associations (CLAs) assisting local communities to establish and develop PES or micro-credit schemes or animal husbandry and, where appropriate, to promote alternative wildlife-friendly enterprises - Recruitment and training of village wildlife scouts to empower and involve communities in park management; - Promotion of alternative fuel use and clean cookstoves to reduce level of fuelwood harvesting; - Identify areas with high incidence of human-wildlife carnivore conflict and assess means to address this, for example community-based insurance schemes linked to land-use planning; and - Assist local communities to establish and develop simple wildlife-friendly management plans. 	x			<p>implementation (will be defined in the programs implementation schedule) - this will consider both internal and external monitoring to obtain an independent assessment of the No Net Loss / Net Gain progress and achievements.</p> <ul style="list-style-type: none"> - Annual EMS review <p>Key Performance Indicators:</p> <ul style="list-style-type: none"> - Progress of programs implementation <p>Natural Habitats:</p> <ul style="list-style-type: none"> - Tropical High Forest: Stable or greater extent and average quality within PAs, similar habitats maintained in strategic location outside PAs, restoration progress (maintaining connectivity) - Grassland/Wooded grassland/Woodland: Stable or greater extent and average quality within PAs, improved quality outside PAs - Wetlands: Stable or greater extent and average quality within MFPA, similar habitats maintained in strategic location outside MFPA with quality improved, - Lake Albert, Victoria Nile and other associated freshwater features: similar/improved freshwater quality of Lake Albert 	<p>independent monitoring or review the data include: NEMA, UWA, WMD, NFA, PAU</p>		

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						Actions to manage and restore wetlands along the southern shore of the Albert Delta Ramsar site: manage anticipated impacts of in-migration on wetland habitat, fisheries and associated biodiversity around the Albert Delta Ramsar site through community-based management. the following will be considered (Subject to feasibility study): - Organisation/establishment of wetland user groups/management committees; - Developing agreed community management rules and regulation approaches; - Environmental awareness raising in local communities; - Establishing nurseries for revegetation of papyrus (and/or applying ecological engineering approaches to restoration); - Participatory monitoring and evaluation of wetland areas and resources; and - Micro-credit schemes to support livelihood diversification.	x			Critical Habitats: - Stable or greater extent and average quality of threatened ecosystems within PAs, improved average quality of threatened ecosystems outside PAs <i>Adaptive management will be implemented in which the implementation of defined mitigation and management measures will be responsive to changing conditions</i>		
* Showing the most significant one before additional mitigation is implemented; working towards No Net Loss/Net Gain Some aspects presented under "Unplanned events" have not been repeated here however are relevant to mitigating impacts on terrestrial vegetation												
TERRESTRIAL WILDLIFE												
x	x			Land acquisition and site clearance, new roads	Habitat or ecosystem loss, fragmentation; direct loss of species	All site clearance activities will be undertaken in line with the Site Clearance Plan which will be developed by the Contractor(s) prior to commencing the Site Preparation and Enabling Works Phase to limit extent of vegetation clearance, wherever possible The Site Clearance Plan will be developed to structure and schedule clearly site clearance activities, noting any constraints Laydown areas at each of the well pad sites will be located within the footprint of the well pad; there will be no additional site clearance required outside the well pad footprint during the Construction and Pre-Commissioning Phase The permanent RoW will be kept clear of trees, deep rooting vegetation, poles, structures and graves. Regular monitoring will be undertaken, which will include removal of vegetation overgrowth and uprooting tree seedlings		x	Site Clearance Plan	Monitoring Mechanisms: The ECO will be present on site during the site Preparation and Enabling Works and Construction and Pre-Commissioning phases where site clearance and excavations are required (e.g. Construction of flow lines) to oversee the Works and ensure compliance - Compliance and site clearance activities monitoring (continuous presence on site during clearance) -Site restoration monitoring (monthly follow-up, monitoring may be adjusted based on site specifics) Key Performance	Project Proponents and Project contractors Relevant Government bodies who may conduct independent monitoring or review the data include: NEMA, UWA, WMD, District Environment Officer, NaFIRRI	Moderate Adverse (Rothschild's Giraffe, Lelwel Elephant, Lion, Spotted Hyena, Bohor Reedbuck, Uganda kob, Denham's Bustard)
				Provision will be made for - the recruitment of Ecological Compliance Officers (ECOs); and - the training and capacity building of the ECOs.	x							
				Biodiversity codes of conduct for workers will be developed, which can be disseminated to economic dependents and others that may be able to enter Protected Areas. This may require punitive measures if not complied with	x	x						
				Workers will be prohibited from collecting shells, timber, firewood, fibres and other plant based resources. Fishing by workers will not be permitted. Ensure control at the camps and work sites	x	x						
				Specific awareness training for Project staff/ contractors about roles of wildlife species in the ecosystem and impacts will be provided ***	x	x						
				Access to areas outside of site boundaries by workers will be prohibited within the park	x	x						

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
					A Site Restoration Plan for the Project will be developed and will be updated prior to commencement of every stage of the Project		x	Site Restoration Plan	Indicators: - Restoration follow-up: - Percentage of areas no longer used by the Project that have been restored - Level of success of restored sites in comparison with pre-project conditions (incl. drainage) - Areas of wetlands rehabilitated - Number of wetlands indirectly impacted Project - Number of non-compliances during site clearance activities - Number of incidents or grievances (received / addressed) related to site clearance and restoration			
				The detailed Site Restoration Plan will be implemented and at each site this will be monitored for success of vegetation establishment (i.e. where plants do not take successfully), erosion issues and presence of invasive species to ensure that all sites are effectively restored. Where such problems are encountered, further planting, site re-profiling and other remedial measures will be taken to ensure that site restoration is completed satisfactorily to the agreed standard or coverage and plant composition, which should match reasonably the sounding vegetation by the end of the restoration process	x	x						
				All temporary facilities, including temporary access roads, will be restored as soon as practicable after they are no longer required after use; in line with Site Restoration Plan	x	x						
				All temporary land required associated with the construction of the roads will be restored following construction in line with the Site Restoration Plan as developed by the Contractor specifically for the roads		x						
				Unused material will be reused within the Project footprint or used to restore the borrow pits as much as practicable		x						
				All borrow pits and quarries used by Project Proponents will be re-habilitated following completions of extraction in line with the Site Restoration Plan as developed by the Contractor	x	x						
				Construction activities for the Production and Injection Network will be contained within the permanent RoW which will have a 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)		x						
				The temporary land required for the HDD Construction Areas roads will be restored following construction in line with the Site Restoration Plan as developed by the Contractor	x	x						
				At the end of the Construction and Pre-Commissioning Phase the C1 road will be restored in accordance with a Site Restoration Plan by the Contractor		x						
				Topsoil shall be stockpiled separately from subsoil with all soils being reinstated in the reverse order to that in which they have been removed in order to initiate rehabilitation. All stockpiles shall be stabilised, not be higher than 3 m, and must blend in with the surrounding topography. Topsoils will also be monitored (e.g. for organic content)		x						
				Materials used in restoration will be locally sourced, where possible (i.e. materials used in the MFNP should be from other sites within the MFNP, where practicable), but away from sensitive biodiversity areas. Plants will be transplanted from nurseries to the site being restored (or from adjacent areas, as appropriate)	x	x						
				A pilot scheme for wetland restoration will be linked to the Restoration Plan - developed in partnership with WMD and DWRM	x		Wetland Management Plan					
				A Wetland Management Plan will be established to ensure no disruption to wetland areas. The main measures will comprise avoiding and minimising impacts on wetlands and restricted exclusion zones	x	x						
				Pre-construction surveys will be performed to confirm the extent and state of identified wetlands	x							

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						Construction activities within 200 m for lake (Lake Albert) and 100 m for a river (River Nile) will be avoided as far as practicable. Should they be unavoidable, a permit for use of river banks and lake shores will be applied for activities within those zones (for Water Abstraction System, HDD crossing, Nile River Ferry Crossing)	x	x				
						Buffer zones will be established to protect watercourses and habitats	x	x				
						For works taking place in or near the Ramsar site, where feasible, a buffer will be established around identified sensitive features where no works will take place, as defined in the Avoidance Protocol		x				
						A Biodiversity and Ecosystem Services Management Plan (BMP) will be developed, ensuring that impacts of site clearance on plant species of conservation concern will be minimised	x	x				
						If there are proposed changes to locations, alignment, working areas or footprint of Project components, the Avoidance Protocol, including site selection survey and mapping, will be carried out before determining the configuration of these components	x	x	Biodiversity and Ecosystem Services Management Plan			
						Plant nurseries will be established to provide plant materials (e.g. seedlings and/or seeds) for restoration of impacted sites, as well as for replacement of felled trees as appropriate. This will include trees as well as common herbaceous species (i.e. grasses, herbs, etc.) for general coverage		x	Biodiversity and Ecosystem Services Action Plan			
						The footprint of the HDD will be minimised to avoid unnecessary loss of wetland/riparian habitat		x				
						Minimise the loss of key plant species for giraffe diet: namely Acacia senegal, A. sieberiana, A. drepanolobium, Harrisonia abyssinica and Crateva adansonii	x	x				
						Decommissioning activities will be confined within the Project footprint as much as practicable	x	x	Physical Environment Monitoring Plan			
						Roads will be designed so that their permanent and construction footprint will be minimised		x	Road Safety and Transport Management Plan Journey Management Plan			
x	x	x	x	Use of equipment, plant and material as well as third party events may be the source of fire	Habitat or ecosystem loss, fragmentation; direct loss of species	There will be no smoking outside of any designated areas due to risk of fire and consequently loss of adjacent habitats	x	x	Emergency Response Plan			
						Burning of vegetation waste following site clearance will be prohibited within MFPA but could be considered in areas outside MFPA when no other appropriate alternative has been identified, to avoid air emissions and reduce the risk of fires. This requirement will be included in the Site Clearance Plan		x	Site Clearance Plan			
x	x	x	x	Movement of vehicles, heavy machinery and equipment, Earthworks and site clearance, maintaining pipeline RoW,	Habitat degradation (e.g. due to erosion, dust, compaction, drainage, water use, effluents discharge)	During site clearance, vegetation stripping will be undertaken using a phased approach to minimise sediment pollution from runoff		x		Monitoring Mechanisms: - An Environmental Monitoring Programme will be established. This will include comprehensive	Project Proponents and Project contractors Relevant Government bodies who may	Moderate Adverse (Rothschild's Giraffe, Lelwel Hartebeest, African Elephant, Lion, Spotted Hyena, Bohor Reedbuck,
						Temporary 'bogmats', riprap bridges and other measures to reduce compaction or erosion of soils and habitat degradation during wet conditions will be utilised		x	Physical Environment Monitoring Plan			
						Soil spill, where soil spreads beyond the defined boundary of the component footprint, from well pad or other construction areas, will be minimised		x				

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
				Storage of equipment and materials, Water abstraction, Drainage, Sewage Discharge	Use of concrete or other impermeable surfacing material at sites will be minimised. These materials will be used only at those areas that absolutely require it		x		Surface Run Off and Drainage Management Plan	monitoring associated with water, noise, air quality, etc. - Weekly site inspections, audits (as per annual audit plan), including of machinery and chemical storage tanks to identify early signs of failure; checks around the construction areas for signs of erosion, blocked water courses, and localised flood. If encountered, undertake corrective measures Key Performance Indicators: - Quality of physical environment parameters (e.g. water, soil) with comparison to pre-project conditions - Results of discharge water quality monitoring - Results of sewage discharge monitoring, waste transfer notes - Chemicals inventory - Number of spill and emergency response exercises - Number of trained personnel - Number of incidents during transportation/handling of chemicals or waste	conduct independent monitoring or review the data include: NEMA, UWA, DWRM, District Environment Officer, PAU	Uganda kob, Denham's Bustard)
					Engineer slopes and drainage to minimise erosion and slope failure		x					
					Changes in natural gradients due to construction activities should be avoided where possible and minimised where unavoidable		x					
					Incorporate erosion protection measures through reuse of cleared material, scours checks, silt traps lining of drains and stepped drains in areas of steep gradient, vegetation cover, and slope protection		x					
					Maintain a buffer of vegetation around the site (particularly in the lower lying areas) to prevent any eroded soil from leaving the site and being deposited in downstream water sources		x					
					Use perimeter drainage ditches and design for storm conditions		x					
					Where required, settlement areas and silt traps will be provided downstream of the construction areas to remove or filter out sediment originating from access tracks or construction site drainage and protect water courses, wetlands, drainages and riparian areas. The most appropriate sedimentation and siltation control measures will be designed prior to excavation during the construction period, and will be dependent on site-specific characteristics		x					
					With the exception of the CPF which has a bespoke drainage arrangement, drainage arrangements for the permanent facilities will be as follows: • Potentially contaminated areas (i.e. fuel and chemical storage areas) will be provided with local effluent collection (sumps, kerbing and bunding) whereby the potentially contaminated water will be collected and removed by road tanker to a licenced waste disposal facility; and • Uncontaminated areas which will drain naturally to the environment via Sustainable Drainage System (SuDS) comprising filter drains and soakaways. The SuDS design is subject to further detailed design. Sampling points will be established for all potentially contaminated areas to enable samples to be collected for analysis	x	x					
					The drainage arrangement of the CPF will be designed to segregate clean and potentially contaminated effluent streams.	x	x					
					(Site preparation and Enabling Works, Construction and Pre-Commissioning): Surface water will be managed via temporary sustainable drainage systems (SuDS) to manage flood and contamination risk. The requirements for construction SuDS will be adapted depending on the nature of the activities		x					
					Ditch plugs will be installed on all trenches to prevent the pooling of water in the trenches		x					
					All dewatering from excavations or isolated work areas will be provided with appropriate level of treatment prior to discharge		x					
				(Site preparation and Enabling Works, Construction and Pre-Commissioning): Clean surface water will be diverted away from exposed soils with use of diversion drains and bunds		x						

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
					Pipeline trenches will be designed to ensure that they do not become preferential flow paths for groundwater, particularly where they cross seasonal wetland areas or terrain, which comprises catchment for wallows or waterholes. This could comprise placement of impermeable backfill (clay or similar) at certain locations within the trench to prevent lateral movement of water within the pipeline alignment		x		- Number of incidents or grievances (received / addressed) related to surface run off or waste management			
				Construction techniques will allow unimpeded shallow groundwater and surface water flow where they have to cross seasonal watercourses (for example between JBR-01 & JBR-10/Nile crossing; JBR-03 & JBR-04; around JBR-09; between JBR-08 and JBR-09), through use of culverts and permeable layers, avoiding compaction of soils		x						
				Further mitigation for the pipeline across the seasonal river between JBR-09 and JBR-08 will be considered. This is a deep gully and bridging may be required		x						
				Implementation of a Dust Control Plan, which will include: measures to include the application of dust suppressants (including water), on potentially dust generating sources, including on site and off site roads used by Project vehicles and material stockpiles.	x	x	Dust Control Plan					
				Dust control measures will be implemented at each site and access road to prevent smothering of adjacent habitats. Dust emissions will be strictly controlled via adhering to the operating procedures set out in the Dust Control Plan								
				For work activities located close to dust sensitive receptors, mitigations will be considered to minimize the dust emissions. A range of specific dust suppression measures shall be implemented to minimise potential impacts. Such measures shall be implemented on a case by case basis and may include the use screens, covers and/or barriers.	x	x						
				Sewage produced from the camps and other Project Areas will be treated at the WWTPs located at the camps in compliance with regulatory requirements. Wastewater from the well pads will be collected and transferred by tanker to the nearest WWTPs	x	x	Waste Management Plan					
				Works and traffic/plant movement will maintain strict adherence to agreed footprint design including access roads and other infrastructure	x	x	Road Safety and Transport Management Plan					
				Water abstraction and activities at other locations will ensure that they do not affect groundwater base-flow to wetlands (including wallows and watering holes) and other habitats resulting in degradation of those habitats. Flow rates and residual recharge rates will be sufficient to sustain sensitive habitats. To achieve this, water abstraction points will be carefully selected. In addition, all water abstraction activities will comply with the requirements of water abstraction permits	x	x	Water Management Plan Wetland Management Plan					
				Care will be taken not to cause compaction of ground near wetlands resulting in hydrological or hydrogeological changes that may affect those habitats		x						
				For sections of pipelines that cross seasonal wetlands/streams, pipeline construction works will take place in the dry season where possible. This is to prevent disruption of surface water / shallow groundwater flow thus affecting habitats as well as disturbing the animals relying on those wetlands		x						

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						Construction of access roads and other infrastructure will be similarly sequenced as much as practicable to restrict disturbance to a discrete areas at any one time. For areas of Project that cross seasonal wetlands/rivers pipeline construction works will take place in the dry season where possible. This is to prevent disruption of surface water / shallow groundwater flow thus affecting habitats as well as disturbing the animals relying on those wetlands		x				
						For areas of the Project that cross seasonal wetlands/rivers decommissioning works will take place in the dry season where possible. Where not possible, additional mitigation measures will need to be defined		x				
x	x	x	x	Accidental release (i.e. spillage and leakage) of chemicals, fuels or wastes	Habitat degradation, direct loss of species	All fuels and hazardous materials will be stored within appropriate bunds and drip trays, providing appropriate containment, where practicable	x	x	Spill Prevention Plan Oil Spill Contingency Plan			
						Chemicals and hazardous liquids will be supplied in dedicated tote tanks made of sufficiently robust construction to prevent leaks/spills. Dedicated procedures will be developed for fuel and hazardous material transfers and personnel will be trained to respond. Spill kits will be available at all storage locations	x	x				
						Main refuelling facilities will be located within the Industrial Area, the camps and the Masindi Vehicle Check Point. Facilities will be located within bunded areas with appropriate capacity (110% tank containment). The refuelling pumps will be equipped with automatic shut off and there will be dedicated procedures and spill kits available. Bunds will be designed to minimise ingress of surface water, facilities roofed where practicable and any contaminated water collected will be trucked off site for disposal	x	x				
						Contaminated run off will be minimised by ensuring adequate storage facilities are in place for materials stockpiles, waste, fuels/chemicals/hazardous materials, vehicles/washing areas, parking facilities		x				
						The pipelines will comprise carbon steel with adequate corrosion allowance built into material specifications (wall thickness) to prevent leaks.		x				
						An Oil Spill Contingency Plan to be established. This will define notification procedure, response strategy, means, and post-spill actions such as clean-up, monitoring, etc. in the event of uncontrolled/accidental discharge	x	x				
						Develop and implement a Spill Prevention Plan, incorporating secondary containment as far as practicable for liquids contained on site	x	x				
						Ensure spill response equipment (including sampling and personal protective equipment) is readily available on site to contain and clean any spillages as soon as reasonably practicable after the event	x	x				
						Additional water supply boreholes will be installed during the Site Preparation and Enabling Works Phase and will be drilled to target deep water aquifer zones using water and bentonite		x		Water management Plan		
						For any chemical usage [with respect to pre-commissioning], a thorough Chemical Risk Assessment will be undertaken and lowest toxicity chemicals will be used wherever possible	x	x		Chemical Management Plan		
						Any residues and wastes generated from pre-commissioning activities will be managed in accordance with the site Waste Management Plan		x	Waste Management Plan			
						A Waste Management Plan will be developed and maintained to cover the duration of the Project; and will address the anticipated waste streams, likely quantities and any special handling requirements. The Project Proponent's will implement a waste tracking system to ensure traceability of all wastes removed off site.	x	x				

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
x	x			Site clearance, construction works, human presence, Traffic,	Species disturbance (including through barrier effect)	Lighting will be reduced to the minimum without impacting safety and security. Where feasible, the light will be directed inwards the facilities and will be of a warm / neutral colour so as to limit nuisance to the surrounding communities and to avoid attracting animals.	x	x	Physical Environment Monitoring Plan	<p>Monitoring Mechanisms:</p> <p>The ECO will be present on site during the site Preparation and Enabling Works and Construction and Pre-Commissioning phases where site clearance and excavations are required (e.g. Construction of flow lines) to oversee the Works and ensure compliance</p> <p>Annual EMS review</p> <p>Species monitoring:</p> <p>Consideration will be given, as appropriate, to future monitoring through undertaking relevant studies on the priority species</p> <p>Consider contributing to development and implementation of a long-term chimpanzee monitoring and evaluation program through establishment of partnerships and information exchange with researchers and land managers (e.g. Budongo Forest Project, NFA, UWA, Makerere) to understand trends and threats to chimpanzees across the landscape and how Project can best contribute to minimising impacts and contributing to long-term persistence</p>	Project Proponents and Project contractors Relevant Government bodies who may conduct independent monitoring or review the data include: NEMA, UWA, WMD, NFA, District Environment Officer, PAU	Moderate Adverse (Rothschild's Giraffe, Lelwel Hartebeest, African Elephant, Lion, Spotted Hyena, Bohor Reedbuck, Uganda kob, Denham's Bustard)
						Lighting at night at well pads and other infrastructure will be minimised to avoid affecting commuting and feeding behaviour of bat species. This can be achieved by using directional lighting and by turning off lights (using timers or motion detectors where practicable and to ensure safety) when not required	x	x				
						With the exception of drilling and HDD construction activities there will be no permanent night time working in the MFNP	x	x	Noise and Vibration Management Plan			
						For work activities located close to noise sensitive receptors, a range of specific noise mitigation measures shall be implemented to minimise impacts. Such measures shall be implemented on a case by case basis and may include the use of temporary abatement such as dampening and shielding techniques, noise barriers, and mufflers. Specific noise regulations and thresholds will be specified in the Noise and Vibration Management Plan	x	x				
						Where possible, selection of low-noise rated machinery and generators		x				
						Loud music is not to be played.	x	x				
						Piling and other activities generating noise and vibration will be 'ramped up' (slow started) to allow wildlife to move away in good time		x				
						Where practicable, construction in and around watercourses and waterbodies will not be undertaken at night. This will minimise the disturbance of hunting crocodiles		x	Biodiversity and Ecosystem Services Management Plan			
						A Biodiversity and Ecosystem Services Management Plan (BMP) will be developed which will define how impacts of site clearance on animal species of conservation concern will be minimised. This will include maps showing locations of sensitive habitats and seasonal wetlands known to be preferred habitat of those species. The BMP will also indicate routes of large mammal movements if known (can be determined from presence of tracks) as well as other sensitive features such as kob leks	x					
						Activities scheduling will consider seasonal sensitivities of Priority Species as much as practicable. In any case, Project shall ensure that wide areas, free of works, are maintained to allow animal movements and any other potential mitigations are investigated as appropriate	x	x				
						Prior to commencement of site works, each site will be subject to a pre-start walkover survey by a qualified ecologist, to detect signs of active burrows, dens, bird nests, bat roosting, presence of reptiles/amphibians and critical wildlife movement routes and tracks (e.g. access to watering holes). This is important because species may have moved to the site since baseline surveys were undertaken	x	x				
						If animal burrows are present and appear to be occupied then these should be carefully excavated to allow any occupant the opportunity to escape	x	x				

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning	Company				Contractor					
						Where bird nests of threatened species are present within or close to the working area, then works must halt and access to these will be restricted in order to avoid disturbance to birds until any fledglings have hatched and left the nest			x		<p>Continue long-term monitoring of giraffe (including population size and structure, incidence of snaring, movements, stress levels, reproduction) throughout the MFPA to assess longer term impacts and disturbances of oil activities</p> <p>Studies of elephant behavioural ecology and response to disturbance in Buligi and Ayago to understand impacts and adapt mitigation will be continued as required</p> <p>Commissioning of studies of elephant movements outside of MFPA in order to understand better the risk of indirect impacts and human-elephant conflict will be considered</p> <p>Monitoring, using radio collars, will be continued. It should cover of all lion prides potentially affected by Project infrastructure and activities and a control pride</p> <p>As this species is Critically Endangered, continue specific study of hyenas within the Project landscape to assess how they could be affected by the Project direct and indirect activities and disturbance</p>		
						Bird eggs of any species must not be taken or destroyed	x		x				
						Where signs of small mammals (including bat roosts), amphibians (in wetland areas) or reptiles are encountered during pre-start surveys, individuals will be given time to escape. For amphibians or reptiles species of conservation concern, capture and translocation to adjacent similar habitat by an experienced field ecologist should be attempted	x		x				
						Prior to commencement of work each morning, every excavation and fenced area will be inspected, and any trapped animals allowed to escape safely	x		x				
						The length of open trenching at any given time will be minimised to approximately 1 km to allow wildlife and the local community safe passage			x				
						In remote areas and/or at night wildlife escape ramps from open trenches will be used. The use of animal crossing structures such as bridges, culverts, and over crossings, along pipeline and access road rights-of-way will be installed where necessary. At special points such as crossings, deep excavations and tie-in bell holes, safety barriers (such as fences) will be installed to prevent human or animal ingress. The barriers will be temporary structures and the intention is that they will be a deterrent to animals entering the working area rather than an impenetrable physical barrier to prevent animals colliding with them. Where fences are used, they should have opaque panels in them (e.g. cloth material), and a means of escape from the fenced areas by use of ramps, etc., will be included			x				
						When stringing pipeline in the MFNP, consideration will be given to minimising the amount of open trench time and where practicable maintaining pathways for wildlife to traverse			x				
						The pipe laying and backfill activity is to be conducted as soon as practicable after the trench excavation utilising standard pipe laying cranes and earthmoving equipment.			x				
						Where positioning of infrastructure could restrict animals' access to critical water resources, alternative access routes will be maintained or created, where practicable			x				
						No feeding of any wildlife will be permitted	x		x				
						Construction in and around bird roosting sites for Shoebill, Madagascar pond heron, Grey Crowned Crane and Pel's fishing owl within the Ramsar site will be avoided as much as practicable. When unavoidable, then works must halt and access to these will be restricted in order to avoid disturbance to birds until any fledglings have hatched and left the nest			x				
						Surface water management on site and pooling of water or open water storage will be managed so as not to create areas to which animals may be attracted			x				
						Excavations will be furnished with ramps or other means of escape, which will be put into open trenches at regular intervals to allow animals to escape			x				
						If temporary surface water pipelines are required, which are not fully buried, then means of crossing them for animals will be constructed, whether these are extended earth ramps or shallow burial of the pipelines			x				

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
					Where feasible, activities scheduling for construction activities should consider avoiding disturbance within Ramsar site during migratory bird season [October to March approximately]		x		As this is priority species, consider specific study of vultures in order to define roosting/nesting and preferred feeding areas to assess how they could be affected by the Project direct and indirect activities and disturbance Key Performance Indicators: Likely to consider (will be detailed in the Biodiversity and Ecosystem Services Action Plan) : - Change in animal population (priority biodiversity) - Change in extent and state of the habitats - Changes in animal behaviour (priority biodiversity) - Ecosystem services quality and quantity Adaptive management will be implemented in which the implementation of defined mitigation and management measures will be responsive to changing conditions			
				Site preparation, construction and decommissioning works affecting wetland and seasonally inundated grassland habitat will be scheduled (as much as possible) to occur as far as practicable outside the November window when shoebill is most likely to be breeding (incubation phase)	x	x						
				Where practicable vegetation clearance activities will be undertaken outside of the crocodile nesting period (January- March) within the Ramsar site. However, if this is not practical a suitably experienced ecologist will inspect the site for any signs of crocodiles or their nest sites prior to the removal of habitats. Where active nests are recorded, they will be cordoned off until the hatchlings have emerged and dispersed	x	x						
				Where feasible, activities scheduling should consider preventing barrier effects for seasonal movements of giraffe. Giraffe tend to be more concentrated in the Buligi area in the dry season (Nov-Feb) and move to the Ayago area when the rains start (Mar)		x						
				Where feasible, activities scheduling should consider preventing barrier effects for seasonal movements of elephants. Elephants tend to be more concentrated in the Ayago area in the dry season (Nov-Feb) and move to the Buligi area when the rains start (Mar)		x						
				When scheduling site construction, as much as practicable simultaneous works at two working areas within the same lion pride's territory will be avoided	x	x						
				Where feasible, activities scheduling should consider preventing barrier effects for seasonal movements of kobs. Kobs tend to be more concentrated in the Ayago area in the dry season (Nov-Feb) and move to the Buligi area when the rains start (Mar). Lekking seems to occur in June (possibly July) and works near identified leks should be avoided as much as practicable during these months		x						
				A Road Safety and Transport Management Plan will be developed and implemented that will outline journey optimisation, speed restrictions, requirements to drivers and vehicles, traffic rules (confirming that animals have right of way if encountered), and appropriate reporting procedures in case of collisions	x	x	Road Safety and Transport Management Plan					
				All construction vehicles/equipment will be kept on site when not in use	x	x						
				The base case for Tilenga is that there will be no night driving. However, night driving may be permitted in exceptional circumstances and with internal derogation where it is deemed safe and practicable to do so**	x	x	Journey Management Plan					
				The ferry will operate for 8 hours a day and will be dedicated to Project use only. There will be no ferry movements during night time hours except in exceptional circumstances and with internal derogation**	x							
				When roads intercept key crossing points for certain species (e.g. amphibians near wetlands), design consideration should include needing to maintain crossing path as much as practicable		x						
				Minimise actual and effective traffic volume in MFNP, including requirements to travel in convoy with defined 'quiet times'	x	x						
				Procedures and protocols for operating water vessels and ferry will be formulated and implemented. Water vessels will travel at reduced speeds while travelling along watercourses to reduce risk of disturbance of wildlife and collisions**	x	x						

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						*** Mitigation similar to the one above apply						
x	x	x	x	Human presence, physical presence within MFNP, Traffic, Food, waste and chemicals storage	Unplanned event - accidental poisoning, traffic accident, animal intrusion in Project site	Further engagement with NFA, Budongo Conservation Field Station, and other key stakeholders will be undertaken to ensure that appropriate measures are identified to mitigate potential impacts associated with anticipated traffic	x		Stakeholders Engagement Plan	<p>Monitoring Mechanisms:</p> <ul style="list-style-type: none"> - Weekly site inspections, audits (as per annual audit plan) - Stakeholder Engagement <p>Key Performance Indicators:</p> <ul style="list-style-type: none"> - Number of incidents or grievances (received / addressed) related to poaching, accidental poisoning, traffic, animal intrusion <p><i>Rf. to ESMP associated with unplanned events for monitoring mechanisms and Key Performance Indicators related to Traffic</i></p>	Project Proponents and	Moderate Adverse (Rothschild's Giraffe, Lelwel Hartebeest, African Elephant, Lion, Spotted Hyena, Bohor Reedbuck, Uganda kob, Denham's Bustard)
					(Wellpads) There will be a 15 m wide buffer from the perimeter security structure, which will be cleared of vegetation. Within the MFNP, the structure will be designed to prevent the ingress of animals entering the well pads and will comprise a bund wall structure		x	Site clearance plan Physical environment monitoring plan				
					Appropriate fencing/animal barriers will be designed with the help of elephant barrier experts where available	x	x	Biodiversity and Ecosystem Services Action Plan				
					Fencing will be erected around human occupied areas (well pads, barge pier facilities, water abstraction point etc.) situated close to watercourses (< 1 km) to prevent crocodiles interacting with people and vehicles		x					
					Use of birds deflectors should be considered when a risk of collision or electrocution is identified; in particular with pylons/flare systems.	x						
					Creation of an "oasis" effect (e.g. lush vegetation from site drainage) will be avoided, that may attract and encourage elephants especially in the dry season, to attempt to break into the well pads and camps	x	x					
					Planting of trees likely to attract elephants (e.g. mango) as ornamentals at Project sites will be prohibited to reduce the risk of human-elephant conflict	x						
					All chemicals, food, food waste, and other materials within current and potential elephant ranges will be stored in secure (ideally elephant-proof structures) to avoid accidental poisoning and / or frequent close encounters with elephants	x	x					
					Within areas of current or potential hyena presence, all chemicals, food waste and hazardous waste will be stored / disposed of in hyena-proof structures (i.e. heavy duty metal freight containers and/or secure cabinets) to avoid accidental poisoning	x	x					
					Use of rodenticides and other toxic chemicals by site personnel and workers inhabiting site compounds will be prohibited during all phases of the Project	x	x					
					** Mitigations similar to these above apply							
				Poaching	Checks will be undertaken on all staff and contractor vehicles, either by TOTAL security staff or through support from UWA, to discourage poaching and to check that only authorised personnel are entering the park in company or contractor vehicles	x	x	Labour Management Plan				
					The Labour Management Plan and General site rules will include a ban on bushmeat hunting/purchase, transport, and/or consumption of bushmeat for employees.	x	x					
					Training and awareness-raising will be undertaken on bushmeat issues and to communicate to all personnel requirements not to consume bushmeat while at work (e.g. notices will be placed around the site to remind staff of their responsibilities)	x	x					
					Access roads under project control will be reserved for Project use only, and appropriate barriers / control and enforcement mechanisms installed to prevent use for extraction of bushmeat or other illegal use of natural resources. This may include manned road blocks, punctual checkpoints and physical barriers	x	x					
x	x	x	x	Use of construction	Habitat or ecosystem loss, direct loss of species	A risk-based Alien/Invasive Species Management Plan will be developed and implemented	x	x	Alien/Invasive Species	Monitoring Mechanisms:		

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
				equipment and power generation equipment, traffic, import of material (incl. construction materials) may lead to the accidental introduction of alien / invasive species	Materials to be used in forming platforms, bund walls and other site preparation works within Protected Areas will be locally sourced as much as possible (i.e. materials used in the MFNP should be from other sites within the MFNP), but away from sensitive biodiversity areas where practicable	x	x	Management Plan Landscape Management Plan	- Site restoration monitoring - Weekly site inspections	Project Contractors Relevant Government bodies who may conduct independent monitoring or review the data include: UWA, NFA		
					Where unavoidable, soil and/or other materials shall be brought from outside of Protected Areas for use within the Protected Areas only upon approval by the responsible government agency (i.e. UWA or NFA), and this process will be subject to a risk assessment process as described in the scope for the Alien/Invasive Species Management Plan	x	x		Key Performance Indicators: - Changes in the extent and density of previously existing alien/invasive species populations			
					The design of the bund walls in the park will be optimised to minimise requirement for materials taken from outside of the park		x		- Occurrence of alien/invasive species attributed to the Project;			
					Herbicide will not be used at any Project location. Control of 'weeds' will be undertaken by hand weeding or use of permeable matting or other standard weed control measures	x	x		- Occurrences of newly introduced alien/invasive species			
					Landscaping, including earth bunds around well pads within the park will be established, and will be covered with topsoil and plants associated with the immediate vicinity and monitored and maintained to ensure success and stability of these bunds. Consideration will be given to the need to avoid attracting animals (e.g. the oasis effect in dry seasons)	x	x		- Unexpected changes in alien/invasive species control activity, e.g., off-target damage, invasion by other species			
									- Undesirable changes in the condition and extent of native vegetation that may be attributed to invasive			
x	x			PAPs resettlement in relation to land acquisition	Habitat or ecosystem loss, fragmentation; direct loss of species	Ensure that the Resettlement Action Plan (RAP) does not increase pressure on natural or critical habitats by moving people into or where practicable closer to sensitive habitats or Protected Areas	x		Resettlement Action Plan	Rf. To ESMP associated with RAP in section Social	Moderate Adverse (Chimpanzee, Rothschild's Giraffe, Lelwel Hartebeest, African Elephant, Lion, Spotted Hyena, Bohor Reedbuck, Medje Mops Bat, Trevor's Free-tailed Bat,	
						Resettlement Action Plans will include livelihood restoration and will also provide alternative livelihoods/ income diversification programmes to ease dependence on natural resources or protected areas as a source of livelihood	x				Savanna/Helios Pipistrelle, Ugandan Lowland Shrew, Uganda kob, Russet free-tailed bat, Grey Crowned Crane, Madagascar Pond-heron, African Crowned Eagle, Shoebill, Nahan's	
x	x	x	x	PAPs resettlement and influx contributing to population growth may increase human-wildlife conflict	Direct loss of species	Measures to minimise human-wildlife conflict will be implemented. This will include provision of livestock management training, fencing (where appropriate) and other initiatives	x	x	Biodiversity and Ecosystem Services Action Plan	Monitoring Mechanisms: - Stakeholder Engagement	Project Proponents Relevant Government bodies that may conduct independent monitoring or review the data include: PAU, NEMA, NFA, UWA, NaFIRRI.	
						The Community Environmental Conservation Plan will contain educational/information programmes in villages affected by human-chimpanzee conflict	x			Key Performance Indicators: - Number of educational/information programmes held		
						A Community Environmental Conservation Plan will be developed that will contain educational/information programmes in villages affected by human-elephant conflict	x		Community Environmental Conservation Plan	- Number of human-wildlife conflicts incidents		
						The community-wildlife conflict prevention program will align with the goals and actions set out in the Community-Based Wildlife Crime Prevention Action Plan (2017-2023) prepared by UWA (April 2017).	x					

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
x	x	x	x	Influx contributing to population growth (indirect impact) may increase pressure on habitats and species	Habitat or ecosystem loss, fragmentation; direct loss of plant species	<p>A Community Environmental Conservation Plan will be developed which will contain educational/information programmes to highlight importance of protected areas, identify plant species of conservation concern (and why they are important), and to explain how pressure on those will be alleviated</p> <p>The Community Environmental Conservation Plan will consider (but not be limited to) community based programmes, following feasibility studies, for extension of tree nurseries, promotion of alternative fuel use, fisheries management and monitoring programme that will entail engagement of communities through BMUs in fisheries management</p> <p>Nurseries will be developed, and where possible plantations, to propagate plants/trees of economic importance to alleviate pressure on natural and protected environments for those resources in line with the Community Environmental Conservation Plan and at a scale and intensity proportional to Project impacts. This is not intended as a replacement for species lost during site clearance but as a measure to relieve pressure on natural resources within existing forests and other protected areas</p> <p>The Community Environmental Conservation Plan will include programmes on promotion of alternative fuel use (e.g. briquettes, solar technology) and clean cook-stoves through partnership with local organisations and social enterprises. Support schemes to find alternative fuel sources, reduce reliance on charcoal will be developed. The potential to involve communities in biodiversity conservation as alternative livelihood options will be explored</p> <p>An Influx Management Strategy will be developed to mitigate in-migration impacts and maximise benefits for local communities. Implementation of the strategy will depend on joint coordination between the Project, government, other project developers, local communities and civil society. The Strategy will build on the recommendations provided in the In-Migration Risk Assessment (Ref. 16-11) and will set out the overarching approach and objectives for mitigating the negative impacts of influx and enhancing the benefits. The strategy will make reference to more detailed actions and procedures contained within other environmental and social management plans that are relevant to addressing influx. The strategy will also propose a specific monitoring & evaluation framework to measure project-induced in-migration trends, hotspots and key impacts.</p> <p>The Influx Management Strategy will include (but not to be limited to) monitoring and management of impacts jointly with local government in in-migration hot spots, education campaigns and capacity building on in-migration impacts</p> <p>The Influx Management Strategy will also consider potential impacts of increased pressure on natural resources due to population growth including looking at ways to provide alternative sources of fuel, building materials, farming land and food (particularly protein)</p> <p>The in-migration risk assessment will be regularly updated based on monitoring data to assess which protected areas, species and habitats are most at risk of indirect impacts, both imminently and in the foreseeable future</p> <p>Project Recruitment Centres locations should be defined in consideration of potential impacts it may generate on protected areas and unprotected forest areas</p> <p>The Community Content, Economic development and Livelihood Plan will consider measures, following feasibility studies, aimed at mitigating impact of population growth such as increased demand for fibres, increased pressure on</p>	x			<p>Monitoring Mechanisms:</p> <p>Specific monitoring & evaluation framework to measure project-induced in-migration trends, hotspots extent rates and key impacts to be proposed as part of Influx Management Strategy</p> <p>Regular monitoring of the extent and impacts of in-migration, generally on natural resources, will be carried out as part of the Biodiversity Monitoring and Evaluation Plan, including regular acquisition and analysis of satellite imagery to assess landuse/landcover changes. Data to be acquired annually until the end of construction.</p> <p>At least annual joint meeting with local and regional authorities and other stakeholders to regularly evaluate the extent of indirect effects and adapt the mitigation accordingly.</p> <p>Key Performance Indicators:</p> <ul style="list-style-type: none"> - Number of meetings held on indirect effects monitoring with local and regional authorities - Changes in land-use - KPIs related to species populations and habitats, as defined in 	<p>Project proponents</p> <p>Strategic collaboration platforms will be established with local and regional authorities, UWA, NFA development and conservation NGOs and other stakeholders as appropriate to regularly evaluate and review the extent of indirect effects, share understanding of causes and identify adapted or additional mitigation requirements</p> <p>Relevant Government agencies who may conduct independent monitoring or review the data include: District Physical Planning Department, Ministry of Lands, Housing and Urban Planning, Ministry of Internal Affairs NEMA, UWA, NFA, WMD, DWRM, Regulatory agencies responsible for infrastructure.</p>	<p>Partridge, African skimmer, Adolf Friedrich's / Rugege Squeaker Frog, Golden Puddle Frog, Kivu Clawed Frog, Adanson's Hinged Terrapin, African soft-shelled turtle, Zaire Hinged Terrapin, Smooth Chameleon, 22 butterfly species, 2 dragonfly species)</p>

