REPORT

Non-Technical Summary

DRAFT

Submitted to:

Submitted by:

Golder Associates (UK) Ltd

Cavendish House, Bourne End Business Park, Cores End Road,
Bourne End, Buckinghamshire, SL8 5AS, UK

+44 0 1628 851851

1433956.637.A1

June 2020

Table of Contents

1.0 INTRODUCTION 1

2.0 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK 2

3.0 IMPACT ASSESSMENT METHODOLOGY 2

4.0 STAKEHOLDER ENGAGEMENT 3

5.0 PROJECT DESCRIPTION 3

6.0 BASELINE SUMMARY 6

6.1 Geology, Geohazards and Seismicity 6

6.2 Soils 6

6.3 Weather and Climate 6

6.4 Air Quality 6

6.5 Noise and Vibration 6

6.6 Water Quality 7

6.7 Water Quantity 7

6.8 Biodiversity, Ecology and Protected Areas 8

6.9 Ecosystem Services 9

6.10 Landscape and Visual 10

6.11 Social 10

6.11.1 Administrative Divisions and Governance Structure 10

6.11.2 Demographics 10

6.11.3 Infrastructure and Services 11

6.11.4 Economics, Employment and Livelihoods 11

6.11.5 Land Use and Ownership 11

6.11.6 Community Health and Safety 12

6.11.7 Education 13

6.11.8 Social Maladies 13

6.11.9 Social Capital and Conflict 13

6.12 Cultural Heritage 13

7.0 POTENTIAL IMPACTS AND MITIGATION 13

7.1 Air Quality 13

7.2 Noise and Vibration 14
7.3 Water Quantity 14
7.4 Water Quality 15
7.5 Soils, Terrain, Geology and Seismicity 16
7.6 Landscape and Visual 16
7.7 Biodiversity, Ecology and Protected Areas 16
7.8 Ecosystem Services 18
7.9 Social 19
7.10 Cultural Heritage 21
7.11 Environmental Risks and Accidents 21
8.0 CUMULATIVE IMPACTS 22
9.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN 22

TABLES

Table NTS-1: Approach to Impact Assessment 2

FIGURES

Figure NTS-1: Project Overview 1
Figure NTS-2: Project Area of Influence 3
Figure NTS-3: Project Layout 4
Figure NTS-4: Kalabata and Turkwel Catchments 8

1.0 INTRODUCTION

This Non-Technical Summary (NTS) provides an overview of the Environmental and Social Impact Assessment (ESIA) completed for the proposed Foundation Phase of the South Lokichar Development ('the Project'). It has been prepared by Golder Associates (UK) Ltd and Ecologics Consulting Ltd. (NEMA Expert Registration No: 9709). The ESIA is based on the Terms of Reference (ToR) approved by the National Environment Management Authority (NEMA) in March 2016.

Copies of this document and the full ESIA Report for the Project are available online: https://www.tullowoil.com/operations/east-africa/kenya/environmental-social/esia. Copies are also available at all Tullow Community Resource Centres and the Tullow Kenya B.V. (TKBV) office in Nairobi.

The Project, as depicted in Figure NTS-1, includes the construction and operation of facilities needed to extract and process crude oil in South Lokichar from the Twiga, Amosing and Ngamia (TAN) fields, prior to its export to Lamu via the separately permitted and operated Lokichar to Lamu Crude Oil Pipeline Project (LLCOP). The ESIA assesses the potential impacts of the Project on the environment and social setting and, where necessary, describes mitigation and management measures that will be used to reduce those effects, or which might enhance the benefits of the Project.

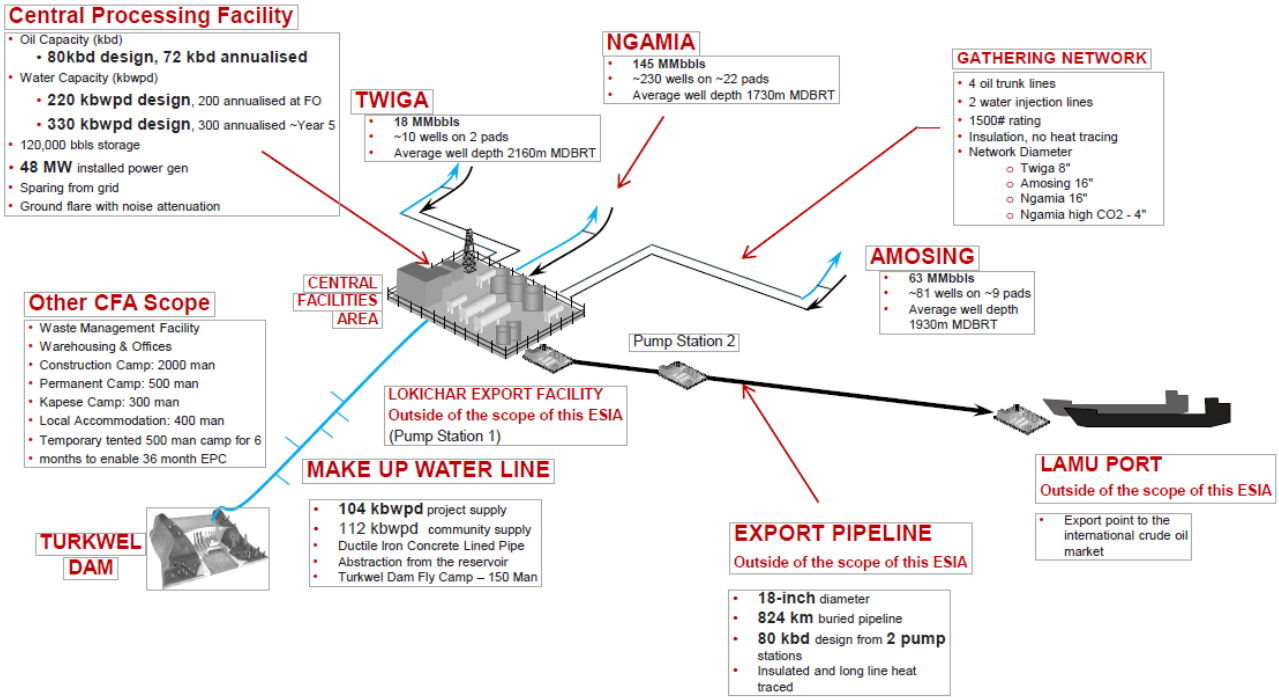

Figure NTS-1: Project Overview

Background

The first onshore well in the South Lokichar Basin commenced drilling in January 2012 and since then several discoveries have been made during the exploration phase. The Project is preceded by the Early Oil Pilot Scheme (EOPS) Phase II, for which a separate ESIA was produced in 2018.

At the time of writing, Tullow Kenya B.V. (TKBV), Africa Oil Kenya B.V. and Total S.A. form the joint venture partners that will execute the Project. TKBV, as main operator of the Project, will be responsible for the implementation of the commitments presented in this ESIA, the NEMA approved Environmental and Social Management Plan (ESMP) and environmental license conditions.

Land will be acquired by the Government of Kenya (GoK) and leased back to TKBV for the Project. The National Land Commission (NLC) will be responsible for all regulatory land acquisition associated with the Project, with TKBV retaining responsibility for ensuring that land acquisition also meets non-regulatory supplemental requirements (for example, those defined in the International Finance Corporation (IFC) Performance Standards (PSs)).

2.0 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

This ESIA has been prepared in compliance with Kenyan law and regulation and, where relevant, references international standards as part of Good International Industry Practice (GIIP). It specifically references the IFC PSs on Environmental and Social Sustainability and World Bank Group (WBG) IFC General EHS Guidelines. It has also been prepared to align with international conventions to which Kenya is a signatory.

The ESIA has been prepared with due consideration for the multiple stakeholders within the administrative framework of Kenya, at community, County and National level. NEMA is the administrative body responsible for the coordination of environmental management activities in Kenya. NEMA is also responsible for the implementation of all environmental policies, as well reviewing and approving ESIAs.

3.0 IMPACT ASSESSMENT METHODOLOGY

The objective of the ESIA is to identify and quantify impacts that the Project may have on the environment and social receptors, using a staged approach, as detailed in Table NTS-1.