Project Phase					Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning	Company				Contractor					
						fisheries resources including looking at ways of providing a registration scheme for the fishing industry			Development and Livelihood Plan	the Biodiversity and Ecosystem Services Action Plan			
						Project Proponents will provide support to the Ministry of Lands Housing and Urban Development and Buliisa District Government to develop a District Land Use Plan through financing of a study that can be used as basis of such planning. The study will consider existing land use and land tenure, trends in land use, and future land use requirements including for Project infrastructure and for any mitigations required to off-set Project impacts, e.g. relocation land and land for biodiversity offsetting. The study will also identify areas that will benefit from improved accessibility across Buliisa District	x						
x	x			Influx contributing to population growth (indirect impact), in-combined and cumulative effects	Habitat or ecosystem loss, fragmentation; direct loss of plant species	Relevant authorities will be engaged with and consideration will be given to fostering development of a plan with them to strengthen the protection of Bugungu Wildlife Reserve and adjacent areas of transitional habitat with direct community involvement. The objective will be to provide legal safeguard for wildlife populations and maintain an effective north-south savanna corridor in the landscape	x		Stakeholders Engagement Plan				
x	x	x	x	Additional mitigation - working towards No Net Loss / Net Gain		Discussions will be held with UWA regarding the MFPA Management Plan in consideration of O&G development, burning regimes and animal species management initiatives to minimise further loss of suitable habitat and improve habitat quality in surrounding areas of habitat, similar to that which is lost	x	x	Biodiversity and Ecosystem Services Management Plan	Monitoring Mechanisms: - As defined above (Species monitoring) - Monitoring of the progress in the implementation (will be defined in the programs implementation schedule) - this will consider both internal and external monitoring to obtain an independent assessment of the No Net Loss / Net Gain progress and achievements. - Annual EMS review Key Performance Indicators (Priority species): - Progress of programs implementation - Lions: Maintained number of prides and composition, increase	Project Proponents Relevant Government bodies who may conduct independent monitoring or review the data include: NEMA, UWA, WMD, NFA, NaFIRRI, PAU	No Net Loss / Net Gain	
		A Biodiversity (and Ecosystem Services) Action Plan (BAP) will be developed in line with relevant IFC Performance Standards, and will include key mitigation actions aiming at achieving No Net Loss/Net Gain to biodiversity	x										
		Measures to conserve and restore forests and forest connectivity along the eastern shore of Lake Albert (including Budongo and Bugoma FRs): As part of reduction effort of in-migration impacts on forests, in order to maintain and restore key forest corridors and enhance protection of threatened species; the following will be considered (Subject to feasibility study). • Establishing agroforestry systems (combining shrub/tree planting with agricultural practices to create more diverse, healthy, productive and profitable sustainable land-use; • Support establishment of community land associations through which to coordinate and implement PES and micro-credit schemes to support livelihood diversification; • Promotion of alternative fuel use and clean cook stoves fuel-efficient stoves to reduce rate of fuelwood harvesting; • Establishing nurseries for community reforestation and sustainable resource extraction (e.g. wood production and NTFPs); • Specific activities to target the conservation of high priority species (e.g. actions to reduce hunting pressures (e.g. removal of snares) and activities that combat illegal hunting and trading will be important); and • Enhanced management of existing Forest Reserves will require support to the Government for enforcement activities (e.g. improved patrolling and boosting community conservation efforts).	x				Biodiversity and Ecosystem Services Action Plan						

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
					<p>Measures to reduce human pressures and increase resilience of the MFPA: through enhanced park protection and community-based management. This will also include measures to protect and maintain connectivity of the savanna corridor outside the MFNP and including Bugungu Wildlife Reserve: manage in-migration impacts to savanna habitat and associated species by addressing threats and maintaining connectivity within and around Bugungu Wildlife Reserve. the following will be considered (Subject to feasibility study) :</p> <p>1) In-kind Support to UWA for:</p> <ul style="list-style-type: none"> - equipment needed to enhance its ability to protect the MFPA; - Recruitment, training and deployment of a rapid reaction team (RRT) for MFPA; - Training in community conservation; and - Strategic and tactical support to UWA including training, capacity building and independent data management, analysis and reporting. <p>2) Community-based interventions including:</p> <ul style="list-style-type: none"> - Establishing community governance structures such as Village Saving and Loans Associations (VSLAs) and Community Land Associations (CLAs) assisting local communities to establish and develop PES or micro-credit schemes or animal husbandry and, where appropriate, to promote alternative wildlife-friendly enterprises - Recruitment and training of village wildlife scouts to empower and involve communities in park management; - Promotion of alternative fuel use and clean cookstoves to reduce level of fuelwood harvesting; - Identify areas with high incidence of human-wildlife carnivore conflict and assess means to address this, for example community-based insurance schemes linked to land-use planning; and - Assist local communities to establish and develop simple wildlife-friendly management plans. 	x			<p>in population</p> <ul style="list-style-type: none"> - Chimpanzees: Stable or greater population number and area of occupancy within the Bugoma-Budongo corridor and Budongo FR - Uganda kob, Lelwel Hartebeest, Giraffe: Stable or greater population number and area of occupancy - Elephants: Similar ranging patterns as per current baseline, stable or greater population number and area of occupancy within MFPA - Incidences of human-wildlife conflicts - Threat-focused indicators to be developed in BSAP for Hyena, Reedbuck, some birds (for which there is limited baseline data) 			
					<p>Actions to manage and restore wetlands along the southern shore of the Albert Delta Ramsar site: manage anticipated impacts of in-migration on wetland habitat, fisheries and associated biodiversity around the Albert Delta Ramsar site through community-based management. the following will be considered (Subject to feasibility study):</p> <ul style="list-style-type: none"> - Organisation/establishment of wetland user groups/management committees; - Developing agreed community management rules and regulation approaches; - Environmental awareness raising in local communities; - Establishing nurseries for revegetation of papyrus (and/or applying ecological engineering approaches to restoration); - Participatory monitoring and evaluation of wetland areas and resources; and - Micro-credit schemes to support livelihood diversification. 	x			<p><i>Monitoring mechanisms and KPIs defined under Terrestrial ESMP are also relevant.</i></p>			
<p>* Showing the most significant one before additional mitigation is implemented; working towards No Net Loss/Net Gain</p> <p>Some aspects presented under "Unplanned events" have not been repeated here however are relevant to mitigating impacts on terrestrial wildlife</p>												
AQUATIC LIFE												
x	x			Land acquisition and site clearance, new roads	Aquatic habitat or ecosystem loss, direct loss of species	All site clearance activities will be undertaken in line with the Site Clearance Plan which will be developed by the Contractor(s) prior to commencing the Site Preparation and Enabling Works Phase to limit extent of vegetation clearance, wherever possible		x	Site Clearance Plan	Monitoring Mechanisms: The ECO will be present	Project Proponents and Project contractors	Low Adverse (direct impact on species and habitats)

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
					Provision will be made for - the recruitment of Ecological Compliance Officers (ECOs); and - the training and capacity building of the ECOs.	x		Labour Management Plan	on site during the site Preparation and Enabling Works and Construction and Pre-Commissioning phases where site clearance and excavations are required (e.g. Construction of flow lines) to oversee the Works and ensure compliance	Relevant Government bodies who may conduct independent monitoring or review the data include: NEMA, UWA, WMD, District Environment Officer, NaFIRRI		
				Biodiversity codes of conduct for workers will be developed, which can be disseminated to economic dependents and others that may be able to enter Protected Areas. This may require punitive measures if not complied with	x	x						
				Workers will be prohibited from collecting shells, timber, firewood, fibres and other plant based resources. Fishing by workers will not be permitted. Ensure control at the camps and work sites	x	x						
				Specific awareness training for Project staff/ contractors about roles of wildlife species in the ecosystem and impacts will be provided ***	x	x						
				The detailed Site Restoration Plan will be implemented and at each site this will be monitored for success of vegetation establishment (i.e. where plants do not take successfully), erosion issues and presence of invasive species to ensure that all sites are effectively restored. Where such problems are encountered, further planting, site re-profiling and other remedial measures will be taken to ensure that site restoration is completed satisfactorily to the agreed standard or coverage and plant composition, which should match reasonably the sounding vegetation by the end of the restoration process	x	x	Site Restoration Plan	- Compliance and site clearance activities monitoring (continuous presence on site during clearance) - Site restoration monitoring (monthly follow-up, monitoring may be adjusted based on site specifics)				
				The temporary land required for the HDD Construction Areas roads will be restored following construction in line with the Site Restoration Plan as developed by the Contractor	x	x						
				At the end of the Construction and Pre-Commissioning Phase the C1 road will be restored in accordance with a Site Restoration Plan by the Contractor		x						
				Materials used in restoration will be locally sourced, where possible (i.e. materials used in the MFNP should be from other sites within the MFNP, where practicable), but away from sensitive biodiversity areas. Plants will be transplanted from nurseries to the site being restored (or from adjacent areas, as appropriate)	x	x	Wetland Management Plan	- Restoration follow-up: - Percentage of areas no longer used by the Project that have been restored - Level of success of restored sites in comparison with pre-project conditions (incl. drainage) - Areas of wetlands rehabilitated - Number of wetlands indirectly impacted by project activities - Number of non-compliances during site clearance activities - Number of incidents or grievances (received / addressed) related to				
				Depending on the final land use agreed with the Ugandan authorities, all or part of the site may need to be rehabilitated. In such circumstances, the Project Proponents will also develop a monitoring programme for completion criteria to verify that the sites are being returned to the agreed representative state.	x	x						
				A pilot scheme for wetland restoration will be linked to the Restoration Plan - developed in partnership with WMD and DWRM	x							
				A Wetland Management Plan will be established to ensure no disruption to wetland areas. The main measures will comprise avoiding and minimising impacts on wetlands and restricted exclusion zones	x	x						
				Pre-construction surveys will be performed to confirm the extent and state of identified wetlands	x							
				Construction activities within 200 m for lake (Lake Albert) and 100 m for a river (River Nile) will be avoided as far as practicable. Should they be unavoidable, a permit for use of river banks and lake shores will be applied for activities within those zones (for Water Abstraction System, HDD crossing, Nile River Ferry Crossing)	x	x						
				Construction of facilities in a floodplain will be avoided as much as possible. Where unavoidable, appropriate mitigation measure shall be developed to minimise adverse impacts	x	x						

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						Any work in watercourses and wetlands will be avoided as far as is practicable in periods of heavy rainfall.	x	x		site clearance and restoration		
						Buffer zones will be established to protect watercourses and habitats	x	x				
						A Biodiversity and Ecosystem Services Management Plan (BMP) will be developed, ensuring that impacts of site clearance on plant species of conservation concern will be minimised	x	x	Biodiversity and Ecosystem Services Management Plan			
						The footprint of the HDD will be minimised to avoid unnecessary loss of wetland/riparian habitat		x	Biodiversity and Ecosystem Services Action Plan			
						Decommissioning activities will be confined within the Project footprint as much as practicable	x	x	Physical Environment Monitoring Plan			
x	x	x	x	Movement of vehicles, heavy machinery and equipment, Earthworks and site clearance, maintaining pipeline RoW, Storage of equipment and materials, Water abstraction, Drainage, Sewage Discharge	Aquatic habitat degradation (e.g. due to erosion, dust, compaction, drainage, water use, effluents discharge)	During site clearance, vegetation stripping will be undertaken using a phased approach to minimise sediment pollution from runoff		x	Surface Run Off and Drainage Management Plan	<p>Monitoring Mechanisms:</p> <ul style="list-style-type: none"> - An Environmental Monitoring Programme will be established. This will include comprehensive monitoring associated with water, noise, air quality, etc. - Water quality and quantity monitoring (Flow meters will be installed on all boreholes to measure flow, water level and allow for sampling to define biological, physical and chemical parameters) - Sewage discharge quantity and quality monitoring (A flow meter will be integrated at the discharge point of 	Project Proponents and Project contractors	Low Adverse (direct impact on species and habitats)
					The topsoils will be removed to a required depth; material will be temporarily stored areas within designated areas		x					
					It is planned to reuse removed soil onsite wherever possible. Through detailed design, the Project will ensure the generation of excess material is minimised as far as practicable and reused, wherever possible	x	x					
					Engineer slopes and drainage to minimise erosion and slope failure		x					
					Changes in natural gradients due to construction activities should be avoided where possible and minimised where unavoidable		x					
					Incorporate erosion protection measures through reuse of cleared material, scours checks, silt traps lining of drains and stepped drains in areas of steep gradient, vegetation cover, and slope protection		x					
					Maintain a buffer of vegetation around the site (particularly in the lower lying areas) to prevent any eroded soil from leaving the site and being deposited in downstream water sources		x					
					Use perimeter drainage ditches and design for storm conditions		x					
					Where required, settlement areas and silt traps will be provided downstream of the construction areas to remove or filter out sediment originating from access tracks or construction site drainage and protect water courses, wetlands, drainages and riparian areas. The most appropriate sedimentation and siltation control measures will be designed prior to excavation during the construction period, and will be dependent on site-specific characteristics		x					

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
					<p>With the exception of the CPF which has a bespoke drainage arrangement, drainage arrangements for the permanent facilities will be as follows:</p> <ul style="list-style-type: none"> • Potentially contaminated areas (i.e. fuel and chemical storage areas) will be provided with local effluent collection (sumps, kerbing and bunding) whereby the potentially contaminated water will be collected and removed by road tanker to a licenced waste disposal facility; and • Uncontaminated areas which will drain naturally to the environment via Sustainable Drainage System (SuDS) comprising filter drains and soakaways. The SuDS design is subject to further detailed design. Sampling points will be established for all potentially contaminated areas to enable samples to be collected for analysis 	x	x		<p>the WWTPs to record to all discharges and a sample point will be established to collect spot samples for analysis)</p> <ul style="list-style-type: none"> - Weekly site inspections, audits (as per annual audit plan), including of machinery and chemical storage tanks to identify early signs of failure; checks around the construction areas for signs of erosion, blocked water courses, and localised flood. If encountered, undertake corrective measures <p>Key Performance Indicators:</p> <ul style="list-style-type: none"> - Quality of physical environment parameters (e.g. water, soil) with comparison to pre-project conditions - Results of discharge water quality monitoring - Results of sewage discharge monitoring, waste transfer notes - Chemicals inventory - Number of spill and emergency response exercises 			
				The drainage arrangement of the CPF will be designed to segregate clean and potentially contaminated effluent streams.	x	x						
				(Site preparation and Enabling Works, Construction and Pre-Commissioning): Surface water will be managed via temporary sustainable drainage systems (SuDS) to manage flood and contamination risk. The requirements for construction SuDS will be adapted depending on the nature of the activities		x						
				Ditch plugs will be installed on all trenches to prevent the pooling of water in the trenches		x						
				Drainage channels will be installed along the edges of the upgraded roads to prevent excessive runoff and cross drainage culverts will be installed, where appropriate. All drainage infrastructure will be designed taking into account the Uganda Ministry of Works and Transport - Road and Bridge Works Design Manual for Drainage (January 2010) (Ref. 4.2)		x						
				All dewatering from excavations or isolated work areas will be provided with appropriate level of treatment prior to discharge		x						
				(Site preparation and Enabling Works, Construction and Pre-Commissioning): Clean surface water will be diverted away from exposed soils with use of diversion drains and bunds		x						
				Further mitigation for the pipeline across the seasonal river between JBR-09 and JBR-08 will be considered. This is a deep gully and bridging may be required		x						
				During the Decommissioning Phase the following assumptions are applicable regarding supporting facilities: <ul style="list-style-type: none"> • Water will be supplied from dedicated abstraction boreholes; • Localised effluent collection facilities will be provided for chemical storage, hazardous materials storage, liquid waste storage, tanks, and fuelling facilities. Such containment will include impermeable areas, kerbing, bunding and drip trays as appropriate; • Drainage systems will remain until sites are free of contamination. SuDS will also manage flood risk during this phase of work; 	x	x						
				Care will be taken not to cause compaction of ground near wetlands resulting in hydrological or hydrogeological changes that may affect those habitats		x	Water Management Plan					
				For sections of pipelines that cross seasonal wetlands/rivers, pipeline construction works will take place in the dry season where possible. This is to prevent disruption of surface water / shallow groundwater flow thus affecting habitats as well as disturbing the animals relying on those wetlands		x	Wetland Management Plan					

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						For areas of the Project that cross seasonal wetlands/rivers decommissioning works will take place in the dry season where possible. Where not possible, additional mitigation measures will need to be defined		x		transportation/handling of chemicals or waste - Number of incidents or grievances (received / addressed) related to surface run off or waste management		
						Abstraction and discharge permits will be obtained, as required	x					
						Ensuring compliance to the abstraction and discharge limits permitted	x	x				
						The installation of boreholes across the Project Area is subject to the outcome of the Water Abstraction Feasibility Study currently being undertaken by the Project Proponents	x					
						Implementation of a Dust Control Plan, which will include: measures to include the application of dust suppressants (including water), on potentially dust generating sources, including on site and off site roads used by Project vehicles and material stockpiles.	x	x	Dust Control Plan			
						For work activities located close to dust sensitive receptors, mitigations will be considered to minimize the dust emissions. A range of specific dust suppression measures shall be implemented to minimise potential impacts. Such measures shall be implemented on a case by case basis and may include the use screens, covers and/or barriers.	x	x				
						Sewage produced from the camps and other Project Areas will be treated at the WWTPs located at the camps in compliance with regulatory requirements. Wastewater from the well pads will be collected and transferred by tanker to the nearest WWTPs	x	x	Waste Management Plan			
						The existing camps have operating Waste Water Treatment Plants (WWTPs). Sewage produced from the camps will be treated at the WWTPs in compliance with regulatory requirements (refer to Chapter 10: Surface Water). Sewage from other Project Areas (e.g. road work sites) will be collected and transferred to WWTPs and/or suitably licensed treatment facilities for processing and disposal. All sewage sludge will be removed periodically from WWTPs and transferred off site for disposal	x	x				
						For the Masindi Vehicle Check Point, sewage will either be treated by a wastewater treatment plant on site and discharged in accordance with the wastewater treatment standards or transferred to the Masindi sewage treatment plant for processing (depending on capacity and approval)	x	x				
						For the well pads, Victoria Nile Ferry Crossing Facility and the Lake Water Abstraction System, sewage will be collected and transferred to suitably licensed treatment facilities for processing and disposal	x	x				
						During the Decommissioning Phase the following assumptions are applicable regarding supporting facilities • Sewage will be treated by existing wastewater treatment plants (WWTPs) and discharged in accordance with wastewater treatment standards as presented in Chapter 10: Surface Water or collected and transferred to suitably licensed treatment facilities for processing and disposal;	x	x				
						Plan site layouts so storage and refuelling areas are located away from the nearest ground and surface water receptors, as far as is practicable	x	x	Spill Prevention Plan			
x	x	x	x	Accidental release (i.e. spillage and leakage) of chemicals, fuels or wastes	Habitat degradation, direct loss of species	All fuels and hazardous materials will be stored within appropriate bunds and drip trays, providing appropriate containment, where practicable	x	x	Oil Spill Contingency Plan			
						Chemicals and hazardous liquids will be supplied in dedicated tote tanks made of sufficiently robust construction to prevent leaks/spills. Dedicated procedures will be developed for fuel and hazardous material transfers and personnel will be trained to respond. Spill kits will be available at all storage locations	x	x	Chemical Management Plan			

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning	Company				Contractor					
						Main refuelling facilities will be located within the Industrial Area, the camps and the Masindi Vehicle Check Point. Facilities will be located within bunded areas with appropriate capacity (110% tank containment). The refuelling pumps will be equipped with automatic shut off and there will be dedicated procedures and spill kits available. Bunds will be designed to minimise ingress of surface water, facilities roofed where practicable and any contaminated water collected will be trucked off site for disposal	x	x					
						Contaminated run off will be minimised by ensuring adequate storage facilities are in place for materials stockpiles, waste, fuels/chemicals/hazardous materials, vehicles/washing areas, parking facilities		x					
						The pipelines will comprise carbon steel with adequate corrosion allowance built into material specifications (wall thickness) to prevent leaks.		x					
						An Oil Spill Contingency Plan to be established. This will define notification procedure, response strategy, means, and post-spill actions such as clean-up, monitoring, etc. in the event of uncontrolled/accidental discharge	x	x					
						Develop and implement a Spill Prevention Plan, incorporating secondary containment as far as practicable for liquids contained on site	x	x					
						Ensure spill response equipment (including sampling and personal protective equipment) is readily available on site to contain and clean any spillages as soon as reasonably practicable after the event	x	x					
						For any chemical usage [with respect to pre-commissioning], a thorough Chemical Risk Assessment will be undertaken and lowest toxicity chemicals will be used wherever possible	x	x					
						Non-toxic paints will be used to treat the pipeline to minimise any impacts on the aquatic environment as much as practicable	x						
						The chemicals used for polymer injection will be subject to detailed environmental risk assessment prior to use taking into account all chemical /biological properties and the specific requirements for early oil recovery use	x	x					
						Synthetic Based Muds will be transferred from the Liquid Mud Plant to the well pads via truck in dedicated sealed containers to reduce the risk of spillage during storage, handling and transportation operations		x					
						The Production and Injection Network outside the Industrial Area will be buried at least 0.8m below the ground surface; markers will be used to denote the location (including the water abstraction pipeline in Lake Albert)		x					
						Any residues and wastes generated from pre-commissioning activities will be managed in accordance with the site Waste Management Plan		x					
						A Waste Management Plan will be developed and maintained to cover the duration of the Project; and will address the anticipated waste streams, likely quantities and any special handling requirements. The Project Proponent's will implement a waste tracking system to ensure traceability of all wastes removed off site.	x	x					
						All drill cuttings from borehole drilling activities will be collected and disposed of appropriately. Disposal methods will be pre-agreed with NEMA prior to commencement of activities		x					
						Disposal of drill cuttings will be in accordance with Ugandan Legislation and IFC Environmental Health and Safety (EHS)		x					
						Spent muds will be temporary stored in containers prior to removal by a vacuum truck, waste cuttings will be collected via augers to the Roll-on Roll-off (Ro-Ro) skips (or equivalent) and transferred off the well pad for treatment and disposal		x					

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						Pre-commissioning water (used for pipeline cleaning and hydrostatic tests) will be reused wherever practicable on multiple pipelines. The base case for management of hydrostatic test water is for the treated water to be left in situ until start up. Final disposal will be determined and selected depending on water quality and available discharge options. The base case for ESIA is that water left in the pipeline from hydrotesting will be disposed via the Produced Water Treatment Train and transferred back via the Production and Injection Network to the well pads for re-injection, subject to further technical assessment		x				
						For the Masindi Vehicle Check Point, waste will be collected and transferred to an approved waste treatment facility for recycling, treatment, recovery and/or disposal						
						During the Commissioning and Operations Phase waste will be stored and processed at the Integrated Waste Management Area located south of Victoria Nile. There will be no waste management facility located north of the Victoria Nile within the MFNP						
						[Decommissioning of Masindi Vehicle Check Point] All wastes will be removed and disposed of at dedicated waste treatment facilities in accordance with the Waste Management Plan. A detailed Decommissioning Plan will be developed for the works during the Site Preparation and Enabling Works Phase of the Project	x	x				
						Commissioning tests will be undertaken using feedstock oil, natural gas, methanol and chemicals. All commissioning fluids will be managed either at CPF or transferred off site for disposal						
						During the Decommissioning Phase the following assumptions are applicable regarding supporting facilities <ul style="list-style-type: none"> No discharge of water used for decommissioning activities will be discharged to the environment; Waste will be segregated and managed in accordance with a Waste Management Plan. 	x	x				
x	x			Site clearance, construction works, human presence, Traffic,	Species disturbance (including through barrier effect)	Lighting will be reduced to the minimum without impacting safety and security. Where feasible, the light will be directed inwards the facilities and will be of a warm / neutral colour so as to limit nuisance to the surrounding communities and to avoid attracting animals.	x	x	Physical Environment Monitoring Plan	<p>Monitoring Mechanisms:</p> <p>The ECO will be present on site during the site Preparation and Enabling Works and Construction and Pre-Commissioning phases where site clearance and excavations are required (e.g. Construction of flow lines) to oversee the Works and ensure compliance</p> <p>- Annual EMS review</p> <p>Species monitoring:</p> <p>- Threat-focused</p>	<p>Project Proponents and Project contractors</p> <p>Relevant Government bodies who may conduct independent monitoring or review the data include: NEMA, UWA, WMD, District Environment Officer, NaFIRRI, PAU</p>	<p>Low Adverse (direct impact on species and habitats)</p>
					For work activities located close to noise sensitive receptors, a range of specific noise mitigation measures shall be implemented to minimise impacts. Such measures shall be implemented on a case by case basis and may include the use of temporary abatement such as dampening and shielding techniques, noise barriers, and mufflers. Specific noise regulations and thresholds will be specified in the Noise and Vibration Management Plan	x	x	Noise and Vibration Management Plan				
					Where possible, selection of low-noise rated machinery and generators				x			
					Piling and other activities generating noise and vibration will be 'ramped up' (slow started) to allow wildlife to move away in good time				x			

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
					Where practicable, construction in and around watercourses and waterbodies will not be undertaken at night. This will minimise the disturbance of hunting crocodiles			x		indicators to be developed in BSAP (in consideration of limited baseline data on aquatic species) Key Performance Indicators: Likely to consider (will be detailed in the Biodiversity and Ecosystem Services Action Plan) : - Change in animal population (priority biodiversity) - Change in extent and state of the habitats - Changes in animal behaviour (priority biodiversity) - Ecosystem services quality and quantity <i>Adaptive management will be implemented in which the implementation of defined mitigation and management measures will be responsive to changing conditions</i>		
					A Biodiversity and Ecosystem Services Management Plan (BMP) will be developed which will define how impacts of site clearance on animal species of conservation concern will be minimised. This will include maps showing locations of sensitive habitats and seasonal wetlands known to be preferred habitat of those species. The BMP will also indicate routes of large mammal movements if known (can be determined from presence of tracks) as well as other sensitive features such as kob leks	x			Biodiversity and Ecosystem Services Management Plan			
					Where feasible, activities scheduling for construction activities should consider avoiding disturbance within Ramsar site during migratory bird season [October to March approximately]			x	Biodiversity and Ecosystem Services Action Plan			
					Site preparation, construction and decommissioning works affecting wetland and seasonally inundated grassland habitat will be scheduled (as much as possible) to occur as far as practicable outside the November window when shoebill is most likely to be breeding (incubation phase)	x		x				
					The ferry will operate for 8 hours a day and will be dedicated to Project use only. There will be no ferry movements during night time hours except in exceptional circumstances and with internal derogation**	x						
					*** Mitigation similar to the one above apply				Road Safety and Transport Management Plan Journey Management Plan			
				Lake Water Abstraction	Loss of species (impingement)	A screen with a mesh size of 2mm will be used to reduce/prevent entrainment of aquatic species at the abstraction point in Lake Albert			x	Monitoring Mechanisms: Testing and Monitoring of the water intake will take place during pre-commissioning to ensure that intake velocities and activities at the Water Abstraction System (WAS) are not having a detrimental impact on fish. Any impingement or issues discovered will be addressed accordingly and appropriately prior to start-up of abstraction.		
					Based on UK guidance the intake velocity should not exceed 75cms-1 for larger fish species and where possible should be lower than this to reduce impingement of smaller fish (Ref 15.43). At present based on the proposed pipe size and abstraction rate, the estimated escape velocity is 49cms-1			x	Physical Environment Monitoring Plan			

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
x	x	x	x	Use of construction equipment and power generation equipment, traffic, import of material (incl. construction materials) may lead to the accidental introduction of alien / invasive species	Habitat or ecosystem loss, direct loss of species	A risk-based Alien/Invasive Species Management Plan will be developed and implemented	x	x	Alien/Invasive Species Management Plan Landscape Management Plan	<p>Key Performance Indicators:</p> <ul style="list-style-type: none"> - Testing and monitoring records <p>Monitoring Mechanisms:</p> <ul style="list-style-type: none"> - Site restoration monitoring - Weekly site inspections <p>Key Performance Indicators:</p> <ul style="list-style-type: none"> - Changes in the extent and density of previously existing alien/invasive species populations - Occurrence of alien/invasive species attributed to the Project; - Occurrences of newly introduced alien/invasive species - Unexpected changes in alien/invasive species control activity, e.g., off-target damage, invasion by other species - Undesirable changes in the condition and extent of native vegetation that may be attributed to invasive 	Project Proponents and Project Contractors Relevant Government bodies who may conduct independent monitoring or review the data include: UWA, NaFIRRI	
x	x			PAPs resettlement in relation to land acquisition	Habitat or ecosystem loss, direct loss of species	Resettlement Action Plans will include livelihood restoration and will also provide alternative livelihoods/ income diversification programmes to ease dependence on natural resources or protected areas as a source of livelihood	x		Resettlement Action Plan	Rf. To ESMP associated with RAP in section Social		Moderate Adverse (indirect impact - all species but Barbys huloti, Murchison Falls-Albert Delta Wetland System Ramsar Site and Lake Albert Habitats)
x	x	x	x	Influx contributing to population growth (indirect impact) may increase pressure on habitats and species	Habitat or ecosystem loss, fragmentation; direct loss of plant species	Measures to minimise human-wildlife conflict will be implemented. This will include provision of livestock management training, fencing (where appropriate) and other initiatives The Community Content, Economic development and Livelihood Plan will consider measures, following feasibility studies, aimed at mitigating impact of population growth such as increased demand for fibres, increased pressure on fisheries resources including looking at ways of providing a registration scheme for the fishing industry	x	x	Biodiversity and Ecosystem Services Action Plan Community Environmental Conservation Plan	<p>Monitoring Mechanisms:</p> <p>Specific monitoring & evaluation framework to measure project-induced in-migration trends, hotspots extent rates and key impacts to</p>	Project proponents Strategic collaboration platforms will be established with local and regional authorities, UWA,	

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
					<p>The Community Environmental Conservation Plan will consider (but not be limited to) community based programmes, following feasibility studies, for extension of tree nurseries, promotion of alternative fuel use, fisheries management and monitoring programme that will entail engagement of communities through BMUs in fisheries management</p> <p>Once operational, there will be restricted access either side of the intake pipeline location in Lake Albert</p> <p>The Influx Management Strategy will also consider potential impacts of increased pressure on natural resources due to population growth including looking at ways to provide alternative sources of fuel, building materials, farming land and food (particularly protein)</p> <p>The in-migration risk assessment will be regularly updated based on monitoring data to assess which protected areas, species and habitats are most at risk of indirect impacts, both imminently and in the foreseeable future</p> <p>Project Recruitment Centres locations should be defined in consideration of potential impacts it may generate on protected areas and unprotected forest areas</p>	x			<p>be proposed as part of Influx Management Strategy</p> <p>Regular monitoring of the extent and impacts of in-migration, generally on natural resources, will be carried out as part of the Biodiversity Monitoring and Evaluation Plan, including regular acquisition and analysis of satellite imagery to assess landuse/landcover changes. Data to be acquired annually until the end of construction.</p> <p>At least annual joint meeting with local and regional authorities and other stakeholders to regularly evaluate the extent of indirect effects and adapt the mitigation accordingly.</p> <p>Key Performance Indicators:</p> <ul style="list-style-type: none"> - Number of meetings held on indirect effects monitoring with local and regional authorities - Changes in land-use - KPIs related to species populations and habitats, as defined in the Biodiversity and Ecosystem Services Action Plan 	<p>NFA development and conservation NGOs and other stakeholders as appropriate to regularly evaluate and review the extent of indirect effects, share understanding of causes and identify adapted or additional mitigation requirements</p> <p>Relevant Government agencies who may conduct independent monitoring or review the data include: District Physical Planning Department, Ministry of Lands, Housing and Urban Planning, Ministry of Internal Affairs</p>		
					x		HSE Management System					
					x		Influx Management Strategy					
					x	x						
				<p>The Project Proponents will provide support to the Ministry of Lands Housing and Urban Development and Buliisa District Government to develop a District Land Use Plan through financing of a study that can be used as basis of such planning. The study will consider existing land use and land tenure, trends in land use, and future land use requirements including for Project infrastructure and for any mitigations required to off-set Project impacts, e.g. relocation land and land for biodiversity offsetting. The study will also identify areas that will benefit from improved accessibility across Buliisa District</p>	x							
x	x	x	x	Additional mitigation - working towards Net Gain	A Biodiversity (and Ecosystem Services) Action Plan (BAP) will be developed in line with relevant IFC Performance Standards, and will include key mitigation actions aiming at achieving No Net Loss/Net Gain to biodiversity	x		Biodiversity and Ecosystem Services Action Plan	<p>Monitoring Mechanisms:</p> <ul style="list-style-type: none"> - As defined above 	Project Proponents	No Net Loss / Net Gain	

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						Actions to manage and restore wetlands along the southern shore of the Albert Delta Ramsar site: manage anticipated impacts of in-migration on wetland habitat, fisheries and associated biodiversity around the Albert Delta Ramsar site through community-based management. the following will be considered (Subject to feasibility study): - Organisation/establishment of wetland user groups/management committees; - Developing agreed community management rules and regulation approaches; - Environmental awareness raising in local communities; - Establishing nurseries for revegetation of papyrus (and/or applying ecological engineering approaches to restoration); - Participatory monitoring and evaluation of wetland areas and resources; and - Micro-credit schemes to support livelihood diversification.	x			(Species monitoring) - Monitoring of the progress in the implementation (will be defined in the program implementation schedule) - this will consider both internal and external monitoring to obtain an independent assessment of the No Net Loss / Net Gain progress and achievements. - Annual EMS review Key Performance Indicators: - Progress of programs implementation - Sustainable fishing practices have been implemented and reduced threats from overfishing to current baseline levels <i>Monitoring mechanisms and KPIs defined under Terrestrial ESMP are also relevant.</i>	Relevant Government bodies who may conduct independent monitoring or review the data include: NEMA, UWA, WMD, NaFIRRI	
* Showing the most significant one before additional mitigation is implemented; working towards No Net Loss/Net Gain Some aspects presented under "Unplanned events" have not been repeated here however are relevant to mitigating impacts on aquatic life												
SOCIAL												
x				Land acquisition and PAs resettlement, land access	Physical Displacement of Communities due to Land Acquisition for the Project Economic Displacement of Communities due to Land Acquisition for the Project	The LARF will be implemented prior to the start of the Project and 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, and livelihood restoration Development of further RAPs and LRPs consistent with the goals, objectives, principles and processes described in the LARF and continuously drawing on lessons learned from RAP1. Resettlement planning and implementation will, as far as possible, be undertaken in one go for a defined geographic area/ footprint to minimise disturbance for communities from resettlement activities and to minimise the risk of double displacement Avoiding forced eviction Temporary land access will be managed in compliance with the requirements specified in the Project Proponents procedure	x		Resettlement Action Plan	Monitoring Mechanisms: The internal monitoring has the objective of informing the Project Management Team of the progress in the implementation of the RAP to identify corrective actions, modify procedures and additional resources. It comprises monitoring	Project Proponents Relevant Government bodies who may conduct independent monitoring or review the data include: PAU, MEMD, NEMA, MLHUD	Low Adverse Moderate Adverse
x			x				x	x	Temporary Land Access procedure			

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
				Changes to Traditional Land Tenure System (individualisation of land) exacerbated by Project Resettlement Process	<p>The RAPs will adequately cater for the respective interests of the PAPs in accordance with criteria for eligibility and the PAPs choice of type of compensation (cash or in-kind) by ensuring that the process:</p> <ul style="list-style-type: none"> - Provided compensation for loss of assets at replacement cost; - Ensures appropriate disclosure of information, consultation, and informed participation of those affected. - Improves livelihoods or at least restores the livelihoods and standards of living of displaced persons which choose to remain within the project area of influence; and - Improves living conditions among displaced persons which have chosen in-kind compensation through provision of adequate housing with security of tenure at resettlement sites. 	x		Resettlement Action Plan	<p>the day-to-day resettlement activities and tracking the progress in meeting predicted or scheduled resettlement milestones. It will be conducted monthly initially.</p> <p>The external monitoring will be undertaken to obtain an independent assessment of the effectiveness of the RAP implementation. It will be undertaken annually at a minimum.</p> <p>Upon conclusion of the resettlement, a Completion Audit is to be prepared by an external specialist. The overall aim of the audit will be to verify that resettlement and livelihood restoration activities have been undertaken in line with the requirements of the RAP, the LARF and IFC PS 5.</p>	The Project Proponents will be involved as observers of any monitoring and evaluation bodies (e.g. committee) and/or review the monitoring and evaluation documentation of resettlement activities undertaken by UNRA and UETCL in addition to resettlement undertaken for direct Project components.	Moderate Adverse	
x					<p>The orphaned land will be acquired by the project on a case by case basis.</p>	x						
					<p>In compliance with the LARF, support will be provided through the Livelihood Restoration Plans to re-establish community support groups and livelihood groups. Project Proponents will in consultation with local communities, government and civil society, consider investments to restore and improve existing economic activities such as fishing, crop farming, livestock farming, and trade, as well as programmes that support economic diversification for project affected persons. These programmes will be aligned with the strategic objectives outlined within the Project National and Community Content Programme and will as far as possible consider how project affected persons can be involved in Project employment opportunities (direct and indirect) and how skills learned on the Project can be applied to other sectors in the local area. Specific training and job readiness support programmes that will be considered will include (but are not limited to):- Adult Literacy and Numeracy (including Financial literacy) - Business management training and links to microfinance;- Vocational training and linkage to employment;- Food security and agriculture programs (irrigation, crops, vegetables, trees, honey, livestock, fishing); - Improve management of natural resources and access to energy- Improve access to health, water and sanitation- Social assistance for vulnerable groups</p>	x						
				Increased Impoverishment due to Land Speculation, Indebtedness, lack of Financial Literacy and Misuse of Compensation Payments	<p>Increased travel distance to public social services and infrastructure for displaced persons</p>			Resettlement Action Plan	<p>Key Performance Indicators: The full monitoring and evaluation framework is defined in the RAP1 report. Performance monitoring will be organised around sets of indicators related to:</p> <ul style="list-style-type: none"> - Programme management - Stakeholder Engagement - Concerns and Grievance Mechanism - Eligibility & Compensation (Physical 		Low Adverse	
					<p>Displacement of Public Infrastructure due to Land Acquisition</p>							
					<p>PAPs will be encouraged to take in-kind compensation as far as possible. The RAPs will have plans for support to PAPs in the relocation and resettlement process for eligible PAPs who choose in-kind compensation (...)</p>	x						
					<p>Inclusive training in basic financial literacy will be provided to PAPs (men and women) who have opted for cash compensation including advice and assistance on how to open bank accounts, especially for savings. The aim is to minimise the risk of misuse of the compensation package. (...)</p>	x						
				Displacement of Public Infrastructure due to Land Acquisition	<p>Payment of compensation will be made at the household level (to husband and wife), and at the family or clan level where appropriate (through nominated representatives). Costs associated with opening bank accounts and bank charges incurred in the first six months after opening the account will be paid for those who choose cash compensation and are paid through the banking system (to avoid liquid cash injection and security issues). (...)</p>	x		Resettlement Action Plan				
x			x		<p>Where replacement land has been identified, a suitability assessment will be undertaken to confirm the suitability of the sites in terms of legal due diligence, ground suitability, agricultural potential, water supply, access to public facilities, safety and distance from existing community and social network. (...)</p>	x						

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
x						Coordination with other developers: - Project will propose to the RAC Chairperson (MEMD) to invite UNRA and Uganda Electricity Transmission Company Limited (UETCL) to participate in the RAC; - Coordination meetings will be held with UNRA and UETCL to advise on best practice approach for resettlement and to continue to share lessons learned from Project experience; and - UNRA and UETCL will be invited to consult with the Project before implementing resettlement to check that any proposed relocation sites do not fall within the Project footprint.	x			Resettlement) - Eligibility & Compensation (Economic Resettlement) - Asset Replacement - Cultural Assets - Vulnerable Groups - Livelihood Restoration		Low Adverse
						Wherever possible, material for the Project will be sourced from existing borrows pits, to minimise the need for land acquisition		x	Community Impact Management Strategy			Low Adverse
x						If there are proposed changes to locations, alignment, working areas or footprint of Project components, the Avoidance Protocol, including site selection survey and mapping, will be carried out before determining the configuration of these components	x	x				
				Improved road network	Improved accessibility within the Project Area due to upgrading of access roads and construction of new roads	The Project Proponents will provide support to the MLHUD and Buliisa District Government to develop a District Land use Plan through financing of a study that can be used as basis of such planning. (...)	x		Community Content, Economic Development and Livelihood Plan (CCEDLP)			Moderate beneficial
x	x		x	Traffic, roads construction and upgrade, access restrictions due to land acquisition	Disruption to road users	There will be no permanent access restrictions to the pipeline RoW	x		Community Content, Economic Development and Livelihood Plan (CCEDLP)	Monitoring Mechanisms: Influx/Community impact Specific monitoring & evaluation framework to measure project-induced in-migration trends, hotspots extent rates and key impacts to be proposed as part of Influx Management Strategy - this will include: - Analysis of aerial / satellite imagery of the local settlements in order to assess their expansion. Data to be acquired annually until the end of construction	Influx: Project Proponents Strategic collaboration platforms will be established with local and regional authorities and other stakeholders as appropriate to regularly evaluate and review the extent of indirect effects, share understanding of causes and identify adapted or additional mitigation requirements	Low Adverse
						During construction and hydrotesting activities, there will be access restrictions to the RoW for safety reasons. Once complete there will be no restrictions to the public using the area	x	x	Community Health, Sanitation, Safety & Security Plan			
						The length of open trenching at any given time will be approximately 1 km to allow wildlife and the local community safe passage		x				
						For the upgraded roads, it will be necessary to cordon off the road (while retaining pedestrian access, where practicable) before widening the road		x				
						The use of animal crossing structures such as bridges, culverts, and over crossings, along pipeline and access road RoW will be installed where necessary. At special points such as crossings, deep excavations and tie-in bell holes, safety fences will be installed to prevent human or animal ingress		x	HSE Management System			
x	x		x	Influx, Employment, improved road network	Increased Pressure on Education Facilities	Development of an Influx Management Strategy to mitigate in-migration impacts and maximise benefits for local communities. Implementation of the strategy will depend on joint coordination between the Project, government, other project developers, local communities and civil society.	x	x	Influx Management Strategy			Moderate Adverse
						Management of influx hotspots through support of public infrastructure. The Project Proponents will, in consultation with relevant stakeholders (local communities and government, donor agencies, NGOs...), evaluate the feasibility and consider investments to improve access to and capacity of public infrastructure to meet the increased demand particularly in influx hot spots for the following key services: health, water, sanitation, education, etc. (...)	x		Community Health, Sanitation, Safety & Security Plan	- Administering household survey for the purpose of analysing changing dynamics related to in-	Monitoring of in-migration impacts	

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
x	x			Land acquisition and PAPs resettlement, Influx (indirect), Employment	Social Disarticulation and Increased Community and Family Conflict - in relation to conflicts over land, competition over jobs and resources and increased disposable incomes	Where land is held collectively (as opposed to individual ownership of land), the RAPs will follow a process of identifying the affected groups and signing agreements with these groups (i.e. families and/ or clans) .	x	x	Resettlement Action Plan	migration in potential hotspots. The targeted settlements should include the identified in-migration hotspot and select one village that is not expected to experience in-migration as part of the survey to be a control group. - Administering semi-structured questionnaire designed to evaluate perceptions of migration patterns in the hotspot villages - Administering a semi-structured questionnaire to local and migrants specifically designed to monitor potential influx related conflict - Monitoring local prices through the review of the changing cost of a standardised basket of goods. Provision for monitoring of local inflation e.g. price index - Engagement with Masindi district local government and local police force to discuss requirements to monitor illegal buildings, settlements, trading activities, and illicit activities within the vicinity of the Masindi check point. Support will be provided to facilitate monitoring activities based on a MoU between these parties and may include, for example, provision of vehicles or equipment	will be done jointly between Project Proponents and local government Relevant Government agencies who may conduct independent monitoring or review the data include: District Physical Planning Department, Ministry of Lands, Housing and Urban Planning, Ministry of Internal Affairs NEMA, UWA, NFA, WMD, DWRM, Regulatory agencies responsible for infrastructure. Community Impacts: Project Proponents, Project contractors for implementation of the management plans Participatory approach to social impact management, monitoring and evaluation with communities and implementing institutions Relevant Government	Moderate Adverse
						Design of relocation sites and housing will take into consideration cultural preferences where technically feasible and in accordance with the entitlement matrix to ensure fair and adequate compensation. In compliance with the LARF, the RAPs will include special provisions for vulnerable groups.	x					
						Child and Gender Based Violence Prevention Programme: A suitable partner will be identified to deliver awareness training to prevent child and gender based violence. The training will focus on increasing sensitisation amongst local communities within the Project Area as well as in influx hotspots (focusing on women and children) on their legal rights to protection from violence and avenues through which incidents of violence can be reported; training of community leaders (political leaders, cultural institutions, religious leaders and local police) to address this issue with members of their communities; and targeted training of male employees and PAPs affected by resettlement against child and gender based violence (GBV). (...)	x		Community Health, Sanitation, Safety & Security Plan			
						The CCEDLP will include measures to mitigate impact of population growth and in particular increased pressure on farming areas, increased demand for crop products, increased pressure on grazing areas, increased demand for fibres and ornamental resources and rise in harvesting pressure, and increased pressure on fisheries resources due to population growth including looking at ways of providing a registration scheme for the fishing industry (e.g. so only local people are registered and can fish).	x		Community Content, Economic Development and Livelihood Plan (CCEDLP)			
						Specific measures to (...) deter influx around Masindi check point including: Operation of Masindi check point as a 'closed camp' following the same rules and procedures in place for other contractor accommodation camps	x	x	Labour Management Plan			
						Project Proponents will, in consultation with local communities, government and civil society, consider investments to extend livelihood programs (targeting PAPs only) to the wider project affected communities, in order to improve food security and economic resilience of affected communities, develop local capacities and enhance activities such as fishing, crop farming, livestock farming, and trade, as well as programmes that support economic diversification. (...)	x	x (vocational training and linkage to employment)	Community Content, Economic Development and Livelihood Plan (CCEDLP)			
x	x			Land acquisition and PAPs resettlement, Influx (indirect), Employment	Changes to Traditional Way of Life Leading to Loss of Sense of Place and Community	A number of environmental conservation initiatives will be undertaken in partnership with local communities, UWA, environmental and tourism organisations, following feasibility studies, to mitigate the project impacts and to give communities a sense of ownership over the management of their local environment and natural resources (...)	x		Community Environmental Conservation Plan	Moderate Adverse		
						Support cultural activities and enhance the preservation and awareness of cultural heritage and traditions including language. (...) Where appropriate, outreach activities will be undertaken to involve local communities, particularly schoolchildren, in understanding and caring for their past	x		Cultural Heritage and Archaeological Management Plan			
						(Workforce code of conduct) Cultural awareness induction training for all new staff regarding local customs, traditions and responsible community relations	x	x	Labour Management Plan			

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
x	x		x	Influx (indirect), Employment	Increase in Crime Rate - in relation to competition over jobs and resources and increased disposable incomes; which could lead to an increased pressure on local police force	The Community Health, Sanitation, Safety and Security Plan will include the following components: - Conflict Resolution & Crime Prevention Capacity Building programmes for local communities and local institutions - Empower local institutions, NGO and government to find solutions to challenges of land speculation and land disputes; - Support training of community organisations, local leaders and police in mediation and conflict resolution. A suitable partner will be identified to deliver the training; - Build the capacity of the local government and security forces to deal with crime, working in particular with community crime preventers (mayumba kumi) and oil and gas police to provide a coordinated approach to crime prevention ** Support Central Government working together with Buliisa District Authorities to implement a robust policing system to curtail the increasing criminal tendencies associated to increased influx	x		Community Health, Sanitation, Safety and Security Plan	(cameras, radios, sign posting etc.). - Stakeholder Engagement Conflict - Establishment of a conflict monitoring programme in partnership with local government (District Welfare Officer, Sub county councils, LC1s) and CSOs to monitor the incidence of conflict within villages in order to identify any emerging issues early on to prevent escalation. This may be through provision of equipment to register and track instances of conflict and allow a rapid alert system (e.g. using mobile phones).	agencies who may conduct independent monitoring or review the data include: PAU, Office of CGV – Ministry of Lands, Housing and Urban Planning, NEMA, Ministry of Museums and Antiquities, Ministry of Health, Ministry of Education, Ministry of Gender, Labour and Social Development District Technical Committee, District, Police	Low Adverse
x	x		x	Presence of workers, influx contributing to population growth (indirect), Employment	Increase in Prostitution	The Project will roll out a series of education campaigns and capacity-building training to the PACs on a range of key in-migration impacts including on: - The dangers of alcoholism, drug abuse, domestic violence, prostitution and safe sex.	x					Moderate Adverse
x	x			Project procurement, Employment, land acquisition	Local Price Inflation	Provision for monitoring of local inflation e.g. price index - feasibility of extending the tool (Price indices) to Buliisa will be investigated	x		Influx Management Strategy	At least annual joined meeting with local and regional authorities and other stakeholders to regularly evaluate the extent of indirect effects and adapt the mitigation accordingly. Key Performance Indicators: - Progress of development and implementation of land-use planning - Progress and development of training and job readiness support programmes for PACs - Changes in land-use - Progress of development and effectiveness of institutional capacity		Moderate Adverse

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
										building and public infrastructure programmes - Number of meetings held on indirect effects monitoring with local and regional authorities - Number of reported conflicts - Number of cultural awareness programs held with workforce Community impact - In-migration and population changes - Changes in access to livelihoods and natural resources (crop farming, fishing, livestock rearing, trading services, etc.) - Changes to status of women, children and vulnerable groups - Change in access to modern forms of energy - Change in homestead asset profiles including homestead structures - Change in homestead land holding, size and yields of gardens - Changes in land tenure - Change in income sources and areas of expenditure - Change in livestock ownership - Level of livelihood improvement or socio-economic improvement of vulnerable groups		
x	x	x	x	Employment	Direct and Indirect Employment Opportunities The site manpower requirements will be in compliance with all relevant provisions of Ugandan law The Project will aim to achieve a large proportion of Ugandan nationals in the workforce		x	x	Community Content, Economic Development and Livelihood Plan (CCEDLP)	Monitoring Mechanisms: - Monitoring and reporting of	Projects Proponents, Project Contractors for implementation of	High beneficial

Project Phase					Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning	Company				Contractor					
						<p>The Project will update its Community Employment Procedure to manage local recruitment via clear, transparent process including by</p> <ul style="list-style-type: none"> - Appointing Community Employment Officers (respectively within the Project Proponents' CTLO team and the contractor CTLO teams) who will have responsibility for enhancing opportunities for local communities to benefit from employment opportunities created by the Project (...); - Ensuring there will be mechanism to verify where job applicants come from (e.g. checking ID cards) so that jobs prioritised for members of local communities are not given to in-migrants. - Prioritisation of PAPs (first) and local residents (second), as far as possible, for local employment opportunities particularly where semi-skilled and non-skilled work is needed. - Fill vacancies(...) through a transparent and fair process that takes into consideration gender balance, equal opportunities – some opportunities should be reserved for women where feasible - , ensure engagement with marginalised groups and to allow the opportunity for employment benefits to reach all parts of local communities. (...) 	x	x	Labour Management Plan	<p>implementation of local employment procedures will be undertaken; and</p> <ul style="list-style-type: none"> - Monitoring and reporting of local procurement impacts using business activity and output indicators including value of goods and services procured locally, regionally and nationally; number of local suppliers; number of employees hired by local suppliers; and local procurement as a percentage of total procurement. 	<p>the National and Community Content Strategy and related plans; and of the Labour Management Plan</p> <p>Relevant Government agencies who may conduct independent monitoring or review include: MEMD, PAU</p>		
				<p>The LMP will include</p> <ul style="list-style-type: none"> - Measures to provide for a transparent, fair and non-discriminatory and ethical recruitment processes, which will be developed in consultation with local communities and local government, - Measures to ensure gender-fair hiring and workplace policies. This will include development of a Diversity Implementation Procedure (...). 	x	x							
				<p>A National and Community Content Strategy (NCCS) for the Project is under development. It incorporates the following key points:</p> <ul style="list-style-type: none"> i. A clear set of objectives and milestones on employment and training of National citizens for the Project. ii. A clear set of objectives and milestones on procurement of Goods and Services from Ugandan companies, registered entities and Ugandan citizens for the Project. iii. A clear set of objectives and milestones for Technology Transfer, including capacity building, support to education and training, etc. 	x	x	National and Community Content Strategy (NCCS)	<p>Key Performance Indicators:</p> <ul style="list-style-type: none"> - Assess recruitment and selection processes of workers (local and migrant workers) - Assess conditions of employment (including casual labour) 					
				<p>The Project Proponents and contractors will work with local and national government to develop a human resources database detailing skills and education levels available locally. This database will be consulted to identify the maximum number of locally available candidates for roles. Project Proponents and contractors will deliver a skills training programme to enhance employability of the local workforce.</p>	x	x	National Content Plan Community Content, Economic Development and Livelihood Plan (CCEDLP)						
				<p>Information campaigns will be incorporated into the Stakeholder Engagement Plan on the Project's local employment policy and procedure</p>	x	x	Stakeholder Engagement Plan		<ul style="list-style-type: none"> - Number of nationals and community members employed by Project - Number of nationals and community trained by Project - Number of national 				

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
x	x	x	x	Project procurement, employment, influx	Increased Demand for Goods and Services Stimulating Economic Growth	The NCCS will include a National and a Regional / Community supplier development program aiming at building capacity at national level , by: - Mapping of local businesses to identify their capabilities and identify which businesses could benefit most from opportunity to participate in local supply chains; - Criteria will be developed to identify opportunities and scopes of work that would best fit local, regional and national procurement; - Goods and services will be procured from local communities where feasible and available, and following a risk assessment of potential indirect impacts (i.e. related to food security for example); - Capacity building will consider opportunities for local suppliers to supply to the Project as well as other clients and markets; - Adoption of tendering and procurement documents to suit local businesses as far as possible within the standards required for the Project	x	x	National Content Plan Community Content, Economic Development and Livelihood Plan (CCEDLP)	and local companies involved in the Project (suppliers) - Value of goods and services procured locally, regionally and nationally - Number of employees hired by local suppliers; and Local procurement as a percentage of total procurement - Number of grievances related to employment received / addressed		
x	x	x		Project procurement, Employment	Development of more Educated and Skilled Workforce through Training and Skills Development for Affected Communities and Project Workers	Support to education to increase youth employability and improve adult literacy and numeracy. The Project will in consultation with relevant stakeholders (local communities and government, donor agencies, NGOs...), evaluate the feasibility and consider investments to support adult and children educational services provision in the project area to deal with the predicted growth in population and to enhance participation of the local population in the Project workforce and supply chain. (...) Women and Girls capacity building programme: Feasibility assessment for delivering a girls empowerment programme in partnership with suitable local organization to build confidence of girls and women in PACs (e.g. education and sports programmes for girls). Inclusive training in financial literacy and financial management will be provided to the local Project workforce (targeting those unaccustomed to waged employment) including advice and assistance on how to open bank accounts, especially for savings. This aims to help employees to maximise the benefits of increased cash incomes and encourage re-investment of wages into productive activities or savings accounts. (...) Training certification system: Successful completion of training and attainment of competency in new skills will be formally recognised through a certification system. A Skills Development Programme will be defined and will include: - Assessment of capacity development needs to ensure local businesses are able to deliver to required standards; - Requirements for educational and skills development and means to help meet the requirements will be detailed The Project Proponents and contractors will work with the sector skills council of the Uganda Petroleum Institute, Kigumba and other education & training institutions to review courses and curricula and to modify them to fit to the sector needs and demands through the Tilenga "Train the Trainers" programme. The NCCS will include promotion of the Industrial Enhancement Centre: Establishment of supplier linkage program in partnership with government, development partners and local NGOs and CBOS to help local businesses to access skills development programs particularly technical mentoring and business development skills	x		Community Content, Economic Development and Livelihood Plan (CCEDLP)	Community Impact - Changes in access to education - Changes in literacy and Education levels - Changes in vocational training levels - Changes in employment levels - Development of new local business enterprises - Number of local people directly or indirectly employed by the project or third-parties linked to vocational training.		
							x	x	Labour Management Plan			
							x	x	National and Community Content Strategy National Content Plan			
							x	x				

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*	
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor					
		x		Project revenues	Increased revenue for Uganda	n/a	n/a	n/a	n/a				
x	x	x		Stakeholder Engagement	Community Empowerment and Increased Community Participation in Decision Making	<p>Building capacity for a participatory approach to social impact management, monitoring and evaluation. A participatory model, in partnership with national and local government agencies, relevant NGOs or CBOs, will be followed for the planning and implementation of community programmes to manage and monitor community impacts. Ongoing capacity building support will be provided to help communities and implementing institutions develop competence in prioritising, planning, managing and monitoring development projects and programmes.</p> <p>Measures will be taken to enhance local government's role in community engagement and their capacity to provide proactive information dissemination and feedback on their monitoring activities to local communities. Strengthening technical capacity will need to be supported with an increased resource capacity provided through local and national government budget allocation to provide for sufficient resources to mobilise to communities and undertake engagement activities. (...)</p>	x		Community Health, Sanitation, Safety and Security Plan	<p>Monitoring Mechanisms:</p> <ul style="list-style-type: none"> - Stakeholder Engagement <p>Key Performance Indicators:</p> <ul style="list-style-type: none"> - Number of capacity building programs held - Community programs implemented to manage and monitor community impacts - Increased resources (local Government) 	Project Proponents and Project Contractors	Relevant Government agencies who may conduct independent monitoring or review the data include: PAU, NEMA	High Beneficial
x	x	x		Land acquisition and resettlement, influx	Overburdening and Challenges to Local and National Government and Cultural Leaders - in relation to monitoring oil and gas activities	<p>Legal Aid - The Project Proponents will investigate options to facilitate increased access to quality legal aid services to PAPs within Buliisa District. This is likely to take the form of a partnership with a suitable and qualified organisation. The partner will be selected following a due diligence process to establish its suitability to provide such a service in a prompt and efficient manner. (...)</p> <p>** Mitigation also relevant to this impact</p>	x		Resettlement Action Plan	Rf. To monitoring mechanisms and key performance indicators under RAP		Low Adverse	
x	x	x	x	Increase in traffic, project plant, accidental release (i.e. spillage and leakage) of chemicals, fuels or wastes	Potential Economic Loss due to Damage to Assets or Injury to Livestock by Project Activities from Unplanned Events	<p>Barriers and fences will be used to isolate work areas</p> <p>Construction activities will be contained within the permanent RoW which will have a 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)</p> <p>The use of animal crossing structures such as bridges, culverts, and over crossings, along pipeline and access road RoW will be installed where necessary. At special points such as crossings, deep excavations and tie-in bell holes, safety fences will be installed to prevent human or animal ingress</p> <p>Buses will be provided to transport workers living in nearby villages</p> <p>A Road Safety and Transport Management Plan will be developed prior to commencing the Construction and Pre-Commissioning Phase</p> <p>All transportation will be compliant with applicable road transport regulations. In the Project Area, routine transportation operations will normally only occur in day light. Deliveries of equipment and the movement of people will be scheduled in convoys, where practicable</p> <p>All construction vehicles/equipment will be kept on site when not in use</p> <p>The base case for Tilenga is that there will be no night driving. However, night driving may be permitted in exceptional circumstances and with internal derogation where it is deemed safe and practicable to do so</p> <p>Drivers will be required to have a break every 2 hours of driving</p> <p>A Compensation Procedure that provides standard and transparent compensation agreements for any accidental or unexpected damage directly due to the Project activities to either individual or community assets will be developed by the Project Proponents (...)</p>		x	HSE Management System	<p>Monitoring Mechanisms:</p> <ul style="list-style-type: none"> - Weekly site inspections, audits (as per annual audit plan) - Recording of anomalies and incidents - Stakeholder Engagement <p>Key Performance Indicators:</p> <ul style="list-style-type: none"> - Quality of physical environment parameters (water, soil, air) with comparison to pre-project conditions - Stakeholder Engagement conducted - Number of spill and emergency response exercises - Number of trained personnel - Number of anomalies and incidents recorded 	Project Proponents and Project Contractors	Relevant Government agencies who may conduct independent monitoring or review the data include: PAU, NEMA, DWRM	Low Adverse
							x	Physical Environment Monitoring Plan					
							x	HSE Management System					
						x	x	Road Safety and Transport Management Plan					
						x	x	Journey Management Plan					
						x	x						
						x	x	Community Impact Management Strategy					
						x	x						

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
												- Number of grievances related to loss or damage to assets received / addressed
x	x			Project revenues	Increased Risk of Corruption in the Public and Private Sector	Sensitisation on bribery and corruption and provide assistance, in partnership with UHRC or other suitable third party, to local and national governments to establish a whistleblowing mechanism to report corruption. The Project Proponents will make payments of taxes and royalties in a transparent, accurate and timely manner during the operations phase. Total is a signatory to the Extractives Industries Transparency Initiative (EITI) since its creation and is playing a very active role in the initiative which advocates for greater transparency in the oil revenues. We publish detailed information on exploration and production activities (mining rights, contracts, subsidiaries, figures on tax paid to national authorities etc.) in countries where we operate. In Uganda, which has not yet joined the EITI, Total E&P Uganda is bound by contractual obligations under the Production Sharing Agreements not to disclose information relating to petroleum operations, without the prior consent of the Government of Uganda. We will extend our support if the Government decides to sign up for this initiative and disclose relevant information.	x		Community Health, Sanitation, Safety and Security Plan		Project Proponents and project contractors	Low Adverse
x	x	x	x	Land acquisition and site clearance, civil works, roads upgrade and construction; drilling, decommissioning, increased traffic	Loss of Tourism Revenue due to the Presence of the Project Detering Visitors to MFNP and Reduced Access to Key Visitor Sites within MFNP	As per base case, there will be no routine night shift activities associated with the Site Preparation and Enabling Works Phase Lighting will be reduced to the minimum without impacting safety and security. Where feasible, the light will be directed inwards the facilities and will be of a warm / neutral colour so as to limit nuisance to the surrounding communities and to avoid attracting animals. A Tourism Management Plan that sets out objectives and procedures for managing relationships with and working with key tourism stakeholders to minimise potential negative effects of the Project on tourism and maximising benefits will be developed by the Project Proponents. It will include: - A communication plan - Feasibility study of alternative tourism routes - Feasibility of opening a visitor centre at a central tourism location - Feasibility of implementing educational visits - Support to tourism stakeholders to develop a strategy to promote tourism nationally and internationally Consider the tourism peak activities (as identified in the baseline) when scheduling Project activities as much as practicable. If significant impacts on tourism which result in loss of revenue are identified (through a detailed assessment conducted by a suitable and qualified organization selected by the project proponent), options to provide in-kind support UWA in the management of MFNP will be assessed (in compliance with project anti-bribery and anti-corruption policies).		x	Noise and Vibration Management Plan		Project Proponents Relevant Government bodies that may conduct independent monitoring or review the data include: UWA, Ministry of Tourism, AUTO	Moderate Adverse
							x		Landscape Management Plan Physical Environment Monitoring Plan			Monitoring Mechanisms:- Stakeholder Engagement Key Performance Indicators:- Number of sensitisation campaigns on bribery and corruption provided
							x		Tourism Management Plan			Monitoring Mechanisms:- Stakeholder engagement. Regular monitoring of impacts on tourism will be undertaken such as through surveys of tourists post-visit, particularly during the peak tourist season, to understand their perceptions of the Project. The adequacy of the existing tourism baseline will be assessed as a basis for future monitoring and updated if necessary. - Annual review of tourism statistics Key Performance Indicators:- - Change in access to touristic sites and viewpoints - Change in tourism economic activity - Community employment levels and community content in

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
										the tourism industry - Number of grievances from tourism stakeholder received / addressed		
x	x	x	x	All above	<p>The Project Proponents will develop a Community Impact Management Strategy for the PACs, which will include an overarching policy statement on the key principles of community impact management (compliant with IFC PS, Ugandan regulations and Project Proponent HSE, Ethics, Anti-Corruption and Anti-Bribery standards). (...)</p> <p>The Project SEP will be reviewed and updated at the start of each Project phase and at least annually with phases. In addition to Project SEP and Project CTLOs, all contractors will also be required to have their own SEP and to appoint their own CTLOs</p>	x	x	Community Impact management Strategy	<p>Monitoring Mechanisms:</p> <ul style="list-style-type: none"> - Stakeholder Engagement, audits (as per annual audit plan) <p>Key Performance Indicators:</p> <p>Stakeholder Engagement</p> <ul style="list-style-type: none"> - Number of stakeholder engagements - Number of people involved in capacity building programs aimed to improve dialog and consultation processes - Changes in the levels of information and awareness of stakeholders - Changes in Stakeholder perception on the Project <p>Grievances management</p> <ul style="list-style-type: none"> - Rate of closing out grievances received - Timely response to grievances received - Percentage of repeat grievances - Percentage of grievances closed at first and second levels - Awareness about the procedure - Percentage on satisfaction about the process 	Project Proponents and Project Contractors Relevant Government agencies who may conduct independent monitoring or review the data include: PAU, NEMA, District Local Government	n/a	
x	x	x	x	Project activities	Working hours will be based on the normal work day in line with Ugandan law	x	x					Low Adverse

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
					Impact on Welfare of Workers in the Project Supply Chain due to Poor Enforcement of Standards to Uphold Labour and Working Conditions	<p>A Project Labour Management Plan will be developed. It will include: (...)</p> <ul style="list-style-type: none"> - Working Conditions and Management of Worker Relationship, including: Working Conditions & Terms of Employment including minimum wages, working hours and rest time; Workers' Organisations and Freedom of Association; Non-Discrimination & Equal Opportunity; Retrenchment; Anti-harassment and Management of Grievances (Employee Grievance Mechanism for all workers - Occupational Health & Safety including the provision to all employees and workers of PPE in good condition and free of charge; - Workers Engaged by Third Parties; and - Procurement and the Supply Chain 	x	x	Labour Management Plan	<p>Monitoring Mechanisms: Auditing of third parties who use subcontracted workers to make sure they are reputable and legitimate and have an appropriate Environmental and Social Management System (ESMS) that will allow them to operate in a manner consistent with the Project's requirements.</p> <p>Due diligence to ensure that the Project does not inadvertently support, via its primary suppliers, child labour or forced labour (...). Where risks of use of child labour or forced labour are considered significant, the Project will institute a program of periodic monitoring and inspection of main suppliers' facilities. In cases where the Project's influence over suppliers is limited, suppliers should be informed that future contracts will be dependent on these issues being addressed.</p>	Project Proponents and Project Contractors	
				The project will provide a Workforce Accommodation Plan	x	x						
				An employee whistleblowing system will be established by the Project and its contractors to provide a confidential mechanism to report any cases of bribery and corruption, or labour rights infringements within the workforce	x	x						
				The project and its contractors will implement a Workforce Code of Conduct	x	x						
					The project and its contractors will foster partnerships with local government and civil society to promote healthy work environments and Project Proponents will sensitise local communities about labour rights.	x	x	Community Content, Economic Development and Livelihood Plan (CCEDLP)		Relevant Government agencies who may conduct independent monitoring or review the data include: OSH Department - MGLSD		
x	x	x	x	Project procurement, Employment	Increased use of Child Labour	<p>The LMP will include</p> <ul style="list-style-type: none"> - An overarching policy statement on labour and working conditions (compliant with national laws and regulations, IFC PS 2 and ILO conventions) - Protection of the Workforce, including measures to identify and avoid child labour and forced labour, 	x	x	Labour Management Plan			Low Adverse
	x		x	Employment	Widespread job losses leading to sudden fall in income levels and local spending	<p>The Project and its contractors will provide a Retrenchment Plan: to include analysis of alternatives and measures to minimise adverse impacts of collective dismissal including notification of public authorities, and provision of information to and consultation with workers and their organisations.</p> <p>The NCCS will include :</p> <ul style="list-style-type: none"> - Development, in partnership with GoU and other relevant industry stakeholders, of a labour mobility strategy (looking at options for redeploying skilled professionals from oil and gas industry to other fields); and - Development, in partnership with GoU and other relevant industry stakeholders of a strategy for redeploying suppliers to other industries in Uganda or foreign markets, which demand similar goods and services. When selecting priority sectors for national content development, the programme will consider the possibility of using products of these sectors in other industries in Uganda and/or overseas. 	x	x	Labour Management Plan National and Community Content Strategy	<p>Contractor auditing (as per annual plan) to :</p> <ul style="list-style-type: none"> - Assess contractor – worker communication and engagement mechanisms - Verify retrenchment procedure and strategy - Verify contracts of employment - Monitor the implementation of induction and training 		Low Adverse

Project Phase					Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning	Company				Contractor					
											programmes - Monitor the implementation of control measures to avoid and minimise impacts of camp and living conditions on local communities Key Performance Indicators: - HSEMS and labour management requirements incorporated into contractual agreements with third party employers - Number of reported cases of bribery/corruption, labour rights infringements within the workforce - Number of disciplinary cases, and any other issues and complaints related to recruitment, working conditions and accommodation <i>This list of mitigation is complemented by the one presented in Health ESMP</i>		
			x	Project closure	Loss in National Government Revenues at Project Closure Adversely Impacting National Economy	Support capacity building for economic development planning, in partnership with international donors, to help national and local government plan the use of oil revenues during production to finance investments that will allow diversified economic growth			Community Content, Economic Development and Livelihood Plan (CCEDLP)	Key Performance Indicators: - Number of capacity building programs supported - Diversified economic growth	Ministry of Finance	Low Adverse	
			x	Project closure	Loss in Local Government Revenues at Project Closure Adversely Impacting Local Economy		x						
* Showing the most significant one ** The Stakeholder Engagement Plan is relevant to each technical chapter as it will support engagement prior, during and after all activities Most of the mitigation have been presented once only however they are relevant in mitigating more than one impact (e.g. influx management strategy)													
ARCHAEOLOGY AND CULTURAL HERITAGE													

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
x	x			Land Acquisition and PAPs resettlement, Site clearance and earthworks, traffic	Removal of specific traditional cultural and sacred sites Impacts on sacred watercourses and water bodies Impacts on local culture Interference with, desecration and damage to sacred sites Changes to public access to cultural heritage	Relocation of sacred sites** (household family shrines; clan sites, sacred water bodies and sacred trees). The Project Proponents will consult with leaders of affected clans or communities to ensure appropriate transfer of the cultural properties, to establish their requirements for the ceremonies that will need to be performed, to ensure continued accessibility for the clan members, and to facilitate the conduct of ceremonies and rituals prior to relocation. The selection of replacement sites should take into consideration linkages with the affected and relocated households.	x	x***	Cultural Heritage and Archaeological Management Plan Resettlement Action Plan	Monitoring Mechanisms - Inspections and audits (as set out in the CHMP and CFRP) - Stakeholders Engagement: The topic of cultural heritage is integrated into the Project Proponents Resettlement Action Plans and Stakeholder Engagement documents. As part of ongoing consultation being undertaken by the Project Proponents, consultation will continue to be undertaken with affected communities regarding attitudes to the cultural heritage mitigation programme and their cultural heritage priorities. Key Performance Indicators: - Progress in Archaeological investigation and recording in line with methods and schedule set out in the CHMP - Number of Cultural Heritage training programs held - Number of signed agreements on the relocation of cultural assets - Number of cultural assets (e.g. graves) that have not been identified. (either assets already recorded, or new assets declared via the grievance mechanism)	Project Proponents and Project Contractors Relevant Government bodies including NEMA, Ministry of Tourism, Wildlife and Antiquities (MTWA) Department of Museums and Monuments	Low Adverse
					Loss of tranquillity of places of worship (churches and mosques) , Disruption of religious services	Relocation of places of worship** if necessary. The Project Proponent will consult with the leaders of places of worship and affected congregations and communities to establish their requirements and ensure appropriate relocation. Should any places of worship impacted by Project activities need to be relocated, compensation and support in relocating religious buildings, holding consecration ceremonies and assuring continued access to places of worship will be undertaken. The selection of replacement sites should take into consideration linkages with the affected and relocated households	x	x***				
					Damage to or the removal of cemeteries and graves Disturbance of burial ceremonies and visitors to graves Changes to public access Resettlement of guardians of burial grounds	Relocation of graves. The Project Proponent will identify the caretakers of the dead and agree on the modalities to exhume and rebury the dead to an alternative location. The Project Proponent will consult with affected families, including any known descendants, and caretakers of burial grounds. The Project Proponent will provide customary ceremonial assistance for grave relocation. In liaison with the affected families, the Project Proponent will meet all costs for performance of appropriate cultural ceremonies; the removal, transportation and burial of remains and any other paraphernalia; burial related expenditure. Mitigation will apply to family graves identified during asset surveys. Unmarked graves identified through the chance find procedure will not qualify for ceremonial assistance, but will be exhumed and reburied at an appropriate local cemetery with due respect and ceremony, in accordance with Ugandan law and local customary practices.	x	x***				
x	x			Damage to or removal of palaeontological or archaeological deposits Illicit removal of archaeological remains Impacts upon setting of cultural heritage sites	Archaeological investigation and recording will be undertaken, including - A detailed walkover survey; - If required Archaeological test-pit evaluation (undertaken as part of a post-ESIA Setting Out/ Pre-Construction Ground Clearance Survey); - Archaeological investigation and recording (excavation); - Archaeological watching briefs alongside some groundworks; - Preservation in situ of significant archaeological sites, where necessary; and - Appropriate expert assessment, analysis and reporting on fieldwork	x	x	Chance Find Procedure				
					It is recommended that a team of trained and experienced professional field archaeologists are retained on site during all groundworks (including road construction and pipeline excavation) in order to undertake watching briefs on groundworks and to respond to any reported chance finds.	x						
					All chance finds will be reported, adequately protected with temporary flagging and promptly assessed by a qualified archaeologist	x	x					

Project Phase					Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning	Company				Contractor					
								x	x		<ul style="list-style-type: none"> - Progress on the establishment of replacement cemeteries. - Progress on the exhumation and relocation of graves - Progress on the re-establishment of Sacred Sites - Number of non-compliances related to implementation of CHMP or CFPr - Number of grievances related to archaeology or cultural heritage received / addressed 		
x	x		x	Movement of vehicles, use of heavy machinery and equipment, Earthworks and site clearance, drilling Physical presence	Reduction in tranquillity of traditional cultural and sacred sites, cemeteries and graves due to increase in noise, vibration, light spill and dust	<p>Implementation of a Dust Control Plan, which will include: measures to include the application of dust suppressants (including water), on potentially dust generating sources, including on site and off site roads used by Project vehicles and material stockpiles.</p> <p>For work activities located close to dust sensitive receptors, mitigations will be considered to minimize the dust emissions. A range of specific dust suppression measures shall be implemented to minimise potential impacts. Such measures shall be implemented on a case by case basis and may include the use screens, covers and/or barriers.</p> <p>For work activities located close to noise sensitive receptors, mitigation measures will be implemented to minimise the impact. A range of specific noise mitigation measures shall be implemented to minimise impacts. Such measures shall be implemented on a case by case basis and may include the use of temporary abatement such as dampening and shielding techniques, noise barriers, and mufflers. Specific noise regulations and thresholds will be specified in the Noise and Vibration Management Plan</p>	x	x	Dust Control Plan	Rf. To monitoring mechanisms and key performance indicators under Environment ESMP for impacts on Air, Noise, Landscape and Visual and Social ESMP for impacts related to Physical Displacement and Changes to Traditional Way of Life	Project Proponents and Project Contractors Relevant Government bodies including NEMA, PAU, MEMD, MLHUD		

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*	
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor					
					During detailed engineering phase the present noise study will be refined by the selected engineering company and drilling contractor(s) and based on selected vendor data and mitigations will be addressed accordingly to minimise the noise impact at receptors at acceptable noise levels		x						
					Loud music is not to be played	x	x						
					To avoid nuisance and potential damage to nearby structures from drilling activities, an assessment of potential vibration levels will be undertaken to determine impacts (if any) to nearby receptors. Investigations will be based well locations, manufacturers vibration data for equipment and vibration risk criteria as per industry guidance. Should at risk receptors be identified from the assessment, further vibration mitigation measures will be developed and applied on a case by case basis	x	x						
				Use of industrial plant (such as compressors, pumps, turbines and generators), Storage of equipment and materials, flaring, traffic, physical presence, water abstraction and effluents discharge	Degradation of setting of traditional cultural and sacred sites due to gas flaring, as well as increase in noise, and visual intrusion, and reduction in tranquillity			x	Landscape Management Plan				
					Impacts on sacred watercourses and water bodies	Design the Project to use materials on the infrastructure that will minimise glare, as much as practicable			x	Physical Environment Monitoring Plan			
					Impacts on local culture Interference with, desecration of and damage to sacred sites	Consideration shall be given to planting naturalistic woodland/bush to blend subject to site specific conditions			x				
					Changes to public access	There will be no routine flaring during normal operations	x			Physical Environment Monitoring Plan			
		x			Cemeteries and graves, places of worship - Loss of tranquillity due to noise, visual intrusion, light spill and flaring Disturbance of burial ceremonies and visitors to graves, disruption of religious services	Loud music is not to be played	x	x		Noise and Vibration Management Plan			
						During detailed engineering phase the present noise study will be refined by the selected engineering company and drilling contractor(s) and based on selected vendor data and mitigations will be addressed accordingly to minimise the noise impact at receptors at acceptable noise levels			x				
						Lighting will be reduced to the minimum without impacting safety and security. Where feasible, the light will be directed inwards the facilities and will be of a warm / neutral colour so as to limit nuisance to the surrounding communities and to avoid attracting animals.	x		x	Landscape Management Plan			
						Use of lights, for example on well pads, will be minimised, and light spill controlled (e.g. restricted lighting height, shading light sources and/or direct them onto site areas)	x		x	Physical Environment Monitoring Plan			
					The Project Proponents are aware of the need to employ water efficiency measures throughout the lifetime of the Project; they will consider water reduction measures, where feasible	x		x	Water Management Plan				

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
		x	x	Maintaining pipeline RoW, Storage of equipment and materials, Movement of vehicles, heavy machinery and equipment, Drainage	Erosion or sedimentation changes on palaeontological and archaeological remains	Erosion prevention through re-vegetation. Increased erosion may occur as a result of vegetation clearance over sites. For sites with fossils or archaeological artefacts, this could result on exposure of specimens or artefacts previously protected by cover. It may be necessary to re-vegetate areas of erosion with appropriate planting to ensure that any specimens or artefacts previously exposed by vegetation clearance are available to be retrieved for future study	x	x	Surface Run Off and Drainage Management Plan			
x	x	x	x	All above	All above	Resettlement Action Plan. The LARF will be implemented prior to the start of the Project and 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, and livelihood restoration	x		Resettlement Action Plan			
						Fixed traffic routes & traffic management. Where reasonably feasible, vehicles will be limited to signposted, flagged and fixed routes in order to prevent cross-country driving and the use of shortcuts. This will also serve to reduce soil cover erosion.	x	x	Road Safety and Transport Management Plan Journey Management Plan			
						All site clearance activities will be undertaken in line with the Site Clearance Plan which will be developed by the Contractor(s) prior to commencing the Site Preparation and Enabling Works Phase to limit extent of vegetation clearance, wherever possible		x	Site Clearance Plan			
						(Workforce code of conduct) Cultural awareness induction training for all new staff regarding local customs, traditions and responsible community relations	x	x	Labour Management Plan			
						Barriers and fences will be used to isolate work areas;	x	x	Physical Environment Monitoring Plan			
						Laydown areas at each of the well pad sites will be located within the footprint of the well pad; there will be no additional site clearance required outside the well pad footprint during the Construction and Pre-Commissioning Phase;		x				
						Construction activities will be contained within the permanent RoW which will have a 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);		x				

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						Management, monitoring and reviewing systems, will be put in place by developing and implementing a Cultural Heritage and Archaeological Management Plan (CHMP) and a Chance Find Procedures (CFPr)	x	x		Rf. To monitoring mechanisms and key performance indicators under Cultural Heritage and Archaeological ESMP	bodies including NEMA, Ministry of Tourism, Wildlife and Antiquities (MTWA) Department of Museums and Monuments	
					Flagging of vulnerable sites. Any vulnerable sites will be protected with temporary flagging in the first instance. Project and contractor staff cultural heritage awareness training and toolbox talks will be undertaken to prevent interference with flagged sites. All staff will be informed of their presence and instructed not to interfere with fencing or archaeological sites.	x	x					
					Archaeological fieldwork will be followed by finds processing and conservation, assessment, analysis, scientific dating, reporting, illustration, accessible publication, dissemination of results and long-term curation of the archaeological excavation archive and the museum curation and display of finds.	x						
				Mitigation of archaeological remains through excavation and recording	Contribute to the national and international scientific knowledge base via research and capacity-building in cultural heritage	Stakeholder Capacity building in archaeology and cultural heritage management; and	x					Beneficial
						Stakeholder Capacity building in museum development, linkage to existing and planned schemes for sustainable development and tourism in the regions, and sustainable planning and conservation initiatives	x					
						All coordinates of the sites and find spots identified during baseline data collection will be forwarded to the Department of Museums and Monuments to enable them to update their databases.	x					
						Community Cultural Heritage and Archaeology - Support cultural activities and enhance the preservation and awareness of cultural heritage and traditions including language. The focus of programme activities will be identified through consultation with local communities and cultural leaders and will take into consideration recommendations included in the 2017 'guidelines by cultural institutions for oil and gas'. Where appropriate, outreach activities will be undertaken to involve local communities, particularly schoolchildren, in understanding and caring for their past	x					

* Showing the most significant one

** Relocation of sacred sites or places of worship from other areas (in case of unexpected land intake or other project impacts requiring mitigation) will apply the same approach

*** Applicable to contractor in case of unexpected land intake

HEALTH AND SAFETY

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
x	x	x	x	Construction activities, influx	Increase in malaria - due to creation of new breeding grounds for vectors	All workers' needs will be provided for in the camps, which will include living facilities, healthcare	x	x	Labour Management Plan	Monitoring Mechanisms:	Influx:	Low Adverse

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
				contributing to population growth (indirect), PAs resettlement due to Land acquisition, drainage	or hosts, people settlements in areas closer to vector habitats	All Construction Camps will be supported by one main medical centre located within the Industrial Area throughout the Site Preparation and Enabling Works, Construction and Pre-Commissioning, and Commissioning and Operations phases. A doctor will also be present and will be responsible for coordinating the satellite facilities located within the Buliisa, Bugungu and Tangi Construction Camps. In addition, all rigs which will be required for the drilling of wells will be equipped with their own sickbay and will be coordinated from the main medical centre based in the Industrial Area. There will also be standby ambulance cover at all times at the Camps and rig sites to cover any emergencies.	x	x	HSE Management System	- Program of water quality and use monitoring in PACs - A monitoring & Evaluation framework of the implementation of Community Road Safety initiatives with the definition of key performance indicators for inputs, outputs and outcomes will be defined as part of the Road Safety and Transport Management Plan. Influx/Community impact Specific monitoring & evaluation framework to measure project-induced in-migration trends, hotspots extent rates and key impacts to be proposed as part of Influx Management Strategy - this will include: - Analysis of aerial /	Project Proponents Strategic collaboration platforms will be established with local and regional authorities and other stakeholders as appropriate to regularly evaluate and review the extent of indirect effects, share understanding of causes and identify adapted or additional mitigation requirements Monitoring of community health and safety impacts related to influx with the District local governments	
				All workers accommodated in Construction Camps will also receive a medical induction and medical check on arrival at camp.	x	x						
				Vector and Malaria Control Programme within the workforce will include: Training specifications for all staff and contractors in vector control and malaria prevention and management; Specifications for personal protection measures for all Project workers e.g. use of bed nets, limiting outside activity from dusk to dawn wherever possible, use of mosquito repellents particularly after dusk, use of chemoprophylaxis to decrease risk infection for non-immune personnel (i.e., workers from non-endemic areas); Review of waste and water management practices against requirements to minimise pooling of water and avoid creation of vector breeding grounds as far as possible (Malaria)	x	x						
				In accordance with the Project Proponent's 'STOP MALARIA Guide', indoor residual spraying with insecticides is conducted at camps, as well as provision of mosquito repellents to cater for all vectors, including tsetse flies.	x	x						
				The Project Proponents will work with local government, the Ministry of Health, District Health Teams and selected NGO partners to deliver education and communication on key public health issues in PACs	x							
				Health and wellness education and communication campaigns programme for local communities including Malaria prevention and management	x							

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
					<p>A Vector and Malaria Control Programme will be developed and measures will be put in place and appropriately monitored to minimise the risk of malaria transmission. It will include:</p> <ul style="list-style-type: none"> - Measures to partner with government on malaria prevention through a Memorandum of Understanding with specification to Align their activities with the National Malaria Control Program; o Collaborate with District Health Offices to work with district vector control office, Community Extension Health Workers (When rolled out by MoH in Buliisa), Village Health Teams and Community-Based Distributors, and selected NGOs in the fight and treatment of malaria and other vector related disease. Measures to be considered may include application of selected insecticides for indoor residual spraying; larvae control programmes; distribution of insecticide treated nets (ITN) and initiatives to promote the correct use of ITN; o Undertake vector control awareness within public health and education facilities (e.g. use of screens, environmental management); o Review training needs and specific skills requirements for personnel involved in vector control; (...) • Specifications for surveillance and monitoring of vectors and vector control activities in the community: Sustained sensitization of the population on the causes and prevention of malaria (implemented through the health education programme delivered under the mitigation Health and wellness education and communication campaigns for local communities H1) with a focus on children by working with schools and educators 	x			satellite imagery of the local settlements in order to assess their expansion. Data to be acquired annually until the end of construction	<p>Community Impact: Project Proponents and Project contractor.</p> <p>Partnership with government to set up surveillance and monitoring specifications. Participatory approach to social impact management, monitoring and evaluation with communities and implementing institutions</p> <p>Relevant Government bodies that may conduct independent monitoring or review the data include: PAU, NEMA, MoGLSD, MoH, MoIA, MLHUD Physical planning.</p>		
					<p>Development of further RAPs and LRPs consistent with the goals, objectives, principles and processes described in the LARF and continuously drawing on lessons learned from RAP1. Resettlement planning and implementation will, as far as possible, be undertaken in one go for a defined geographic area/ footprint to minimise disturbance for communities from resettlement activities and to minimise the risk of double displacement</p> <p>In relation to resettlement housing, there will be a review of building design for resettlement housing to reduce vector-human contact to minimise disease risk.</p>	x		Resettlement Action Plan	<p>questionnaire designed to evaluate perceptions of migration patterns in the hotspot villages</p> <p>- Administering a semi-structured questionnaire to local and migrants specifically designed to monitor potential influx related conflict</p> <p>- Monitoring local prices through the review of the changing cost of a standardised basket of goods. Provision for monitoring of local inflation e.g. price index</p> <p>- Engagement with Masindi district local government and local police force to discuss requirements to monitor illegal buildings, settlements, trading activities, and illicit activities within the vicinity of the</p>			
x	x		x	<p>Influx contributing to population growth (indirect), PAs resettlement due to Land acquisition, workers accommodation, increased traffic</p>	<p>Increase in rates of TB and other respiratory disease - due to an increased exposure in relation to poor accommodation conditions, and in case of traffic an increase exposure to dust</p>	x	x	<p>Labour Management Plan</p> <p>HSE Management System</p>	<p>- Administering semi-structured questionnaire to local and migrants specifically designed to monitor potential influx related conflict</p> <p>- Monitoring local prices through the review of the changing cost of a standardised basket of goods. Provision for monitoring of local inflation e.g. price index</p> <p>- Engagement with Masindi district local government and local police force to discuss requirements to monitor illegal buildings, settlements, trading activities, and illicit activities within the vicinity of the</p>			
					<p>Camps will operate a closed gate policy meaning only authorised visitors will be permitted to enter the camp and movement of workers in and out of the camp will be strictly controlled.</p>	x	x					
					<p>All workers' needs will be provided for in the camps, which will include living facilities, healthcare</p>	x	x					
					<p>All Construction Camps will be supported by one main medical centre located within the Industrial Area throughout the Site Preparation and Enabling Works, Construction and Pre-Commissioning, and Commissioning and Operations phases. A doctor will also be present and will be responsible for coordinating the satellite facilities located within the Buliisa, Bugungu and Tangi Construction Camps. In addition, all rigs which will be required for the drilling of wells will be equipped with their own sickbay and will be coordinated from the main medical centre based in the Industrial Area. There will also be standby ambulance cover at all times at the Camps and rig sites to cover any emergencies.</p>	x	x					
					<p>The camps will operate a strict ban on consumption of alcohol and drugs, and smoking will only be permitted in designated areas</p>	x	x					
					<p>All workers, contractors and subcontractors accommodated in Construction Camps are required to complete a fitness for work assessment prior to coming to site.</p>	x	x					