Table NTS-1: Approach to Impact Assessment

Stage	Activity
1	Establish baseline conditions – determine baseline conditions through review of existing published and available site-specific information.
2	Establish the key receptors and their importance.
3	Characterise the magnitude of the impact to the receptor Bio-physical: determine the potential changes to receptors brought about by the Project (including incorporated environmental measures) and assign a magnitude of impact. Social: determine the potential changes to Project Affected People (PAP) brought about by the Project and assign a consequence.
4	Assess the impact significance Bio-physical: determined by the nature and magnitude of impact, combined with the importance of receptor. Social significance of impacts defined by a narrative evaluating direction, consequence, geographic extent and duration of impact
5	Consider the need for monitoring and management – used where there is a need to support the implementation of or monitor the efficacy of any mitigation.

The Area of Influence (AoI) for the ESIA is shown in Figure NTS-2.

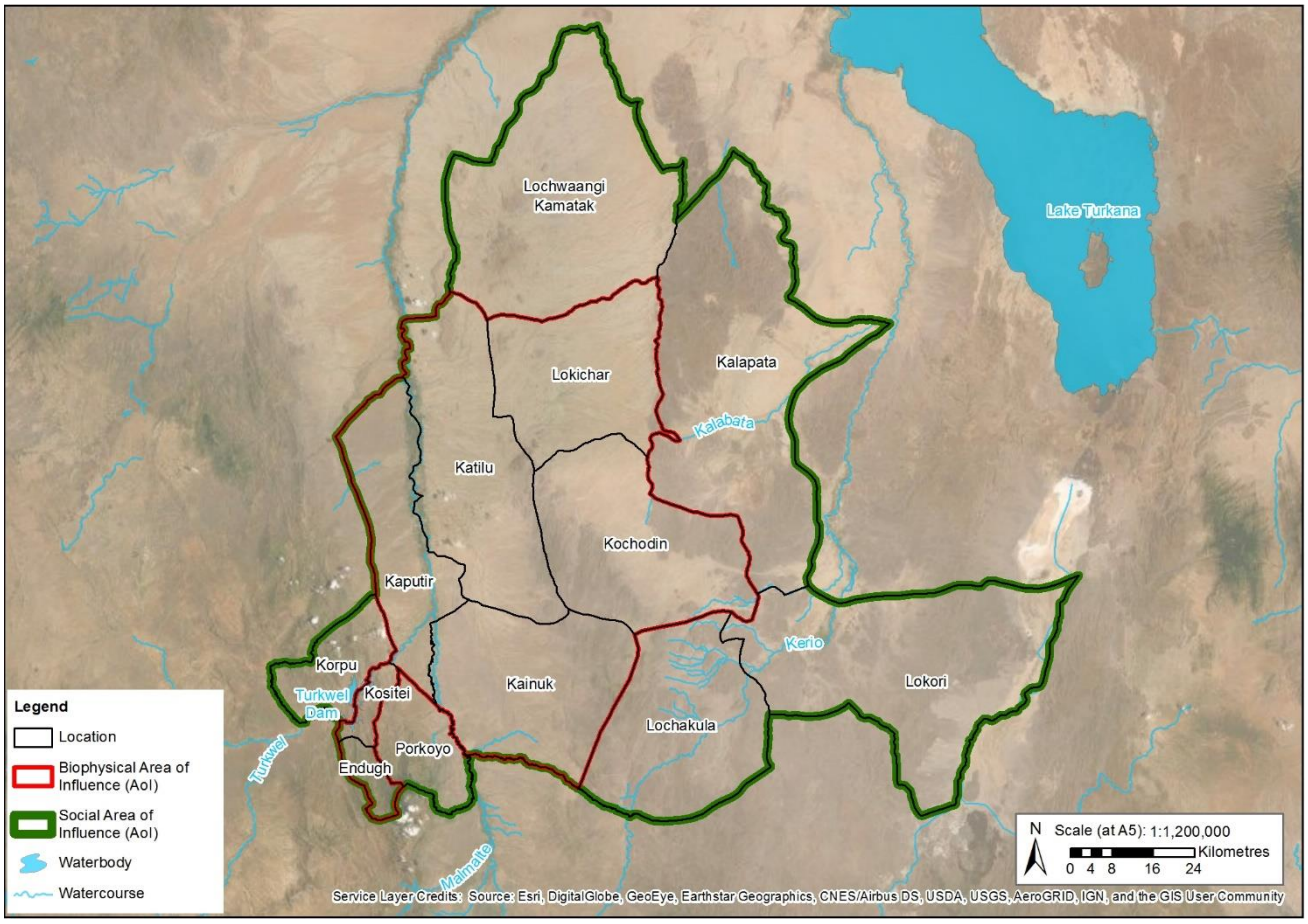

Figure NTS-2: Project Area of Influence

4.0 STAKEHOLDER ENGAGEMENT

Stakeholder Engagement will be completed in line with the Stakeholder Engagement Plan (SEP) which is publicly available on the Tullow website: https://www.tullowoil.com/Media/docs/default-source/operations/kenya-eia/esia-stakeholder-engagement-plan_september-2019.pdf?sfvrsn=2

Stakeholder engagement for the Project has been undertaken since the ESIA scoping stage in December 2015. Future planned engagement relating to this ESIA will include extensive consultation with Stakeholders on this draft ESIA. Consultation is planned at the earliest convenient time (dependent on restrictions relating to Covid-19) in 2020. The primary objective of this consultation is to ensure that stakeholder issues are registered and addressed in the final ESIA and PAP can discuss Project impacts, and proposed mitigation and monitoring measures. Stakeholders including local communities, government, civil society organisations and non-government organisations (NGOs) will be invited to participate in consultation on the draft ESIA.

5.0 PROJECT DESCRIPTION

The Project consists of the following key facilities:

- Use of the existing facilities developed as part of EOPS including wellpads, wells, production facilities and water supply boreholes;

- Use of existing wellpads, which do not form part of EOPS;
- New wellpads and 321 new wells;
- Use of the existing airstrip and basecamp which is leased by TKBV;
- Infield flowlines;
- Central Facilities Area (CFA) which includes a Central Processing Facility (CPF); the Lokichar Export Facility (LEF) associated with LLCOP, an ancillary area, an Integrated Waste Management Facility (IWMF), a permanent accommodation camp, a temporary accommodation camp, a drilling area and a construction laydown area;
- Additional temporary accommodation camps (water pipeline construction camp, rig camp and drilling mini-camp);
- Make-up water facilities;
- An engineered landfill facility (not located within the IWMF); and
- Infrastructure, including roads, power supply network and communications network.

Overview

Oil will be produced from production wells located on multiple wellpads across the TAN fields. An overview of the Project layout is depicted in Figure NTS-3.

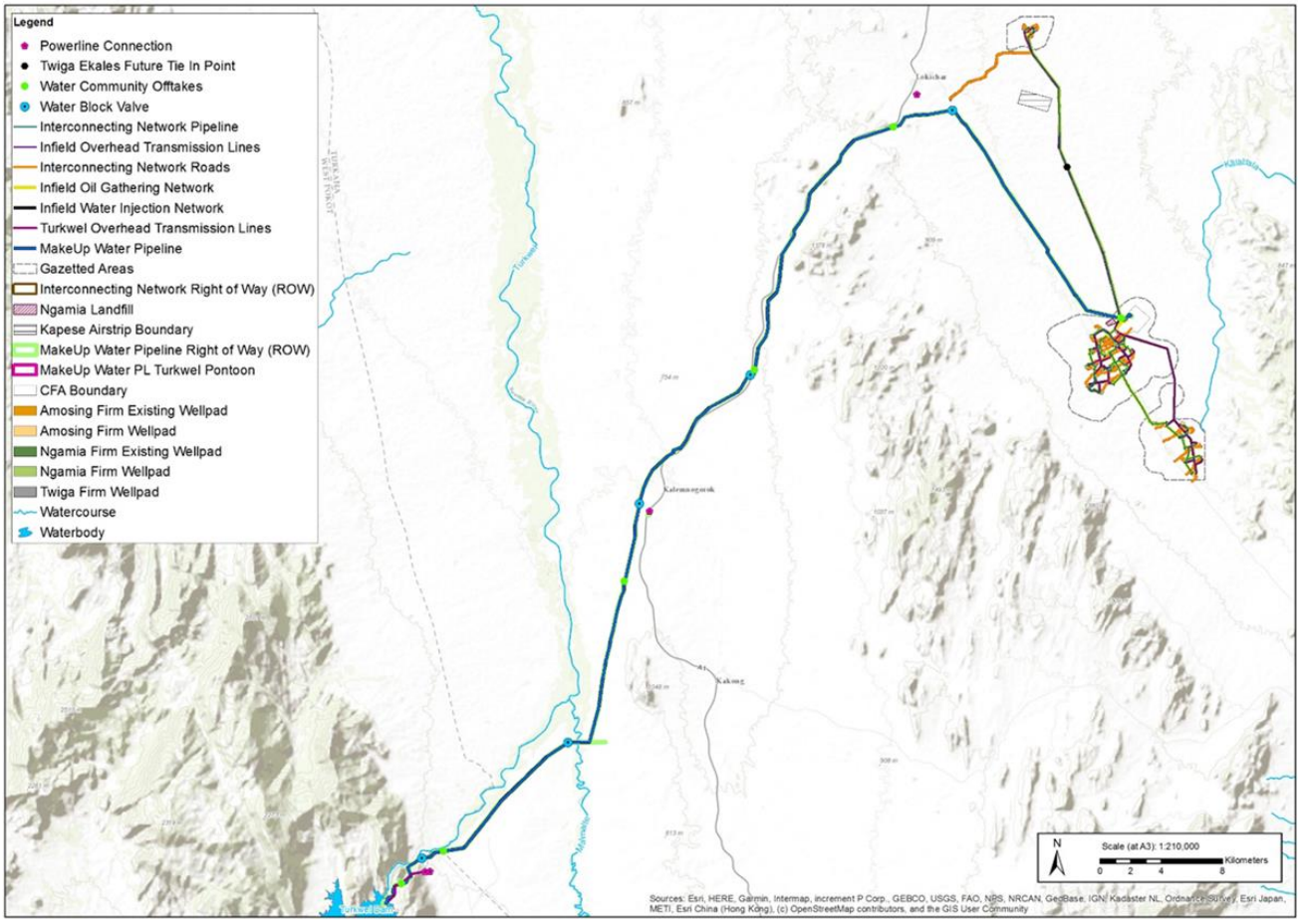

Figure NTS-3: Project Layout

The CPF will process the oil from the production wells to degas the oil, separate the oil and water and stabilise and heat the oil prior to storage and export to the pipeline. Flow from high carbon dioxide (CO_2) wells will be degassed separately prior to co-mingling with main oil treatment process

The construction period for the first 6 wellpads will be completed 15 months from the start of construction, when drilling of the wells required for Project First Oil (FO) will commence. The CFA, CPF and wells required for FO will be constructed by Month 36. The remaining 27 wellpads will be constructed with wells drilled up to Month 66. Operations are assumed to last approximately 25 years.

The Project requires access to approximately 1,085 ha of land to develop the facilities required to construct and operate the Project

Water Demand and Supply

During the early part of the construction phase, water supply will be from a network of existing boreholes. After approximately 18 months, water will be abstracted from the Turkwel Reservoir and transported via a buried pipeline.

Power Supply

During construction the power supply to construction camps, work areas, warehouses and drill rigs shall be provided by standalone diesel generators.

During operations, the power generation for the CPF is provided by two Gas Turbine Generators (GTGs). Wellpads will be powered by new Overhead Transmission Lines (OHTLs) and the permanent camp will be powered from the CPF substation.

Excess Gas

Produced gas from the oil reservoir will primarily be used for power and heat generation. In the first six years of operation, the predicted produced gas flowrate is in excess of the required demand for fuel gas, power and heat. Where there is excess gas, and no feasible, economic alternative use is identified, the Project will carry out flaring using a ground flare. After this initial period, the Project will be gas deficient and power will be imported from the grid to make up the shortfall.

Waste Management

During construction, the Engineering, Procurement and Construction (EPC) contractor will be responsible for waste management and disposal. This will be undertaken in accordance with Kenyan and IFC requirements. Drilling muds will be reused where possible and either buried in the vicinity of the wellpads (water-based muds) or stored on the wellpads prior to treatment and ultimate disposal at the engineered landfill (synthetic-based muds).

During operations, waste will be managed at the IWMF which will be located within the main CFA footprint. The IWMF will include a recycling area, an autoclave for the disinfection of medical waste, effluent and sewage treatment plants for treating wastewater and an incinerator for the disposal of wastes. The engineered landfill will continue to be used during operations for the disposal of non-organic wastes.

Workforce

The construction workforce is estimated to peak between 2,700 and 3,400. The final manpower requirements will be determined during detailed design and construction tendering prior to Final Investment Decision (FID). During operations, approximately 350 personnel will be required including upstream operators, midstream operators, catering personnel and well engineer/servicing personnel. In addition to these personnel, there will be up to 200 people sourced from the local community to fill roles such as guards and cleaners.

6.0 BASELINE SUMMARY

The following subsections provide a brief overview of the existing environmental and socioeconomic baseline conditions in the Project AoI and highlights receptors and resources sensitive to potential impacts.

6.1 Geology, Geohazards and Seismicity

The geological setting of the region is based on secondary research. The geology in the AoI largely comprises Tertiary and Quaternary sediments and volcanic rocks. Soils are locally saline, contain few rocks or stones, and are moderately susceptible to erosion from flood events and wind. The primary geohazards in the area are related to the coarse-textured soils. In low-lying areas, they may be prone to annual or periodic flood events and road washouts or undercutting of project infrastructure is possible. In Turkana and West Pokot the natural earthquake hazard is rated by the World Health Organization (WHO) (2010) as low to medium.

6.2 Soils

The soils baseline incorporates secondary data from official sources and primary data which comprises a collection of surface soil samples (topsoil). The area is characterised by typical desert-like sandy soils with some minimal areas of clay loam. Sand is the dominant particle size at all test pits across the TAN sites, which coincides with the dominantly sandy characteristics of soil which are typical of this region. Total carbon, organic carbon and inorganic carbon values are low across the TAN fields which reflects the naturally very low soil organic matter content of soils in the region. Infiltration testing near Ngamia indicates fine to medium sandy soils and near Amosing, loamy soils.

6.3 Weather and Climate

The meteorological conditions were determined with focus on primary data at Kapese and Ngamia and secondary data from the wider region including Lodwar and Mesoscale Model Interface Program (MMIF) Modelled Data.

Conditions are generally dry with ‘long rains’ of the rainy season in April to June and ‘short rains’ in November with average monthly total precipitation varying between approximately 1 millimetre (mm) and 110 mm. Average and maximum monthly wind speeds at Kapese and Ngamia are low and do not exhibit any distinct seasonal variation with east-north-east prevailing winds at Kapese and north-east, south-east and south-south-east prevailing winds at Ngamia. Recorded average monthly temperatures are similar at both stations and range from approximately 27.5 degrees Celsius (°C) to 31.0°C.

Regarding climate change trends, daily temperature observations indicate increasing trends in the frequency of hot days and hot nights, precipitation patterns indicate an increase in the proportion of rainfall occurring in heavy rain events and in the AoI, the projected median change in mean annual temperature is 1.2°C by the 2030s.

6.4 Air Quality

Primary baseline data is focused on the South Lokichar basin within the AoI. Air quality data was collected at Twiga-1 wellpad, Lokichar town, Kapese camp, Amosing-5 wellpad, and Ngamia 5/6 wellpad. For most of the monitored substances, baseline values are low in comparison to the Air Quality Standards (AQS). Baseline concentrations of total suspended particles were above the AQS. Concentrations of deposited dust vary throughout monitoring locations and the average concentrations recorded at any location (excluding Lokichar) are less than 90% of the relevant Standard.

6.5 Noise and Vibration

Noise baseline data gathering was completed within the AoI during five field surveys between 2015 and 2019. The monitoring locations were associated with potential receptors and include Lokichar, Twiga-1, Amosing-5,

Ngami-5/6, and Kapese camp. No vibration data was gathered as part of the ESIA baseline due to the greenfield nature of the Site.

Night-time minimum noise levels were recorded at or near the equipment minimum (~20 A-weighted decibels (dBA)) at several monitoring locations. Higher daytime noise levels were recorded in comparison to night-time levels, which is generally attributed to widespread activities during daylight hours, including vehicle traffic and human and livestock movements. Noise data was gathered to calculate an average daytime and night-time noise level for each of the locations. The average outputs are above the Kenyan standards for both periods at Lokichar (also above IFC standards) and Ngamia 5/6 (daytime greater than IFC standard) and for daytime only at Kapese.

6.6 Water Quality

Due to the ephemeral nature of the surface water in the area, the water quality baseline largely focusses on groundwater quality data. Primary information includes sampling of groundwater wells, surface locations, surface watercourses and surface water bodies and water samples were later analysed in the laboratory.

In general, water quality across the AoI is good with no inexplicable exceedances of project water quality standards. There are some influences of the natural environment (high concentrations of sodium and fluoride).

6.7 Water Quantity

The baseline comprises primary data gathered by Golder or provided by TKBV or its contractors. This includes precipitation data, infiltration tests, groundwater level monitoring and surface water flow monitoring.