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						All workers accommodated in Construction Camps will also receive a medical induction and medical check on arrival at camp	x	x		Masindi check point. Support will be provided to facilitate monitoring activities based on a MoU between these parties and may include, for example, provision of vehicles or equipment (cameras, radios, sign posting etc.). - Stakeholder Engagement		
						All workers, contractors and subcontractors in Construction Camps are required to get vaccinations against common infectious diseases for example rabies, pneumococcal, influenza, tetanus, and yellow fever	x	x				
						Health and wellness education and communication campaigns programme for local communities including Indoor air pollution and household ventilation, TB prevention and management	x		Community Health, Sanitation, Safety & Security Plan			
						Future RAPs will consider specific requirements in relation to community health and safety	x		Resettlement Action Plan			
x	x		x	Construction activities, influx contributing to population growth (indirect), PAPs resettlement due to Land acquisition	Increased rates of zoonotic disease (including Rabies, Ebola, Ascariasis and Brucellosis) - due to an increased exposure in relation to poor accommodation conditions, farming activities and settlements moving in closer proximity to wild animals; increased sharing of water resources between people and animals	All workers' needs will be provided for in the camps, which will include living facilities, healthcare	x	x	Labour Management Plan	At least annual joined meeting with local and regional authorities and other stakeholders to regularly evaluate the extent of indirect effects and adapt the mitigation accordingly. Key Performance Indicators: - Progress of development and implementation of land-use planning - Progress and development of training and job readiness support programmes for PACs - Changes in land-use - Progress of development and effectiveness of institutional capacity building and public infrastructure programmes - Number of meetings held on indirect effects monitoring with local and regional authorities - Number of reported conflicts		
						All workers accommodated in Construction Camps will also receive a medical induction and medical check on arrival at camp	x	x				
						All workers, contractors and subcontractors in Construction Camps are required to get vaccinations against common infectious diseases for example rabies, pneumococcal, influenza, tetanus, and yellow fever	x	x				
						Health and wellness education and communication campaigns programme for local communities including Zoonotic disease	x		Community Health, Sanitation, Safety & Security Plan			
						The community-wildlife conflict prevention program will align with the goals and actions set out in the Community-Based Wildlife Crime Prevention Action Plan (2017-2023) prepared by UWA (April 2017).	x		Community Environmental Conservation Plan			
						The CHSSP will include provision of support for monitoring and surveillance of livestock health to identify any diseases that can be transmitted from livestock to humans. A monitoring and alert programme will be developed in partnership with District Veterinary Officer and District Health Teams	x					
						The Plan will provide for extension of tree nurseries, including for trees with medicinal values, tree cover, honey for medical and other purposes.	x					
x	x	x	x	Presence of workers, influx contributing to population growth (indirect), Employment	Increased prevalence of HIV/AIDS and other STIs - due to an increased presence of MARP**and an increase in practice of risky sexual behaviour (in relation to increased disposable incomes) Increase in teenage and unwanted pregnancy leading to adverse impacts on maternal and new born health	Camps will operate a closed gate policy meaning only authorised visitors will be permitted to enter the camp and movement of workers in and out of the camp will be strictly controlled.	x	x	Labour Management Plan			
						The Project Proponents will partner with the Ministry of Health (specifically the AIDS Control Program and Uganda AIDS Commission) and District Health Teams to develop a site specific HIV Workplace Policy	x	x				
						(Workforce Code of Conduct) Most project workers will reside at the Project camp where services like meals, waste management services and clean water will be provided, minimising need for worker interaction with local communities	x	x				
						Health and wellness education and communication campaigns programme for local communities including STI and HIV/AIDS prevention and management, family planning	x			Community Health, Sanitation, Safety & Security Plan		

Project Phase					Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning	Company				Contractor					
						Community Engagement Capacity Building programme for local government Measures will be taken to enhance local government's role in community engagement and their capacity to provide proactive information dissemination and feedback on their monitoring activities to local communities. Focus will be placed on communicating around some of the key Project impacts and mitigation measures linked to employment, resettlement and influx, including but not limited to: • The importance of safe sex.	x		Stakeholder Engagement Plan	Community Impact - In-migration and population changes - Access to primary and other healthcare services - Health facility usage - Access to potable water			
x	x	x	x	Accidental release (i.e. spillage and leakage) of chemicals, fuels or wastes	This could lead to contamination of local environment and impact on human and livestock health	An Oil Spill Contingency Plan to be established. This will define notification procedure, response strategy, means, and post-spill actions such as clean-up, monitoring, etc. in the event of uncontrolled/accidental discharge	x	x	Oil Spill Contingency Plan Spill Prevention Plan Chemicals Management Plan	- Access to justice systems - Changes to community health profile including exposure to disease, sexually transmitted infections, availability and quality of water resources, sanitation, food insecurity and nutritional status - Changes in community safety profile including road safety, emergency response, and unplanned events - Changes in community security profile including crime rates, conflict, domestic violence etc. - Changes to status of women, children and vulnerable groups - Changes in community addictive behaviours (including alcohol, drugs,...) and their social consequences for community cohesion and security		Insignificant	
					Ensure spill response equipment (including sampling and personal protective equipment) is readily available on site to contain and clean any spillages as soon as reasonably practicable after the event	x	x						
					Develop and implement a Spill Prevention Plan, incorporating secondary containment as far as practicable for liquids contained on site	x	x						
					All fuels and hazardous materials will be stored within appropriate bunds and drip trays, providing appropriate containment, where practicable	x	x						
						Chemicals and hazardous liquids will be supplied in dedicated tote tanks made of sufficiently robust construction to prevent leaks/spills. Dedicated procedures will be developed for fuel and hazardous material transfers and personnel will be trained to respond. Spill kits will be available at all storage locations	x	x					
						A Waste Management Plan will be developed and maintained to cover the duration of the Project; and will address the anticipated waste streams, likely quantities and any special handling requirements. The Project Proponent's will implement a waste tracking system to ensure traceability of all wastes removed off site.	x	x	Waste Management Plan				
						Ensure adequate controls are in place for the movement of drill cuttings from well pads to intermediate waste consolidation area or final treatment/disposal site, including use of trucks with sealed bodies to prevent spillage		x					
x	x		x	Influx contributing to population growth (indirect), PAs resettlement due to Land acquisition,	Increase in prevalence of water, sanitation and waste related disease - due to and increased pressure on water and sanitation infrastructure (include, limited access to those)	All workers' needs will be provided for in the camps, which will include living facilities	x	x	Labour Management Plan			Low Adverse	
						The installation of boreholes across the Project Area is subject to the outcome of the Water Abstraction Feasibility Study currently being undertaken by the Project Proponents	x		Water Management Plan				
						Health and wellness education and communication campaigns programme for local communities including Hygiene and sanitation and access to clean and safe water	x		Community Health, Sanitation, Safety & Security Plan				

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						The Project Proponents will, in consultation with relevant stakeholders (local communities and government, donor agencies, NGOs etc.), evaluate the feasibility and consider investments to improve access to and capacity of public infrastructure to meet the increased demand particularly in influx hot spots for the following key services: health, water, sanitation, education, etc. . Investments will be based on feasibility studies and will align with government development plans and the land use plan (to be developed). The feasibility and sustainability of any measures to support improvement in public infrastructure will depend on input from national and local government stakeholders and/or community associations to provide resources for the ongoing management, staffing and upkeep of such infrastructure. This will be established through and MoU between relevant parties with potential support from donor organisations.	x					
						National and Community Content Programme - In compliance with the LARF, support will be provided through the Livelihood Restoration Plans for PAPs to re-establish community support groups and livelihood groups. Project Proponents will in consultation with local communities, government and civil society, consider investments to restore and improve existing economic activities. These programmes will be aligned with the strategic objectives outlined within the Project National and Community Content Programme and will as far as possible consider how project affected persons can be involved in Project employment opportunities (direct and indirect) and how skills learned on the Project can be applied to other sectors in the local area. Specific training and job readiness support programmes that will be considered will include (but are not limited to): • Improve access to health, water and sanitation	x					
						National and Community Content Programme - Project Proponents will, in consultation with local communities, government and civil society, consider investments to extend livelihood programs (targeting PAPs only) to the wider project affected communities (...). Specific training and job readiness support programmes that will be considered will include (but are not limited to): • Improve access to health, water and sanitation	x		Community Content, Economic Development and Livelihood Plan			
x	x	x	x	Land acquisition and PAPs resettlement, Influx contributing to population growth (indirect), Employment	Deterioration in nutritional status - due to reduction of overall availability of land for farming, increased demand and pressure on available land and other subsistence resources	All workers' needs will be provided for in the camps, which will include living facilities such as kitchen/ dining	x	x	Labour Management Plan			
						Health and wellness education and communication campaigns programme for local communities including nutrition***	x		Community Health, Sanitation, Safety & Security Plan			
x	x	x	x	Employment								Low Beneficial

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
					Improvement in nutritional status - due to increased household income	<p>National and Community Content Programme - In compliance with the LARF, support will be provided through the Livelihood Restoration Plans for PAPs to re-establish community support groups and livelihood groups. Project Proponents will in consultation with local communities, government and civil society, consider investments to restore and improve existing economic activities. These programmes will be aligned with the strategic objectives outlined within the Project National and Community Content Programme and will as far as possible consider how project affected persons can be involved in Project employment opportunities (direct and indirect) and how skills learned on the Project can be applied to other sectors in the local area. Specific training and job readiness support programmes that will be considered will include (but are not limited to):</p> <ul style="list-style-type: none"> • Business management training and links to microfinance; • Food security and agriculture programs (irrigation, crops, vegetables, trees, honey, livestock, fishing); • Improve management of natural resources and access to energy;*** 	x		Resettlement Action Plan			
						<p>National and Community Content Programme - Project Proponents will, in consultation with local communities, government and civil society, consider investments to extend livelihood programs (targeting PAPs only) to the wider project affected communities (...). Specific training and job readiness support programmes that will be considered will include (but are not limited to):</p> <ul style="list-style-type: none"> • Business management training and links to microfinance; • Food security and agriculture programs (irrigation, crops, vegetables, trees, honey, livestock, fishing); • Improve management of natural resources and access to energy*** 	x		Community Content, Economic Development and Livelihood Plan			
						<p>The Road Safety and Transport Management Plan will include a component on Community Road Safety, where additional mitigation measures involving the affected community, local authorities and other project developers will be developed.</p>	x	x				
x	x	x	x	Increase in traffic	Injuries from road traffic accidents	<p>(As part of Community Road Safety) Road safety campaign and initiatives: Agree MoU with local government and Uganda Police about a road safety campaign that will include:</p> <ul style="list-style-type: none"> o Sensitisation on road safety e.g. wearing seatbelt, respecting speed limits, not overloading vehicles, keeping safe distance from other vehicles, safe road crossing, dangers of driving under influence of drugs or alcohol, managing the presence of livestock and cattle crossing roads; o Targeted campaigns and provision of equipment to ensure that bicycle and motorcycle users wear appropriate protective helmets and reflective jackets'; and o Provision of equipment to traffic police to help monitor and enforce speed limits, verification of vehicle safety and driving licenses, use of protective helmets and other driving rules. 	x	x	Road Safety and Transport Management Plan			Low Adverse
						<p>(As part of Community Road Safety) A Community Transport Communication Plan will be developed</p>	x	x	Stakeholders Engagement Plan			
						<p>Health and wellness education and communication campaigns programme for local communities including Community road safety</p>	x					

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
x	x	x	x	Project activities, Influx (requiring an increase in security personnel and government security staff)	Personal injury due to excessive use of force by government or private security staff	The Project will comply with the Voluntary Principles on Security and Human Rights. Project Proponents will agree a MoU with the Uganda Human Rights Commission (UHRC) or any relevant entity for provision of human rights training for all Project security personnel as well as local and regional security personnel in the Voluntary Principles on Security and Human Rights.	x	x	Community Health, Sanitation, Safety & Security Plan			
					Support Central Government working together with Buliisa District Authorities to implement a robust policing system to curtail the increasing criminal tendencies associated to increased influx	x						
x	x	x	x	Project activities	Risk of accident of injury due to community exposure to worksites and Project equipment	During construction and hydrotesting activities, there will be access restrictions to the RoW for safety reasons. Once complete there will be no restrictions to the public using the area	x	x	Physical Environment Monitoring Plan HSE Management System		Insignificant	
					Barriers and fences will be used to isolate work areas.	x	x					
					For the upgraded roads, it will be necessary to cordon off the road (while retaining pedestrian access, where practicable) before widening the road		x					
						Construction activities will be contained within the permanent RoW which will have a 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).		x				
x	x	x	x	Land acquisition and PAPs resettlement, Influx (indirect), Employment	Injury resulting from increase in violence at the household or community level due to introduction of Project related stress factors - in relation to conflicts over land, competition over jobs and resources and increased disposable incomes	RAPs for future land acquisition. Development of further RAPs and LRPs consistent with the goals, objectives, principles and processes described in the LARF and continuously drawing on lessons learned from RAP1. Resettlement planning and implementation will, as far as possible, be undertaken in one go for a defined geographic area/ footprint to minimise disturbance for communities from resettlement activities and to minimise the risk of double displacement	x		Resettlement Action Plan		Low Adverse	
					Health and wellness education and communication campaigns programme for local communities including on the dangers of alcoholism, drug abuse and domestic violence	x		Community Health, Sanitation, Safety & Security Plan				
					Support Central Government working together with Buliisa District Authorities to implement a robust policing system to curtail the increasing criminal tendencies associated to increased influx	x						
					(Workforce code of conduct) Cultural awareness induction training for all new staff regarding local customs, traditions and responsible community relations	x	x	Labour Management Plan				
					Community Engagement Capacity Building programme for local government Measures will be taken to enhance local government's role in community engagement and their capacity to provide proactive information dissemination and feedback on their monitoring activities to local communities. Focus will be placed on communicating around some of the key Project impacts and mitigation measures linked to employment, resettlement and influx, including but not limited to: <ul style="list-style-type: none"> The resettlement process including information about land rights, the valuation process, and mediation mechanisms; Land speculation through community sensitisation, campaign to raise awareness of land rights implemented in partnership with government, local civil society organisations and community leaders; The Project's Local Employment Procedure to anticipate conflicts over Project employment and; The dangers of alcoholism, drug abuse, domestic violence 	x	x	Stakeholder Engagement Plan				
					Increased prevalence of substance misuse (drugs, alcohol, smoking)	(Workforce code of conduct) The camps will operate a strict ban on consumption of alcohol and drugs, and smoking will only be permitted in designated areas	x	x	Labour Management Plan			

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
					due to Project related stress factors - in relation to conflicts over land, competition over jobs and resources and increased disposable incomes	All workers accommodated in Construction Camps will also receive a medical induction and medical check on arrival at camp	x	x				
						RAPs for future land acquisition. Development of further RAPs and LRPs consistent with the goals, objectives, principles and processes described in the LARF and continuously drawing on lessons learned from RAP1.	x		Resettlement Action Plan			
						Health and wellness education and communication campaigns programme for local communities including on the dangers of alcoholism and drug abuse	x		Community Health, Sanitation, Safety & Security Plan			
x	x	x	x	Employment, improved road network, influx	Improved health seeking behaviour - due to increased incomes, improved access	All workers accommodated in Construction Camps will also receive a medical induction and medical check on arrival at camp	x	x	Labour Management Plan			
						National and Community Content Programme - In compliance with the LARF, support will be provided through the Livelihood Restoration Plans for PAPs to re-establish community support groups and livelihood groups. Project Proponents will in consultation with local communities, government and civil society, consider investments to restore and improve existing economic activities. These programmes will be aligned with the strategic objectives outlined within the Project National and Community Content Programme and will as far as possible consider how project affected persons can be involved in Project employment opportunities (direct and indirect) and how skills learned on the Project can be applied to other sectors in the local area. Specific training and job readiness support programmes that will be considered will include (but are not limited to): • Business management training and links to microfinance; • Improve access to health, water and sanitation	x		Resettlement Action Plan			Moderate Beneficial
						National and Community Content Programme - Project Proponents will, in consultation with local communities, government and civil society, consider investments to extend livelihood programs (targeting PAPs only) to the wider project affected communities (...). Specific training and job readiness support programmes that will be considered will include (but are not limited to): • Improve access to health, water and sanitation	x		Community Content, Economic Development and Livelihood Plan			
x	x			Influx contributing to population growth	Overburdening of health services infrastructure and delivery (including emergency health services)	All workers' needs will be provided for in the camps, which will include healthcare	x	x				
						All Construction Camps will be supported by one main medical centre located within the Industrial Area throughout the Site Preparation and Enabling Works, Construction and Pre-Commissioning, and Commissioning and Operations phases. A doctor will also be present and will be responsible for coordinating the satellite facilities located within the Buliisa, Bugungu and Tangi Construction Camps. In addition, all rigs which will be required for the drilling of wells will be equipped with their own sickbay and will be coordinated from the main medical centre based in the Industrial Area. There will also be standby ambulance cover at all times at the Camps and rig sites to cover any emergencies.	x	x	Labour Management Plan			Low Adverse
						Emergency medical care will be provided for all workers (including locally hired day labourers) while they are engaged in Project work	x	x				
						The CHSSS plan will also include measures to work with district health teams and health service providers in influx hotspots to identify gaps and provide capacity building measures amongst local health providers	x		Community Health, Sanitation, Safety & Security Plan			

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						The Project Proponents will, in consultation with relevant stakeholders (local communities and government, donor agencies, NGOs etc.), evaluate the feasibility and consider investments to improve access to and capacity of public infrastructure to meet the increased demand particularly in influx hot spots for the following key services: health, water, sanitation, education, etc.	x					
x	x	x	x	Employment, improved road network, influx	Improved regional health planning and programme delivery due to increased health data available	Provide the District Health Team with information in regards to the identified infectious risks in the environment that Company medical team may have documented amongst the workers at the different facilities.	x	x	Labour Management Plan			Moderate Beneficial
						Disease surveillance and rapid response measures developed in partnership with District Health Teams, local health centres, and the Office for the Prime Minister	x					
						The Project Proponents will also collaborate with the District Health Office and Ministry of Health to produce reporting on key community health and safety indicators	x					
						Workforce Health monitoring and reporting: Disease cases amongst the Project workforce will be monitored and procedures will be put in place for notification to relevant government health agencies and programmes of cases (including the National TB Control Program, Malaria Control Program, AIDS Control Program, and Onchocerciasis Program);	x	x				
				Employment, improved road network, influx, Land acquisition and PAs resettlement	Increase in Non-Communicable Disease (NCD) - due to increased disposable incomes, improved access to products which can favour NCD, increased stress level	The camps will operate a strict ban on consumption of alcohol and drugs, and smoking will only be permitted in designated areas	x	x	Community Health, Sanitation, Safety & Security Plan			Low Adverse
x	x	x	x			Health and wellness education and communication campaigns programme for local communities including nutrition and on the dangers of alcoholism and drug abuse	x					
						RAPs for future land acquisition. Development of further RAPs and LRPs consistent with the goals, objectives, principles and processes described in the LARF and continuously drawing on lessons learned from RAP1.	x					
x	x	x	x	All above	All above	Development of a Community Impact Management Strategy, which will include an overarching policy statement on the key principles of community impact management	x	x	Community Impact Management Strategy			n/a
						Assess feasibility of establishing a mobile clinic to provide healthcare services to communities in Buliisa District particularly those located remote from health centres	x		Community Health, Sanitation, Safety & Security Plan			
						Refresher training for Village Health Teams / Community extension workers	x					
						Health and safety education will be provided for all workers including: o Hygiene training (e.g. hand washing) in worker health and safety induction briefings; o Nutrition and health lifestyle messages as part of continuous employee communications; o Prevention and management of diseases including HIV/AIDS and other STIs, malaria and TB; and o Community road safety.	x	x	Labour Management Plan HSE Management System Workforce Accommodation Plan			

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
x	x	x	x	Project activities	Potential Exposure of Workforce to Insufficient Occupational Health and Safety Standards	All Project staff, including contractors, will be subject to the Project Proponents' Workplace HSE Policies and Standards and the Project's overall HSE Management System	x	x		accommodation specifications and camp management, housekeeping and maintenance practices. - Medical check	conduct independent monitoring or review the data include: OSH Department - MGLSD	Insignificant
						The HSE Standards will require identification of potential hazards to workers will be undertaken prior to the start of each phase and periodically during each phase and appropriate mitigation/controls specified	x	x				
						Develop and implement HSE Policies and Procedures, to include details of required safety measures (including personal protective equipment (PPE)) for construction and maintenance workers	x	x				
						All primary and secondary contractors will implement a health surveillance programme for personnel working in areas where occupational exposures are close to or might exceed occupational exposure limits. Should the surveillance programme indicate any potential problem, further mitigation measures will be used to reduce exposure levels.				Key performance indicators: - HSE training records (employees, contractors, visitors) - Records of Safety inspection and testing of all safety features and hazard control measures and calibration of monitoring equipment; - Incidents statistics (Injuries rates, number of incidents by types including high potential incidents, number of occupational illnesses) - Anomaly reporting frequency - Incident investigation statistics (number of root cause analysis, rate of closure of actions from incidents) - Indicators on emergency preparedness (number of emergency drills) - HSE audits / inspections (number, actions closure rate) - HSE communication (number of HSE committees, HSE alerts)		
						All Construction Camps will be supported by one main medical centre located within the Industrial Area throughout the Site Preparation and Enabling Works, Construction and Pre-Commissioning, and Commissioning and Operations phases. A doctor will also be present and will be responsible for coordinating the satellite facilities located within the Buliisa, Bugungu and Tangi Construction Camps. In addition, all rigs which will be required for the drilling of wells will be equipped with their own sickbay and will be coordinated from the main medical centre based in the Industrial Area. There will also be standby ambulance cover at all times at the Camps and rig sites to cover any emergencies.	x	x				
						All workers, contractors and subcontractors accommodated in Construction Camps are required to complete a fitness for work assessment prior to coming to site.	x	x				
						The Project Proponents will develop an Infection Prevention and Control Program to minimise the transmission of infectious diseases and to prepare for and prevent disease outbreaks.	x	x				
						All workers accommodated in Construction Camps will also receive a medical induction and medical check on arrival at camp	x	x				
						Emergency medical care will be provided for all workers (including locally hired day labourers) while they are engaged in Project work	x	x				
						Working hours will be based on the normal work day in line with Ugandan law	x	x				
						As per base case, there will be no routine night shift activities associated with the Site Preparation and Enabling Works Phase	x	x				
						The project will provide a Workforce Accommodation Plan	x	x				
						Developing and implementing a Road Safety and Transport Management Plan that will outline speed limits and setting and enforcing traffic management measures (e.g. 40 km/hr), and indicating vehicles should be driven at steady speeds observing the speed limit and not making unnecessary noise, such as sounding horns, etc.	x	x	Road Safety and Transport Management Plan			
						Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods						

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
					Where possible, selection of low-noise rated machinery and generators		x					
					Noise abatement of drilling equipment, for example by use of mufflers, or noise barriers and enclosures where appropriate, especially during night time operations		x					
					For the CPF, equipment will be designed to achieve occupational noise level compliance of 85dBA at 1 metre (which is an industry accepted standard) where practicable		x					
					All fuels and hazardous materials will be stored within appropriate bunds and drip trays, providing appropriate containment, where practicable	x	x					
					Chemicals and hazardous liquids will be supplied in dedicated tote tanks made of sufficiently robust construction to prevent leaks/spills. Dedicated procedures will be developed for fuel and hazardous material transfers and personnel will be trained to respond. Spill kits will be available at all storage locations	x	x					
					<ul style="list-style-type: none"> Mud Products will comply with Uganda's Health, Safety and Environment Regulations. Only Chemicals ranked E or D in the OCNS (Oil Chemical National Scheme classification) will be allowed to be used; All products for completion and drilling fluids will be free of chlorides; the upper limit will be 2% by weight; All Products entering in the mixing of drilling, completion and cementing will be free of aromatic Hydrocarbon, the upper limit is fixed at 300 parts per million (ppm); and No asphalt, no gilsonite, nor equivalent so called "black" products will be permitted in the drilling fluids and cementing formulations. 		x		Spill Prevention Plan Chemicals Management Plan			
					A Chemical Management Plan will be developed that will describe the selection, transport, storage and usage processes as well as mitigation measures against releases or toxic effects and spill contingency measures in case of spills. The plan will be based on the results of Chemical Risk Assessment	x	x					
					MSDS for any chemicals are to be displayed at the point of storage	x	x					
					A Waste Management Plan will be developed and maintained to cover the duration of the Project; and will address the anticipated waste streams, likely quantities and any special handling requirements. The Project Proponents will implement a waste tracking system to ensure traceability of all the wastes removed off site	x	x					
					LSA/NORM monitoring strategy shall be developed and implemented for development drilling and production phases. In the event that presence is detected, a suite of management procedures shall be developed to ensure that any LSA/NORM contaminated materials and wastes are stored and managed appropriately	x			Waste Management Plan			
					Sewage produced from the camps and other Project Areas will be treated at the WWTPs located at the camps in compliance with regulatory requirements. Wastewater from the well pads will be collected and transferred by tanker to the nearest WWTPs	x	x					

Project Phase					Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning	Company				Contractor					
* Showing the most significant one ** MARPs are population groups that are recognised as being more at risk than others of contracting HIV/AIDS. *** These mitigations are expected to also play a role in mitigating impact of deterioration in nutritional status													
ECOSYSTEM SERVICES													
x	x			Land acquisition and PAPs resettlement, increased traffic	Loss of land for crop production	RAPs for future land acquisition. Development of further RAPs and LRPs consistent with the goals, objectives, principles and processes described in the LARF and continuously drawing on lessons learned from RAP1. Resettlement planning and implementation will, as far as possible, be undertaken in one go for a defined geographic area/ footprint to minimise disturbance for communities from resettlement activities and to minimise the risk of double displacement	x		Resettlement Action Plan	Rf. To monitoring mechanisms and key performance indicators under Social ESMP for RAP	Low Adverse		
					Disruption to pathways used by communities to travel around farming area; impacts on movement of livestock and their herders across the study area	There will be no permanent access restrictions to the pipeline RoW	x		Community Content, Economic Development and Livelihood Plan (CCEDLP)				
						A Road Safety and Transport Management Plan will be developed prior to commencing the Construction and Pre-Commissioning Phase	x	x	Road Safety and Transport Management Plan Journey Management Plan				
						A Compensation Procedure that provides standard and transparent compensation agreements for any accidental or unexpected damage directly due to the Project activities to either individual or community assets will be developed by the Project Proponents (...)	x	x	Community Impact Management Strategy				
					Changes in land tenure systems	The Project Proponents will provide support to the MLHUD and Buliisa District Government to develop a District Land use Plan through financing of a study that can be used as basis of such planning. (...)	x		Community Content, Economic Development and Livelihood Plan (CCEDLP)				

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
					Temporary and permanent loss of land previously used for collecting wild foods.	In compliance with the LARF, support will be provided through the Livelihood Restoration Plans to re-establish community support groups and livelihood groups. Project Proponents will in consultation with local communities, government and civil society, consider investments to restore and improve existing economic activities such as fishing, crop farming, livestock farming, and trade, as well as programmes that support economic diversification for project affected persons. These programmes will be aligned with the strategic objectives outlined within the Project National and Community Content Programme and will as far as possible consider how project affected persons can be involved in Project employment opportunities (direct and indirect) and how skills learned on the Project can be applied to other sectors in the local area. Specific training and job readiness support programmes that will be considered will include (but are not limited to): - Adult Literacy and Numeracy (including Financial literacy) - Business management training and links to microfinance; - Vocational training and linkage to employment; - Food security and agriculture programs (irrigation, crops, vegetables, trees, honey, livestock, fishing); - Improve management of natural resources and access to energy - Improve access to health, water and sanitation - Social assistance for vulnerable groups	x		Resettlement Action Plan			
x	x			Site clearance, physical footprint	Clearance of vegetation resulting in decrease in local and global climate regulation	Avoidance of sensitive features where feasible (e.g. Wooded areas identified and listed as sensitive features and considered for avoidance as much as practicable in project design),	x	x	Biodiversity and Ecosystem Services Management Plan Community Impact Management Strategy	Rf. To monitoring mechanisms and key performance indicators under Biodiversity sections of ESMP		Low Adverse
						Project footprint minimisation	x	x				
					Decrease in hazard regulation	Use of concrete or other impermeable surfacing material at sites will be minimised. These materials will be used only at those areas that absolutely require it		x	Physical Environment Monitoring Plan			
x	x	x	x	Influx, Improved road network, PAsP resettlement, Workforce presence	Reduced supply of timber and woody biomass / Increased demand for timber and woody biomass Increased pressure on fisheries Increased access to collection areas and demand for fibrous and ornamental materials Increased collection of biochemicals/natural medicines materials from MFNP and Budongo Forest Reserve Impacts on hunting activities	Development of an Influx Management Strategy to mitigate in-migration impacts and maximise benefits for local communities. Implementation of the strategy will depend on joint coordination between the Project, government, other project developers, local communities and civil society. (...) Specifically, the Influx Management Strategy will include (but is not limited to): i. Working with local government in in-migration hot spots and building their capacity in dealing with impacts. ii. Reviewing the range of management plans which will deal with in-migration impacts and ensuring each Project department is putting in place the required measures. iii. Monitor in-migration impacts with local government and continue to provide capacity building support and report on findings to the Social Affairs Department iv. The Project will roll out a series of education campaigns and capacity-building training to the PACs on a range of key in-migration impacts including on: - The Project's Local Employment Procedure to anticipate conflicts over Project employment and - The dangers of alcoholism, drug abuse, domestic violence, prostitution and safe sex.	x	x	Influx Management Strategy	Monitoring Mechanisms: Specific monitoring & evaluation framework to measure project-induced in-migration trends, hotspots extent rates and key impacts to be proposed as part of Influx Management Strategy - this will include: - Analysis of aerial / satellite imagery of the local settlements in order to assess their expansion. Data to be acquired annually until	Project Proponents Strategic collaboration platforms will be established with local and regional authorities and other stakeholders as appropriate to regularly evaluate and review the extent of indirect effects, share understanding of causes and	Moderate Adverse (Ecosystem Services Capture fisheries; Wild foods and bushmeat)

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
					<p>The in-migration risk assessment will be regularly updated based on monitoring data to assess which protected areas, species and habitats are most at risk of indirect impacts, both imminently and in the foreseeable future</p> <p>Project Recruitment Centres locations should be defined in consideration of potential impacts it may generate on protected areas and unprotected forest areas</p>	x			<p>the end of construction</p> <ul style="list-style-type: none"> - Administering household survey for the purpose of analysing changing dynamics related to in-migration in potential hotspots. The targeted settlements should include the identified in-migration hotspot and select one village that is not expected to experience in-migration as part of the survey to be a control group. - Stakeholder Engagement 	<p>identify adapted or additional mitigation requirements</p> <p>Monitoring of in-migration impacts will be done jointly between Project Proponents and local government</p> <p>Relevant Government agencies who may conduct independent monitoring or review the data include: District Physical Planning Department, Ministry of Lands, Housing and Urban Planning, Ministry of Internal Affairs NEMA, UWA, NFA, WMD, DWRM, Regulatory agencies responsible for infrastructure.</p>		
					<p>Project Proponents will, in consultation with local communities, government and civil society, consider investments to extend livelihood programs (targeting PAPs only) to the wider project affected communities, in order to improve food security and economic resilience of affected communities, develop local capacities and enhance activities such as fishing, crop farming, livestock farming, and trade, as well as programmes that support economic diversification. These programmes will be aligned with the strategic objectives outlined within the Project National and Community Content Programme and will as far as possible consider how affected communities can enhance their capacity to participate in the project supply chain, and how skills learned on the Project can be applied to other sectors in the local area. Specific training and job readiness support programmes that will be considered will include (but are not limited to):</p> <ul style="list-style-type: none"> • Institutional capacity building (targeting local government, local institutions); • Adult Literacy and Numeracy (including Financial literacy); • Business management training and links to microfinance; • Vocational training and linkage to employment; • Food security and agriculture programs (irrigation, crops, vegetables, trees, honey, livestock, fishing); • Improve access to education and employability of youth and in particular girl & women empowerment; • Improve management of natural resources and access to energy; • Improve access to health, water and sanitation; and • Social assistance for vulnerable groups. 	x	x (vocational training and linkage to employment)	<p>Community Content, Economic Development and Livelihood Plan (CCEDLP)</p>	<p>Key Performance Indicators:</p> <ul style="list-style-type: none"> - Progress of development and implementation of land-use planning - Progress and development of training and job readiness support programmes for PACs - Changes in land-use - Progress of development and effectiveness of institutional capacity building and public infrastructure programmes - Number of meetings held on indirect effects monitoring with local and regional authorities <p>Ecosystem Services Impact</p> <ul style="list-style-type: none"> - In-migration and population changes - Access to potable water - Changes to community health profile including 			
					<p>The CHSSS plan will also include measures to mitigate impact of increased demand for natural medicines and rise in harvesting pressures on medicinal plants and animals</p>	x		<p>Community Health, Sanitation, Safety & Security Plan</p>	<p>- Progress of development and effectiveness of institutional capacity building and public infrastructure programmes</p> <p>- Number of meetings held on indirect effects monitoring with local and regional authorities</p> <p>Ecosystem Services Impact</p> <ul style="list-style-type: none"> - In-migration and population changes - Access to potable water - Changes to community health profile including 			

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
										(...) availability and quality of water resources, sanitation, food insecurity and nutritional status		
					Community Wildlife Conflict Prevention: The community-wildlife conflict prevention program will align with the goals and actions set out in the Community-Based Wildlife Crime Prevention Action Plan (2017-2023) prepared by UWA (April 2017). Specific actions include:				Community Environmental Conservation Plan	Rf. To monitoring mechanisms and key performance indicators under Biodiversity sections of ESMP		
					Measures to minimise human-wildlife conflict will be implemented. This will include provision of livestock management training, fencing (where appropriate) and other initiatives	x	x		Biodiversity and Ecosystem Services Action Plan			
					Resettlement Action Plans (RAPs) will provide measures to avoid resettling people within or closer to sensitive habitats or protected areas in order to avoid placing any additional pressure on natural or critical habitats. Any longer term monitoring requirements related to this issue will be agreed with relevant Ugandan departments and international interested groups, where relevant.	x			Resettlement Action Plan	Rf. To monitoring mechanisms and key performance indicators under Social ESMP for RAP		
					Labour Management plan - Workforce code of conduct o Rules to forbid staff/contractors from purchasing charcoal & provide sensitisation against unsustainable use of firewood and charcoal; and o General site rules will include ban on bushmeat hunting/purchase for employees and employee sensitisation against bush meat hunting/purchase (Within component on environmental awareness training)	x	x		Labour Management Plan	Rf. To monitoring mechanisms and key performance indicators under Social ESMP for Impact on Welfare of Workers		
x	x	x	x	Water abstraction, drainage, sewage discharge, accidental releases	Impact on groundwater availability (Type 1 and Type 2 impact)	The installation of boreholes across the Project Area is subject to the outcome of the Water Abstraction Feasibility Study currently being undertaken by the Project Proponents	x		Water Management Plan			
					Degradation of groundwater quality including potential contamination of drinking water	Management of influx hotspots through support of public infrastructure. The Project Proponents will, in consultation with relevant stakeholders (local communities and government, donor agencies, NGOs...), evaluate the feasibility and consider investments to improve access to and capacity of public infrastructure to meet the increased demand particularly in influx hot spots for the following key services: health, water, sanitation, education, etc. (...)	x		Community Health, Sanitation, Safety & Security Plan	Rf. To monitoring mechanisms and key performance indicators for Hydrogeology and Surface water impacts		Low Adverse
						(Site preparation and Enabling Works, Construction and Pre-Commissioning): Surface water will be managed via temporary sustainable drainage systems (SuDS) to manage flood and contamination risk. The requirements for construction SuDS will be adapted depending on the nature of the activities		x	Surface Run Off and Drainage Management Plan			

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning	Company				Contractor					
						<p>With the exception of the CPF which has a bespoke drainage arrangement, drainage arrangements for the permanent facilities will be as follows:</p> <ul style="list-style-type: none"> - Potentially contaminated areas (i.e. fuel and chemical storage areas) will be provided with local effluent collection (sumps, kerbing and bunding) whereby the potentially contaminated water will be collected and removed by road tanker to a licenced waste disposal facility; and - Uncontaminated areas which will drain naturally to the environment via Sustainable Drainage System (SuDS) comprising filter drains and soakaways. The SuDS design is subject to further detailed design. Sampling points will be established for all potentially contaminated areas to enable samples to be collected for analysis 		x					
						Contaminated run off will be minimised by ensuring adequate storage facilities are in place for materials stockpiles, waste, fuels/chemicals/hazardous materials, vehicles/washing areas, parking facilities			x				
						Develop and implement a Spill Prevention Plan, incorporating secondary containment as far as practicable for liquids contained on site	x	x		Spill Prevention Plan			
						A Chemical Management Plan will be developed that will describe the selection, transport, storage and usage processes as well as mitigation measures against releases or toxic effects and spill contingency measures in case of spills. The plan will be based on the results of Chemical Risk Assessment	x	x		Chemicals Management Plan			
						A Waste Management Plan will be developed and maintained to cover the duration of the Project; and will address the anticipated waste streams, likely quantities and any special handling requirements. The Project Proponent's will implement a waste tracking system to ensure traceability of all wastes removed off site.	x	x		Waste Management Plan			
						Sewage produced from the camps and other Project Areas will be treated at the WWTPs located at the camps in compliance with regulatory requirements. Wastewater from the well pads will be collected and transferred by tanker to the nearest WWTPs	x	x					
x	x	x	x	Land Acquisition and PAs resettlement, Site clearance and earthworks, traffic, Use of industrial plant (such as compressors, pumps, turbines and generators), Storage of	Impacts on traditional knowledge, skills, practices, rituals, festive events and religion. Damage to or the removal of specific cultural/spiritual sites	<p>Archaeological investigation and recording will be undertaken, including</p> <ul style="list-style-type: none"> - A detailed walkover survey; - If required Archaeological test-pit evaluation (undertaken as part of a post-ESIA Setting Out/ Pre-Construction Ground Clearance Survey); - Archaeological investigation and recording (excavation); - Archaeological watching briefs alongside some groundworks; - Preservation in situ of significant archaeological sites, where necessary; and - Appropriate expert assessment, analysis and reporting on fieldwork 	x	x		Cultural Heritage and Archaeological Management Plan	Rf. To monitoring mechanisms and key performance indicators for impacts on Archaeology and Cultural Heritage		Low Adverse

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor					
				equipment and materials, flaring, physical presence, water abstraction and effluents discharge		Cultural Heritage Awareness Training Project Proponent and contractor staff are to receive Cultural Heritage Training which will include training in community relations, respect of local cultural norms and the Chance Find Procedure It is recommended that fieldwork involves a component of training and capacity building of university students and employing them as assistants to give them field experience, developing local skills and capacity in rescue archaeology.	x	x					
						Community Cultural Heritage and Archaeology - Support cultural activities and enhance the preservation and awareness of cultural heritage and traditions including language. The focus of programme activities will be identified through consultation with local communities and cultural leaders and will take into consideration recommendations included in the 2017 'guidelines by cultural institutions for oil and gas'. Where appropriate, outreach activities will be undertaken to involve local communities, particularly schoolchildren, in understanding and caring for their past	x						
						All chance finds will be reported, adequately protected with temporary flagging and promptly assessed by a qualified archaeologist	x	x					
						Resettlement Action Plan. The LARF will be implemented prior to the start of the Project and 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, and livelihood restoration	x						Resettlement Action Plan
						(Workforce code of conduct) Cultural awareness induction training for all new staff regarding local customs, traditions and responsible community relations	x	x					Labour Management Plan
						All site clearance activities will be undertaken in line with the Site Clearance Plan which will be developed by the Contractor(s) prior to commencing the Site Preparation and Enabling Works Phase to limit extent of vegetation clearance, wherever possible		x					Site Clearance Plan
						Laydown areas at each of the well pad sites will be located within the footprint of the well pad; there will be no additional site clearance required outside the well pad footprint during the Construction and Pre-Commissioning Phase;		x					Physical Environment Monitoring Plan
						Construction activities will be contained within the permanent RoW which will have a 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);		x					
x	x	x	x	Land acquisition and site clearance, civil works, roads upgrade and construction; construction and drilling,	Decrease in Tourism activity (and associated Revenue) - due to the Project activities which may impact on key species (from habitat loss and degradation within MFNP), generation of noise, associated visual impact which may deter Visitors to MFNP and result in	For work activities located close to noise sensitive receptors, mitigation measures will be implemented to minimise the impact. A range of specific noise mitigation measures shall be implemented to minimise impacts. Such measures shall be implemented on a case by case basis and may include the use of temporary abatement such as dampening and shielding techniques, noise barriers, and mufflers. Specific noise regulations and thresholds will be specified in the Noise and Vibration Management Plan		x	Noise and Vibration Management Plan	Rf. To monitoring mechanisms and key performance indicators under Environmental ESMP for impacts on Noise and Vibration, Landscape and Visual, Terrestrial Vegetation, Terrestrial Wildlife and Social ESMP for impacts on Tourism	Moderate Adverse		