The AoI is located in the Rift Valley Basin Area, partly in the Kalabata catchment and partly in the Turkwel catchment (see Figure NTS-4). The Kalabata water course is a sub-catchment of the Kerio basin. The Kalabata River is an ephemeral watercourse that is fed by direct precipitation, run-off and ephemeral flow from luggas that provide a drainage network from the south-west. Flow in the luggas is ephemeral and driven by short duration, intense seasonal rainfall. The Kerio and the Turkwel Rivers both ultimately discharge to Lake Turkana. The Turkwel River receives input from the Malmalte River and discharges from the tailrace of the Turkwel Dam after power production. Discharges from the tailrace mean that flows in the upper reaches of the River Turkwel are typically perennial

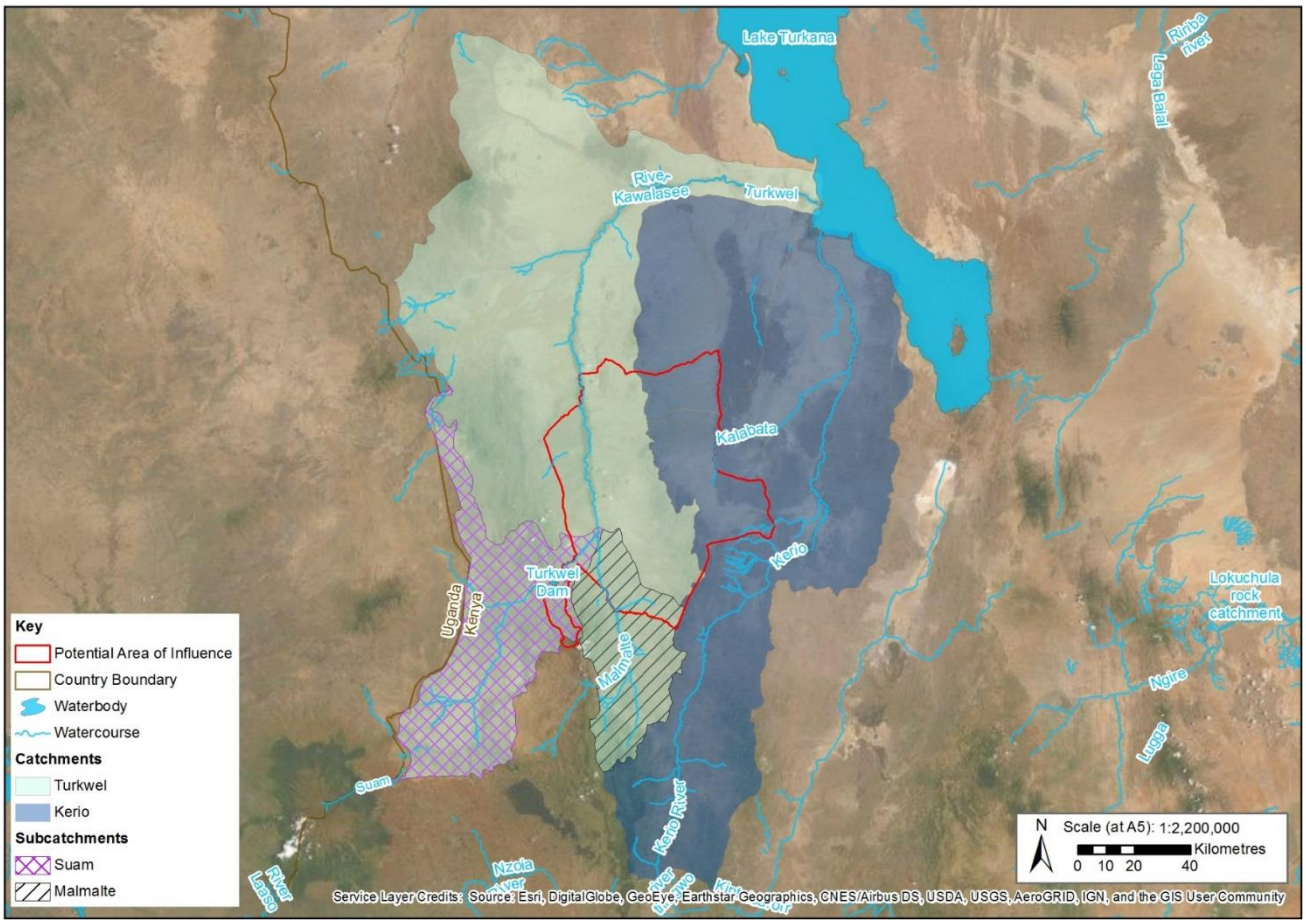

Figure NTS-4: Kalabata and Turkwel Catchments

6.8 Biodiversity, Ecology and Protected Areas

The baseline ecology and biodiversity in the AoI have been characterised using both primary and secondary data. Primary field surveys were designed to collect, process and provide analysis of data gathered within the AoI (including surveys on vegetation, invertebrates, amphibians, reptiles, birds, mammals and fish). The secondary assessment comprised a literature and database review and analysis of existing information.

Vegetation

The field surveys confirmed six broad vegetation communities in differing areas across the AoI. No threatened vegetation communities were recorded. Acacia (thorny tree and shrub) species dominate the vegetation communities, depending on location and degrees of aridity. These communities occur in areas along the large luggas, woodland/bushland on the plains, bushland/thicket mosaic west of the Malmalte River, and the shrubland on steep rocky slopes of the high ridge between Turkwel Dam and the Malmalte River. Forest along the Malmalte River is the only true forest community observed between South Lokichar and the Turkwel Dam.

Euphorbia turkanensis, a range-restricted plant species only known from sites within the AoI, was recorded at various locations along the make-up water pipeline route.

Invertebrates

A total of 6,513 invertebrate specimens were collected. These included spiders, centipedes, millipedes, woodlice, camel spiders, scorpions, and insects. By far the most abundant and diverse invertebrates in the region were the insects, with 12 orders recorded, comprising families and 466 genera.

An invertebrate species of concern was recorded. A single specimen of a ground beetle was collected near Loperot, in the east of the AoI. This genus has never been recorded in Kenya and represents a species new to science.

Amphibians and Reptiles

Eighteen amphibian and reptile species were recorded in the AoI. Apart from the Turkana toad, no species of conservation concern were recorded.

The Turkana toad, an amphibian species of conservation concern, was recorded in the Kalabata River. It is a range-restricted species previously only known from two localities: Loiengalani on the south-eastern shores of Lake Turkana, and the Ewaso Ng'iro River in the Samburu Game Reserve (IUCN, 2019). Its presence in the AoI represents an extension of its known range. It is listed as 'data deficient' by the IUCN, and 'Protected' by Kenyan legislation (KWCMA, 2013).

Birds

Two hundred and seventy-six bird species were recorded in the AoI.

Fifteen species of conservation concern were recorded. These included: the African white-backed vulture and Rüppell's vulture, which are both listed as 'critically endangered' by the IUCN; and the lappet-faced vulture and steppe eagle, which are both listed as 'endangered' by the IUCN. Another two bird species listed as 'vulnerable' and two as 'near threatened' by Kenya legislation, were confirmed within the AoI.

Mammals

Thirty-six mammal species were either directly observed or deduced to be present, based on secondary evidence (for example, tracks and signs). Twenty-five medium and large mammal species[1], and nine small mammal species were recorded over the four seasonal mammal surveys.

Four mammal species of conservation concern were confirmed: African elephant, striped hyena, leopard and lesser kudu. The African elephant, striped hyaena and leopard are all listed as 'endangered' in Kenya.

Fish

Surveys of the Turkwel River, downstream of the Turkwel Dam, and downstream of the confluence with the Malmalte River in the vicinity of Kaputir village were completed.

The Senegal minnow was the most abundant species recorded, while the Cyprinidae was the most diverse family, with seven species recorded. Four cichlid species were recorded, including Nile tilapia. The Nile tilapia has reportedly been stocked in the Turkwel Dam to promote fisheries in that impoundment.

Two Haplochromis species were recorded in the Turkwel River, both species were previously only known from Lake Turkana. The records from the Turkwel River therefore represent a range extension for these species.

6.9 Ecosystem Services

Ecosystem Services are natural products and processes that contribute to human well-being and the personal and social reliance on natural resources.

An ecosystem service prioritisation exercise was undertaken which identified the following key natural resources used in the Project AoI:

- Provisioning services including cultivated foods, grazing/browsing resources for livestock, wild foods, biomass fuel (wood and charcoal) and biological raw materials (used for construction of traditional houses)

[1] Medium and large mammal species include all species except rodents and bats.

from ephemeral stream woodlands and riparian forest ecosystems used by some residents and pastoralists

- Fresh water supplied from Turkwel Dam, ephemeral stream woodland and riparian forest used by some residents and pastoralists
- Cultural services including spiritual values, and educational and inspirational ecosystem services supplied by Acacia-commiphora bushland/thicket, ephemeral stream woodland and riparian forests used by some residents and mobile pastoralists

6.10 Landscape and Visual

The aesthetic quality of the landscape was ascertained through the baseline study. The landscape is predominantly semi-desert with some areas of dense bushland, rocky habitat/stunted bushland, and alluvial woodland.

The desktop study identified the following:

- Settlements are scattered and predominantly comprise of semi-permanent, individual residential dwellings of simple construction (homesteads), larger concentrated settlements and permanent major settlements (e.g. Lokichar).
- Roads are generally compacted bare earth tracks, except for stretches of tarmacked surfaces on the A1 road, which passes down from Lokichar towards Kainuk.
- With respect to artificial lighting, minimal light pollution occurs as the area does not have a built-up nature. Existing facilities at Kapese base present some night-time lighting within the camp area. Further light sources are located at Lokichar; the nearest urban centre to the Upstream facilities, which is located approximately 7.5 kilometres (km) to the south-west of the Twiga oil field.

6.11 Social

The socio-economic baseline includes a wide range of secondary material on general socio-economic data that has been gathered and consolidated between 2015 and early 2019. Primary information was also collected through field visits in West Pokot and Turkana for both socio-economic and health community disciplines.

A brief summary of the main findings for each of the socio-economic sub-categories addressed as part of the socio-economic baseline is presented below.

6.11.1 Administrative Divisions and Governance Structure

Turkana County is divided into seven Sub-counties and West Pokot County is divided into four Sub-Counties. Each Sub-county is further divided into Divisions, Locations and Sub-locations.

Divisions, Locations and Sub-locations are part of a national government administrative structure. This overlaps with the Sub-county structure, however a Ward is part of the newly instituted devolution process. Sub-county Administrators and Ward Administrators are part of the county government administration structure. The Constitution of Kenya (2010) set up these two levels of government, making a shared mandate between the national government and counties.

The primary focus of socio-economic baseline is the two Sub-counties of Turkana South and Turkana East in Turkana County, plus the four Locations adjacent to the Turkwel Dam, the proposed water abstraction point. These Locations are part of three Sub-counties in West Pokot, Pokot West, Pokot North and Pokot Central.

6.11.2 Demographics

The most recent census data from the Kenya Population and Housing Census (KPHC) was conducted in 2019.

The previous census conducted in 2009, counted a total population of 855,399 in Turkana County and 926,976 in 2019. For West Pokot, the total was 512,690 in 2009 and 621,214 in 2019. The new census information shows slower population growth than previously anticipated.

Sub-county figures suggest movement within Turkana County, especially to Turkana East with a population increase of over 50% indicating a shift towards the Project AoI. The socio-economic baseline also reports on migration and vulnerable groups. Turkana and West Pokot migration is driven by seasonal changes due to pastoral culture and lifestyle. Migration of pastoralists and livestock to seek better water sources leads to increased competition for these available resources, especially in times of limited rainfall.

6.11.3 Infrastructure and Services

Infrastructure and services are improving as a result of the devolved system of government. Health facilities are improving and the distance to health facilities has been reduced. There are more Early Childhood Development (ECD) facilities, which has allowed more access to education for small children. Improvements have been generally more noticeable in Lodwar, as a result of increased employment from devolution and the activities of key NGOs. However, some areas have not seen much improvement at all, especially in areas affected by the lack of security along the A1 highway.

West Pokot County infrastructure is similar to that of Turkana County, with poor waste and sanitation systems. Education facilities are also limited, especially for pastoralists. Facilities, including schools, are reportedly minimal unless they are funded by faith-based organisations (FBOs) or NGOs.

6.11.4 Economics, Employment and Livelihoods

Most people in Turkana County and West Pokot County depend on nomadic pastoralism, as well as some crop farming, fishing and weaving for their livelihood. The Kerio River and Turkwel River are key sources of water to support animal husbandry and farming is mainly practiced at household level through irrigation along the Turkwel and Kerio Rivers. Fishing is also practiced in Lake Turkana.

In West Pokot County, apart from agricultural and livestock enterprises, transport, trade and small-scale gold mining is increasing in economic importance. The trade in the market centres is increasing, especially at Makutano, Chepareria, Ortum and Marich townships. Small-scale gold mining activities are present in parts of the county and support thousands of people.

Wage earners constitute only 6% of the population in Turkana County. Unemployment levels are estimated at 70% in contrast to national figures of 42%. Wage earners in West Pokot County constitute only five percent of the population.

Turkana has some of the highest levels of poverty in the country. The Kenya National Bureau of Statistics (KNBS) reports poverty at 94%, and the poverty rates in West Pokot County currently stand at 68.7%, approximately 433,656 people.

6.11.5 Land Use and Ownership

The following describes the baseline land use across the TAN fields, interconnecting network and water pipeline routes.

Twiga, Amosing and Ngamia fields

Land use baseline surveys have been undertaken by TKBV in the three gazetted field areas from 2015 to 2019 to record patterns of land use and numbers of occupied homesteads. The baselines of November 2018 and July 2019 provide an indication only of the numbers and locations of occupied homesteads that could be present when land acquisition surveys are undertaken by the NLC and provide a basis for the assessment of impacts arising from Project land access.

Twiga – Occupied homesteads were identified in 2018 and 2019. The new Lomokamar Primary School classroom in use in November 2019, is located 120 m north of the Twiga field area.

Ngamia – Occupied homesteads were identified in 2018 and 2019.The Ngamia Secondary School lies just inside the south-east boundary of the Ngamia field, approximately 1.8 km away from any planned Project wellpads.

Amosing - Occupied homesteads were identified in 2018 and 2019. The new Lokosemikori Primary School is located near the centre of the Amosing field area, approximately 800 m west of the Amosing-3 wellpad**.** The school was constructed in 2018 but was not yet in use as of November 2019.

Interconnection Routes Between Fields

The routes pass through sparsely populated areas of communal livestock grazing land, all classified as unregistered community land.

The routes of interconnecting buried flowlines and OHTL run for 18.3 km between the Twiga field and the Ngamia field and a shorter 800 m section between the Ngamia and Amosing fields.

Baseline data analysis on land use along the Right of Way (RoW) for the interconnection routes involved a baseline survey undertaken on the ground by TKBV in July 2019 and review by Golder of aerial imagery taken in early 2018 and July 2019 which identified occupied homesteads along the route.

Water Pipeline

The water pipeline runs for approximately 90 km from the Turkwel Dam to the CFA. The pipeline will be buried and pass for approximately 8 km from the Turkwel Dam through land in West Pokot and then for approximately 80 km through land in Turkana County

All land through which the water pipeline passes in Turkana County is understood to be unregistered community land. The approximate eight km stretch in West Pokot is also understood to be unregistered community land, with a small area next to the Turkwel Dam understood to be owned by the Kerio Valley Development Authority (KVDA). Desk based analysis of the 27 m wide construction RoW using aerial images taken in July 2019 identified areas containing buildings and potential homesteads or other signs of land use such as animal shelters.

6.11.6 Community Health and Safety

An estimated half of the facilities are public (government owned), 38% private-for-profit, 10% FBOs and 3% NGOs. According to official County documents, the average distance to a heath facility is 35 km in Turkana County, and 25 km in West Pokot.

The leading causes of morbidity in the area are predominantly communicable and infectious diseases particularly upper respiratory tract infections, malaria, diarrhoeal diseases, skin diseases, and pneumonia. Malnutrition and anaemia also featured among child morbidities, but the burden could be underestimated given that most of the cases (mild-moderate) remain undetected at the community level. Eye and ear infections were also common as were intestinal worms, animal bites and injuries. Human Immunodeficiency Virus (HIV)/ Acquired Immune Deficiency Syndrome (AIDS) and tuberculosis (TB) also cause significant morbidity and mortality, especially among adults. Non-communicable diseases are emerging, particularly hypertension, but these are still overshadowed by the high burden of communicable diseases. Predisposing factors to disease burden in the area include favourable environments for mosquitoes to proliferate, dust that contribute to respiratory ailments, poor access to safe drinking water and sanitation, high levels of poverty and food insecurity, and cultural practices.