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
				decommissioning, increased traffic	reduced Access to Key Visitor Sites within MFNP	An additional detailed review of the noise generated by various project activities at each key Project component will be undertaken when the construction and drilling contractors are defined. Should significant potential impacts be identified, appropriate mitigation measures will be undertaken		x				
						The Site Clearance Plan will be developed to structure and schedule clearly site clearance activities, noting any constraints		x	Site clearance plan			
						The pipe laying and backfill activity is to be conducted as soon as practicable after the trench excavation utilising standard pipe laying cranes and earthmoving equipment.		x	Biodiversity and Ecosystem Services Action Plan			
						The Production and Injection Network RoW will be restored in line with the Site Restoration Plan as developed by the Contractor specifically for the RoW		x	Site Restoration Plan			
						All borrow pits and quarries used by Project Proponents will be re-habilitated following completions of extraction in line with the Site Restoration Plan as developed by the Contractor	x	x				
						Depending on the final land use agreed with the Ugandan authorities, all or part of the site may need to be rehabilitated. In such circumstances, the Project Proponents will also develop a monitoring programme for completion criteria to verify that the sites are being returned to the agreed representative state	x	x				
						The detailed Site Restoration Plan will be implemented and at each site this will be monitored for success of vegetation establishment (i.e. where plants do not take successfully), erosion issues and presence of invasive species to ensure that all sites are effectively restored. Where such problems are encountered, further planting, site re-profiling and other remedial measures will be taken to ensure that site restoration is completed satisfactorily to the agreed standard or coverage and plant composition, which should match reasonably the sounding vegetation by the end of the restoration process	x	x				
						The temporary land required for the HDD Construction Areas roads will be restored following construction in line with the Site Restoration Plan as developed by the Contractor	x	x				
						All transportation will be compliant with applicable road transport regulations. In the Project Area, routine transportation operations will normally only occur in day light. Deliveries of equipment and the movement of people will be scheduled in convoys, where practicable	x	x	Road Safety and Transport Management Plan			
						Vegetating stockpiles of material remaining on site for a significant amount of time to merge with the surroundings as much as practicable	x	x	Landscape Management Plan			
						Landscaping, including earth bunds around well pads within the park will be established, and will be covered with topsoil and plants associated with the immediate vicinity and monitored and maintained to ensure success and stability of these bunds. Consideration will be given to the need to avoid attracting animals (e.g. the oasis effect in dry seasons)	x	x				
				Use of lights, for example on well pads, will be minimised, and light spill controlled (e.g. restricted lighting height, shading light sources and/or direct them onto site areas)	x	x						

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
						Design the Project to use materials on the infrastructure that will minimise glare, as much as practicable		x				
						Consideration shall be given to planting naturalistic woodland/bush to blend subject to site specific conditions		x				
						A pilot scheme for wetland restoration will be linked to the Restoration Plan - developed in partnership with WMD and DWRM	x		Wetland Management Plan			
						A Wetland Management Plan will be established to ensure no disruption to wetland areas. The main measures will comprise avoiding and minimising impacts on wetlands and restricted exclusion zones	x	x				
						Discussions will be held with UWA regarding the MFPA Management Plan in consideration of O&G development, burning regimes and animal species management initiatives to minimise further loss of suitable habitat and improve habitat quality in surrounding areas of habitat, similar to that which is lost	x		Biodiversity and Ecosystem Services Management Plan			
						A Tourism Management Plan that sets out objectives and procedures for managing relationships with and working with key tourism stakeholders to minimise potential negative effects of the Project on tourism and maximising benefits will be developed by the Project Proponents. It will include: - A communication plan - Feasibility study of alternative tourism routes - Feasibility of opening a visitor centre at a central tourism location - Feasibility of implementing educational visits - Support to tourism stakeholders to develop a strategy to promote tourism nationally and internationally	x	x (communication plan through SEP)	Tourism Management Plan			
						Consider the tourism peak season (as identified in the baseline) when scheduling Project activities as much as practicable.	x	x				
						If significant impacts on tourism which result in loss of revenue are identified (through a detailed assessment conducted by a suitable and qualified organization selected by the project proponent), options to provide in-kind support UWA in the management of MFNP will be assessed (in compliance with project anti-bribery and anti-corruption policies).	x					
x	x	x	x	All above		Building capacity for a participatory approach to social impact management, monitoring and evaluation. A participatory model, in partnership with national and local government agencies, relevant NGOs or CBOs, will be followed for the planning and implementation of community programmes to manage and monitor community impacts. Ongoing capacity building support will be provided to help communities and implementing institutions develop competence in prioritising, planning, managing and monitoring development projects and programmes.	x		Community Health, Sanitation, Safety and Security Plan	Rf. To monitoring mechanisms and key performance indicators under Social ESMP for impacts related to Community Empowerment and Increased Community Participation in Decision Making		n/a
						Measures will be taken to enhance local government's role in community engagement and their capacity to provide proactive information dissemination and feedback on their monitoring activities to local communities. Strengthening technical capacity will need to be supported with an increased resource capacity provided through local and national government budget allocation to provide for sufficient resources to mobilise to communities and undertake engagement activities. (...)	x		Stakeholder Engagement Plan			

Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Residual Significance*	
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor					
						<p>A number of environmental conservation initiatives will be undertaken in partnership with local communities, UWA, environmental and tourism organisations, following feasibility studies, to mitigate the project impacts and to give communities a sense of ownership over the management of their local environment and natural resources. Options that will be considered include but are not limited to:</p> <ul style="list-style-type: none"> • Extension of tree nurseries (including for trees with medicinal values, tree cover, honey for medical and other purposes); • Promotion of alternative fuel use e.g. solar technology, briquettes, fuel saving/efficient cooking stoves business development; • Sensitisation on poaching and illegal fishing; • Sensitisation on the environmental consequences of deforestation, overgrazing, and over-harvesting of natural resources; • Community based fisheries management and monitoring programme that will entail engagement of communities through BMUs or other suitable local structures engaged in fisheries management e.g. beach landing sites to give them a sense of ownership over the management of their local environment and natural resources. Engage with UWA, National Fisheries Resources Research Institute (NaFIRRI), Ministry Agriculture, Animal Industry and Fisheries and Ministry of Defence to discuss options to support management and monitoring of fishing activities in Lake Albert and rivers within the Project Area e.g. through establishment and better management of protected zones, provision of equipment, advice on designing and implementing monitoring systems, joint training of communities on monitoring and conservation activities; • Sensitisation on the environmental consequences of deforestation, overgrazing, and over-harvesting of natural resources; • Community based tourism and conservation programs to develop alternative forms of income; and • Joint planning with environment and social teams to look at opportunities for both community forest use and use of tree plantations for conservation and to provide buffers around protected areas. This will draw on existing research. 	x		Community Environmental Conservation Plan	<p>Monitoring Mechanisms:</p> <ul style="list-style-type: none"> - As indicated above under influx management strategy <p>Key Performance Indicators:</p> <ul style="list-style-type: none"> - In-migration and population changes - Access to natural resources - Access to modern forms of energy - changes In land use 	Project Proponents, in collaboration with other stakeholders including UWA	Relevant Government bodies that may conduct independent monitoring or review the data include: PAU, NEMA, NFA, UWA, MLHUD Physical planning, NaFIRRI.	
x	x	x	x	Biodiversity and socio-economic baseline studies	Improved knowledge of the region due to changes in the area being of ecological, anthropogenic, economic, historical and sociological interest.	n/a	n/a	n/a	n/a	n/a	Moderate Beneficial		

* Showing the most significant one

UNPLANNED EVENTS												
Project Phase				Activity	Potential Impact description	Impact mitigation / Enhancement measure	Responsibility for implementation		Management Plan	Monitoring Mechanism / Performance Indicators	Monitoring Responsible party	Potential Significance* <i>Unplanned events are generally characterised by a low probability however if they did occur and in some circumstances they have the potential to result in high adverse significant events</i>
Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
x	x	x	x	Road traffic	Traffic accidents may result in injury to people, livestock and wildlife	Developing and implementing a Road Safety and Transport Management Plan that will outline speed limits and setting and enforcing traffic management measures (e.g. 40 km/hr), and indicating vehicles should be driven at steady speeds observing the speed limit and not making unnecessary noise, such as sounding horns, etc.	x	x	Road Safety and Transport Management Plan	Monitoring Mechanisms: - Vehicle speed trackers - Stakeholder Engagement Key Performance Indicators - Rate of traffic incidents involving Project vehicles - Records of over speeding - Compliance with defensive driving training - Number of traffic-related grievances received / addressed - Number of anomalies linked to transport	Project Proponents and Project contractors	Whilst the consequences of minor road traffic incidents could be negligible, any road traffic collisions resulting in one or more serious injuries or fatalities would be High Adverse
						For the upgraded roads, it will be necessary to cordon off the road (while retaining pedestrian access, where practicable) before widening the road.		x				
						Roads will be well maintained to keep the roads usable.	x	x				
						Construction activities will be contained within the permanent RoW which will have a 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).		x				
						The base case for Tilenga is that there will be no night driving. However, night driving may be permitted in exceptional circumstances and with internal derogation where it is deemed safe and practicable to do so	x	x				
						Drivers will be required to have a break every 2 hours of driving.	x	x				
				Use of construction equipment and power generation equipment, may result in: - Accidental release (i.e. spillage and leakage) of chemicals, fuels or wastes - Fire*** - Damage to third party assets - Other accidents - Accidental introduction of alien / invasive species****	Accidental release may result in degradation of environment and habitat quality, direct loss of species	Vehicle/equipment maintenance should only be done in designated areas	x	x	Spill Prevention Plan	Monitoring Mechanisms: - Weekly site inspections, audits (as per annual audit plan) - Recording of anomalies and incidents - Stakeholder Engagement - Equipment inspection, calibration and maintenance Key Performance Indicators: - Quality of physical environment parameters (water, soil, air) with comparison to pre-project conditions	Project Proponent and Project Contractors	Low to High Adverse , depending on the sensitivity of the receptor where the incident occurs.
						Regular inspection, servicing and maintenance of vehicles and plant to ensure they are operating as per manufacture's specification. Use manufacturer approved parts to minimise potentially serious accidents caused by equipment malfunction or premature failure	x	x				
						All fuels and hazardous materials will be stored within appropriate bunds and drip trays, providing appropriate containment, where practicable.	x	x				
						Where practicable, equipment will be located under shelters to prevent the ingress of rainwater	x	x				
						Buffer zones will be established to protect watercourses and habitats	x	x				
						Ensure spill response equipment (including sampling and personal protective equipment) is readily available on site to contain and clean any spillages as soon as reasonably practicable after the event**	x	x				
						A Chemical Management Plan will be developed that will describe the selection, transport, storage and usage processes as well as mitigation measures against releases or toxic effects and spill contingency measures in case of spills. The plan will be based on the results of Chemical Risk Assessment**	x	x				
						Develop and implement a Spill Prevention Plan, incorporating secondary containment as far as practicable for liquids contained on site**	x	x				
An Oil Spill Contingency Plan to be established. This will define notification procedure, response strategy, means, and post-spill actions such as clean-up, monitoring, etc. in the event of uncontrolled/accidental discharge**	x	x										
Emergency spill response teams will have appropriate training to handle all types of spills**	x	x										

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Site Preparation and Enabling Works	Construction and Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
					A 24 hour emergency response team will be established**		x	x				
					In case of an unplanned event resulting in confirmed contamination of groundwater an alternative source of water supply to affected communities will be considered**		x	x			- Stakeholder Engagement conducted	
				Fire may cause Injury to people, livestock and wildlife, loss / damage of assets and habitat	Fire risk associated with Project facilities will be minimised through: - The established buffer zones around the CPF, well pads and construction areas; - Competent personnel for supervision and response for firefighting; - The definition and enforcement of strict control measures, including the implementation of a "permit to work" system for hot works with spark potential such as welding, grinding, cutting etc.; - Use of dedicated fire waters, mobile fire protection measures (fire trucks and mobile firefighting measures); - Controlling Smoking with the use of designated smoking areas for workers during all phases of the Project; - Other ignition sources will also be prohibited, dry vegetation will be removed from the RoW and from areas close to hot works; and - Fire breaks, which are cleared areas of vegetation to prevent spread of fire, will also be introduced around higher risk activities and specified in the Community Health, Sanitation, Safety & Security Plan		x	x	Emergency Response Plan Site Clearance Plan		- Number of spill and emergency response exercises - Number of trained personnel - Number of anomalies and incidents recorded - Number of grievances received / addressed - Maintenance records - Certification of safety and environmental critical elements	Whilst the impact significance of a small, localised fire in an area of Low or Moderate receptor sensitivity might be Low Adverse, the impact of a major fire resulting in harm to the personnel, the community, wildlife or loss of critical habitat would be High Adverse significance.
					(Wellpads) There will be a 15 m wide buffer from the perimeter security structure, which will be cleared of vegetation.				x			
					There will be diesel powered firewater pumps (including one backup pump) provided to ensure appropriate fire protection for the Central Processing Facilities (CPF).		x					
					Regular servicing and maintenance of plant to ensure they are operating as per manufacturer's specification. Use manufacturer approved parts to minimise potentially serious accidents caused by equipment malfunction or premature failure		x	x	Road Safety and Transport Management Plan			
				Economic Loss due to damage to third party assets	There are no known underground or overhead utilities in the Project Area, however local and national utilities companies will be consulted and utilities maps reviewed by the Contractors prior to commencement of site works		x	x	Physical Environment Monitoring Plan			Low to Moderate Adverse, depending on the scale of the incident and location
					Should any utilities be identified or suspected, certain equipment may be prevented from using the right of way to avoid accidental damage. Procedures to stop work will also be implemented until the nature of the services can be established and the risk deemed safe. Project construction activities would restart following the definition of appropriate working methods which would avoid impacting upon the integrity of the subject services and/or the health and safety of the workers		x	x				
				Accidents that extend the impact, e.g. dropping pipe segments outside the designated working areas may result in injury to people, livestock and wildlife, loss/damage of assets and habitats	Allow only trained and accredited (as required) personnel in the use of machines			x	Spill Prevention Plan			Insignificant to High Adverse, depending on the location and magnitude of the incident

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Site Preparation and Enabling Works	Construction and Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
					Accidental introduction of alien / invasive species may result in Habitat or ecosystem loss, direct loss of species	An Alien/Invasive Species Management Plan will be developed and implemented	x	x	Alien/Invasive Species Management Plan			Insignificant to Moderate Adverse depending on the sensitivity of the receptors where the incident occurs
x	x	x		Third party activity may result in:	Fire may cause Injury to people, livestock and wildlife, loss / damage of assets and habitat	*** Mitigation similar to those above apply						Low to High Adverse, depending on the location and magnitude of the incident
				- Fire (caused either by public or nature, e.g. lightning strike requiring evacuation of the site)	Protests and communal violence may result in injury to community and workers, damage / loss of assets	A Stakeholder Engagement Plan is already in place; this will ensure the community are informed both prior to the commencement of work on site, during the works on a regular basis and after. A Grievance Mechanism will be established for the local community to raise compliant and concerns relating to Project activities (i.e. dust, noise etc.).	x	x	Stakeholders Engagement Plan	Low Adverse		
				- Protests and communal violence	Seismic activity may damage assets which in turn could result in a major accidents	Given that the Project Area is located within the EARS, the Project Proponents will establish a Passive Seismic Network programme, of seismograph stations in the area to enable detection of naturally occurring seismic events.	x		Physical Environment Monitoring Plan	Moderate to High Adverse, depending on the sensitivity of the affected receptors		
				- Sabotage of equipment	Sabotage of equipment may damage assets which in turn could result in a major accidents	The Project Proponents will undertake analysis of archive images from Interferometric Synthetic Aperture Radar (InSAR) for ground movement data in the Project Area.	x					
				It also includes:	Sabotage of equipment may damage assets which in turn could result in a major accidents	Barriers and fences will be used to isolate work areas.	x	x	HSE Management System	Low to High Adverse, depending on where the sabotage occurs and the receptor sensitivity		
				- Seismic activity	Damage to equipment by animal	(Wellpads) There will be a 15 m wide buffer from the perimeter security structure, which will be cleared of vegetation. Within the MFNP, the structure will be designed to prevent the ingress of animals entering the well pads and will comprise a bund wall structure.			x	Site Clearance Plan	High Adverse in the case where a major incident affects sensitive receptors	
- Damage to equipment by animal	Health epidemics	Spread of illness or disease into the local community or wildlife	The Community Impact Management Strategy will set out overall objectives and targets for management of impacts on community health, safety and security	x	x	Community Impact Management Strategy	Moderate Adverse					

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
	x			Wells drilling	Loss of drilling muds, fluids and chemicals may result in contamination of soils and groundwater	All wells will be drilled using a Blow Out Preventer (BOP) system prior to entering hydrocarbons bearing reservoirs to prevent an uncontrolled release of hydrocarbons in the event that well control issues are experienced during drilling.	x	x	Emergency Response Plan Blow Out Contingency Plan HSE Management System		Moderate to High Adverse depending on the location (and therefore receptor sensitivity) of the incident	
	x	x			Well Blowout could result in contamination of soils, groundwater, surface water, degradation/loss of assets and habitats	A down-hole safety valve (DHSV) will be fitted on all production wells crossing major fault lines.	x	x				
					A Wellbore Surveying Management Strategy will be implemented to address the main challenges related to wellbore positioning and collision avoidance aspects.	x	x					
					Each well pad will include an emergency pit with capacity for up to 50 cubic metres (m3) for use should there be an unplanned event during drilling. The pit will be lined and covered to prevent rainwater ingress.		x					
					A Blowout Contingency Plan (BOCP) to be established prior to commencement of drilling activities. This will explain the mitigation procedures to put in place to reduce the likelihood and the severity of such event including notification procedure and response strategy	x	x					
					Strict procedures will be enforced when a workover rig is moving close to or on top of the wells. All lifting activities shall be also be risk assessed and supervised by a Competent Person for Lifting Operations (CPLO)	x	x					
					Conduct proper maintenance of the well cellar and well head	x	x					
					Continuous monitoring of drilling parameters will be undertaken and any unexpected behaviour such as erratic torque, sudden drop in drill rate will be investigated. Mud returns at the shakers shall be also be monitored closely as per GIIP	x	x					
					The BOP is also be considered a safety and environmental critical equipment and, as such, will be certified by an independent competent authority and tested at least once every 3 weeks	x	x					
					Regular maintenance will be planned on DHSVs during production phase to assure their continued operation	x	x					
					The cementing operation will be analysed and a cement bond log will run accordingly to check quality of cement	x	x					
					Firefighting equipment must be maintained and tested on the well pads	x	x					
					In case of a kick, the effluent will be controlled by closing the BOP. The well will then be circulated with a fluid of density high enough to kill the well. If required a limited quantity of hydrocarbon will be diverted to a dedicated emergency storage pit on the well pad (there will be no flaring of hydrocarbon). Fluids will then be transferred to vacuum trucks for treatment and/or disposal at a licensed facility	x	x					
					In the case of failure of all barriers including the BOP, the well will be killed via a capping device and/or drilling of a dedicated relief well	x	x					
					Key personnel will be provided with all mandatory well control training	x	x					

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
	x			Horizontal Directional Drilling (HDD) of Victoria Nile Pipeline	HDD frack-out may result in contamination of soils and groundwater	Prior to starting HDD activities a Risk Assessment will be undertaken to identify the necessary design of the HDD tunnels. Appropriate tunnelling and slurry management practices will control groundwater ingress, and prevent and minimise slurry loss from the tunnel into surrounding aquifers/surface waters Develop a "Frack out" plan to ensure that preventive and responsive measures can be implemented Design protocols will be defined with support from appropriate expertise (geotechnical and geophysical) to integrate appropriate recommendations regarding suitability of the formation to be bored in order to minimise likelihood Pre-HDD surveys will be undertaken to identify and locate sensitive receptors at the site. The findings will be communicated to employees Ensure that all field personnel understand their responsibility for timely reporting of frack outs To minimise the potential extent of impacts from a frack out, all HDD activity will be attended by a full-time monitor, to look for observable "frack out" conditions or lowered pressure readings on the drilling equipment HDD contractor shall possess sufficient knowledge, training and experience for HDD operation	x	x	Spill Prevention Plan			Up to Moderate Adverse, depending on the scale of the incident
	x			Pre-Commissioning may result in - Accidental spillage of hydrotest liquids / uncontrolled discharge - Oil or fluids spillage during well start up	May result in degradation of environment and habitat quality, direct loss of species	** Mitigation similar to those above apply						Low to Moderate Adverse, depending on the scale of the incident and location where it occurs.
		x		Operational equipment failure	Equipment failure, including accidental release of possible polymer, oily waste, solid corrosion products, sand and wax from pigging operation; water treatment failure; operational blowout; pipeline failure may result in degradation of environment and habitat quality, direct loss of species	The Production and Injection Network outside the Industrial Area will be buried at least 0.8m below the ground surface. The pipelines will comprise carbon steel with adequate corrosion allowance built into material specifications (wall thickness) to prevent leaks. An anticorrosion coating will be applied for external protection. A corrosion inhibitor will be injected for internal protection. A dedicated Pipeline Integrity Management System will be implemented during the Commissioning and Operations Phase. This will include regular preventative maintenance including operational pigging, intelligent pigging, and inspection campaigns to monitor the status of pipelines. The fibre optic monitoring system will be regularly tested and maintained		x	Spill Prevention Plan HSE Management System			Insignificant to High Adverse, depending on the location and magnitude of the incident

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
					Cathodic Protection (CP) will be applied to buried carbon steel non-insulated pipelines in accordance with the Cathodic Protection Philosophy. A high visibility polyethylene pipeline warning net shall be laid 0.3 m above the pipeline over the entire route of the pipeline	x						
					Contaminated run off will be minimised by ensuring adequate storage facilities are in place for materials stockpiles, waste, fuels/chemicals/hazardous materials, vehicles/washing areas, and parking facilities.		x					
					Clean surface water will be diverted away from exposed soils with use of diversion drains and bunds.		x					
					With the exception of the CPF which has a bespoke drainage arrangement, drainage arrangements for the permanent facilities will be as follows: - Potentially contaminated areas (i.e. fuel and chemical storage areas) will be provided with local effluent collection (sumps, kerbing and bunding) whereby the potentially contaminated water will be collected and removed by road tanker to a licenced waste disposal facility; and - Uncontaminated areas which will drain naturally to the environment via Sustainable Drainage System (SuDS) comprising filter drains and soakaways. The SuDS design is subject to further detailed design. Sampling points will be established for all potentially contaminated areas to enable samples to be collected for analysis			x	Surface Run Off and Drainage Management Plan			
					Prior to decommissioning, an intrusive ground investigation will be carried out as deemed necessary based on historical site data and monitoring data done throughout the life of the field	x	x		Physical Environment Monitoring Plan			
					In the event of a leak being detected on the production line (depending on the location and extent), the production would be stopped and the leaking section of pipeline depressurised to the CPF. The section of line would then be flushed with hot water from the nearest well pad	x			Emergency Response Plan Oil Spill Contingency Plan			
					** Mitigation similar to those above apply							
				Emergency flaring and venting, with associated impacts on air quality	There will be no routine flaring during normal operations			x	Physical Environment Monitoring Plan			Up to High Adverse (Enclosed Ground Flare Particulate Matters EALs)Up to Moderate Adverse (Noise from Emergency flaring at night with elevated flare)

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Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operation	Decommissioning				Company	Contractor				
					Emergency Power Generation (i.e. diesel firing), in the event of associated gas being unavailable with associated impacts on air quality	A Vapour Recovery Unit will be located at the CPF to process gases generated.	x					Low Adverse

* Showing the most significant one
 **** Activities which may result in accidental introduction of alien/invasive species are not limited to use of construction equipment and power generation equipment; they also include traffic, import of material (incl. construction materials).

ESMP FOR CUMULATIVE IMPACT ASSESSMENT

VECs	Potential cumulative impact	Key Tilenga mitigation measures that could be developed to address potential cumulative impacts / Enhance benefits	Key Government agencies that may support collaborative mitigation	Potential significance	Steps proposed to progress with the Regional Cumulative Impact Management*	Responsibility
Nature-based tourism in protected areas	Reduction of MFPA's reputation for remoteness and wildness and visitor experience.	Tourism Management Plan	Ministry of Tourism Wildlife and Antiquities Uganda tourism Board Uganda Wildlife Authority Wetlands Management Department	Moderate to High Adverse		
	Loss or degradation of habitats as a result of direct and indirect impacts					
	Increased commercial hunting of key 'flagship' species.					
	Increased commercial hunting of Chimpanzee in the Budongo Forest Reserve.					
Critical and Natural Habitat and key indicator species	Loss or degradation of species habitats as a result of direct impacts	Mitigation programs to: - Reduce human pressures and increase resilience of the MFPA - Conserve and restore forests and forest connectivity along the eastern shore of Lake Albert - Manage and restore wetlands along the southern shore of the Albert Delta Ramsar site Community Environmental Conservation Plan	National Environment Authority Uganda Wildlife Authority Ministry of Agriculture, Animal Industry and Fisheries Ministry of Lands, Housing and Urban Development National Forestry Authority Wetlands Management Department National Fisheries Resources Research Institute Department of Water Resources Management	High Adverse	Allocate appropriate resources to support establishment of RCIM. Design a draft roadmap or framework for the Regional Sustainable Development Initiative. Map and engage stakeholders. Identify stakeholders both institutional and from civil society relevant to the RCIM. To include other Government Departments, district authorities in Albertine Graben, NGOs, and project developers.	Project Proponents
	Disturbance as a result of construction or operation of development, including increased traffic					
	Barrier impacts caused by construction or presence of development					
	Loss, degradation or fragmentation of species habitats as a result of indirect impacts linked to influx					
Climate change linked to carbon emissions	Loss of carbon stocks due to clearance of vegetation and stripping of soils.	Community Environmental Conservation Plan National and Community Content Programme Mitigation program to conserve and Restore Forests and Forest Connectivity Influx Management Strategy	Ministry of Water and Environment National Forestry Authority Forestry Sector Support Department	Low to Moderate Adverse		
	Project related emissions from construction and operational activities including embodied carbon, transport, fuel consumption and energy generation.					
Sustainable woodland	Increased demand for timber and woody biomass due to influx			High Adverse		
	Improved access to areas of woodland					
Bushmeat	Increase in population leading to an increase in subsistence and commercial hunting, including both to meet basic needs and/or to generate a monetary income. Improved access leading to an increase in hunting, bushmeat and wildlife trade.	Community-wildlife conflict prevention program Influx Management Strategy Mitigation program to reduce human pressures and increase resilience of the MFPA Community Environmental Conservation Plan	Uganda Wildlife Authority National Forestry Authority	High Adverse		
Lake Albert Capture fisheries	Over fishing in Lake Albert from in-migration and induced population growth	Community Environmental Conservation Plan Influx Management Strategy Mitigation program to manage and restore wetlands along the southern shore of the Albert Delta Ramsar site	Ministry of Agriculture, Animal Industry and Fisheries National Fisheries Resources Research Institute	High Adverse	Liaise with all stakeholders to confirm willingness to participate in RCIM initiative.	The Project Proponents on behalf of Government
	Reduction in species diversity and catch size due to overfishing as a result of in-migration and population growth induced by Project activities.					
Open-access grazing land	Potential for reduced access to communal grazing land due to: - Influx leading to loss of, fragmentation and degradation of grazing land - Increase in cattle numbers leading to overgrazing - Changes in land use	Livelihood Restoration Plans Land Use Planning (support to the Ministry Lands Housing and Urban Development and Buliisa District Government to develop a District Land Use Plan) Community Environmental Conservation Plan Influx Management Strategy:	Ministry of Lands, Housing and Urban Development Ministry of Agriculture, Animal Industry and Fisheries National Agricultural Research Organisation National Agricultural Advisory Services District Physical Planning Committee	High Adverse	Liaise with Government to agree to implement the RCIM and confirm leadership and management structure.	The Project Proponents and appropriate Government agencies

VECs	Potential cumulative impact	Key Tilenga mitigation measures that could be developed to address potential cumulative impacts / Enhance benefits	Key Government agencies that may support collaborative mitigation	Potential significance	Steps proposed to progress with the Regional Cumulative Impact Management*	Responsibility
Food security	Increased vulnerability to food insecurity due to: -Economic displacement - Local price inflation - Deterioration in nutritional status - Impacts on crop production - Impact on livestock and fodder/pastoralism - Impact on capture fisheries	RAPs for Future Land Acquisition: Development of further RAPs consistent with the goals, objectives, principles and processes described in the LARF Land Use Planning Influx Management Strategy Financial literacy training and access to financial services	Ministry of Lands, Housing and Urban Development District Physical Planning Committee	Moderate Adverse	Once structure identified, prepare meeting with stakeholders and agree: • Objectives and terms of reference for RCIM. • Communication protocol to foster collaboration between stakeholders. • Mechanism for sharing information about developments and baseline data. • Priority VECs relevant to the RCIM. The Project ESIA can be used to test mechanisms that link RCIM with other ESIA and CIAs. • A mechanism to participate in / review the impacts on VECs for each project within the region and the results of multiple CIAs. This is to ensure alignment and optimise the mitigation and monitoring efforts. • To promote common standards and approaches to project level mitigation. • To prioritise mitigation strategies that should be scaled-up and who should participate including their planning. The Project CIA (Table 21 49) can be used as a starting point for discussion.	To be organised by the Project Proponents on behalf of Government, and chaired by lead Government agency
Access to safe drinking water resources	Potential for reduced access to safe drinking water sources due to: - Potential for contamination of water sources during construction activities of other developments - Influx placing pressure on existing water sources	Management of influx hotspots through support of public infrastructure: Land Use Planning Influx Management Strategy Access to Water (program to contributing to the improvement of the water and sanitation situation)	Directorate of Water Resources Management Directorate of Water Development	Moderate Adverse	• A mechanism to participate in / review the impacts on VECs for each project within the region and the results of multiple CIAs. This is to ensure alignment and optimise the mitigation and monitoring efforts. • To promote common standards and approaches to project level mitigation. • To prioritise mitigation strategies that should be scaled-up and who should participate including their planning. The Project CIA (Table 21 49) can be used as a starting point for discussion.	
Community health	Potential deterioration in community health due to: - Influx leading to increased spread of communicable disease and HIV/AIDS and other STIs and placing increased pressure on existing health infrastructure - Increase in disposable incomes leading to increased spending on behaviours contributing to ill health e.g. alcohol and drug use	Health and Wellness Education and Communication Campaigns for Local Communities Infection Prevention and Control Plan HIV Workplace Policy Health Monitoring and Reporting Influx Management Strategy Access to Water	Ministry of Health Community Health Department District Health teams Ministry of Works and Transport Ministry of Gender Labour and Social Development	High Adverse	• Approaches, roles and responsibilities for collaborative monitoring linked to project monitoring activities. The indicators identified in the Project CIA can be used as a starting point for discussion. • Schedule for future meetings and activities. Participate / lead regular meetings with the RCIM structure to advance agreed actions. Participate/lead specific initiatives for collaborative mitigation.	
Primary and secondary school education	Deterioration in VEC status due to: - Influx leading to increased pressure on education facilities - Increased demand for education facilities as a result of increased incomes and changed perceptions about the value of investing in education	Support to education to increase youth employability and improve adult literacy and numeracy Access to Education (program to create sustainable relations with Universities; Promote more local employees; Anticipate the need for skilled and unskilled manpower)	Ministry of Education and Sports Ministry of Gender Labour and Social Development	Moderate Adverse	• Approaches, roles and responsibilities for collaborative monitoring linked to project monitoring activities. The indicators identified in the Project CIA can be used as a starting point for discussion. • Schedule for future meetings and activities. Participate / lead regular meetings with the RCIM structure to advance agreed actions. Participate/lead specific initiatives for collaborative mitigation.	
Access to land and shelter	Deterioration in VEC status due to: - Influx leading to increased demand for local land and housing - Increased land speculation - Land take for all developments - Local price inflation	RAPs for Future Land Acquisition Land Use Planning Influx Management Strategy Financial literacy training and access to financial services	Ministry of Lands, Housing and Urban Development District Physical Planning Committee	High Adverse	• Approaches, roles and responsibilities for collaborative monitoring linked to project monitoring activities. The indicators identified in the Project CIA can be used as a starting point for discussion. • Schedule for future meetings and activities. Participate / lead regular meetings with the RCIM structure to advance agreed actions. Participate/lead specific initiatives for collaborative mitigation.	
Local economic stability	Positive and negative effects on VEC status due to: - Increased stimulation of regional economy - Local price inflation - Increased formal employment - Reduction in tourism in MFNP	Financial literacy training and access to financial services Livelihood support programme Economic Planning Influx Management Strategy National and Community Content Programme	Office of the Prime Minister Ministry of Finance, Planning and Economic Development Ministry of Lands, Housing and Urban Development Ministry of Gender Labour and Social Development	Beneficial Effect	• Approaches, roles and responsibilities for collaborative monitoring linked to project monitoring activities. The indicators identified in the Project CIA can be used as a starting point for discussion. • Schedule for future meetings and activities. Participate / lead regular meetings with the RCIM structure to advance agreed actions. Participate/lead specific initiatives for collaborative mitigation.	

VECs	Potential cumulative impact	Key Tilenga mitigation measures that could be developed to address potential cumulative impacts / Enhance benefits	Key Government agencies that may support collaborative mitigation	Potential significance	Steps proposed to progress with the Regional Cumulative Impact Management*	Responsibility
Safe communities	Increased risk to community wellbeing as a result of:- Physical displacement- Economic displacement- Social disarticulation and increased community and family conflict- Increased pressure on police- Increase in crime rate due to project induced wealth generation- Increase in prostitution	RAPs for Future Land Acquisition Child and Gender Based Violence Prevention Programme. Legal Aid Financial literacy training and access to financial services Conflict Resolution & Crime Prevention Capacity Building programmes for local communities and local institutions Road Safety and Transport Management Plan Influx Management Strategy Community Cohesion Programme	Ministry of Lands, Housing and Urban Development Uganda National Roads Authority Ministry of Works and Transport, Office of the Prime Minister Ministry of Gender Labour and Social Development District Police	Low to Moderate Adverse		
Social cohesion	Reduced social cohesion due to: - Influx leading to increased tension between migrants and host community - Changing community dynamics (for example changing livelihood patterns effecting existing power structures) - Increased spending on alcohol and prostitution due to increased disposable incomes	Child and Gender Based Violence Prevention Programme Legal Aid Community Cultural Heritage & Archaeology Financial literacy training and access to financial services Conflict Resolution Influx Management Strategy Community Cohesion Programme:	Office of the Prime Minister Ministry of Lands, Housing and Urban Development Ministry of Gender Labour and Social Development	Moderate Adverse		

* These are relevant to all VECs but have been grouped in relation to responsibilities around implementation

ESMP FOR IN-COMBINATION EFFECTS

Impact mitigation / Enhancement measure in relation to in-combination effect
<p>Project Proponents will invite other developers to participate in joint planning initiatives with local government and other relevant stakeholders, and will continue to share best practices to allow other developers to learn from successful implementation of mitigation measures addressing:</p> <ul style="list-style-type: none"> - Odour and atmospheric emissions; - Noise; - Impacts on terrestrial vegetation habitats and ecosystems, terrestrial wildlife, aquatic life, also aiming at minimising potential combined disturbance and barrier-effects; - Vehicle and traffic management; - Socio-economic impacts such as economic physical displacement, influx, prostitution, employment and procurement; - Education and skills training and capacity building programs; - Capacity building for local police in the Project Area; - Managing labour and working conditions in their supply chain with other developers, local and national government. This may include, for example, sharing results of due diligence and audits on supply chain companies such that other developers are aware of any high risk companies; and - Health monitoring data sharing, for the benefit of public health planning and how this can be done. <p>Where feasible, other developers will be invited to invest expertise or resources in the joint implementation of initiatives addressing these impacts.</p>
<p>Project Proponents will invite other developers to participate in joint planning initiatives with local government and other relevant stakeholders to:</p> <ul style="list-style-type: none"> - Optimise traffic flows in consideration of required vehicle movements for all developments, jointly invest expertise and/ or resources to enhance the capacity of local traffic police, jointly invest expertise and/ or resources to implement a road safety campaign within local communities and provide a platform to share 'lessons learned' in relation to vehicle and traffic management; - Participate in joint planning of the mitigation concepts for dealing with likely residual indirect impacts; - Participate in joint planning initiatives to address influx. Feasibility of jointly sponsoring a regional level Influx Management Strategy will be assessed; - Maximise opportunities for local communities to access employment opportunities on the various developments; and - Assess the feasibility of enhancing the capacity of government employment inspectors at the district and national level.
<p>Project Proponents will collaborate with other developers of the supporting and associated facilities to ensure that waste Management facilities are suitable for the intended waste types and have sufficient capacity to manage waste from the supporting and associated facilities, in addition to the waste generated by the Project.</p>
<p>Project Proponents will invite other developers, local and national government to participate in risk assessments to identify whether demand for local goods and services for their projects will lead to inflationary pressures on those goods and services (e.g. risk of driving up local food prices).</p>
<p>Project Proponents will collaborate with other developers and invite them to enter into close collaboration with the Department of Museums and Monuments and Uganda Museums to:</p> <ul style="list-style-type: none"> - Seek their advice and inputs into the development of joint field surveys and mitigation programmes, as well as contributing to the national mapping of heritage assets; and - Develop a common archaeology, palaeontology and cultural heritage database and GIS platform for all heritage data moving forwards, and seek to build a collaborative team of Ugandan archaeologists and palaeontologists to develop and take ownership of the linked investigation and mitigation programmes over the next decades.

23.4 Roles and Responsibilities

23.4.1 Project Proponents and Contractors

Table 23-3 outlines the roles and responsibilities of the Project key contributors. The Project Proponents have overall responsibility for ensuring the implementation of the ESMP.

Table 23-3: List of Environmental and Social Management Roles and Responsibilities

Role	Responsibilities
<p><u>The Project Proponents</u> The Proponents will be responsible for overall control of the project implementation.</p>	<ul style="list-style-type: none"> • Ensuring the overall implementation and monitoring of the HSSSE-IMS and ESMP, and the negative impacts are adequately mitigated, and positive impacts enhanced. • Allocation of means within the Project Proponents' organisations for implementation of the plans and mitigation measures. • Ensuring that all contractors set up their management systems with consideration of the ESIA findings. • Approval of contractors' ESMP. • Ensuring compliance with the Project Proponents' commitments. • Notifying NEMA in the case of changes to the design or activities which can result in changes to the ESIA findings. • Preventing pollution and actions that will harm or may cause harm to the environment. • Preparing for emergencies. • Notifying the relevant authorities in case of emergencies. • Ensuring continuous stakeholder engagements throughout the Project lifetime. • Providing resources for adequate environmental and social training and awareness of its employees. • Ensuring adequate financing for implementation of the ESMP to ensure compliance and desired outcomes. <p>The implementation of some management plans and mitigation measures will depend not solely on the Project Proponents but also on other parties, including government agencies and third parties operating in the Project Area of Influence (AoI).</p>
<p><u>Project Proponents' representative for Site Preparation, Enabling works, Construction, Drilling, Commissioning, Operations and Decommissioning</u> The Project Proponents' representatives for each phase will be responsible for adherence to ESIA findings by respective contractors</p>	<ul style="list-style-type: none"> • Informing Health, Safety, Security, Social and Environmental (HSE) team on changes in the design. • Ensuring development and approval of detailed ESMP and its implementation by respective contractors and development of clear system of penalties for breach. • Performing periodic audits of contractors activities jointly with HSE team • Reporting on status of the ESMP implementation and any non-compliance.

Role	Responsibilities
<p><u>Project Proponents' HSE team</u></p>	<ul style="list-style-type: none"> • Ensuring a detailed ESMP is produced in line with ESIA findings. • Ensuring implementation of the ESMP including impacts monitoring. • Ensuring update of the HSSSE-IMS and ESMP: on a periodic basis or in case of important changes to the impacts or mitigation measures. • Advising contractors on the Project Proponents' ESIA findings. • Monitoring Project activities on site, ensuring adherence to the ESMP, and reporting any non-compliances. • Planning and undertaking continuous stakeholder engagements throughout the Project lifetime. • Performing audits of site activities and reporting accordingly. • Reporting any significant environmental incidents to the responsible Authorities as may be required. • Analysing incidents in order to prevent re-occurrence. • Assessing design changes for further notification to NEMA where it may result in changes to the ESIA findings. • Monitoring project related grievances according to grievance management protocol. • Undertaking regular environment and social reporting. • Providing environmental and social training and awareness to the employees.
<p><u>Project Proponents' Responsible on Site for Safety and Environment (RSES)</u></p> <p>The RSES is a delegate of the Project Proponent on site, and all personnel working on that site are answerable to the RSES on HSE issues.</p>	<ul style="list-style-type: none"> • Ensuring HSE leadership on site (training, site committees, managing site action plans). • Ensuring risk assessment of Project activities and management of risks on site. • Implementing the emergency preparedness system on site and managing on-site command post in case of emergency.
<p><u>Site Preparation and Enabling Work, Drilling, Construction, Operations, Decommissioning Contractors</u></p>	<ul style="list-style-type: none"> • Developing a detailed ESMP in line with ESIA findings and Project Proponents' requirements relative to the scope of work. • Ensuring work conducted is done within the framework of the Contractor's ESMP, Ugandan legislation and GIIP. • Ensuring that contractors' and sub-contractors' employees are aware about the contents of the ESMP relative to the scope of work and their roles and responsibilities in its implementation. • Ensuring that all sub-contractors have a copy of and are fully conversant with the contents of the ESMP and their roles and responsibilities. • Providing regular reports to Project Proponents' representatives on implementation of Contractor's ESMP and any non-compliances. • Participating in monitoring compliance and impacts upon the surrounding environment done through independent audits or led by Project Proponents, implement corrective mitigation measures in case of non-compliances. • Appointing persons responsible on site for health, safety, security, social and environment. • Informing Project Proponents' representative on incidents or complaints from stakeholders. • Addressing issues raised from the activities including activities-related grievances according to grievance management protocol. • Implementing the emergency response on site.