6.11.7 Education

There are only 315 primary schools and 32 secondary schools in all of Turkana County. There are polytechnic institutes in Kakuma and Lodwar; two colleges, one focussed on health and the second on teacher training. The only campus university sites are in Lodwar and Lokichoggio, and a Technical Training Institute is being built in Lodwar.

In the Kositei Location, West Pokot Sub-County, there are five primary schools, one each in Turkwel, Kudungole, Chepokachim, Riting and Reres villages. There is only one secondary school at Turkwel.

The low literacy levels of 22.2% in Turkana County can be attributed to many causes that include extreme poverty, understaffing in schools and cultural practices such as early marriages. The literacy levels in West Pokot County stands at approximately 40% but this varies in the Sub-counties and Pokot West Sub-county has a high illiteracy rate of around 67%.

6.11.8 Social Maladies

According to numerous key informants interviewed in Turkana, alcoholism has increased and greatly influences youth, in some cases causing them to lose jobs. Due to peer groups, youth are drawn into smoking cannabis (*bhang*) and chewing khat (*miraa*), which it is linked to individuals becoming homeless. In Kainuk, focus group participants report new types of drugs and alcohol being consumed, in some cases incapacitating people for up to three days. Social Maladies in West Pokot County are similar to those in Turkana. Child Labour is prominent due to livelihoods which entail young boys to herd livestock and young girls employed as house girls.

6.11.9 Social Capital and Conflict

A total number of 106 security incidents have been registered in Turkana and West Pokot during the reporting period August 2018 to July 2019. These are differentiated as banditry, cattle raids, civil disorder and intercommunal violence incidents. Turkana accounts for 85.8% of the total number of incidents. The security reports reveal that the number of incidents related to cattle raiding have increased during the first quarter of 2019. West Pokot has fewer reported incidents over the same reporting period with two cattle raids registered during October 2018 and June 2019.

6.12 Cultural Heritage

The cultural heritage baseline was defined through a mix of desk-based research, field survey and community consultation between 2016 and 2019. This work was undertaken by Golder, with support from specialists from the National Museums of Kenya (NMK).

Data was captured from across the South Lokichar Basin, with a total of 2,123 cultural heritage assets identified. These included large volumes of archaeological remains, such as pottery and stone tools, as well as living cultural heritage sites, such as elder/sacred trees, churches and graves. Elements of intangible cultural heritage were also identified, including distinct Turkana and West Pokot cultures (including belief systems, societal structures and traditional practices), nomadic pastoralism and environmental subsistence.

7.0 POTENTIAL IMPACTS AND MITIGATION

The following presents a summary of the main potential impacts (only) and key commitments to manage or mitigate potential impacts.

7.1 Air Quality

Dust generated by construction activities are identified as having the potential to impact on people and ecological receptors within 250 m of the Project footprint. During operation, impacts are expected within a

defined area near the CPF, and on people travelling through that same area, as a result of small particulate emissions.

Key commitments to mitigate and manage impacts include:

- Communication to local communities of the construction schedule, the potential duration of construction activities and the risks of exposure for extended periods;
- Effective signage to explain risks associated with staying in affected areas for extended periods;
- Pre-construction surveys to map sensitive species distribution. Once surveys are completed, suitable mitigation will be developed where appropriate; and
- Homesteads within affected areas will be considered under the Land Acquisition and Resettlement Framework (LARF).

With mitigation in place, impacts during construction and operations are all expected to be of **Minor** or **Negligible** significance.

7.2 Noise and Vibration

The impacts of vibration are considered to be **Negligible**.

Construction noise from building the Project and drilling wells is expected to impact people who are both permanently based within close proximity of the Project footprint and those who use the area temporarily. These impacts will not be throughout the entire construction period but will be linked to specific construction activities. It is expected that noise during operation has the potential to impact upon people who temporarily use land in close proximity to the Project footprint.

Key commitments to mitigate and manage impacts include:

- Communication to local communities of the construction schedule, the potential duration of construction activities, the noise levels during construction (including well drilling) and the risks of exposure for extended periods;
- Communication to local communities of potential change to noise levels during operation to encourage avoidance or minimal exposure;
- Signage should be put in place around operational areas, to further communicate the risks;
- TKBV will exert influence over the owners of the airstrip to consider a communication plan to encourage avoidance or minimal exposure during the Kapese airstrip upgrade work.

With these mitigation in place, impacts during construction and operation are all expected to be of **Minor** or **Negligible** significance.

7.3 Water Quantity

During construction, it is expected that the abstraction of water from the abstraction wells for the Project, discharge of water from the Project and activities near or within watercourse have the potential to impact upon water quantity in the Kalabata River, seasonal rivers/ streams and drainage luggas, and the Turkwel Reservoir.

Key commitments to mitigate and manage impacts include:

- Communication and provision of alternative water supplies where shallow groundwater could be affected during construction;

- Monitoring of shallow groundwater adjacent to sensitive habitats to establish baseline groundwater levels and to monitoring groundwater abstraction during construction along the Kalabata River (see Section 7.7).
- An action plan to avoid long term stress of potential critical habitat along the Kalabata River relating to groundwater abstraction during construction;
- Adoption of the water management philosophy to promote efficient water use, reuse and disposal;
- Site specific assessments to identify any local water users dependent on access to local water supplies prior to construction;
- Climate change management plan (including supply security assessment to account for climate change scenarios) will be developed to make sure an adequate supply from the reservoir, or alternative, can be maintained for the Project; and
- Determination of a reservoir water level, below which Project abstraction would impact other reservoir water users and an action plan should unprecedented changes in reservoir level occur.

With these mitigation measures in place, impacts during construction and operation are all expected to be of **Minor** or **Negligible** significance.

7.4 Water Quality

There is potential that water quality may be impacted during construction as a result of activity in or near watercourses and discharges/releases to watercourses from waste storage and disposal activities. These impacts (without mitigation) have the potential to affect water quality in either the Kalabata, Turkwel and Malmalte Rivers, seasonal rivers/ streams and drainage luggas, the Turkwel Reservoir and groundwater. It is predicted that, during operation, water quality may be impacted by discharges/releases to watercourses from waste storage and disposal activities.

Key commitments to mitigate and manage impacts include:

- Managing construction works in the rainy season and periods of extreme rainfall with temporary erosion control measures, water quality monitoring programmes and minimising work in seasonal watercourses when there is flow to reduce the generation of sediment mobilisation;
- Where necessary, during construction, temporarily redirecting the flow to re-join the watercourse further downstream;
- Monitoring of shallow groundwater quality in the Kalabata River prior to and during construction;
- Monitoring of water quality in sensitive environments in the Turkwel River prior to and during construction;
- Production and implementation of a construction waste management plan;
- Site drainage systems that are isolated from surface and groundwater;
- Landfill leachate monitoring and management and surface water management system at the engineered landfill; and
- Groundwater monitoring will be installed around the engineered landfill and CFA.

With this mitigation in place, impacts during construction and operation are all expected to be of **Minor** or **Negligible** significance.

7.5 Soils, Terrain, Geology and Seismicity

During construction, it is predicted that soils with agricultural potential will be impacted by ground disturbance and the handling of topsoil.

Key commitments to mitigate and manage impacts include:

- Implementation of a soil management procedure, erosion control plans and rehabilitation plans to revegetate areas of agricultural potential and reduce soil erosion;
- An erosion control plan outlining soil conservation tactics for works during extreme rainfall events and extreme dry, windy events during construction;
- Storage of topsoil for no more than 6 months along the water pipeline;
- Salvage topsoil in areas where it occurs in the direct soil disturbance footprint of the CFA, wellpads, engineered landfill, roads and camps; and
- The make-up water pipeline will be inspected within the first two years following construction to identify areas of erosion and subsidence.

With this mitigation in place, impacts during construction and operation are all expected to be of **Minor** or **Negligible** significance.

7.6 Landscape and Visual

It is expected that construction works will impact on the landscape within the Nasolot Nature Reserve and the Pellow Community Conservancy. Construction activities are expected to have visual impacts upon people and visual impacts from Project infrastructure and site activities are expected to impact people during operation.

Key commitments to mitigate and manage impacts include:

- During construction, night-time working (dusk until dawn) is avoided, in areas within 100 m of the Nasolot National Reserve (NR) or Pellow Community Conservancy unless agreed by TKBV and supervised by the Project Biodiversity Clerk of Works (BCoW);
- Communication of the construction schedule to the administrators and users of protected areas;
- Where possible, natural screening will be maintained as well as vegetating stockpiles, dust suppression and minimising light spill;
- A Grievance Management Procedure will be implemented, to enable the recording and follow up of complaints related to Project activities that could contribute to visual impacts; and
- During operations, where practical, landscaping (including earth bunds and vegetation) will be maintained to act as screening.