23.4.2 Government Agencies

As detailed in **Chapter 2: Policy, Regulatory, and Administrative Framework**, there are a number of government agencies with the mandate to give permits and approvals, and monitor compliance during implementation of the Project. Agencies such as NEMA, Ministry of Energy and Mineral Development (MEMD), PAU, UWA, Ministry of Water and Environment (MWE), DWRM, Wetlands

Management Department (WMD), MGLSD, Office of CGV, Ministry of Tourism, Wildlife and Antiquities, and others, will be involved in the various phases through the life of the Project. The Government agencies will play a key role in checking the suitability and effectiveness of the mitigation measures in the ESMP.

In addition, as indicated above, the successful implementation of some management plans and mitigation measures will also depend on other parties, including government agencies.

23.5 Project ESMP Implementation

23.5.1 Supporting Strategies and Plans

An overview of the strategies and management plans is provided in Figure 23-6. In addition, Table 23-4 lists the strategies and management plans that will be updated or developed by the Project Proponents to support the detailed ESMP, prior to Project implementation. Strategies provide high level commitments, while management plans define detailed procedures to be used for implementation of mitigation measures. A process will be in place to ensure consistency between environment and social (community) strategies and management plans for a coordinated implementation of appropriate mitigation measures in the Project area, particularly in sensitive biodiversity areas. This will be integrated into the relevant strategies and management Plans.

An outline structure for the supporting plans is also presented in Appendix T.

<u>Overarching Strategies & Mechanisms</u>	<u>Social</u>	<u>Biodiversity</u>
➤ Community Impact Management Strategy	➤ Resettlement Action Plan (RAP)	➤ Biodiversity and Ecosystem Services Management Plan
➤ Influx Management Strategy	➤ Livelihood Restoration Plan	➤ Biodiversity and Ecosystem Services Action Plan
➤ National and Community Content Strategy / Framework	➤ Labour Management Plan	➤ Alien/Invasive Species Management Plan
➤ Stakeholder Engagement Plan	➤ Cultural Heritage and Archaeology Management Plan (CHMP)	➤ Site Clearance Plan
➤ Grievance Management Procedure	➤ Chance Find Procedure (CFPr)	➤ Site Restoration Plan
➤ Biodiversity Strategy	➤ Community Content, Economic Development and Livelihood Plan (CCEDLP)	➤ Wetland Management Plan
➤ HSE Management System		
<u>Physical Environment</u>		<u>Emergency Preparedness</u>
➤ Physical Environment Monitoring Plan	➤ Community Health, Sanitation, Safety, and Security Plan (CHSSSP);	➤ Spill Prevention Plan
➤ Surface Run Off and Drainage Management Plan	➤ Community Environmental Conservation Plan (CECP)	➤ Oil Spill Contingency Plan (OSCP)
➤ Dust Control Plan	➤ Tourism Management Plan	➤ Emergency Preparedness and Response Plan (ERP)
➤ Noise and Vibration Management Plan	➤ Road Safety and Transport Management Plan	➤ Blow Out Contingency Plan (BOCP)
➤ Waste Management Plan	➤ Journey Management Plan	➤ Frack Out Plan
➤ Chemical Management Plan		
➤ Water Management Plan		
➤ Landscape Management Plan		

Figure 23-6: List of supporting Management Plans

Table 23-4: Supporting Management Plans

Supporting Plan	Objective	Description	Monitoring (including performance indicators)	Responsibility for monitoring
National and Community Content Strategy (Existing, to be revised)	To increase economic participation and business access to contract opportunities for Ugandan nationals and local communities.	<p>Sets out measures derived from the National and Community Content Programme that aims at maximising knowledge and skills transfer to the Government, Ugandan companies, registered entities and Ugandan citizens.</p> <p>In order to promote sustainable economic development and national industrialisation, capacity building, and technology transfer will be the cornerstones of the Project's National and Community Content Strategy.</p> <p>A set of strategies will be implemented to maximise the Project's National and Community Content, including:</p> <ul style="list-style-type: none"> - Strengthening of existing companies - Development of goods and services provided by Ugandan companies or registered entities - Joint-Venture between international companies and Ugandan companies, registered entities or Ugandan citizens as a means to foster technology transfer - for goods and services that are not available in Uganda according to the standards required by the Project - Foreign Direct Investment (FDI) through the creation / establishment of a Ugandan Company – for goods and services that are not available in Uganda according to the standards required by the Project - 'International with National Content Support' Initiatives – for highly technical goods or services with unique requirements which are provided by a limited number of global companies <p>The implementation of the National and Community Content Strategy at the local level of project affected communities (PAC) will also be performed through the Community Content, Economic Development and Livelihood Plan.</p> <p>This plan is described in Chapter 4: Project Description and Alternatives Chapter 16: Social, and Chapter 18: Health and Safety.</p>	<p>A monitoring mechanism for national and community content will be developed and implemented.</p> <p>Performance indicators will include:</p> <p>Monitoring indicators set in The Petroleum (Exploration, Development and Production) (National Content) Regulations, 2016 will be applied, as well as other indicators as required. These include:</p> <ul style="list-style-type: none"> - Number of nationals and community members employed by Project - Number of nationals and community trained by Project - Number of national and local companies involved in the Project (suppliers) - Value of goods and services procured locally, regionally and nationally - Number of employees hired by local suppliers; and Local procurement as a percentage of total procurement 	<p>Project Proponents</p> <p>Project Proponents' Contractors</p> <p>Relevant Government agencies who may conduct independent monitoring or review include: MEMD, PAU</p>
Influx Management Strategy (To be developed)	To guide the implementation of measures to	A strategy outlining high level measures to avoid or minimise consequences associated with the influx of people into the area as a result of the Project's presence and activities. Influx could be associated with planned workers and unplanned immigration	A monitoring strategy will be setup to measure the influx of workers and non-workers, to monitor the rate of expansion in migrant hot-spots in	The Project Proponents Project Contractors

Supporting Plan	Objective	Description	Monitoring (including performance indicators)	Responsibility for monitoring
	mitigate in-migration impacts	<p>moving with the intention of benefitting economically from the Project.</p> <p>The strategy will also cover measures aimed to mitigate potential impacts due to influx on biodiversity, ecosystem services, and social system as detailed in the respective management plans. Plans covered within this strategy include:</p> <ul style="list-style-type: none"> - Labour Management Plan - Community Content, Economic Development and Livelihood Plan - Community Health, Sanitation, Safety & Security Plan - Community Environmental Conservation Plan - Biodiversity and Ecosystem Services Action Plan; and - Wetland Management Plan <p>Monitoring & Evaluation of influx and associated impacts will be embedded in each of the plans.</p> <p>This strategy and associated plans and mitigation measures are described in Chapter 16: Social, Chapter 18: Health, Chapter 21: Cumulative Impact Assessment and are summarised in the ESMP Mitigation Checklist (Appendix T).</p>	<p>order to understand the rate of in-migration and to audit the actions and mitigation:</p> <ul style="list-style-type: none"> - Analysis of aerial / satellite imagery of the local settlements in order to assess their expansion - Administer household survey for the purpose of analysing changing dynamics related to in-migration in potential hotspots. The targeted settlements should include the identified in-migration hotspot and select one village that is not expected to experience in-migration as part of the survey to be a control group. - Administer semi-structured questionnaire designed to evaluate perceptions of migration patterns in the hotspot villages - Administer a semi-structured questionnaire to local and migrants specifically designed to monitor potential influx related conflict - Monitor local prices through the review of the changing cost of a standardised basket of goods - Measure progress of development and implementation of land-use planning - Measure progress of development and effectiveness of institutional capacity building and public infrastructure programmes 	<p>Relevant Government agencies who may conduct independent monitoring or review the data include: District Physical Planning Department, Ministry of Lands, Housing and Urban Planning, Ministry of Internal Affairs NEMA, UWA, NFA, WMD, DWRM, Regulatory agencies responsible for infrastructure.</p>

Supporting Plan	Objective	Description	Monitoring (including performance indicators)	Responsibility for monitoring
			- Input, output and outcome indicators of the respective plans and programmes	
Community Impact Management Strategy (To be developed)	To guide the implementation of measures for dealing with, and managing direct and indirect impacts on local communities, focusing on both Project Affected Persons (PAPs) and Project Affected Communities (PACs).	<p>It is essential to highlight how social impacts are intertwined and need to be addressed at all levels: national, regional and local. This Strategy will focus on project impacts specifically targeting affected communities. The proposed plans under the Community Impact Management Strategy also aim to include and cascade down measures and programmes related to the key issues identified in the Influx Management Strategy and the National and Community Content Strategy.</p> <p>The Strategy will build upon two aspects:</p> <p>i. Management of direct social, health and cultural heritage impacts related to land acquisition and resettlement process. These will be primarily addressed through the respective Project Resettlement Action Plans (RAP). Other plans and procedures covered in this strategy include:</p> <ul style="list-style-type: none"> - Livelihood Restoration Plan - Cultural Heritage and Archaeological Management Plan - RAP Monitoring & Evaluation <p>ii. Management of direct and indirect social, health, and cultural heritage impacts beyond land acquisition and resettlement in the wider Project AoI. These will be addressed through the following plans and procedures:</p> <ul style="list-style-type: none"> - Labour Management Plan - Community Content, Economic Development & Livelihood Plan - Community Health, Sanitation, Safety & Security Plan - Community Environmental Conservation Plan - Cultural Heritage and Archaeology Management Plan - Chance Find Procedure - Tourism Management Plan - Road Safety and Transport Management Plan - Compensation Procedure for unexpected damages 	<p>An appropriate monitoring and evaluation methodology will be developed for impacts on peoples and communities.</p> <p>Input and Output Key Performance indicators include:</p> <ul style="list-style-type: none"> - Key inputs into respective plans and programmes - Key outputs of respective plans and programmes - Sustainability indicators of plans and programmes - Number of people included in the respective plans and programmes - Stakeholder perception on the effectiveness of the respective plans and programmes <p>Examples of outcome performance indicators are provided within each of the respective plans.</p>	<p>Project Proponents</p> <p>Project Proponents' Contractors</p> <p>Relevant Government agencies who may conduct independent monitoring or review the data include: PAU, Office of CGV – Ministry of Lands, Housing and Urban Planning, NEMA, Ministry of Museums and Antiquities, Ministry of Health, Ministry of Education, Ministry of Gender, Labour and Social Development District Technical Committee, District, Police</p>

Supporting Plan	Objective	Description	Monitoring (including performance indicators)	Responsibility for monitoring
		This strategy and associated plans and mitigation measures are described in Chapter 16: Social, Chapter 17: Archaeology and Cultural Heritage and Chapter 18: Health , and are summarised in the <i>ESMP Mitigation Checklist</i> (Appendix T).		
Stakeholder Engagement Plan (Existing, to be revised)	To guide the engagement and consultation with statutory and non-statutory stakeholders.	<p>The Plan identifies key stakeholders and the most effective methods and structures through which to disseminate project information to the respective stakeholders.</p> <p>The list of stakeholders will be checked regularly and updated when necessary. Comments from stakeholders and responses from the Project Proponents will be logged and the plan amended if necessary. The principles of free, prior and informed consultations will be applied.</p> <p>This is a living document that has been updated through each phase of Project planning and will continue to be updated through Project implementation. It aims to ensure regular, timely, accessible, and appropriate dissemination of information; build mutually respectful, beneficial, and lasting relationships with stakeholders; involve stakeholders in the design of mitigation measures; and provide stakeholders with the means to address concerns and grievances, cross referencing the Grievance Management Procedure for more information.</p> <p>This plan is referred in almost all of the ESIA Chapters, and more specifically described in Chapter 16: Social.</p>	<p>Input and Output Key Performance indicators include:</p> <ul style="list-style-type: none"> - Key inputs into the plan and associated programmes - Key outputs of the plan and associated programmes - Sustainability indicators of the plan and associated programmes <p>Example of performance indicators: include (list not exhaustive):</p> <ul style="list-style-type: none"> - Number of stakeholder engagements - Number of people involved in capacity building programs aimed to improve dialog and consultation processes - Changes in the levels of information and awareness of stakeholders - Changes in Stakeholder perception on the Project 	<p>Project Proponents' HSE team</p> <p>Project Contractors</p> <p>Relevant Government agencies who may conduct independent monitoring or review the data include: PAU, NEMA</p>
Grievance Management Procedure (Existing, to be revised)	A procedure for managing affected communities, with measures to protect their livelihoods and deal with grievances in a fair and transparent manner.	<p>Special interventions are taken to make sure stakeholders are aware of the procedures; these include disclosure of the procedure at meetings, translated in an easy to understand language with contact details, creation of community grievance committees, and establishment of a Project community office in Buliisa. A toll free phone number has already been established to allow communities to report grievances via phone free of charge.</p> <p>This procedure will:</p>	<p>An audit system will be setup to regularly check the logged grievances, Project Proponents' responses, and effectiveness and fairness of any actions or outcomes. The response time will also be monitored.</p> <p>Key Performance indicators include:</p> <ul style="list-style-type: none"> - Rate of closing out grievances received 	<p>Project Proponents' representatives HSE team</p> <p>Project Contractors</p> <p>Relevant Government agencies who may conduct independent monitoring or review the data include: PAU, District Local Government</p>

Supporting Plan	Objective	Description	Monitoring (including performance indicators)	Responsibility for monitoring
		<ul style="list-style-type: none"> - Provide mechanisms for those affected by the Project to contact the Project Proponents and raise their concerns in a timely manner - Outline procedure for responding to stakeholders with grievances - Identify relevant contact points for stakeholders - Ensure grievances are dealt with fairly and in a timely manner <p>This plan is further described in Chapter 16: Social.</p>	<ul style="list-style-type: none"> - Timely response to grievances received - Percentage of repeat grievances - Percentage of grievances closed at first and second levels - Awareness about the procedure - Percentage on satisfaction about the process 	
<p>HSE Management System (Existing, to be revised)</p>	<p>To ensure health, safety and security of Project employees' activities comply with laws and achieve continuous performance improvement</p>	<p>The HSSSE-IMS is based on ten principles as defined in section 23.3.1.</p> <p>Contractors will develop their own HSE Management systems as described in section 23.3.1.3 as well as a Labour Management Plans.</p>	<p>Performance objectives are set on an annual basis, and performance assessment by Project Proponents' Management is undertaken twice a year as detailed in section 23.3.1</p> <p>Key Performance indicators will be followed for each principle described in section 23.3.1 and will include but not be limited to:</p> <ul style="list-style-type: none"> - Incidents statistics (Injuries rates, number of incidents by types including high potential incidents, number of occupational illnesses) - Anomaly reporting frequency - Incident investigation statistics (number of root cause analysis, rate of closure of actions from incidents) - Indicators on emergency preparedness (number of emergency drills) - HSE audits / inspections (number, actions closure rate) - HSE communication (number of HSE committees, HSE alerts) 	<p>Project Proponents, HSE team</p> <p>Project Contractors</p> <p>Relevant Government agencies who may conduct independent monitoring or review the data include: OSH Department - MGLSD</p>

Supporting Plan	Objective	Description	Monitoring (including performance indicators)	Responsibility for monitoring
<p>Biodiversity Strategy (Existing, to be revised)</p>	<p>To outline a roadmap for achieving the Project Vision to leave the Murchison Falls National Park, and when feasible its surrounding landscape, in better ecological condition than if the Project had not taken place, by achieving a positive effect for biodiversity.</p>	<p>Biodiversity Strategy is a high level document that will guide the Project to ensure alignment with IFC PSs and with Project Proponents biodiversity charter.</p> <p>Plans under this strategy include:</p> <ul style="list-style-type: none"> - Biodiversity and Ecosystem Services Management Plan - Biodiversity and Ecosystem Services Action Plan - Alien/Invasive Species Plan - Site Clearance Plan - Site Restoration Plan - Wetland Management Plan 	<p>The Project will implement a carefully designed monitoring programme to track the scale of impacts and the effectiveness of interventions for priority biodiversity and ecosystem services.</p> <p>Detailed monitoring indicators will be listed in the respective plans.</p>	<p>Project Proponents, HSE team</p> <p>Relevant Government bodies who may conduct independent monitoring or review the data include: NEMA, UWA, District Environment Officer</p>
<p>Biodiversity and Ecosystem Services Management Plan (BMP) (To be developed)</p>	<p>To provide a reference framework for the biodiversity risk management of the Project</p>	<p>This plan will detail procedures to mitigate potential direct and indirect impacts on priority biodiversity (fauna, flora and ecosystems) within the Project's AoI through specific measures to avoid, minimise and restore.</p> <p>The plan will also:</p> <ul style="list-style-type: none"> - Detail general and species-specific measures to mitigate impacts for priority biodiversity, with links to relevant management plans and protocols that provide additional detail - Provide timeframe and means and roles for implementation of the procedures - Outline indicators to track the progress of implementation and where appropriate, including thresholds to trigger adaptive management responses to alter the scale of the action as required - Provide guidance to minimise impacts on biodiversity and maximise enhancement opportunities - Ensure the mitigation measures presented in the ESIA are implemented and the significance of any impacts is no worse than predicted - Guide implementation of biodiversity offset 	<p>A monitoring regime will be developed to ensure the impacts on biodiversity are no worse than predicted in this ESIA report. This will be reviewed and updated on a predetermined basis.</p>	<p>Project Proponents, HSE team</p> <p>Government bodies expected to have an interest in the plan include NEMA, UWA, District Environment Officer, NaFIRRI</p>

Supporting Plan	Objective	Description	Monitoring (including performance indicators)	Responsibility for monitoring
		<ul style="list-style-type: none"> - Facilitate rehabilitation and restoration of the terrestrial ecosystem <p>Proposed mitigation measures are defined in the Chapter 13: Terrestrial Vegetation, Chapter 14: Terrestrial Wildlife and Chapter 15: Aquatic Life and are summarised in the ESMP Mitigation Checklist (Appendix T).</p>		
Biodiversity and Ecosystem Services Action Plan (To be developed)	To define how ecological impacts of the Project will be minimised and lay out biodiversity related monitoring and evaluation actions.	<p>This plan will include a compilation of the objectives and actions related to managing biodiversity risks presented in the ESIA</p> <p>It will include a <i>Biodiversity Monitoring and Evaluation Plan</i>, which will set out measures to monitor and evaluate the biodiversity during the life of the Project, including monitoring after Project decommissioning to ensure that the Project is meeting its targets and objectives. A <i>Net Gain Strategy</i> to design offset actions/projects that encompass loss and other impacts on biodiversity and a <i>Net Gain Implementation Plan</i> that sets out measures to relocate singular species or biodiversity in the eventuality that loss of biodiversity is attributed to actions of the Project will also be developed and used.</p> <p>The Action Plan will also aim to:</p> <ul style="list-style-type: none"> - Ensure that minimal or no adverse impact to the biodiversity and ecosystem occurs - Provide an overview of additional actions to mitigate indirect impacts (including offsets), their management and operationalisation - Reduce the loss of biodiversity and its habitats, and relieve pressure on natural resources within existing protected areas, natural habitats, including wetlands, aquatic/freshwater, lake shores - Invest in the AoI in activities that will mitigate impacts on biodiversity and ecosystem services <p>Associated mitigation measures are defined in the Chapter 13: Terrestrial Vegetation, Chapter 14: Terrestrial Wildlife and Chapter 15: Aquatic Life and are summarised in the <i>ESMP Mitigation Checklist</i> (Appendix T).</p>	<p>The Project Proponents will design and implement a robust long-term biodiversity monitoring and evaluation program including a set of biodiversity metrics and indicators to track the efficacy of mitigation measures and undertake adaptive management to ensure it meets its biodiversity goals</p> <p>Performance indicators include:</p> <ul style="list-style-type: none"> - Change in animal population (priority biodiversity) - Change in extent and state of the habitats - Changes in animal behaviour (priority biodiversity) - Ecosystem services quality and quantity 	<p>Project Proponents' HSE team</p> <p>Relevant Government bodies who may conduct independent monitoring or review the data include: NEMA, UWA; District Environment Officer</p>

Supporting Plan	Objective	Description	Monitoring (including performance indicators)	Responsibility for monitoring
Alien/Invasive Species Plan <i>(Existing, to be revised)</i>	To prevent the introduction and spread of alien/invasive species, and define management measures to react in case of species introduction in order to avoid and minimise the spread of alien/invasive species.	<p>This plan aims to prevent alien/ invasive species (including terrestrial and aquatic plants, pathogens and pest fauna) from entering, spreading or becoming established owing to Project-related activities. The plan contains measures to help identify and contain, suppress or manage invasive species already present in the Project Area to prevent spread by Project-related activities. Where possible, measures to reduce the severity or extent of alien and invasive species within the Project Area will be applied.</p> <p>The mitigation measures covered in this plan are discussed in Chapter 13: Terrestrial Vegetation, Chapter 14: Terrestrial Wildlife and Chapter 15: Aquatic Life and are summarised in the <i>ESMP Mitigation Checklist</i> (Appendix T).</p>	<p>The Project Area will be checked regularly for alien/invasive species. The success of any remedial measures to reduce the spread or such species will be verified through monitoring.</p> <p>Performance indicators include:</p> <ul style="list-style-type: none"> - Changes in the extent and density of previously existing alien/invasive species populations - Occurrence of alien/invasive species attributed to the Project; - Occurrences of newly introduced alien/invasive species - Unexpected changes in alien/invasive species control activity, e.g., off-target damage, invasion by other species - Undesirable changes in the condition and extent of native vegetation that may be attributed to invasive 	<p>HSE Representative from the Project Proponents</p> <p>Project Proponents HSE Team</p> <p>Project Contractors</p> <p>Relevant Government bodies who may conduct independent monitoring or review the data include: UWA, NaFIRRI</p>
Site Clearance Plan <i>(To be developed)</i>	To structure and schedule clearly site clearance activities, noting any constraints; with the aim of minimising environmental impacts and disruption to local communities and wildlife, while ensuring minimal hindrance to Project activities and schedules.	<p>This plan outlines the approach to clearing the Project Area and a schedule for site preparation, enabling works, and construction of Project related facilities. Strict adherence to the Site Clearance Plan will be required to avoid unnecessary habitat loss.</p> <p>Mitigation measures covered in this plan are discussed in Chapter 13: Terrestrial Vegetation, Chapter 14: Terrestrial Wildlife and Chapter 15: Aquatic Life and are summarised in the <i>ESMP Mitigation Checklist</i> (Appendix T).</p>	<p>A monitoring procedure will be developed to audit the Project activities against the requirements in this plan and measure the success of the mitigation measures.</p> <p>Performance indicators include:</p> <ul style="list-style-type: none"> - Number of non-compliances - Number of incidents 	<p>HSE Representative from the Project Proponents</p> <p>Project Proponents HSE Team</p> <p>Project Contractors</p>

Supporting Plan	Objective	Description	Monitoring (including performance indicators)	Responsibility for monitoring
Site Restoration Plan (Existing, to be revised)	Sets out the Project Proponents' approach to restoring different habitats in areas no longer used by the Project and verifying the effectiveness of the restoration. It will be updated prior to commencement of every stage of the Project.	This plan defines the clear criteria for timely identification and monitoring of decommissioned areas that are no longer used by the Project which should be subject to physical and biological restoration. Mitigation measures covered in this plan are discussed in Chapter 13: Terrestrial Vegetation, Chapter 14: Terrestrial Wildlife and Chapter 15: Aquatic Life and are summarised in the <i>ESMP Mitigation Checklist</i> (Appendix T).	A monitoring procedure will be developed to track progress towards meeting physical and biological rehabilitation completion criteria and implementation of adaptive management processes if required Performance indicators include: - Percentage of areas no longer used by the Project that have been restored - Level of success of restored sites in comparison with pre-project conditions (vegetation and drainage)	HSE Representative from the Project Proponents Project Proponents HSE Team Project Contractors Relevant Government bodies who may conduct independent monitoring or review the data include: NEMA, District Environment Officer
Wetland Management Plan (To be developed)	To guide the implementation of Project activities in areas where wetland habitat might potentially be impacted, and ensure that there is no disruption to wetland areas in the Project Aol.	This plan will comprise measures aimed at avoiding and minimising impacts on wetlands and restricted exclusion zones, adhering to national and international wetland protection legislation and guidance, and ensuring that activities at or near Ramsar sites do not affect water quality, permeability, or compaction of the wetland, among others. The mitigation measures covered in this plan are discussed in Chapter 13: Terrestrial Vegetation, and Chapter 14: Terrestrial Wildlife and Chapter 15 Aquatic Life and are summarised in the <i>ESMP Mitigation Checklist</i> (Appendix T).	A monitoring programme will be developed to check the success of the mitigation measures and audit the plan. Performance indicators include: - Number of wetlands indirectly impacted Project - Areas of wetlands rehabilitated	HSE Representative from the Project Proponents Project Proponents HSE Team Relevant Government bodies who may conduct independent monitoring or review the data include: WMD, NEMA, District Environment Officer
Physical Environment Monitoring Plan (Existing, to be revised)	To confirm targets and outline plan for monitoring of physical environment components against baseline conditions and regulatory requirements in order to ensure that there are no detrimental	It will provide detailed requirements for monitoring the physical environment at all stages of the Project, including relevant standards, roles, schedule, frequency, locations, methods, analysis and records requirements. The following components will be included in the Project Environment Monitoring Plan: - Air Quality - Noise and Vibration - Terrestrial Soils, Groundwater, and Surface Water - Solid and Liquid Wastes - Landscape and Visual Amenity	Periodic monitoring will be performed in line with regulatory requirements and permit conditions Monitoring indicators will include physical, chemical, biological parameters as required for each environment component. The Following parameters will be monitored	Project Proponents' HSE team Project Contractors Relevant Government bodies who may conduct independent monitoring or review the data include: NEMA

Supporting Plan	Objective	Description	Monitoring (including performance indicators)	Responsibility for monitoring
	changes to the environment and for implementation of adaptive management if required.		<ul style="list-style-type: none"> - Air – Total suspended particulate, PM₁₀, VOC, NO₂, SO₂, and O₃ - Greenhouse gas emissions – calculated through annual fuel consumption. - Noise and vibration – levels of noise and vibration at the Project site borders and sensitive receptors - Water (surface and groundwater) – water level, chemical, physical and biological parameters - Soils – chemical, physical and biological parameters - Oil seeps - Liquid waste – chemical, physical and biological parameters 	
Surface Run Off and Drainage Management Plan <i>(To be developed)</i>	To guide the implementation of mitigation measures to avoid and minimise Project impacts on receiving environment.	<p>This Plan sets out measures to prevent the unnatural movement of water attributed to the earthworks of the Project and drainage management principles for the Project life time.</p> <p>The plan will primarily:</p> <ul style="list-style-type: none"> - Determine measures required to control surface run off to avoid impacts on the environment or communities - Set out the drainage strategy for the Project - Ensure that the erosion of the environment does not occur as a result of the Project or sediment is not washed into watercourses - Ensure that water does not pool and create a contaminated source of water that could be consumed by wildlife <p>Detailed mitigation measures are identified in Chapter 8: Geology and Soils, Chapter 9: Hydrogeology and Chapter 10: Surface Water and are summarised in the <i>ESMP Mitigation Checklist</i> (Appendix T).</p>	<p>Efficiency of the mitigation measures will be assessed on periodic basis, in order to correct mitigation measures if required.</p> <p>Monitoring indicators include:</p> <ul style="list-style-type: none"> - Quality of discharged water - Quality of surface water - Number of incidents or grievances registered related to surface run off 	<p>Project Proponents' HSE team</p> <p>Project Contractors</p> <p>Relevant Government bodies who may conduct independent monitoring or review the data include: NEMA, DWRM</p>

Supporting Plan	Objective	Description	Monitoring (including performance indicators)	Responsibility for monitoring
Dust Control Plan <i>(To be developed)</i>	This plan will guide the implementation of mitigation measures to minimise impacts of the Project on air quality (particulate emissions), in line with applicable laws, standards and GIIP	<p>This is a plan laying out the mitigation and monitoring requirements for controlling particulate emissions (i.e. coarse dusts and PM₁₀), and responding to dust deposition and windblown dust, as attributed to the construction, abrasive land clearing, and earthworks.</p> <p>In particular, the plan will aim to:</p> <ul style="list-style-type: none"> - Minimise dust and particulate matter emissions and dust deposition attributed to the Project - Ensure that local communities do not experience nuisance from dust or health impacts from airborne particulates - Protect sensitive habitats from dust deposition - Outline monitoring requirements to ensure Project standards are being met <p>The mitigation measures covered in this plan are discussed in Chapter 6: Air Quality and Climate and are summarised in the <i>ESMP Mitigation Checklist</i> (Appendix T).</p>	<p>A detailed monitoring programme will be produced to measure dust levels and deposition to verify the predictions in Chapter 6: Air Quality and Climate and identify any exceedances against Project standards. Locations for monitoring will depend on activities and on proximity to sensitive receptors.</p> <p>Monitoring indicators include:</p> <ul style="list-style-type: none"> - Air quality (dust particulates) - Number of grievances registered related to dust 	<p>HSE Representative from the Project Proponents</p> <p>Project Contractors</p> <p>Relevant Government bodies who may conduct independent monitoring or review the data include: NEMA, District Environment Officer</p>
Noise and Vibration Management Plan <i>(To be developed)</i>	This plan will guide the implementation of mitigation measures to minimise impacts of the Project on noise and vibration, in line with applicable laws, standards and GIIP	<p>This plan sets out the approach to mitigating noise and vibration at all Project stages.</p> <p>In particular, the plan will aim to:</p> <ul style="list-style-type: none"> - Outline national and international noise regulations and thresholds to be known and understood by workers - Ensure that workers, local communities, tourism activities and wildlife do not experience nuisance from noise and vibration - Provide proposals for responding to complaints and monitoring requirements associated with noise and vibration <p>The mitigation measures covered in this plan are discussed in Chapter 7: Noise and Vibration and are summarised in the <i>ESMP Mitigation Checklist</i> (Appendix T).</p>	<p>A detailed monitoring programme will be produced to measure noise and vibration at pre-identified locations to an appropriate method to verify the predictions in Chapter 7: Noise and Vibration and identify any exceedances of the Project noise and vibration standards.</p> <p>Key Performance indicators include:</p> <ul style="list-style-type: none"> - Noise and vibration – levels of noise and vibration at the Project site borders and sensitive receptors - Number of incidents or grievances related to noise or vibration 	<p>Project Proponents' HSE team</p> <p>Project Contractors</p> <p>Relevant Government bodies who may conduct independent monitoring or review the data include: NEMA, District Environment Officer</p>
Waste Management Plan	This plan will guide the implementation of mitigation	This is a plan setting out the recommended approach to managing waste (including hazardous, non-hazardous and inert) at all stages of the Project, storage requirements, transport methods, and disposal methods.	A monitoring regime and periodic audits of the Project waste storage facilities and waste management companies will be established.	<p>HSE Representative from the Project Proponents</p> <p>Project Contractors</p>

Supporting Plan	Objective	Description	Monitoring (including performance indicators)	Responsibility for monitoring
(Existing, to be revised)	measures to minimise impacts of the Project in relation to waste management, in line with applicable laws, standards and GIIP	<p>The Waste Management Plan will be based on the principles of waste management hierarchy: Avoid, Reduce, Reuse, Recycle, Recover, Dispose.</p> <p>The plan will aim to:</p> <ul style="list-style-type: none"> - Ensure that potential impact from waste is minimized through appropriate handling, storage and disposal - Ensure that NEMA third party licensed hazardous waste management companies are used for transportation and disposal <p>The mitigation measures covered in this plan are discussed in Chapter 12: Waste and are summarised in the <i>ESMP Mitigation Checklist (Appendix T)</i>.</p>	<p>Key performance indicators include:</p> <ul style="list-style-type: none"> - Quantities and types of waste - Quality of physical environment parameters (e.g. water, soil) with comparison to pre-project conditions - Number of incidents or grievances related to Project waste 	<p>Relevant Government bodies who may conduct independent monitoring or review the data include: NEMA, DWRM</p>
Chemical Management Plan (Existing, to be revised)	This plan will guide the use, storage, response in case of a spill and disposal of chemicals for the Project	<p>The plan will contain an assessment of selected chemicals, their risks, and how these will be appropriately managed, including usage, storage, and disposal.</p> <p>The plan will aim to:</p> <ul style="list-style-type: none"> - Understand the risks and hazardous principles of each chemical used - Support appropriate selection of chemicals, choosing more environmentally friendly options where possible and practical - Define the requirements of hard and soft engineering techniques to mitigate infiltration or absorption of the chemicals into the environment - Sensibly manage the use and storage of chemicals, fuels, oils, and lubricants - Manage and transport chemicals in an appropriate manner that meets local and international standards, with safe disposal to protect the environment and local communities <p>Detailed mitigation measures are defined in the Chapter 8: Soils and Geology, Chapter 9: Hydrogeology and Chapter 10: Surface Water and are summarised in the <i>ESMP Mitigation Checklist (Appendix T)</i>.</p>	<p>Key performance indicators include:</p> <ul style="list-style-type: none"> - Names and quantities of chemicals - Quality of physical environment parameters (e.g. water, soil) - Number of incidents during transportation/handling of chemicals 	<p>Project Proponents' representatives</p> <p>Project Proponents HSE team</p> <p>Project Contractors</p> <p>Relevant Government bodies who may conduct independent monitoring or review the data include: NEMA, OSH Department - MGLSD</p>

Supporting Plan	Objective	Description	Monitoring (including performance indicators)	Responsibility for monitoring
Water Management Plan (To be developed)	To guide the Project's management of water usage, discharge, and prevention of water sources pollution by the Project.	<p>This plan will serve to ensure that the risks of the Project to water quantity and quality are minimised to levels that are as low as reasonably practicable through:</p> <ul style="list-style-type: none"> - Ensure that water use by communities/animals is not compromised by Project activities - Ensure that water abstraction from the surface and ground water sources is performed in a sustainable manner and in line with permit requirements - Periodic monitoring of water quality and adjustment of mitigation measures if required - Effective management of water abstraction systems and drainage systems <p>Detailed mitigation measures are identified in Chapter 9: Hydrogeology and Chapter 10: Surface Water and are summarised in the <i>ESMP Mitigation Checklist</i> (Appendix T).</p>	<p>Key Performance indicators include:</p> <ul style="list-style-type: none"> - Abstraction rates - Discharge rates - Water quality 	<p>Project Proponents' representatives</p> <p>Project Proponents HSE team</p> <p>Project Contractors</p> <p>Relevant Government bodies who may conduct independent monitoring or review the data include: NEMA, DWRM</p>
Landscape Management Plan¹ (To be developed)	To guide Project implementation in a manner that ensures visual impacts shall be minimised during the life of the Project.	<p>This plan will include a compilation of the objectives and actions related to managing visual impacts presented in the ESIA</p> <p>The plan shall:</p> <ul style="list-style-type: none"> - Define objectives and thresholds in terms of visual impact and identify roles and responsibilities - Define recommendations for each phase of the Project in order to minimise visual impact from Project activities <p>Detailed mitigation measures are defined in Chapter 11: Landscape and Visual and are summarised in the <i>ESMP Mitigation Checklist</i> (Appendix T).</p>	<p>A monitoring programme will be developed to check the success of the mitigation measures and audit the plan.</p> <p>Key performance indicators include:</p> <ul style="list-style-type: none"> - Number of non-compliances - Number of grievances related to visual disturbance 	<p>Project Proponents</p> <p>Project Contractors</p> <p>Relevant Government bodies who may conduct independent monitoring or review the data include: Ministry of Tourism Wildlife and Antiquities (MTWA)</p>
Labour Management Plan (LMP) (To be developed)	<p>Objectives of the Labour Management Plan are to:</p> <ul style="list-style-type: none"> - Promote compliance with national employment 	<p>The scope of the LMP covers construction, operational and decommissioning phases of the Project. It is further applicable across the entire workforce at all skills levels, and deals with all aspects relating to the Project and contractor workforce including recruitment, labour and accommodation conditions, management of worker relationships and occupational health and safety. The LMP also includes measures related to the management of workers engaged by third parties, and the management of workforce-related risks within the supply chain.</p>	<p>Key performance indicators include:</p> <ul style="list-style-type: none"> - Verify contractor human resource and sub-contracting policies - Assess recruitment and selection processes of workers (local and migrant workers) 	<p>Project Proponents</p> <p>Project Contractors</p> <p>Relevant Government bodies who may conduct independent monitoring or review the data include: Ministry of Gender, Labour</p>

¹ The Landscape Management Plan may be merged with the Site Clearance or Site Restoration plans

Supporting Plan	Objective	Description	Monitoring (including performance indicators)	Responsibility for monitoring
	and labour laws. - Establish, maintain, and improve the worker-management relationship. - Promote the fair treatment, non-discrimination, and equal opportunity of workers. - Protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties, and workers in the client's supply chain. - Avoid the use of forced labour.	The LMP will be done within the context of meeting national requirements and standards, the requirements of the IFC Performance Standards (IFC PS2) and in adherence with the United Nations Universal Declaration of Human Rights, the Conventions of the International Labour Organization, the United Nations Global Compact, the OECD Guidelines for Multinational companies, the Voluntary Principles on Security and Human Rights, and the United Nations Guiding Principles on Business and Human Rights. This plan is further described in Chapter 16: Social , and Chapter 18: Health and Safety and mitigation measures are summarised in the <i>ESMP Mitigation Checklist</i> (Appendix T).	<ul style="list-style-type: none"> - Assess conditions of employment (including casual labour) - Monitor the implementation of cultural awareness programs and worker code of conduct - Assess contractor – worker communication and engagement mechanisms - Monitor contractor grievance mechanisms, disciplinary cases, and any other issues and complaints related to recruitment, working conditions and accommodation - Verify retrenchment procedure and strategy - Verify contracts of employment - Assess working conditions, tools, PPE and OHS measures - Verify worker accommodation specifications and camp management, housekeeping and maintenance practices. - Monitor the implementation of induction and training programmes - Monitor the implementation of control measures to avoid and minimise impacts of camp and living conditions on local communities <p>The implementation of the mitigation and its effectiveness will be audited and additional training needs identified.</p>	and Social Development, District Labour Officer
Resettlement Action Plan (RAP) and Livelihood	To secure long term access to land to enable the project to be	The document will specify the plan and procedures that the Project will follow, and the actions that it will take to mitigate adverse effects, compensate losses, and provide development	The internal monitoring has the objective of informing the Project Management Team of the progress in the implementation of the RAP to	Project Proponents' HSE team

Supporting Plan	Objective	Description	Monitoring (including performance indicators)	Responsibility for monitoring
Restoration Plan (LRP) (Existing, to be revised)	developed and operated, while addressing displacement impacts and enhancing development impacts by improving the livelihoods and standard of living of Project Affected Persons.	<p>benefits to persons and communities affected by the Project land intake.</p> <p>Livelihood restoration refers to programs or measures designed specifically to improve the assets, levels of economic productivity, and/or standards of living to above pre-project levels. Livelihood improvements in the context of this document are targeted to displaced people whose livelihoods are affected by the project. Livelihood improvements are required as part of the resettlement action plan to conform to the spirit and intent of IFC PS 5.</p> <p>The RAP and the LRP shall be consistent with the Land Acquisition and Resettlement Framework.</p> <p>This plan is further described in Chapter 16: Social and mitigation measures are summarised in the <i>ESMP Mitigation Checklist</i> (Appendix T).</p>	<p>identify corrective actions, modify procedures and additional resources. It comprises monitoring the day-to-day resettlement activities and tracking the progress in meeting predicted or scheduled resettlement milestones. The monitoring parameters are included in the RAP report.</p> <p>The external monitoring will be undertaken to obtain an independent assessment of the effectiveness of the RAP implementation. The monitoring parameters are included in the RAP report. Upon conclusion of the resettlement, a Completion Audit is to be prepared by an external specialist. The overall aim of the audit will be to verify that resettlement and livelihood restoration activities have been undertaken in line with the requirements of the RAP, the LARF and IFC PS 5.</p>	<p>Relevant Government bodies who may conduct independent monitoring or review the data include: PAU, MEMD, NEMA, MLHUD</p>
Cultural Heritage and Archaeology Management Plan (CHMP) and the Chance Find Procedure (CFP) (Existing, to be revised)	The purpose of the CHMP is to develop an approach to cultural property management, including the required mitigation measures to be taken before, during and after Project activities in order to manage and protect cultural	<p>Cultural heritage encompasses properties and sites of archaeological, cultural, artistic and religious significance. It also refers to unique environmental features and cultural knowledge, as well as intangible forms of culture embodying traditional lifestyles that should be preserved for current and future generations</p> <p>The CHMP will:</p> <ul style="list-style-type: none"> - Define measures to help avoid or reduce the risk of adverse cultural heritage impacts on project affected communities during all phases of the Project - Establish the potential for sub-surface remains through pre-construction archaeological test excavations - Develop a Chance Finds Procedure (CFP) to manage the discovery of Chance Finds during the construction phase; 	<p>Input and Output Key Performance indicators include:</p> <ul style="list-style-type: none"> - Key inputs into the plan and associated programmes - Key outputs of the plan and associated programmes - Sustainability indicators of the plan and programmes. - Number of people included in the plans and associated programmes - Stakeholder perception on the effectiveness of the plan and associated programs. 	<p>Project Proponents' HSE team</p> <p>Project Contractors</p> <p>Relevant Government bodies including NEMA, Ministry of Tourism, Wildlife and Antiquities (MTWA) Department of Museums and Monuments</p>

Supporting Plan	Objective	Description	Monitoring (including performance indicators)	Responsibility for monitoring
	heritage in the Project area.	<ul style="list-style-type: none"> - Establish an appropriate Cultural Heritage Training Program for the Project management and staff - Support community cultural activities and enhance the preservation and awareness of cultural heritage and traditions including language - Define the roles and responsibilities for implementing the management and mitigation measures outlined in this CHMP. - Meet local regulatory requirements and IFC PS expectations. <p>This plan is further described in Chapter 17: Archaeology and Cultural Heritage and mitigation measures are summarised in the <i>ESMP Mitigation Checklist</i> (Appendix T).</p>	<p>Example of performance indicators: (list not exhaustive)</p> <ul style="list-style-type: none"> - Progress in Archaeological investigation and recording - Monitoring implementation of Cultural Heritage training programs - Number of signed agreements on the relocation of cultural assets - Number of cultural assets (e.g. graves) that have not been identified. (either assets already recorded, or new assets declared via the grievance mechanism) - Progress on the establishment of replacement cemeteries. - Progress on the exhumation and relocation of graves - Progress on the re-establishment of Sacred Sites 	
Community Content, Economic Development and Livelihood Plan (To be developed)	This Plan addresses social economic, education and livelihood activities undertaken to mitigate the impacts or potential risks generated by the Project, as well as discretionary activities conducive to enhancing the existing livelihoods and	<p>The Plan will provide a framework for how community content, economic development and livelihood activities are identified, selected, prioritised, implemented, monitored and evaluated. Where contractors are undertaking community activities, they are expected to apply this framework.</p> <p>The Plan aims to:</p> <ul style="list-style-type: none"> - Avoid or reduce the risk of adverse socio-economic impacts on project affected communities during all phases of the Project - Promote the development of conditions to strengthen communities to benefit from the Project's presence - Ensure that the development process fosters full respect for the dignity, human rights, aspirations, cultures and natural resource-based livelihoods of local communities - Define the roles and responsibilities for implementing the management and mitigation measures outlined in this Plan 	<p>The Input and Output Key Performance indicators will be the same as for the CHMP and CFPr.</p> <p>Example of outcome performance indicators include (list not exhaustive):</p> <ul style="list-style-type: none"> - In-migration and population changes - Access to education - Literacy and Education levels - Vocational training levels - Employment levels - Development of new local business enterprises. - Number of local people directly or indirectly employed by the 	<p>Project Proponents' HSE team</p> <p>Project Contractors</p> <p>Relevant Government bodies that may conduct independent monitoring or review the data include: PAU, MEMD, MoGLSD, MoES, MAAIF.</p>