With this mitigation in place, impacts during construction and operation are all expected to be of **Minor** or **Negligible** significance.

7.7 Biodiversity, Ecology and Protected Areas

A range of important biodiversity receptors, including habitats, species of conservation concern, and protected areas, are expected to be impacted upon during construction and operation. These include: forest vegetation along the Malmalte River; range-restricted plant species; elephants; vultures; the Turkana toad; a ground beetle; fish; the Nasolot NR and South Turkana NR; and the Pellow Community Conservancy.

These biodiversity receptors trigger critical habitat (CH)[2], as defined by the IFC's PS6 (2012), within the AoI. Critical habitat potentially impacted by the construction and operation of the Project include: *Euphorbia turkanensis* identified along the water pipeline route; the African elephant populations, which extend from the Kerio Valley in the south, to the South Turkana NR and Nasolot NR in the north; leopard and striped hyaena populations in the peripheral rocky ridges and densely vegetated habitats along the Malmalte and Turkwel Rivers; a ground beetle species new to science recorded and collected near Loperot in the east of the AoI; the Turkana toad, recorded in the vicinity of the Kalabata River; and vulture and steppe eagle populations in the AoI with the CH restricted to those areas where vultures are likely to encounter carrion, preferred flights paths and areas where they are likely to find large trees for nesting and roosting

Impacts on biodiversity receptors are predicted from a number of construction and operation-related activities, including direct disturbance and land take, disruption of ecological connectivity, sensory disturbance, introduction of alien invasive species, and increased mortality/persecution as a result of interactions between animals and humans (particularly traffic), and between animals and project infrastructure (particularly OHTL).

Impacts on habitats and species are also expected to occur specifically during operation due to increased access along the RoW resulting in increased human interaction, direct mortality (e.g. from traffic, OHTLs or flares), persecution, sensory disturbance, and 'edge' impacts. Edge impacts are those that occur in transitional habitats (e.g. the habitat between woodland and the desert), and, with regard to the Project, are particularly associated with the establishment of invasive plants species.

Key commitments to mitigate and manage impacts include:

- Monitoring to establish baseline physiological stress levels in riparian trees, humidity levels, and shallow water level data adjacent to potentially affected habitats for the Turkana toad and undescribed beetle, which trigger critical habitat and potential nesting habitat for vultures. Plus, continuation of this monitoring during construction when groundwater abstraction will occur;
- Turkana toad and beetle surveys will be completed during a rainy season ideally May/June prior to construction (the season when data was originally collected in 2016), to establish likely baseline presence in the Kalabata and areas likely affected by groundwater drawdown during construction;
- Should evidence of the Turkana toad be collected, the survey will be repeated on a yearly basis in May/June during the period of groundwater abstraction during construction;
- A Biodiversity Management Plan (BMP) is proposed, which will include a range of management plans for rehabilitation after ground disturbance, a wildlife rescue plan, and a range of species-specific management plans (e.g. Turkana toad, undescribed beetle, elephant, leopard, striped hyaena, vultures, *E. turkanensis*, as well as invasive species);
- Demarcation of sensitive areas during construction, including critical habitats;
- Avoiding night-time driving, where possible;
- Including bird-friendly design measures in the OHTL design;
- Exerting influence over the relevant Kenyan electricity company to implement an OHTL mitigation and monitoring programme to assess effectiveness of bird impact mitigation measures;

2 Critical habitats are areas with high biodiversity value, including (i) habitat of significant importance to Critically Endangered and/or Endangered species; (ii) habitat of significant importance to endemic and/or restricted-range species; (iii) habitat supporting globally significant concentrations of migratory species and/or congregatory species; (iv) highly threatened and/or unique ecosystems; and/or (v) areas associated with key evolutionary processes.

- Staff environmental inductions;
- Development and Implementation of an Influx Management Plan;
- Development and Implementation of an Invasive Species Management Plan (ISMP), vegetation and wildlife monitoring programmes;
- Development and implementation of a Rehabilitation plan;
- Effective communication with, and logistical support for, Kenya Wildlife Service (KWS);
- Implementation of a start-up routine for flares that includes checking for the presence or proximity of birds; and
- During detailed design, a review of off-site light spillage will be undertaken and any identified mitigation measures will be implemented.

With these mitigation measures in place, the majority of the impacts are expected to be of **Minor** or **Negligible** significance. **Moderate** significance impacts during construction are expected on elephants, leopards and striped hyaena, the Turkana toad and the ground beetle species. Mitigated impacts on vultures are expected to be **Moderate** during both construction and operations.

7.8 Ecosystem Services

During construction, it is expected that there will be impacts on cultivated and wild food, grazing for livestock, medicinal plants, freshwater, cultural sites (such as sacred trees) and spiritual values. These impacts will occur primarily as a result of direct disturbance and changes to land cover reducing the availability of certain resources, but also due to increased demand as population increases. Water abstraction and changes to the air, noise and visual environment will also have an impact. During Project construction, micro-alignment of the route within the RoW will be used to avoid direct impacts on sacred trees, however, one sacred tree (CH-046 near Twiga) is located in close proximity to the RoW. The tree could be directly impacted by construction dust and users of the tree could be impacted by visual disturbance.

During operation, it is expected that, as a result of influx and the presence of the Project within the landscape, there will be impacts on wild food, grazing for livestock, medicinal plants, biomass fuel, wood and fibre, spiritual values, and educational and inspirational values.

Key commitments to mitigate and manage impacts include:

- Adoption of biodiversity and ecosystem services (BES) management practises to address impacts, dependencies, risks and opportunities on ecosystem services, in line with GIIP;
- Influence all third-party contractors to ensure the avoidance of impacts on cultural heritage features (such as sacred trees) that are essential to the identity and/or cultural, ceremonial, or spiritual aspects of beneficiaries' lives;
- Sacred sites close to construction/operation areas should be protected through demarcation of no-go areas for vehicles and Project personnel;
- Avoid beekeeping enterprises and farms where possible;
- Pre-construction survey to identify any cultivation areas likely to be impacted and rehabilitation plan immediately post-construction where necessary;
- Consultation with the local community will be undertaken and a communication plan will be produced and implemented involving relevant traditional leaders in relation to the affected sacred tree;

- A cultural heritage management plan;
- Encourage sustainable use of water points to discourage overgrazing, and record issues as part of the grievance mechanism;
- Economic displacement (e.g. loss of grazing/browsing resources) experienced by affected pastoralists will be addressed via the Livelihood Restoration Plan (LRP);
- Community development planning that will support developing sustainable herding practises, crafts, ecotourism or other activities that provide alternative livelihoods and income;
- Enforcement of a ban on purchasing locally produced charcoal for sale outside camps for Project personnel;
- Rehabilitation of affected cultivation areas;
- Further studies into the economic and importance of livestock to pastoralists, use of wild foods and medicinal plants; and
- Develop and share an influx management plan with Turkana and West Pokot County governments.

With these mitigation measures in place, the majority of these impacts are expected to be of **Minor** or **Negligible** significance. **Moderate** residual impacts are expected on the one sacred tree (CH-046) near Twiga and associated spiritual values.

7.9 Social

Social impacts are a mix of both positive and negatives impacts for both construction and operation and are linked to:

- Project-induced influx and in-migration;
- Infrastructure;
- Economics, employment and livelihoods (including taxes and payments; contractor employment; business opportunities and local content; and inflation);
- Land use and ownership (including long term loss of community land; temporary restriction on land use - particularly in relation to pastoral use); long term restriction on settlement along the water pipeline route; loss of occupied homesteads, other household structures and business structures; temporary loss of access to TKBV community water tanks; increased travel distance to community assets or TKBV water tanks; impacts on livelihoods due to loss of communal land; impacts on graves; and impacts on vulnerable people);
- Community Health (including sexually transmitted infections; vector related diseases; communicable diseases; diseases that can transfer from animals to humans ('zoonotic'); and accidents and injuries);
- Changes in access to education;
- Social maladies (including crime and commercial sex work); and
- Social capital and conflict (including inter-ethnic conflict and community cohesion within Turkana and West Pokot.