Supporting Plan	Objective	Description	Monitoring (including performance indicators)	Responsibility for monitoring
	sustainable opportunities for local businesses to participate in the supply chain and the employability of the local workforce in the Project area.	<ul style="list-style-type: none"> - Meet local regulatory requirements and IFC PS expectations <p>This plan is further described in Chapter 16: Social, and Chapter 19: Ecosystem Services and mitigation measures are summarised in the <i>ESMP Mitigation Checklist</i> (Appendix T).</p>	<ul style="list-style-type: none"> - project or third-parties linked to vocational training. - Access to livelihoods and natural resources (crop farming, fishing, livestock rearing, trading services, etc.) - Changes to status of women, children and vulnerable groups - Access to modern forms of energy - Homestead asset profiles including homestead structures - Homestead land holding, size and yields of gardens - Changes in land tenure - Income sources and areas of expenditure - Livestock ownership - Level of livelihood improvement or socio-economic improvement of vulnerable groups 	
Community Health, Sanitation, Safety, and Security Plan (CHSSSP) (To be developed)	The purpose of the CHSSSP is to provide a clear set of actions and responsibilities for the control of project impacts affecting the health, sanitation, safety and security of the project affected communities.	<p>The CHSSSP will provide a framework for how community health, sanitation, safety and security activities are identified, selected, prioritised, implemented, monitored and evaluated. Where contractors are undertaking community activities, they are expected to apply this framework.</p> <p>Community health, sanitation, safety and security include the concept of well-being, which looks beyond physical health or absence of disease, and incorporates a broader psychosocial concept of mental and social health. Wellbeing also considers the ability of an individual to realise their potential within society, work productively, build strong and positive relationships with others and contribute to their community. Factors such as self-esteem, coping mechanisms, resilience and stress response are important in determining an individual's wellbeing</p> <p>The CHSSSP aims to:</p>	<p>The Input and Output Key Performance indicators will be the same as for the CHMP and CFPr.</p> <p>Example of outcome performance indicators (list not exhaustive) include:</p> <ul style="list-style-type: none"> - In-migration and population changes - Access to primary and other healthcare services - Health facility usage - Access to potable water - Access to justice systems - Changes to community health profile including exposure to disease, sexually transmitted infections, availability and quality of water resources, sanitation, 	<p>Project Proponents' HSE team</p> <p>Project Contractors</p> <p>Relevant Government bodies that may conduct independent monitoring or review the data include: PAU, NEMA, MoGLSD, MoH, MoIA, MLHUD Physical planning.</p>

Supporting Plan	Objective	Description	Monitoring (including performance indicators)	Responsibility for monitoring
		<ul style="list-style-type: none"> - Avoid or reduce the risk of adverse social and health impacts on project affected communities during all phases of the Project - Assist and collaborate with the community and the local government agencies in their preparations to respond effectively to emergency situations, especially when their participation and collaboration are necessary to respond to such emergency situations - Ensure that the development process fosters full respect for the dignity, human rights, aspirations, cultures and natural resource-based livelihoods of local communities - Define the roles and responsibilities for implementing the management and mitigation measures outlined in this CHSSSP - Meet local regulatory requirements and IFC PSs expectations <p>This plan is further described in Chapter 16: Social, and Chapter 18: Health and Safety and mitigation measures are summarised in the <i>ESMP Mitigation Checklist</i> (Appendix T).</p>	<ul style="list-style-type: none"> food insecurity and nutritional status - Changes in community safety profile including road safety, emergency response, and unplanned events - Changes in community security profile including crime rates, conflict, domestic violence etc. - Changes to status of women, children and vulnerable groups - Changes in community addictive behaviours (including alcohol, drugs,...) and their social consequences for community cohesion and security 	
Community Environmental Conservation Plan (CECP) <i>(To be developed)</i>	The purpose of the CECP is to mitigate the project impacts and to provide project affected communities a sense of ownership over the management of their local environment and natural resources.	<p>A number of community environmental conservation initiatives will be undertaken in partnership with local communities, UWA, environmental and tourism organisations, following feasibility studies. The CECP will provide a framework for how these activities are identified, selected, prioritised, implemented, monitored and evaluated.</p> <p>The CECP aims to:</p> <ul style="list-style-type: none"> - Avoid or reduce the risk of adverse influx related impacts on the environment and natural resources of project affected communities during all phases of the Project - Ensure that the development process fosters full respect for the dignity, human rights, aspirations, cultures and natural resource-based livelihoods of local communities - Define the roles and responsibilities for implementing the management and mitigation measures outlined in this CECP - Meet local regulatory requirements and IFC PSs expectations 	<p>The Input and Output Key Performance indicators will be the same as for the CHMP and CFPr.</p> <p>Outcome Performance indicators will include (list not exhaustive):</p> <ul style="list-style-type: none"> - In-migration and population changes - Access to natural resources - Access to modern forms of energy - Changes in land use 	<p>Project Proponents' HSE team</p> <p>Relevant Government bodies that may conduct independent monitoring or review the data include: PAU, NEMA, NFA, UWA, MLHUD Physical planning, NaFIRRI.</p>

Supporting Plan	Objective	Description	Monitoring (including performance indicators)	Responsibility for monitoring
		This plan is further described in Chapter 13: Terrestrial Vegetation, Chapter 14: Terrestrial Wildlife, Chapter 15 Aquatic Life, Chapter 16: Social and Chapter 19: Ecosystem Services and mitigation measures are summarised in the <i>ESMP Mitigation Checklist</i> (Appendix T).		
Tourism Management Plan (TMP) (To be developed)	The purpose of the TMP is to manage relationships with key tourism stakeholders to minimise potential negative effects of the Project on tourism.	<p>A number of tourism management initiatives will be undertaken in partnership with UWA, biodiversity and tourism organisations, following feasibility studies. The TMP will provide a framework for how these activities are identified, selected, prioritised, implemented, monitored and evaluated. All contractors and sub-contractors will be required to follow the measures and procedures set out in the plan.</p> <p>The TMP aims to:</p> <ul style="list-style-type: none"> - Avoid or reduce the risk of adverse impacts on tourism during all phases of the Project - Assist and collaborate with tourism stakeholders to promote tourism both nationally and internationally and support UWA in the management of tourism activities in MFNP - Define the roles and responsibilities for implementing the management and mitigation measures outlined in this TMP - Meet local regulatory requirements and IFC PSS expectations - Enhance any identified benefits relating to tourism <p>This plan is described in Chapter 16: Social, and Chapter 19: Ecosystem Services and mitigation measures are summarised in the <i>ESMP Mitigation Checklist</i> (Appendix T).</p>	<p>The Input and Output Key Performance indicators will be the same as for the CHMP and CFPr.</p> <p>Outcome Performance indicators will include (list not exhaustive):</p> <ul style="list-style-type: none"> - Access to touristic sites and viewpoints - Changes in tourism economic activity - Community employment levels and community content in the tourism industry 	<p>Project Proponents</p> <p>Relevant Government bodies that may conduct independent monitoring or review the data include: UWA, Ministry of Tourism, AUTO</p>
Journey Management Plan (Existing, to be revised)	To guide all logistical planning for the Project and ensure safety during transportation by specifying the safety procedures and processes for all journey types	<p>This is a logistics plan covering Project-related vehicle movements. The plan will specify journey routes for construction deliveries and workers, and provide more detail on the mitigation measures related to achieving safe and considerate journeys.</p> <p>The plan will aim to:</p> <ul style="list-style-type: none"> - Ensure that the risks associated with all journeys are appropriately considered and mitigated 	<p>A monitoring procedure will be developed to record road trip numbers, any deviations from designated routes, accidents and incidents inside the Project Area, vehicle speeds, and fuel usage.</p> <p>Key performance indicators will include:</p>	<p>Project Proponent RSES</p> <p>Project proponent HSE team</p> <p>Project Contractors</p> <p>Relevant bodies that may conduct independent monitoring or review the</p>

Supporting Plan	Objective	Description	Monitoring (including performance indicators)	Responsibility for monitoring
	(travel by road vehicle, air, boat), as well as optimising logistics through maximising use of available vehicles and reducing number of trips.	<ul style="list-style-type: none"> - Minimise risk of accidents and incidents associated with travel - Minimise negative impacts associated with traffic noise, dust, pollution, and disturbance to communities and wildlife - Minimise barrier effects from increased road traffic - Regulate access to Protected Areas (and other areas of high biodiversity value or sensitivity) to minimise disturbance of these areas, prevent unsustainable exploitation of natural resources and illegal activities - Minimise negative effects on tourism within the Project Area as a result of Project activities <p>The mitigation measures covered in this plan are discussed in Chapter 6: Air Quality and Climate, and Chapter 16: Social and are summarised in the <i>ESMP Mitigation Checklist</i> (Appendix T).</p>	<ul style="list-style-type: none"> - Rate of traffic incidents involving Project vehicles - Records of over speeding - Compliance with defensive driving training 	data include: Traffic Police, CAA, UNRA, UWA
Project Road Safety and Transport Management Plan (Existing, to be revised)	To guide all logistical planning for the Project and ensure safety during transportation.	<p>A logistics plan covering Project-related vehicle movements, outlining procedures relevant to transportation to appropriately manage the associated environmental and social impacts and safety.</p> <p>The plan will aim to:</p> <ul style="list-style-type: none"> - Manage the journeys required on site and off site to minimise impacts on environment - Outline speed limits and traffic management measures for Project Proponents and contractors vehicles - Include reporting procedures of incidents - Training and enforcement to ensure that all Project Proponents' / contractors' drivers adhere to applicable requirements and driving conditions as specified by the Project Proponents - Meet local regulatory requirements and IFC PSs expectations (e.g. PS 4) <p>The implementation of road safety and transport management programs at the local level of project affected communities (PAC) will also be performed through the CHSSSP.</p> <p>The mitigation measures covered in this plan are discussed in Chapter 6: Air Quality, Climate, Chapter 7: Noise, Chapter</p>	<p>A monitoring procedure will be developed to record driving performance, vehicle speeds, accidents and incidents outside the Project Area, and the need for additional training.</p> <p>Key performance indicators will include:</p> <ul style="list-style-type: none"> - Number of traffic-related grievances received / addressed - Number of anomalies linked to transport 	<p>Project Proponent RSES</p> <p>Project proponent HSE team</p> <p>Project Contractors</p> <p>Relevant Government bodies that may conduct independent monitoring or review the data include: UNRA, Ministry of Works, MGLSD (OSHD), District Traffic Police</p>

Supporting Plan	Objective	Description	Monitoring (including performance indicators)	Responsibility for monitoring
		16: Social , and Chapter 18: Health and Safety and are summarised in the <i>ESMP Mitigation Checklist</i> (Appendix T).		
Spill Prevention Plan (Existing, to be revised)	To guide the Project's approach to preventing, spills of chemicals, fluids, and oils at each stage of the Project.	<p>This plan will aim to:</p> <ul style="list-style-type: none"> - Outline control measures to prevent spillages from installation activities, fuelling, plant and equipment, etc. - Outline maintenance requirements for equipment to the relevant codes and standards - Present responsibilities for implementing and monitoring control measures. <p>The mitigation measures covered in this plan are discussed in Chapter 8: Soils and Geology, Chapter 9: Hydrogeology, Chapter 10: Surface Water, Chapter 20: Unplanned Events and are summarised in the <i>ESMP Mitigation Checklist</i> (Appendix T).</p>	<p>Key performance indicators will include:</p> <ul style="list-style-type: none"> - Incidents statistics indicators (number of incidents, severity, rate of actions closure) - Number of spill exercises 	<p>Project Proponent RSES</p> <p>Project proponent HSE team</p> <p>Project Contractors</p> <p>Relevant Government bodies that may conduct independent monitoring or review the data include: NEMA, PAU, Department for Disaster Preparedness -Office of the Prime Minister</p>
Oil Spill Contingency Plan (OSCP) (Existing, to be revised)	To present a detailed oil spill response plan that addresses controlling, containing, and recovering an oil spill	<p>The plan will aim to:</p> <ul style="list-style-type: none"> - Provide measures to reduce the likelihood of oil spillage - List clear roles and responsibilities - Provide scenarios for spills and spill contingency methods for different scenarios - Specify list of required equipment to respond to spills - Specify communication and notification requirements - Outline emergency drill requirements (including examinations, inspections and testing) - Outline measures to restore habitat after occurred spillage and monitoring requirements after a spillage <p>The mitigation measures covered in this plan are discussed in Chapter 20: Unplanned Events and are summarised in the <i>ESMP Mitigation Checklist</i> (Appendix T).</p>	<p>A strategy will be developed for regularly testing the Oil Spill Contingency Plan (scenario based response exercises) to monitor the effectiveness of the contingency measures and reinstatement after a spill. Changes in legislation, guidance, and GIPP will also be regularly checked.</p> <p>Key Performance indicators include:</p> <ul style="list-style-type: none"> - Number of emergency response exercises - Number of trained personnel - Number of spills 	<p>Project Proponent RSES</p> <p>Project proponent HSE team</p> <p>Project Contractors</p> <p>Relevant Government bodies that may conduct independent monitoring or review the data include: NEMA, MEMD, PAU, UWA, DWRM, MGSLD (OSHD), Department for Disaster Preparedness - Office of the Prime Minister</p>
Emergency Preparedness and Response Plan (ERP) (Existing, to be revised)	To provide detailed description of measures to prepare and respond to an emergency	<p>The purpose of this document is to provide practical guidelines on how the Project Proponent shall respond to an emergency situation.</p> <p>The plan will:</p> <ul style="list-style-type: none"> - Provide an emergency response management strategy per scenario 	<p>A strategy will be developed for monitoring the effectiveness of the response measures and reinstatement after an unplanned or emergency event. Changes in legislation, guidance, and GIPP will also be regularly checked.</p>	<p>Project Proponent RSES</p> <p>Project proponent HSE team</p> <p>Project Contractors</p>

Supporting Plan	Objective	Description	Monitoring (including performance indicators)	Responsibility for monitoring
		<ul style="list-style-type: none"> - Include Emergency risk analysis, Emergency Preparedness and Response Plan and definition of the relationships with Contractors' Emergency Response Plans - List clear roles and responsibilities - Specify communication and notification requirements. - Outline emergency drill requirements (including examinations, inspections and testing). - Define review processes <p>The implementation of ERP at the local level of project affected communities (PAC) will also be performed through the CHSSSP.</p> <p>The mitigation measures covered in this plan are discussed in Chapter 20: Unplanned Events and are summarised in the <i>ESMP Mitigation Checklist</i> (Appendix T).</p>	<p>Key Performance indicators include:</p> <ul style="list-style-type: none"> - Number of emergency response exercises - Number of trained personnel - Number of incidents 	<p>Relevant Government bodies that may conduct independent monitoring or review the data include: NEMA, MEMD, UWA, PAU, DWRM, Department for Disaster Preparedness -Office of the Prime Minister, Regional referral hospital, Police fire brigade</p>
<p>Blow Out Contingency Plan (BOCP) (Existing, to be revised)</p>	<p>To provide a detailed description of measures to prevent and respond to an emergency blowout scenario during drilling.</p>	<p>The plan will:</p> <ul style="list-style-type: none"> - Outline measures to reduce the likelihood of a blow out and appropriately monitor and maintain their effectiveness - Lay out the responsibilities for staff and channels of communication with the Project team and externally - Contact details for responsible persons - List of equipment, locations, and methods for mobilisation - Response measures and principles during a blowout event <p>The mitigation measures covered in this plan are discussed in Chapter 20: Unplanned Events and are summarised in the <i>ESMP Mitigation Checklist</i> (Appendix T).</p>	<p>A strategy will be developed for regular testing of the BOCP (scenario based response exercises), monitoring the effectiveness of the contingency measures and reinstatement after a blowout event. Changes in legislation, guidance, and GIIP will also be regularly checked.</p> <p>Key Performance indicators include:</p> <ul style="list-style-type: none"> - Number of anomalies - Number of incidents 	<p>Project Proponent representative for Drilling</p> <p>Drilling Contractors</p> <p>Relevant Government bodies that may conduct independent monitoring or review the data include: NEMA, MEMD, PAU, UWA, DWRM, MGSLD (OSHD)</p>
<p>Frack-Out Plan (To be developed)</p>	<p>To provide a detailed description of measures to prevent and respond to frack-out scenario during HDD operations</p>	<p>The plan will:</p> <ul style="list-style-type: none"> - Outline measures to reduce the likelihood of a frack-out and appropriately monitor and maintain their effectiveness - Lay out the responsibilities for staff and channels of communication with the Project team and externally - Contact details for responsible persons - List of equipment, locations, and methods for mobilisation. - Response measures and principles during a frack out event 	<p>Key Performance indicators include:</p> <ul style="list-style-type: none"> - Number of anomalies - Number of incidents 	<p>Project Proponent representative for Construction</p> <p>Project Contractors</p> <p>Relevant Government bodies that may conduct independent monitoring or review the data include:</p>

Supporting Plan	Objective	Description	Monitoring (including performance indicators)	Responsibility for monitoring
		The mitigation measures covered in this plan are discussed in Chapter 20: Unplanned Events and are summarised in the <i>ESMP Mitigation Checklist</i> (Appendix T).		NEMA, UWA, DWRM, WMD

23.5.2 Monitoring of the Implementation of Mitigation Measures

The ESMP table provides an overview of monitoring mechanisms associated with each technical chapter. Management plans will include details outlining the monitoring requirements based on the findings of this ESIA. For each of these monitoring requirements the management plans will specify:

- The parameters to be assessed as part of the monitoring;
- The proposed scheduling of monitoring activities;
- The proposed location of monitoring activities;
- The means of verification; and
- The roles and responsibilities for the monitoring activity.

Monitoring is required in order to both demonstrate compliance with the relevant national (and international) standards as well as to provide verification of the overall design and effectiveness of the implemented mitigation and management measures. The key objectives of the proposed monitoring activities will be:

- To monitor compliance with relevant standards and the Project Proponents' environmental and social objectives;
- To provide an early indication of any mitigation and management measures or practices that are failing to achieve objectives;
- To determine whether environmental and social changes are attributable to Project activities; and
- To provide a basis for continuous review of, and adjustment of mitigation measures if needed.

The monitoring requirements outlined in the detailed ESMP and associated supporting management plans will provide greater clarification and definition on the monitoring methodology. The Physical Environmental Monitoring Plan and other supporting plans will present greater specificity and instruction on the monitoring locations, parameters to be monitored, sampling and storage methodologies, sampling frequency, analytical techniques, evaluation, and reporting requirements. In developing these plans, the following factors will be considered:

- Significance of environmental and social aspects identified through impact assessment;
- National legislative requirements;
- GIIP;
- Stakeholder concerns and comments;
- Responsiveness to the detection of environmental and social changes or trends;
- Logistical practicality; and
- Cost effectiveness.

23.5.3 Inspections and Audits

HSE performance will be assessed by inspections and audits that are designed to identify positive implementation and also missing elements or non-compliance with the Project Proponents' HSSSE-IMS. Periodic inspections and audits will include:

- Site inspections and walkovers; and
- Internal and external (third party) audits.

This will provide assurance that the requirements of the Project Proponents' HSSSE-IMS, including the ESMP, have been met. The ESMP will detail the nature, frequency, and responsibility of inspections and audits.

23.5.4 Reporting

The format and protocols for HSE reporting is specified by the Project Proponents' HSSSE-IMS as detailed in Section 23.3, which requires periodic internal and external reporting. Reports will be prepared for a range of stakeholders; including those necessary to satisfy applicable law, regulations and permits.

HSE reports will provide a summary of HSE performance against objectives and targets, performance indicators and industry benchmarks, together with supporting information on the implementation of the Project Proponents' HSSSE-IMS.

National content reports will also be produced.

23.5.5 Interaction with Other Developers

There are several associated facilities and cumulative developments that have been considered as part of this ESIA which have the potential to increase impacts on certain receptors, as described in **Chapter 21: Cumulative Impact Assessment** and discussed within the in-combination effects section of each technical chapter. It is therefore important for the Project Proponents to liaise with these other developers to ensure that changes to the Project are communicated to these interested parties, that the proposed mitigation in the Project ESMP is not disrupted by the activities of another developer in the vicinity, and that opportunities are taken to collaborate to collectively manage in-combination and cumulative impacts.

In order to promote and implement collaboration between developers the Project Proponents will promote the Regional Cumulative Impacts Management (RCIM) initiative; a regional mechanism for the sustainable management of cumulative impacts. The RCIM initiative envisages that mitigation measures would be designed and implemented collectively by developers, and other stakeholders, under GoU's leadership. The first stage in the implementation process will be to establish the RCIM in liaison with Government and other stakeholders and agree its objectives and priorities. Once agreement with Government and other participants is confirmed, the RCIM will subsequently develop detailed strategies and actions for the implementation of collaborative mitigation. The effectiveness of the identified mitigation measures will depend on the success of the collaborative efforts to reduce adverse impacts.

23.6 Change Management

The Project design for enabling infrastructure and the main facilities was still ongoing at time of ESIA submission. The final scheme shall be subject to further detailed engineering and although major deviations impacting the conclusions of this ESIA are not anticipated, design and construction aspects will be subject to further iteration throughout the next phase of the project which is Engineering, Procurement, Supply and Construction (EPSC).

The Project Enabling Infrastructure and engineering has been developed taking into account the requirements of this ESIA. It has been an iterative process whereby the engineering has fully considered the environmental and social sensitivities as presented in each chapter of this ESIA. This has ensured that a robust process has been implemented to thoroughly address the impacts associated with the proposed project design and construction. Any deviations from the technical description of the Project (as described in **Chapter 4: Project Description and Alternatives**) which are considered to have a material impact² on the ESIA will be addressed through the Management of Change (MoC) Process, which is an integral part of the Project Proponents' management system.

Changes will be categorised into two types. Type 1 changes will be minor, not affecting the assessment, mitigation, or conclusions presented in the ESIA, and therefore not requiring engagement with NEMA. They will however be recorded, along with any specific commitments or regulatory requirements associated with these changes.

² A material impact being a substantial change or modification of the project design, construction or operation which may lead to increased environmental, social, and/or health impacts; or where there is a substantive undesirable effect not assessed in the ESIA – see Type 2 changes.

NEMA will be notified of all Type 2 changes, which are those changes considered to deviate from the information presented in the ESIA and affecting the mitigation or conclusions of the ESIA. The communication will describe the change, how the change affects the impacts presented in the ESIA, and any changes in proposed mitigation measures or monitoring. Following submission of the change, the Project team will engage in meetings and communicate with NEMA in order to secure formal approval.

A change register will be maintained for Type 1 and 2 changes, and the Project ESIA *ESMP Mitigation Checklist* shall be updated with any new commitments associated with Type 2 changes.

23.7 References

- Ref. 23-1 Government of Uganda. (1998). The Environmental Impact Assessment Regulations, 1998.
- Ref. 23-2 Environmental and Social Impact Assessment Guidelines for the Energy Sector in Uganda, NEMA, (2014).
- Ref. 23-3 IFC. 2012. "Performance Standard Assessment and Management of Environmental and Social Risks and Impacts." [Online] Available at: https://www.ifc.org/wps/wcm/connect/3be1a68049a78dc8b7e4f7a8c6a8312a/PS1_English_2012.pdf?MOD=AJPERES [Accessed 17/01/2018]
- Ref. 23-4 IFC. 2012. "Biodiversity Conservation and Sustainable Management of Living Natural Resources." Available at: https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/performance-standards/ps6 [Accessed 11/04/2018]
- Ref. 23-5 Ministry of Water and Environment, Republic of Uganda. 2013. Framework and Guidelines for Water Source Protection Volume 1: Framework for Water Source Protection



24 – Residual Impacts and Conclusions

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24 Residual Impact Assessment and Conclusions

This Environmental and Social Impact Assessment (ESIA) chapter summarises the conclusions of the impact assessment undertaken for the Project. It provides a holistic view of how the ESIA was undertaken, how the Project has committed to avoiding, mitigating and managing potential risks and impacts so that development opportunities are enhanced, and provides a summary of impact assessment conclusions for each technical discipline. The impact assessment covers the entire life of the Project, over the four individual phases consisting of Site Preparation and Enabling Works, Construction and Pre-Commissioning, Commissioning and Operations and Decommissioning.

The Tilenga Project will support the Government of Uganda's (GoU) plans for development of the discovered oil resources within the Albertine Graben. Tilenga is a strategic project because of the anticipated benefits for the country including improved infrastructure such as roads and the development of associated business opportunities (e.g. supply of agricultural products, employment and job training among others). The Project is part of the wider oil and gas development being undertaken in the Lake Albert region.

24.1 Meeting ESIA Objectives

The Project is being carried out in accordance with relevant national regulations and standards and guidelines for international financing, including those for ESIA. As described in **Chapter 2 Policy, Regulatory and Administrative Framework**, key applicable guidelines and regulations include: the GoU Environmental Impact Assessment Regulations, S.I. No 13/1998 (under section 107 of the National Environmental Act Cap 153) (Ref. 24-11); and the International Finance Corporation (IFC) Performance Standards (PS) (Ref. 24-2). In accordance with these standards, guidelines and regulations, this ESIA has met the necessary requirements for an assessment and management of the potential environmental and social risks. Additionally, the production of this ESIA has taken on board comments received from National Environment Management Authority (NEMA) which accompanied the ESIA Scoping Report/Terms of Reference. The Project Proponents are also committed to implementing Good International Industry Practice (GIIP) in relation to environmental and social performance during all phases of the Project.

Chapter 4 Project Description and Alternatives provides a detailed description of the Project, and has formed the basis for the impact assessment of Project Activities. It also presents a summary of the alternatives considered for this Project, including the "Zero" alternative. Due to the sensitive environment within which the Project is based, environmental and social considerations were key factors in the decision making process as the design of the Project evolved. This resulted in refinement of the design to avoid sensitive features, minimise footprints and overall reduce interaction with the environment. The assessment of potential impacts as a result of the Project, along with the identification of appropriate mitigation measures, is contained in the technical chapters (Chapters 6 to 19) of this ESIA Report. Baseline information is also presented in each technical chapter. Key receptors for each technical study area are identified and their characteristics described.

This ESIA Report has been prepared taking into consideration the definition of the Project Area and of the Project Area of Influence (Aoi) provided by IFC PS 1. The Project Aoi includes those areas likely to be affected by the main Project components and Associated Facilities, and in the case of cumulative impacts, potential incremental impacts from other developments unrelated to the Project that will take place within the vicinity of the Project Area and within the Project timescale of implementation.

24.2 Stakeholder Engagement

The approach to stakeholder engagement during the ESIA process has been guided by the following good practice principles:

- **Free:** Engagement was free of external manipulation or coercion and intimidation;
- **Prior:** Engagement was undertaken in a timely way and prior to decisions being made so that views expressed can be taken into account; and

- **Informed:** relevant and understandable project information was disclosed to help stakeholders to understand the potential risks, impacts and opportunities of the Project

Stakeholder engagement (including dialogue, consultation and the disclosure of information) is a key element of project planning, development and implementation. Effective stakeholder engagement assists good design, builds relationships with local communities, and reduces the potential for delays through the early identification of potential risks and issues.

Stakeholder engagement is a continuous process and with the help of the Project Proponents Community and Tourism Liaison Officers (CTLOs), communities in the Project Area have been regularly consulted since the start of Project-related oil and gas activities.

Chapter 5: Stakeholder Engagement describes the Project Proponents approach to stakeholder engagement, its purpose, and the regulatory context in which it occurs. It provides information about engagement activities undertaken to date for the ESIA process and those that are planned for the future. The chapter also summarises the key issues that have been raised by stakeholders which include potential impacts to health, safety and the environment, potential disruption to livelihoods (e.g. fishing, farming and tourism), use of local labour and businesses, communication and Project-induced in-migration. Input from stakeholders was incorporated into baseline studies, and helped to guide the identification and assessment of potential impacts and assist in the development of suitable mitigation measures to reduce negative impacts and enhance beneficial impacts.

A Stakeholder Engagement Plan (SEP) has been developed and will continue to be updated throughout the Project lifecycle. The Project Proponents also have established a formal complaints procedure (Grievance Mechanism) to ensure that grievances are addressed through a transparent and impartial process. The grievance procedure has been and will continue to be disclosed to the public via individual or group meetings and via printed material.

24.3 Impact Assessment Conclusions

The ESIA process is a systematic approach to identifying the potential environmental and social impacts of a development proposal, and to describing the mitigation and management measures that will be implemented to address those impacts. Ultimately, it allows relevant parties to make informed decisions about a development proposal, and allows potentially affected stakeholders to participate in the process. The impact assessment has been based on the methodology presented in **Chapter 3: ESIA Methodology**. Potential impacts to the key receptors were in general assessed using an impact significance matrix approach that considers the sensitivity of the receptors and the magnitude of the impacts. Potential impacts due to unplanned events, and potential cumulative and transboundary impacts, were also considered and subject to dedicated assessments.

Impact significance was assessed after consideration of embedded mitigation, but prior to the implementation of additional mitigation measures, resulting in a list of “*potential impacts*”. Additional mitigation was thereafter identified in order to further mitigate the potential impacts. The impact significance was then assessed after the implementation of additional mitigation measures, resulting in a list of “*residual impacts*”. It is pertinent to note that impacts without additional mitigation measures in place are not representative of the Project’s actual extent of impact, and are described in this ESIA Report to facilitate understanding of how and why additional mitigation measures were identified and how they help to reduce any negative impacts to an acceptable level where possible.

The residual impact is what remains following the application of embedded mitigation and additional mitigation and management measures, and thus represents the final level of predicted impact associated with the development of the Project. **Significant** residual impacts are considered to be those which are classed as Moderate or High. A residual impact significance of Insignificant or Low is considered to be **Not Significant**. Impacts were considered to be either **Adverse** or **Beneficial**.

For the ecological chapters, in consideration of the objectives of the IFC PS6 there is a requirement to achieve no net loss of natural habitat and net gain of Critical Habitat. For the ecological assessments (**Chapter 13: Terrestrial Vegetation**, **Chapter 14: Terrestrial Wildlife** and **Chapter 15: Aquatic Life**) measures to achieve net gain are therefore considered where residual impacts could remain even after implementing the earlier actions in the mitigation hierarchy.

A summary of the residual impacts is presented below for each topic covered within the ESIA.

24.3.1 Air Quality and Climate

Overall, residual impacts to air quality have been assessed as being of a **Low Adverse** significance.

The residual effect of Greenhouse Gas (GHG) emissions on the atmosphere and climate is judged to range between **Insignificant** to **Moderate Adverse** significance throughout the project lifetime, with higher emissions associated with the Commissioning and Operations phase (mainly associated with power generation, for which excess gas from reservoir will be combusted during an initial period).

The residual impacts significance for each phase of the Project is summarised in Table 24-1.

Table 24-1: Residual Impacts Significance to Air Quality and Climate (GHG Emissions)

Potential Impact	Residual Impact Significance (Post mitigation)			
	Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operations	Decommissioning
Air Quality				
Fugitive Emissions of Dust & PM ₁₀	Low Adverse	Low Adverse	N/A	Low Adverse
Fugitive Emissions from NRMM ¹	Low Adverse	Low Adverse	N/A	Low Adverse
Fugitive Emissions of VOCs	Low Adverse	Low Adverse	Low Adverse	Low Adverse
Fugitive Emissions of Odour	Low Adverse	Low Adverse	Low Adverse	Low Adverse
Controlled Emissions of NO ₂ , PM ₁₀ & PM _{2.5}	Low Adverse	Low Adverse	N/A	Low Adverse
Controlled emissions from energy generation plant	Low Adverse	Low Adverse	Low Adverse	N/A
Climate				
GHG Emissions	Insignificant	Low Adverse	Moderate Adverse	Low Adverse

The results of the impact assessment indicate that implementation of the embedded and additional mitigation measures will be adequate to address any negative impacts on air quality related to the Project. The Project Proponents are committed to adhering to implementing Best Available Techniques (BAT) and will continue seeking design controls during the detailed engineering to help minimise emissions.

24.3.2 Noise and Vibration

Through the adoption of design controls and the implementation of additional mitigation measures, residual impacts from noise and vibration during all phases of the Project have generally been assessed as **Insignificant** or **Low Adverse** significance with the exception of the following activities which have been assessed, on a worst case basis², to have a **Moderate Adverse** residual significance to noise:

- Night-time Well Pad Drilling Noise during Construction and Pre-Commissioning Phase;
- Night-time Central Processing Facility (CPF) Option Two Noise (worst case CPF site layout with high noise generating plant located in the northeast of the site, which is the nearest location to receptors) during Commissioning and Operations Phase; and

¹ Non Road Mobile Machinery (NRMM)

² Worst case has considered that highest noise generating plant may be located on any site boundary

- Night-time operational well pad Noise during Commissioning and Operation Phase.

The residual impacts significance for each phase of the Project is summarised in Table 24-2.

Table 24-2: Residual Impacts Significance to Noise and Vibration

Potential Impact	Residual Impact Significance (Post mitigation)			
	Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operations	Decommissioning
Site Activity Noise	Insignificant to Low Adverse	Insignificant to Moderate Adverse	Insignificant to Moderate Adverse	Insignificant to Low Adverse
Road Traffic Noise	Low Adverse	Low Adverse	Insignificant	Low Adverse
Vibration	Insignificant to Low Adverse	Insignificant to Low Adverse	N/A	N/A

The results of the impact assessment indicate that implementation of the embedded and additional mitigation measures will be adequate to reduce impacts from vibration and the vast majority of potential impacts from noise to levels which are not considered significant.

Of the identified residual significant (Moderate Adverse) impacts, it is considered that the significant CPF noise impacts can be designed out through selection of the Option One CPF layout, and it is proposed that an additional noise modelling be undertaken during detailed engineering based on finalised locations and manufacturers detailed data on plant items, to identify if potentially significant impacts remain and can be suitably reduced.

24.3.3 Soils and Geology

Residual impacts on soil and human health receptors during all phases of the Project have been assessed as **Insignificant** or **Low Adverse** significance. The residual impacts significance for each phase of the Project is summarised in Table 24-3.

Table 24-3: Residual Impacts Significance to Soils and Geology

Potential Impact	Residual Impact Significance (Post mitigation)			
	Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operations	Decommissioning
Soil Compaction	Insignificant to Low Adverse	Insignificant to Low Adverse	Insignificant	Insignificant to Low Adverse
Soil Erosion	Insignificant to Low Adverse	Insignificant to Low Adverse	Insignificant to Low Adverse	Insignificant to Low Adverse
Soil Quality	Insignificant to Low Adverse	Insignificant to Low Adverse	Insignificant	Insignificant to Low Adverse
Human Health	Insignificant to Low Adverse	Insignificant to Low Adverse	Insignificant to Low Adverse	Insignificant to Low Adverse

The results of the impact assessment indicate that implementation of the embedded and additional mitigation measures will be adequate to address potential impacts to soils and to human health (from soil quality impacts) in relation to the development of the Project.

24.3.4 Hydrogeology

Based on worst-case water balance calculations, it is considered that the residual impacts to regional groundwater resources and local groundwater level and flow from proposed rates of groundwater abstraction for the Project will be **Insignificant**.

Through the adoption of design controls and the implementation of additional mitigation measures, the residual impacts during all phases of the Project on groundwater quality and on human health receptors have been assessed as **Insignificant** to **Low Adverse** significance.

The residual impacts significance for each phase of the Project is summarised in Table 24-4.

Table 24-4: Residual Impacts Significance to Hydrogeology

Potential Impact	Residual Impact Significance (Post mitigation)			
	Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operations	Decommissioning
Derogation of Regional Groundwater Resources	Insignificant	Insignificant	Insignificant	Insignificant
Groundwater Level and Flow	Insignificant	Insignificant	Insignificant	Insignificant
Groundwater Quality	Insignificant to Low Adverse	Insignificant to Low Adverse	Insignificant to Low Adverse	Insignificant to Low Adverse
Human Health	Insignificant to Low Adverse	Insignificant to Low Adverse	Insignificant to Low Adverse	Insignificant

The results of the impact assessment indicate that implementation of the embedded and additional mitigation measures will be adequate to address potential impacts to groundwater and to human health (from groundwater quality impacts) in relation to the development of the Project.

24.3.5 Surface Water

Residual impacts to surface water quantity are considered to be **Insignificant** and residual impacts to surface water quality have been assessed as **Insignificant** to **Low Adverse** significance.

The residual impacts to flood risk during all phases of work are considered to be **Insignificant** to **Low Adverse** significance, with the exception of potential localised flood risk impacts associated with the Victoria Nile Ferry Crossing. During the Site Preparation and Enabling Works, Construction and Pre-Commissioning and Commissioning and Operations phases flood risk impacts are considered to be of **Moderate Adverse** significance due to the proximity of the infrastructure to the Victoria Nile and the potential that the landing structure could pose a reduction in floodplain storage and obstruction to floodplain overland flows which in turn could cause localised flooding.

The residual impacts significance for each phase of the Project is summarised in Table 24-5.

Table 24-5: Residual Impacts Significance to Surface Water

Potential Impact	Residual Impact Significance (Post mitigation)			
	Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operations	Decommissioning
Surface Water Quantity (Availability)	Insignificant	Insignificant	Insignificant	Insignificant
Surface Water Quality	Insignificant to Low Adverse	Insignificant to Low Adverse	Insignificant	Insignificant to Low Adverse
Flood Risk / Morphology	Insignificant to Moderate Adverse	Insignificant to Moderate Adverse	Insignificant to Moderate Adverse	Insignificant to Low Adverse

The results of the impact assessment indicate that implementation of the embedded and additional mitigation measures will generally be adequate to address potential impacts to surface water as a result of the Project. The design of Victoria Nile ferry crossing jetty will take into consideration the potential localised flood risk.

24.3.6 Landscape and Visual

The landscape and visual impact assessment concluded that residual impacts significance on landscape and visual receptors ranged from **Insignificant** to **High Adverse** as shown in Table 24-6.

Table 24-6: Residual Impacts Significance to Landscape and Visual

Potential Impact	Residual Impact Significance (Post mitigation)			
	Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operations	Decommissioning
Landscape Character Areas				
LCA-01 - Buliisa Lowland Pastoral Farmland	Low Adverse	Moderate Adverse	Moderate Adverse	Low Adverse
LCA-02 - Buliisa Lowland Rolling Farmland	Low Adverse	Moderate Adverse	Moderate Adverse	Insignificant
LCA-03 - Lake Albert Coastal Fringe	Low Adverse	Moderate Adverse	Low Adverse	Insignificant
LCA-04 - Victoria Nile Corridor	Low Adverse	Moderate Adverse	Low Adverse	Insignificant
LCA-05 - Lake Albert-Victoria Nile Delta	N/A	Low Adverse	Insignificant	Insignificant
LCA-06 - MFNP South, Rolling Woodland	Low Adverse	Insignificant	Insignificant	Insignificant
LCA-07 - MFNP North, Savanna Plateau	Moderate Adverse	High Adverse	Moderate Adverse	Insignificant
Viewpoints				
1 - Kimoli	High Adverse	High Adverse	Moderate Adverse	Low Adverse
2 - Kibambura	Insignificant	Low Adverse	Low Adverse	Insignificant
3 - Buliisa (West)	Low Adverse	Moderate Adverse	Low Adverse	Insignificant
4 - Kisimo	Insignificant	Moderate Adverse	Low Adverse	Insignificant
5 - Kirama	Moderate Adverse	Low Adverse	Low Adverse	Insignificant
6 - Ngwedo Farm	Low Adverse	Low Adverse	Low Adverse	Insignificant
7 - Baker's Lodge	Insignificant	Low Adverse	Insignificant	Insignificant
8 - Kabalega Wilderness Lodge	Insignificant	Moderate Adverse	Low Adverse	Insignificant
9 - Murchison River Lodge	Insignificant	Moderate Adverse	Low Adverse	Insignificant
10 - Nile Safari Lodge	Insignificant	Moderate Adverse	Low Adverse	Insignificant
11 - Pakuba Safari Lodge	Moderate Adverse	Moderate Adverse	Low Adverse	Insignificant
12 - Paraa Ferry Crossing	Moderate Adverse	Moderate Adverse	Moderate Adverse	Insignificant
13 - Buligi Track, Delta Track Jct	Moderate Adverse	High Adverse	Moderate Adverse	Insignificant
14 - Albert Track	Moderate Adverse	High Adverse	Low Adverse	Insignificant
15 - Wanseko beach	Low Adverse	Low Adverse	Low Adverse	Insignificant

Potential Impact	Residual Impact Significance (Post mitigation)			
	Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operations	Decommissioning
16 - Kasinyi (West)	Low Adverse	Moderate Adverse	Low Adverse	Insignificant
17 - Kasinyi (East)	Moderate Adverse	Moderate Adverse	Moderate Adverse	Insignificant
18 - Buligi Track (Pakuba Airfield)	Moderate Adverse	High Adverse	Moderate Adverse	Insignificant

The Project Proponents have minimised the footprint of the proposed installation as much as practicable. However, considering the baseline condition and due to the scale and spread of activity including removal of vegetation, loss of landscape pattern and introduction of uncharacteristic infrastructure, significant impacts (Moderate to High Adverse significance) are predicted to remain to five Landscape Character Areas and 13 Viewpoints during at least one Project phase. Negative impacts are predicted to the perceptual qualities of the landscape character including remoteness and tranquillity experienced throughout the landscape but will be temporary and overall reversible, in particular during the Site Preparation and Enabling Works and Construction and Pre-Commissioning Phases. The Project Proponents will continue to explore design options which may further reduce the potential impacts on landscape and visual receptors.

24.3.7 Waste

Residual waste management impacts are assessed to be **Insignificant to Low Adverse** significance.

Table 24-7 provides a summary of the anticipated residual impacts significance. Waste impacts during the Decommissioning Phase have not been assessed since waste arisings estimates for this phase are not available at the time of writing. Decommissioning will be undertaken in accordance with the Ugandan legislation, international standards and best practice, and a developed Decommissioning Management Plan. A detailed decommissioning waste management plan will also be developed including identification of waste types, quantities and recycling, treatment technologies as well as facilities required for waste management.

Table 24-7: Residual Waste Management Impacts Significance

Waste Type	Category	Residual Impact Significance (Post mitigation)	
		Site Preparation and Enabling Works and Construction and Pre-Commissioning	Commissioning and Operations
Chemicals	Hazardous	Low Adverse	Low Adverse
Drill Cuttings	Hazardous	Low Adverse	N/A
	Non-hazardous	Insignificant	N/A
Drilling / Workover Fluids	Hazardous	Low Adverse	Low Adverse
	Non-hazardous	Insignificant	N/A
Electrical Equipment	Hazardous	Low Adverse	Low Adverse
Food	Non-hazardous	Insignificant	Insignificant
Used cooking oil	Hazardous	Low Adverse	Low Adverse
General Waste	Non-hazardous	Insignificant	Insignificant
Glass	Non-hazardous	Insignificant	Insignificant
Medical waste	Hazardous	Low Adverse	Low Adverse
Metal	Non-hazardous	Insignificant	Insignificant
Cables	Hazardous	Low Adverse	N/A
Oily Waste	Hazardous	Low Adverse	Low Adverse
Paper & Cardboard	Non-hazardous	Insignificant	Insignificant

Waste Type	Category	Residual Impact Significance (Post mitigation)	
		Site Preparation and Enabling Works and Construction and Pre-Commissioning	Commissioning and Operations
Plastic (clean)	Non-hazardous	Insignificant	Insignificant
Plastic (contaminated)	Hazardous	Low Adverse	N/A
Sanitary waste	Hazardous	Low Adverse	Low Adverse
Jetting sand (clean)	Non-hazardous	N/A	Insignificant
Jetting sand (oily)	Hazardous	N/A	Low Adverse
Soil and rock	Inert	Insignificant	N/A
Contaminated soil	Hazardous	Low Adverse	Low Adverse
Tyres & Rubber	Non-hazardous	Insignificant	Insignificant
Wood (untreated)	Non-hazardous	Insignificant	Insignificant
Wood (treated)	Hazardous	Low Adverse	Low Adverse
Bitumen	Hazardous	Insignificant	N/A
Insulation Foam	Non-hazardous	Low Adverse	Low Adverse

With implementation of the embedded and additional mitigation measures including the Project Proponents commitment to managing Project waste using GIIP-compliant facilities, residual impacts are expected to be reduced such that they are not expected to be significant, indicating that the identified mitigation measures are adequate to address the waste impacts of the Project.

24.3.8 Terrestrial Vegetation

The Project has the potential to directly and/or indirectly affect vegetation within a number of protected areas (e.g. Murchison Falls National Park (MFNP), Bugungu Wildlife Reserve and Budongo Central Forest Reserve), Critical Habitats (as defined by previous Critical Habitat Assessment activities (Ref. 24-3)), and a number of priority flora species listed on the International Union for Conservation of Nature (IUCN) Red List (Ref. 24-4) and/or Uganda Red List (Ref. 24-5) (e.g. *Brazzeia longipedicellata* and *Dialium excelsum* both listed as Endangered on the IUCN Red List).

The findings from the assessment of direct impacts on terrestrial vegetation indicate that the residual impacts on species and on threatened ecosystems will generally be **Insignificant to Low Adverse** significance. This is because most of the species have been avoided through footprint design, are not present within the Primary Study Area or are more associated with forest habitats than with savanna habitats.

The one exception to this is the Forest-Savanna Mosaic threatened ecosystem which represents the remnant forest patches within the overall savanna landscapes generally outside of protected forests. This ecosystem is already under threat particularly due to rapid loss of its remaining forest patches. Indirect impacts, due to induced influx of people to the area in relation to the Project, are likely to increase as the Project progresses and this will mean increasing pressure on remaining forested areas as they are cleared (for subsistence farming, fuel, etc). The impact on this ecosystem receptor is therefore defined as **Moderate Adverse** significance. The residual impacts significance on species and threatened ecosystems is shown in Table 24-8.

Table 24-8: Residual Impacts Significance to Species and Threatened Ecosystems (Direct and Indirect)

Potential Impact	Residual Impact Significance (Post mitigation)			
	Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operations	Decommissioning
Vegetation Species (Based on Receptor Sensitivity)				
Very High Sensitivity	Low Adverse	Low Adverse	Low Adverse	Low Adverse
High Sensitivity	Low Adverse	Low Adverse	Low Adverse	Low Adverse
Moderate Sensitivity	Insignificant	Insignificant	Insignificant	Insignificant
Threatened Ecosystems				
Dry Acacia Savanna	Low Adverse	Low Adverse	Low Adverse	Low Adverse
Forest-Savanna Mosaic	Low Adverse	Moderate Adverse	Moderate Adverse	Moderate Adverse
Moist Acacia Savanna	Low Adverse	Low Adverse	Low Adverse	Low Adverse
Moist <i>Combretum</i> Savanna	Insignificant	Insignificant	Insignificant	Insignificant
<i>Butyrospermum</i> Savanna	Insignificant	Insignificant	Insignificant	Insignificant
Palm Savanna (<i>Borassus</i> palms)	Insignificant	Insignificant	Insignificant	Insignificant
<i>Hyparrhenia</i> Grass Savanna	Low Adverse	Low Adverse	Low Adverse	Low Adverse

The potential impacts of the Project on protected areas has also been assessed. This has considered the direct and indirect impacts separately.

Direct residual impacts on the majority of protected areas are considered **Low Adverse** significance as Tilenga Project infrastructure will not be present within them; however, the residual direct impact for the MFNP & Karuma Wildlife Reserve is considered **Moderate Adverse** significance as there will be direct impacts on grassland habitats within the MFNP where 10 well pads, pipelines and other Project related infrastructure (access tracks) will be constructed and operated over an extended period.

Potential Indirect impacts to the identified protected areas will be more diffuse in origin but more long term and difficult to manage. Overall a residual impact of **Moderate Adverse** significance has been defined for protected areas due to this risk of induced impacts from influx of people to the region.

The residual impacts significance on protected areas is summarised in Table 24-9 below.

Table 24-9: Residual Impacts Significance on Protected Areas

Protected Area	Impact Type	Residual Impact Significance (Post mitigation)			
		Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operations	Decommissioning
MFNP & Karuma Wildlife Reserve	<i>Direct</i>	Moderate Adverse	Moderate Adverse	Moderate Adverse	Moderate Adverse
	<i>Indirect</i>	Moderate Adverse	Moderate Adverse	Moderate Adverse	Moderate Adverse
Bugungu Wildlife Reserve	<i>Direct</i>	Low Adverse	Low Adverse	Low Adverse	Low Adverse
	<i>Indirect</i>	Moderate Adverse	Moderate Adverse	Moderate Adverse	Moderate Adverse
Budongo Central Forest Reserve	<i>Direct</i>	Low Adverse	Low Adverse	Low Adverse	Low Adverse
	<i>Indirect</i>	Moderate Adverse	Moderate Adverse	Moderate Adverse	Moderate Adverse
Forest Reserves in Masindi Area	<i>Direct</i>	Low Adverse	Low Adverse	Low Adverse	Low Adverse
	<i>Indirect</i>	Moderate Adverse	Moderate Adverse	Moderate Adverse	Moderate Adverse
Bugoma Forest	<i>Direct</i>	Low Adverse	Low Adverse	Low Adverse	Low Adverse
	<i>Indirect</i>	Moderate Adverse	Moderate Adverse	Moderate Adverse	Moderate Adverse

In view of the anticipated indirect impacts mainly associated with influx, the Project Proponents will develop an Influx Management Strategy to mitigate in-migration impacts and maximise benefits for local communities. Implementation of the strategy will depend on joint coordination between the Project Proponents, government, other project developers, local communities and civil society.

In addition, the assessment indicates that further mitigation will be required, in order to reach the objective of no net loss (Natural Habitat) / net gain (Critical Habitat). This will be organised around three main priority areas aiming at improving protection of existing protected areas, particularly savanna, wetlands and forests; improving connectivity between areas of natural habitat; and improving the quality of existing habitats. It will be organised through partnerships and other initiatives (see section 24.3.9). Overall, the Project will use an outcome-focused approach to demonstrate that the sum of all mitigation is sufficient to lead to improvements over the baseline for Priority Biodiversity, thereby demonstrating and delivering a net gain within the same landscape by leaving Priority Biodiversity in a better situation than if the Project had not taken place.

24.3.9 Terrestrial Wildlife

The Project is located in the Albertine Graben which is recognised as one of Africa's most important areas for biodiversity. Project infrastructure will extend into the western part of MFNP, and the Murchison Falls-Albert Delta Wetland System Ramsar site (also designated as an Important Bird Area and a Key Biodiversity Area). Given the high number of species present within the Project AoI, it is not possible to assess the potential impacts of the Project on all of them individually; therefore, the impact assessment considered the potential effects of Project activities on identified Priority Species. The Priority Species were selected as they were either Critical Habitat Qualifying Species (CHQS) (Ref. 24-3); high profile, conservational interest, or have been recorded within the Project footprint.

The findings from the assessment of potential direct impacts indicate that, taking all embedded and additional mitigation into account, the residual impacts will generally be **Moderate Adverse** significance for species present and associated with MFNP and savanna habitats (within the Project footprint, referred to as "Landscape Context A") across all phases of the Project. This includes species such as Rothschild's Giraffe, African Elephant, Lelwel Hartebeest and Uganda Kob. Within the MFNP and savanna habitats, there may also be potential indirect impacts associated with increased human-wildlife interactions such as illegal hunting, mainly because there will be more people in the vicinity due to elevated economic activity in the area. Consequently, residual indirect impacts to species in these landscapes will generally be **Moderate Adverse** significance.

Direct residual impacts on species not recorded as being present within the Project footprint are generally **Insignificant** to **Low Adverse** significance. However, for these species there may be potential indirect impacts. Indirect residual impacts will be generally **Low** to **Moderate Adverse** significance and will be due to anticipated induced human population changes (increases) within the Project Aol. Population changes could increase pressure on ecological resources such as forests and water. Species that may be particularly impacted include chimpanzees and other forest species. Loss of habitat, as well as increased human-wildlife interactions (e.g. poaching, fire, zoonotic disease), will be the main causes of indirect impact.

The residual impacts significance on terrestrial wildlife is summarised in Table 24-10 below.

Table 24-10: Residual Impacts Significance to Terrestrial Wildlife

Mammals (27 species)	Impact Type	Residual Impact Significance (Post mitigation)			
		Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operations	Decommissioning
CHQS Species – Present in Landscape Context A	<i>Direct</i>	Moderate Adverse	Moderate Adverse (7 species)	Moderate Adverse (7 species)	Moderate Adverse (7 species)
	<i>Indirect</i>	Low Adverse	Moderate Adverse (13 species)	Moderate Adverse (13 species)	Moderate Adverse (13 species)
CHQS Species – Not present in Landscape Context A	<i>Direct</i>	Insignificant to Low Adverse	Insignificant to Low Adverse	Insignificant to Low Adverse	Insignificant to Low Adverse
	<i>Indirect</i>	Low Adverse	Low to Moderate Adverse	Low to Moderate Adverse	Low to Moderate Adverse
Other Notable Species (not CHQS) – Present in Landscape Context A	<i>Direct</i>	Insignificant to Low Adverse	Insignificant to Low Adverse	Insignificant to Low Adverse	Insignificant to Low Adverse
	<i>Indirect</i>	Insignificant	Low Adverse	Low Adverse	Low Adverse
Other Notable Species (not CHQS) – Not Present in Landscape Context A	<i>Direct</i>	Insignificant to Low Adverse	Insignificant to Low Adverse	Insignificant to Low Adverse	Insignificant to Low Adverse
	<i>Indirect</i>	Insignificant	Low Adverse	Low Adverse	Low Adverse

Birds (17 species)	Impact Type	Residual Impact Significance (Post mitigation)			
		Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operations	Decommissioning
CHQS Species – Present in Landscape Context A	<i>Direct</i>	Low to Moderate Adverse	Low to Moderate Adverse	Low to Moderate Adverse	Low to Moderate Adverse
	<i>Indirect</i>	Low Adverse	Low to Moderate Adverse	Low to Moderate Adverse	Low to Moderate Adverse
CHQS Species – Not present in Landscape Context A	<i>Direct</i>	Low Adverse	Low Adverse	Low Adverse	Low Adverse
	<i>Indirect</i>	Low Adverse	Moderate Adverse (5 species)	Moderate Adverse (5 species)	Moderate Adverse (5 species)

Amphibians (10 species)	Impact Type	Residual Impact Significance (Post mitigation)			
		Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operations	Decommissioning
CHQS Species – Present in Landscape Context A	Direct	Low Adverse	Low Adverse	Low Adverse	Low Adverse
	Indirect	Insignificant	Low Adverse	Low Adverse	Low Adverse
CHQS Species – Not present in Landscape Context A	Direct	Insignificant to Low Adverse	Insignificant to Low Adverse	Insignificant to Low Adverse	Insignificant to Low Adverse
	Indirect	Insignificant to Low Adverse	Low to Moderate Adverse	Low to Moderate Adverse	Low to Moderate Adverse
Other Notable Species (not CHQS) – Not Present in Landscape Context A	Direct	Insignificant	Insignificant	Insignificant	Insignificant
	Indirect	Insignificant	Low Adverse	Low Adverse	Low Adverse

Reptiles (12 species)	Impact Type	Residual Impact Significance (Post mitigation)			
		Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operations	Decommissioning
CHQS Species – Present in Landscape Context A	Direct	Low Adverse	Low Adverse	Low Adverse	Low Adverse
	Indirect	Low Adverse	Moderate Adverse (1 species)	Moderate Adverse (1 species)	Moderate Adverse (1 species)
CHQS Species – Not present in Landscape Context A	Direct	Insignificant to Low Adverse	Insignificant to Low Adverse	Insignificant to Low Adverse	Insignificant to Low Adverse
	Indirect	Insignificant to Low Adverse	Insignificant to Moderate Adverse	Insignificant to Moderate Adverse	Insignificant to Moderate Adverse
Other Notable Species (not CHQS) – Present in Landscape Context A	Direct	Insignificant to Low Adverse	Insignificant	Insignificant	Insignificant
	Indirect	Insignificant	Insignificant to Low Adverse	Insignificant to Low Adverse	Insignificant to Low Adverse

Butterflies and Dragonflies (42 species)	Impact Type	Residual Impact Significance (Post mitigation)			
		Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operations	Decommissioning
CHQS Species – Not present in Landscape Context A	Direct	Insignificant to Low Adverse	Insignificant to Low Adverse	Insignificant to Low Adverse	Insignificant to Low Adverse
	Indirect	Insignificant to Low Adverse	Low to Moderate Adverse	Low to Moderate Adverse	Low to Moderate Adverse
Other Notable	Direct	Insignificant	Insignificant	Insignificant	Insignificant

Butterflies and Dragonflies (42 species)	Impact Type	Residual Impact Significance (Post mitigation)			
		Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operations	Decommissioning
Species (not CHQS) – Present in Landscape Context A	<i>Indirect</i>	Insignificant	Low Adverse	Low Adverse	Low Adverse

In view of the anticipated indirect impacts mainly associated with influx, the Project Proponents will develop an Influx Management Strategy to mitigate in-migration impacts and maximise benefits for local communities. Implementation of the strategy will depend on joint coordination between the Project Proponents, government, other project developers, local communities and civil society. In addition, the assessment indicates that further requirements for mitigation at a landscape level will be required to achieve no net loss (for Natural Habitats) and net gain (for Critical Habitats). Net gain activities will include measures to improve the quality of habitat preferred by priority species mainly through management changes in protected areas and in specific landscape contexts which are associated with CHQS that will be subject to significant residual direct impacts.

In addition to the specific embedded and additional mitigation measures identified in the ESIA, three broad mitigation concepts have been identified for addressing indirect impacts and achieving gains towards net positive outcomes within the main following priority areas:

- Reduce human pressures and increase resilience of the Murchison Falls Protected Area (MFPA);
- Conserve wetlands along the southern shore of the Albert Delta Ramsar site; and
- Conserve forests and forest connectivity along the eastern shore of Lake Albert (including Budongo and Bugoma Forest Reserves).

These will be developed in detail by the Project Proponents and a joint approach will be pursued with other stakeholders to identify specific actions, determine targets and monitoring requirements and to work towards achieving net gain in relation to Priority Biodiversity identified in this assessment.

The no net loss / net gain initiatives, based on the three above concept strategies will be the mechanism by which the objectives of IFC PS6 with regard to Natural and Critical Habitat will be achieved. At the time of writing, the full details of these strategies are yet to be defined although their objectives have been developed and quantified.

In any case, long term monitoring of the status and trends of net gain indicator species will be required to ensure that the indicatives are effective and so that where necessary corrective actions can be taken to achieve the net gain objectives.

24.3.10 Aquatic Life

The Project Area includes several different freshwater habitats which may be impacted by Project activities. Based on an assumption that the embedded and additional mitigation measures will be successful in achieving their objectives for potential direct impacts, residual direct impacts are considered to be **Insignificant to Low Adverse** significance. The residual indirect impacts are assessed to be **Low Adverse** significance for the Site Preparation and Enabling Works and Decommissioning phases, but **Low Adverse to Moderate Adverse** significance for the Construction and Pre-Commissioning and Commissioning and Operations phases.

The residual impacts significance on aquatic life is summarised in Table 24-11 below.

Table 24-11: Residual Impacts Significance to Aquatic Life

Receptor	Impact Type	Residual Impact Significance (Post mitigation)			
		Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operations	Decommissioning
Fish - CHQS	<i>Direct</i>	Insignificant	Insignificant to Low Adverse	Low Adverse	Insignificant
	<i>Indirect</i>	Low Adverse	Low to Moderate Adverse	Moderate Adverse	Low Adverse
Fish – Other Priority Species	<i>Direct</i>	Insignificant	Low Adverse	Low Adverse	Insignificant
	<i>Indirect</i>	Low Adverse	Low Adverse	Low Adverse	Low Adverse
Molluscs - CHQS	<i>Direct</i>	Insignificant to Low Adverse	Low Adverse	Low Adverse	Insignificant
	<i>Indirect</i>	Low Adverse	Moderate Adverse	Moderate Adverse	Low Adverse
Molluscs – Other Priority Species	<i>Direct</i>	Insignificant	Low Adverse	Low Adverse	Insignificant
	<i>Indirect</i>	Low Adverse	Moderate Adverse	Moderate Adverse	Low Adverse
Shrimp – Other Priority Species	<i>Direct</i>	Insignificant	Low Adverse	Low Adverse	Insignificant
	<i>Indirect</i>	Low Adverse	Moderate Adverse	Moderate Adverse	Low Adverse
Natural Habitat – Ramsar Site	<i>Direct</i>	Insignificant	Low Adverse	Low Adverse	Insignificant
	<i>Indirect</i>	Low Adverse	Low Adverse	Moderate Adverse	Low Adverse

No significant direct residual impacts are expected as an outcome of the Project. The significant indirect residual impacts anticipated during the Construction and Pre-Commissioning and Commissioning and Operations phases are a result of in-migration pressures to the region which are expected to add more pressure on fisheries. These potential indirect impacts are harder to mitigate. However, if the implementation of the indirect mitigation strategies (related to influx and to reach no net loss / net gain) are successful, pressures on aquatic species and natural habitats are likely to be insignificant.

In consideration of general the lack of data for most aquatic species, the main recommendation is to undertake monitoring of potential threats through pressure and response indicators.

24.3.11 Social and Socio Economics

The main source of potential social impacts are expected to be from Project induced in-migration, land acquisition and resettlement, but also employment and economic development leading to business opportunities. Additional mitigation measures outlined will help to mitigate the potential negative impacts and enhance the beneficial impacts identified. Despite additional mitigation however, some **Moderate Adverse** significance impacts could remain during the early phases of the Project.

Taking into account additional mitigation measures however it is not considered that there will be any residual significant impacts during the Commissioning and Operations or Decommissioning phases.

The Project is also expected to lead to a number of residual **Moderate** and **High Beneficial** impacts that will be experienced at the local and national level.

The residual impacts significance on social and socio economic receptors is summarised in Table 24-12 below.

Table 24-12: Residual Social Impacts Significance (Direct and Indirect)

Potential Impact	Residual Impact Significance (Post mitigation)			
	Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operations	Decommissioning
Physical Displacement (Direct)	Low Adverse	N/A	N/A	N/A
Economic Displacement (Direct)	Moderate Adverse	N/A	N/A	Low Adverse
Changes to traditional land tenure system (Induced)	Moderate Adverse	N/A	N/A	N/A
Increased impoverishment following resettlement (Indirect)	Low Adverse	N/A	N/A	Insignificant
Increased travel distance to education facilities for displaced communities (Indirect)	Low Adverse	N/A	N/A	N/A
Displacement of public infrastructure due to land acquisition (Direct)	Low Adverse	N/A	N/A	N/A
Improved road accessibility within the Project Area (Direct)	Moderate Beneficial	N/A	N/A	N/A
Increased pressure on education facilities (Indirect / Induced)	Moderate Adverse	Low Adverse	N/A	Insignificant
Disruption to road users from project traffic (Direct)	Low Adverse	Low Adverse	N/A	Insignificant
Social disarticulation and increased family and community conflict (Indirect / Induced)	Low Adverse	Moderate Adverse	N/A	N/A
Changes to traditional way of life leading to loss of community/sense of place (Indirect / Induced)	Low Adverse	Moderate Adverse	N/A	N/A
Increased pressure on police (Indirect / Induced)	Low Adverse	Low Adverse	N/A	Insignificant
Increased crime (Indirect / Induced)	Low Adverse	Low Adverse	N/A	Insignificant
Increased prostitution (Indirect / Induced)	Low Adverse	Moderate Adverse	N/A	Low Adverse
Direct and indirect employment opportunities (Direct / Indirect / Induced)	Moderate Beneficial	High Beneficial	Moderate Beneficial	High Beneficial
Increased demand for goods and services (Direct / Indirect / Induced)	Moderate Beneficial	High Beneficial	Moderate Beneficial	Moderate Beneficial

Potential Impact	Residual Impact Significance (Post mitigation)			
	Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operations	Decommissioning
Development of more educated and skilled workforce (Direct / Indirect)	High Beneficial	High Beneficial	Moderate Beneficial	N/A
Economic loss if Project activities damage assets / cause injury to livestock (Direct)	Low Adverse	Low Adverse	Low Adverse	Low Adverse
Local price inflation (Induced)	Moderate Adverse	Low Adverse	N/A	N/A
Community empowerment (Induced)	High Beneficial	High Beneficial	Moderate Beneficial	N/A
Overburdening of local government (Indirect)	Low Adverse	Low Adverse	Insignificant	N/A
Increased risk of corruption within local and national government and in Project supply chain	Low Adverse	Low Adverse	Low Adverse	N/A
Loss of tourism revenue (Indirect)	Low Adverse	Moderate Adverse	Low Adverse	Low Adverse
Impact on welfare of Project workers due to poor enforcement of standards to uphold labour and working conditions (Indirect / Induced)	Low Adverse	Low Adverse	Insignificant	Low Adverse
Increased use of child labour (Indirect / Induced)	Low Adverse	Low Adverse	Insignificant	Low Adverse
Job losses leading to fall in income level (Direct)	N/A	Low Adverse	N/A	Low Adverse
Increased Revenue for Government (Direct)	N/A	N/A	High beneficial	N/A
Loss in Government Revenues at project closure (Direct)	N/A	N/A	N/A	Low Adverse

The Project Proponents are committed to implementing the identified embedded and additional measures contained within this ESIA. Due to the nature of the significant negative residual impacts which have been identified (e.g. most are indirect or induced impacts) the Project Proponents recognise that there will be a need to work with government agencies and other developers within the region to help implement further mitigation to remediate these. This collaborative approach will ensure that efforts can be focussed on where they are most needed and measures are monitored to ensure their effectiveness at reducing any potential negative impacts and enhancing benefits.

24.3.12 Archaeology and Cultural Heritage

Overall, with mitigation, the residual impact significance on archaeology and cultural heritage is assessed to vary between **Insignificant** and **Low Adverse** significance. In addition, the mitigation of archaeological remains through excavation and recording will contribute to the national and international scientific knowledge base via research and capacity-building in cultural heritage, and will therefore be classed as a **Beneficial** impact. Implementation of the cultural heritage management systems will contribute to local and expatriate workers' training.

The residual impacts significance for each phase of the Project is summarised in Table 24-13.

Table 24-13: Residual Impacts Significance to Archaeology and Cultural Heritage

Potential Impact	Residual Impact Significance (Post mitigation)			
	Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operations	Decommissioning
Sacred trees, sacred watercourses, springs / marches, traditional religious cultural sites	Low Adverse	Low Adverse	Low Adverse	Insignificant to Low Adverse
Places of worship – churches and mosques	Insignificant	Low Adverse	Insignificant to Low Adverse	Insignificant to Low Adverse
Cemeteries and graves	Low Adverse	Low Adverse	Insignificant to Low Adverse	Insignificant to Low Adverse
Complex palaeontological and archaeological remains	Low Adverse	Low Adverse	Insignificant to Low Adverse	Insignificant to Low Adverse
Isolated palaeontological and archaeological remains	Insignificant to Low Adverse	Insignificant to Low Adverse	Insignificant to Low Adverse	Insignificant to Low Adverse

The residual impacts on archaeology are not anticipated to be significant, in consideration of the mitigation strategy. It currently revolves around four key concepts: avoiding or minimising impacts by design (protection and preservation), mitigation (excavation and relocation), cultural heritage management systems (plans and procedures) and offset via technical and institutional capacity building and development of cultural heritage aspects of ongoing social programmes and is therefore expected to result in some Beneficial impact.

24.3.13 Health and Safety

The main source of potential community health and safety impacts will be from Project induced in-migration, and employment and economic development leading to business opportunities. Additional mitigation measures will help to mitigate the potential adverse impacts identified to ensure that the vast majority will be classed as **Insignificant** or **Low Adverse** significance. Additionally, enhancement measures will be put in place to further increase any identified beneficial impacts, where practical. However, some **Moderate Adverse** significance impacts will remain despite additional mitigation.

The Project is also expected to lead to a number of residual **Moderate Beneficial** impacts that will be experienced at the local and national level.

The residual impacts significance to health is summarised in Table 24-14.

Table 24-14: Residual Impacts Significance to Health

Potential Impact	Residual Impact Significance (Post mitigation)			
	Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operations	Decommissioning
Increase in malaria (Direct / Indirect / Induced)	Low Adverse	Low Adverse	Low Adverse	Low Adverse
Increase in rates of TB / other respiratory disease (Indirect)	Low Adverse	Low Adverse	Low Adverse	Low Adverse
Increased rates of zoonotic disease (Indirect)	Low Adverse	Low Adverse	Low Adverse	Low Adverse
Increased prevalence of HIV/AIDS and other STIs (Indirect)	Moderate Adverse	Moderate Adverse	Moderate Adverse	Moderate Adverse
Improper management of Project waste or discharge leading to illness from contamination exposure (Indirect)	Insignificant	Insignificant	Insignificant	Insignificant
Increase in prevalence of water, sanitation and waste related disease (Indirect / Induced)	Low Adverse	Low Adverse	Low Adverse	Low Adverse
Deterioration in nutritional status (Indirect / Induced)	Low Adverse	Low Adverse	Low Adverse	Low Adverse
Improvement in nutritional status (Indirect / Induced)	Low Beneficial	Low Beneficial	Low Beneficial	Low Beneficial
Injuries from road traffic accidents due to increase in traffic on public roads (Direct / Indirect)	Low Adverse	Low Adverse	Low Adverse	Low Adverse
Personal injury due to use of force by government or private security staff (Direct / Indirect)	Low Adverse	Low Adverse	Low Adverse	Low Adverse
Risk of accident of injury due to community exposure to worksites and Project equipment (Direct)	Insignificant	Insignificant	Insignificant	Insignificant
Injury resulting from increase in violence at the household or community level (Indirect / Induced)	Low Adverse	Low Adverse	Low Adverse	Low Adverse
Increased prevalence of substance misuse due to Project stress factors (Indirect / Induced)	Low Adverse	Low Adverse	Low Adverse	Low Adverse

Potential Impact	Residual Impact Significance (Post mitigation)			
	Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operations	Decommissioning
Increase in teenage and unwanted pregnancy (Indirect)	Moderate Adverse	Moderate Adverse	Moderate Adverse	Moderate Adverse
Improved health seeking behaviour (Induced)	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial
Overburdening of health services (Induced)	Low Adverse	Low Adverse	Low Adverse	Low Adverse
Improved regional health planning and programme delivery (Induced)	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial
Increase in non-communicable disease (Induced)	Low Adverse	Low Adverse	Low Adverse	Low Adverse
Exposure of workforce to insufficient OHS standards (Direct)	Insignificant	Insignificant	Insignificant	Insignificant

The Project Proponents are committed to implementing the embedded and additional mitigation measures outlined in this chapter to help minimise and reduce any negative impacts. Due to the nature of potential health impacts it is also important that both national and local authorities play their role in providing health provision and education within the Project Area to help minimise further any adverse impacts and enhance benefits.

24.3.14 Ecosystem Services

Ecosystem services are defined as “*the benefits that people, including businesses, obtain from ecosystems*” (IFC, PS 6) (Ref. 24-2). Potential impacts were assessed to be significant for a number of the priority ecosystem services identified for the Project Area. Additional mitigation measures have been identified and will help to reduce adverse impacts to **Insignificant to Low Adverse** residual significance for the majority of ecosystem services during all phases, with the exception of the following which have been assessed as having **Moderate Adverse** significance residual impacts:

- **Capture Fisheries** - based on potential indirect and induced impacts due to increasing short and medium term fishing pressures and contribution to over-fishing;
- **Wildfoods and Bushmeat** - induced population changes due to influx and a generally improved accessibility (roads network) may lead to an increase in subsistence or commercial hunting and an increase in human-wildlife contact / conflict which could result in increased reactive / pre-emptive hunting.
- **Tourism and Recreation Values and Wild Species Diversity** - Project infrastructure / traffic flows may lead to potential direct impacts related to noise and visual amenity, and indirect impacts to visitors' perceptions of MFPA. The potential indirect and induced impacts identified for wildfoods and bushmeat above may also affect wild species diversity.

A **Moderate beneficial** impact across all phases of the Project is anticipated in relation to the Scientific and Knowledge Values as information is gathered as a result of greater scrutiny and monitoring of all priority ecosystems identified within the Project Area.

The residual impacts significance to ecosystem services is summarised in Table 24-15.

Table 24-15: Residual Impacts Significance to Ecosystem Services

Potential Impact	Residual Impact Significance (Post mitigation)			
	Site Preparation and Enabling Works	Construction and Pre-Commissioning	Commissioning and Operations	Decommissioning
Crop Production	Low Adverse	Low Adverse	Low Adverse	Low Beneficial
Livestock and Fodder/Pastoralism	Low Adverse	Low Adverse	Low Adverse	Low Beneficial
Capture Fisheries	Low Adverse	Moderate Adverse	Moderate Adverse	Low Adverse
Timber and Woody Biomass	Low Adverse	Low Adverse	Low Adverse	Low Beneficial
Water (for drinking and supply)	Low Adverse	Low Adverse	Low Adverse	Low Adverse
Wildfoods and Bushmeat	Low Adverse	Low Adverse	Low to Moderate Adverse	Low Beneficial
Fibres and Ornamental Resources	Low Adverse	Low Adverse	Low Adverse	Low Beneficial
Biochemicals / Natural Medicines	Low Adverse	Low Adverse	Low Adverse	Insignificant
Local and Global Climate Regulation	Low Adverse	Low Adverse	Low Adverse	Insignificant
Hazard Regulation	Insignificant	Insignificant	Insignificant	Insignificant
Cultural and Spiritual Values	Low Adverse	Low Adverse	Low Adverse	Insignificant
Tourism and Recreation Values and Wild Species Diversity	Low Adverse	Moderate Adverse	Moderate Adverse	Low Beneficial
Scientific and Knowledge Values	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial

Overall, it is considered that the potential indirect impacts are likely to be more significant than the potential direct impacts identified and harder to mitigate. However, if the implementation of mitigation strategies addressing potential indirect impacts is successful, pressures on the key ecosystems supporting these ecosystem services are likely to be less significant. There will however need to be monitoring of the success of mitigation strategies undertaken to ensure that interventions remain effective.

24.3.15 Unplanned Events

Unplanned events are activities that are not expected to occur during the Project's normal activities, such as emergencies, accidents, and incidents. Key activities / events which could result in an unplanned event include:

- Road traffic and equipment/plant use could bring an increased risk of traffic accidents, spills, fires, damages to third party assets, accidental introduction of Alien/Invasive Species;
- Third Party activities that may result in fire, but also sabotage, protests, violence or damages generated by animals;
- Natural events such as seismicity;
- Health epidemics that may spread to the local community or wildlife;
- Drilling of wells could bring risks of fluids losses or blowouts; and
- Equipment failure could bring risks of spills but could also result in need for emergency flaring, venting, and associated requirement for power generation.

By the very nature that they are unplanned or emergency scenarios, the events have the potential to result in significant impacts on the environment and local people and communities if they were to occur. Rigorous control measures have therefore been developed as part of the Project design and through the introduction of additional mitigation measures to reduce the risk of these events occurring to as low as reasonably practicable (ALARP), as well as ensuring rapid and efficient response plans are in place if an event were to occur.

A series of supporting plans have been proposed to accompany the ESMP to assist with minimising the risk and impacts of unplanned events.

Unplanned events associated with the Decommissioning Phase are unknown at this stage; however, it is anticipated that some of the potential unplanned events will be similar in nature to some of those that may arise during the Construction and Pre-Commissioning Phase.

24.3.16 Cumulative Impact Assessment

Chapter 21: Cumulative Impact Assessment (CIA) provides an assessment of potential cumulative effects of the Project together with other developments that will also potentially have effects within the Project’s AoI. The CIA was conducted to meet the requirements of the GoU Environmental Impact Assessment Regulations (Ref. 24-1) and IFC PS1 (Ref. 24-2).

The approach to CIA focuses on the effects on identified valued environmental and social components (VECs). Fifteen priority VECs were identified for the Project, informed by stakeholder consultation. In addition to the Project components, supporting infrastructure and associated facilities, a list of other known developments within or likely to overlap with the Project AoI was also identified. The potential significance of cumulative impacts for each VEC is presented in Table 24-16.

Table 24-16: Potential Cumulative Impact Significance (Pre-Collaborative Mitigation)

VEC	Impact Significance	VEC	Impact Significance
<i>Nature Based Tourism in Protected Areas</i>	Moderate to High Adverse	<i>Food Security</i>	Moderate Adverse
<i>Critical and Natural Habitat and Associated Species</i>	High Adverse	<i>Primary and Secondary School Education</i>	Moderate Adverse
<i>Sustainable Woodland</i>	High Adverse	<i>Safe Communities</i>	Low to Moderate Adverse
<i>Open-Access Grazing Land</i>	High Adverse	<i>Climate Change linked to Carbon Emissions</i>	Low to Moderate Adverse
<i>Access to Safe Drinking Water Resources</i>	Moderate Adverse	<i>Access to Land and Shelter</i>	High Adverse
<i>Local Economic Stability</i>	Beneficial Effect	<i>Community Health</i>	High Adverse
<i>Lake Albert Capture Fisheries</i>	High Adverse	<i>Social Cohesion</i>	Moderate Adverse
<i>Bushmeat</i>	High Adverse		

For each VEC, key mitigation measures that address cumulative impacts and which require, or would benefit, from collaboration, were identified. In order to promote and implement collaboration between developers the Project Proponents will promote the Regional Cumulative Impacts Management (RCIM) initiative; a regional mechanism for the sustainable management of cumulative impacts. The RCIM initiative envisages that mitigation measures would be designed and implemented collectively by developers, and other stakeholders, under GoU’s leadership. The first stage in the implementation process will be to establish the RCIM in liaison with Government and other stakeholders and agree its objectives and priorities. Once agreement with Government and other participants is confirmed, the RCIM will subsequently develop detailed strategies and actions for the implementation of collaborative mitigation. The effectiveness of the identified mitigation measures will depend on the success of the collaborative efforts to reduce negative impacts.

24.3.17 Transboundary Impacts

The potential for the Project to generate potential transboundary impacts has been assessed and is presented in **Chapter 22: Transboundary Impact Assessment**. This included an assessment of the potential implications of influx on community health; impacts on the road network; waste disposal; effects on air quality and greenhouse gas emissions; Sustainable fisheries; and impacts to the water environment including groundwater, the Nile Basin and Lake Albert.

There are several potential pathways for transboundary impacts on neighbouring countries; however, due to the nature and type of the Project and the effectiveness of the embedded and additional mitigation, it is unlikely to result in significantly impact upon other countries and states.

The residual transboundary impacts significance is presented in Table 24-17 below.

Table 24-17: Residual Transboundary Impacts Significance

Impact	Impact Significance
Land take in the Albertine Rift Ecosystem	Insignificant
Water Abstraction in Lake Albert	Insignificant
Increase in fishing in Lake Albert	Low Adverse
Deterioration of Water Quality in the Nile Basin	Insignificant
Abstraction from groundwater aquifers and accidental spills	Insignificant
Labour migration from neighbouring countries	Low Adverse
Impacts on community health	Low Adverse
Impact on air quality	Insignificant
Impacts on greenhouse gas emissions	Low Adverse
Inter-country road traffic movements	Low Adverse
Disposal of specialised waste	Insignificant

24.4 Environmental and Social Management

As described in **Chapter 23: Environmental and Social Management Plan**, an Environmental and Social Management Plan (ESMP) is required by NEMA and the IFC prior to commencement of Project activities onsite. The ESMP presented in the ESIA outlines the requirements and standards of the Management System, its structure, discusses the roles and responsibilities of key members of the Project personnel, and outlines the environmental and social documentation and compliance procedures that will be required, and costs associated with the implementation of the ESMP during the Site Preparation and Enabling Works, and Construction and Pre-Commissioning until first oil. Supporting plans to be implemented alongside the ESMP are also listed and an outline provided. The respective strategies, plans and programmes will be updated or developed prior to Project implementation.

To allow for continuous improvement of the Project's environmental and social performance, the ESMP will be a 'live' document which will be reviewed, amended, and updated by the Project Proponents and the appointed contractor(s) as the Project design develops and more detailed information becomes available.

The ESMP will form part of the wider Project Proponents Health, Safety, Security, Social and Environment Integrated Management System (HSSSE-IMS) which is based on the principles of continuous improvement. The Project Proponents have taken commitments for the Project to be implemented in line with internal, national, and international standards, and good international industry practices. This includes developing and implementing the Project in line with the impacts mitigation hierarchy (i.e. avoid, minimise, restore, offset/compensate).

The Project ESMP will be supplemented by a set of supporting plans which will provide procedures,

guidelines and protocols for the day to day activities to be carried out during the Project to manage identified risks and impacts, and to implement project controls and mitigation measures. The embedded measures and additional mitigation measures outlined in this ESIA have been collated into an *ESMP Mitigation Checklist*, which is presented in Appendix T of the ESIA.

The supporting plans will expand upon the *ESMP Mitigation Checklist* by providing more detail on the identified impact, mitigation measures, monitoring requirements, and roles and responsibilities. Where applicable, monitoring has been committed to (in technical chapters 6-19) to check and validate the predictions in this ESIA and has been further defined in the detailed ESMP table 23-2.

Each main contractor shall prepare corresponding ESMPs relative to their scope and commensurate to the level of risks of work and submit them for review / approval by the Project Proponents prior to the start of each phase.

There are a number of government agencies with the mandate to give permits and approvals, and monitor compliance during implementation of the Project. Agencies such as NEMA, Ministry of Energy and Mineral Development, Petroleum Authority of Uganda, Ugandan Wildlife Authority, Ministry of Water and Environment, Directorate of Water Resources Management, Wetlands Management Department, Ministry of Gender Labour and Social Development, Office of Chief Government Valuer, Ministry of Tourism Wildlife and Antiquities, and others, will be involved in the various phases through the life of the Project.

The Government agencies will play a key role in checking the suitability and effectiveness of the mitigation measures in the ESMP. Additionally, as outlined in section 24.3.16, the RCIM initiative envisages that mitigation measures would be designed and implemented collectively by developers, and other stakeholders, under GoU's leadership. The effectiveness of the identified mitigation measures will depend on the success of the collaborative efforts to reduce negative impacts.

24.5 Conclusions

The ESIA has systematically reviewed the potential effects of the Project on the existing environmental, social and ecological sensitive receptors over the entire life of the Project. The assessment was undertaken in accordance with the Ugandan EIA Regulations, 1998 (Ref 2), and the IFC PSs, 2012 (Ref 3).

Potential short term and long term, direct and indirect as well as cumulative impacts were identified using standard assessment methodology and subsequently additional mitigation measures and enhancement controls were identified to try and help ensure that any negative impacts are minimised and reduced to a level which is ALARP. For any beneficial impacts identified, ways to further enhance and improve them were also explored.

For all large scale oil and gas projects, both beneficial and negative impacts are identified. The majority of potential negative impacts for each of the four phases have been mitigated to an ALARP level with the significance of the residual impacts being identified as being Low or Insignificant. However, a number of potential negative impacts remain and these have been stated within the ESIA Report. In this regard, monitoring will be required to help ensure that the implemented mitigation measures are effective. The Project will also bring numerous beneficial social, cultural heritage and archaeological impacts.

Overall, the Project needs to be viewed as a whole and be determined on the vast array of benefits that it will bring to the Country, which will far outweigh any short term localised negative impacts. The GoU expects that the development of the oil and gas industry will stimulate accelerated economic growth, job creation, contribute towards poverty reduction and general prosperity to the people in Uganda.

24.6 References

- Ref. 24-1 Government of Uganda. (1998). The Environmental Impact Assessment Regulations, Statutory Instruments No. 13
- Ref. 24-2 International Finance Corporation, (2012), Performance Standards 1 to 8
- Ref. 24-3 TBC & FFI Critical Habitat Assessment: Interpretation and Recommendations for ESIA. Report on behalf of Total E&P Uganda, Block EA1, EA1A and EA2 North (2017)
- Ref. 24-4 International Union for Conservation of Nature (IUCN) Red List of Threatened Species. www.iucnredlist.org/
- Ref. 24-5 WCS, Nationally Threatened Species for Uganda. National Red List for Uganda for the following taxa: Mammals, Birds, Reptiles, Amphibians, Butterflies, Dragonflies and Vascular Plants. Prepared by WCS, the Government of Uganda, the Uganda Wildlife Authority. (2016)