Key commitments to mitigate and manage impacts include:

- Implementation and maintenance of Policies including Human Resources Contractor Standard, Code of Ethical Conduct, Human Rights, Safe and Sustainable Operations and HIV Policy;
- Implementation and maintenance of Management Plans including Influx, Community Health, Safety and Security, Transport, Malaria and TB;
- Develop and Implement Community Development Plans (CDPs) and LRP, which will be created with authorities in Turkana and West Pokot Counties and will deliver livelihood restoration and community benefits;
- Develop and approve a strategy for educational support, which will be created in partnership with authorities in Turkana and West Pokot Counties, NGO/development agencies;
- Agree to a revised and updated National Content planning approach;
- Maintenance of the SEP and Grievance mechanisms;
- TKBV will also continue to adhere to Accounting Directive and disclose taxes in company-wide Annual Reports;
- Maintain all construction accommodation and worker accommodation during operations as "*closed camps*";
- Work with County Governments to encourage sustainable use of community offtake water points on the water pipeline to discourage overgrazing at water off take points, and record issues as part of the grievance mechanism;
- Land impact mitigations are guided by two key commitments. First, compensation, as determined under the Kenyan Law, will be provided as part of the Government-led statutory land acquisition process. Any gaps between government-led land acquisition and IFC PS 5 will be addressed as part of the LRP.;
- Compensation, as provided under Kenyan Law which recognises graves and the costs of rituals required to relocate graves, to be provided as part of the Government-led statutory land acquisition process;
- Human Resources processes will restrict informal hiring, establish clear procedures for hiring unskilled and low skilled workers, establish explicit definitions for "*local*" or "*local-local*" hiring criteria; and revise all recruitment procedures in line with external engagement practice outlined in the SEP;
- Adoption of a "*95-95-95*" strategy, which sets targets for awareness, treatment and demonstrating performance in viral suppression to combat HIV/AIDs;
- Implement TB Management Programme, linked to the HIV Programme, in collaboration with authorities in Turkana and West Pokot Counties;
- Develop and implement Pest Control Plan for landfill and other Project facilities;
- Engage with the community to agree procedures for demarcation of 'no go' sensitive locations and mapping and communication of cultural heritage 'constraints', including graves and sacred trees; and
- Maintain regular community engagement outreach to address rumour and other misunderstandings identified through regular engagement.

With these mitigation measures in place, residual negative impacts during construction and operation are all expected to be of **Minor** to **Negligible** significance, except for one **Moderate** negative residual impact relating to accidents and injuries. Many impacts are expected to be positive, with **Moderate** or **Major** positive impacts relating to transparent tax payments, infrastructure, employment and business opportunities.

7.10 Cultural Heritage

During construction, it is expected that ground disturbance, changes to environmental setting (e.g. changes to air quality, the landscape, or noise levels), and changes to socio-economic conditions have the potential to impact upon archaeology, living cultural heritage and intangible cultural heritage. During operation, there will be visual impacts on sacred trees, and socio-economic changes will continue to impact upon intangible cultural heritage.

Key commitments to mitigate and manage impacts include:

- Continued community consultation in accordance with the SEP;
- Staff induction and training to include information on the different cultural heritage receptors and the proposed mitigation strategy;
- Implementation of a Cultural Heritage Management Plan (including a Chance Finds Procedure);
- Pre-construction targeted archaeological investigation, survey and mapping of living cultural heritage receptors along the water pipeline;
- Development and implementation of communication plans to engage traditional leaders and local administrative leaders to inform local communities of the Project construction schedule;
- Consultation with communities along the make-up water pipeline and mapping of sacred trees in this area. If sacred trees are identified, then measures such as micro-alignment and consultation regarding the possible translocation of sites and associated cultural practices will be applied to reduce impacts;
- Consultation with communities along the make-up water pipeline and mapping of living cultural heritage receptors in this area. If receptors are identified, then measures such as micro-alignment and exhumation of burials will be applied to reduce impacts; and
- Influx Management Plan, LRP and CDPs.

With this mitigation in place, most impacts are expected to be of **Minor** significance. **Moderate** significance impacts are expected as a result of visual impacts on users of the identified sacred tree and on graves that have to be relocated.

7.11 Environmental Risks and Accidents

Emergency, accidental and non-routine events risk assessment were assessed, including an evaluation of natural and industrial hazards and the probability of their occurrence during the lifetime of the project (including the construction and operational stages).

Hazards identified (and the assessed risk) include:

- Natural seismicity on built structures, flowlines, vibration-sensitive built structures or equipment (low risk);
- Failure or rupture of a storage tank (low risk);
- Perforation or rupture of a flowline or spillage due to poor working practices (low risk);
- Road traffic accidents on access roads (medium risk);
- Road traffic accidents on public roads (high risk);
- Induced seismicity due to well testing/oil production (low risk); and
- Well casing/cement integrity failure and down hole collisions during drilling and production (low risk).

The following management plans are required to respond to the identified unplanned events:

- Emergency Preparedness Response Plan;
- Construction Environmental Management Plan, including Waste Management, Traffic Management, Water Management and Hazardous Materials Management; and
- Operational Environment Management Plan, including Waste Management, Traffic Management, Water Management and Hazardous Materials Management.

8.0 CUMULATIVE IMPACTS

Cumulative impacts, as defined by IFC (2013), are those that may result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned, or reasonably defined planned developments, at the time the risks and impact identification process is undertaken. While a standalone activity may itself result in an impact that is not significant, when combined with other impacts (significant or not significant) in the same geographical area and occurring simultaneously, it may result in a significant cumulative impact.

Combined impacts associated with the LLCOP project present the greatest potential cumulative impacts. Cumulative impacts are largely expected to occur during the construction phase of the Project relating to the concurrent construction schedules and the operational phase relating to community health and safety. The project proponents will work together to identify additional measures and controls to limit the significance and duration of activities.

TKBV are committed to engage with other associated and third-party projects to encourage implementation of specific mitigation measures including OHTL routing and bird-friendly design, consideration of receptors close to the proposed Kapese airstrip upgrade works and to discourage the development of borrow pits in areas of sensitive biodiversity and to ensure that site-specific Project reports are developed and submitted to NEMA.

9.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

In accordance with the Environmental Impact Assessment Guidelines for the Energy Sector in Kenya, an Environmental and Social Management Plan (ESMP) is included as part of the ESIA. An ESMP compiles a set of management, mitigation and monitoring measures to be taken during construction and operation of the Project to manage key potential environmental and social impacts identified in this ESIA. The ESMP contained within this ESIA therefore:

- Describes the Environmental and Social Management System (ESMS) that will be developed to implement the requirements of the approved ESMP and to meet Kenyan regulatory requirements; and
- Sets out the key impacts and mitigations defined in the ESIA and allocates responsibilities for implementation and performance monitoring in an ESMP format.

The ESMP addresses each of the topics assessed as part of this ESIA and considers a framework for decommissioning.

The commitments, mitigations and management controls set out will be used by TKBV, the Project Management Company (PMC) and the EPC Contractor to develop detailed implementing procedures for construction and operations.

Signature Page

Golder Associates (UK) Ltd

DRAFT

Andrew Morsley
Project Manager

DRAFT

Philip Abour
Ecologics Consulting Ltd

ACRONYMS

%	Percentage
~	About/approximately
°C	Degrees Celsius
AIDS	Acquired Immune Deficiency Syndrome
AoI	Area of Influence
AQS	Air Quality Standards
BCoW	Biodiversity Clerk of Works
BES	Biodiversity and Ecosystem Service
BMP	Biodiversity Management Plan
CDP	Community Development Plan
CFA	Central Facilities Area
CH	Critical Habitat
CO_2	Carbon Dioxide
CPF	Central Processing Facility
dBA	A-weighted decibels
EOPS	Early Oil Pilot Scheme
EPC	Engineering, Procurement and Construction (Contractor)
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
FBO	Faith-Based Organisations
FID	Final Investment Decision
FO	First Oil
GIIP	Good International Industry Practice
GoK	Government of Kenya
GTG	Gas Turbines Generators
ha	Hectares
HIV	Human Immunodeficiency Virus
IFC	International Finance Corporation
ISMP	Invasive Species Management Plan
IWMF	Integrated Waste Management Facility
kbd	Thousand Barrels per Day
kbwpd	Thousand barrels of water per day
km	Kilometres
KNBS	Kenya National Bureau of Statistics
KPHC	Kenya Population and Housing Census
KVDA	Kerio Valley Development Authority
KWS	Kenya Wildlife Service
LARF	Land Acquisition and Resettlement Framework
LEF	Lokichar Export Facility
LLCOP	Lokichar to Lamu Crude Oil Pipeline
LRP	Livelihood Restoration Plan
m	Metres
MBBRT	Measured Depth Below Rotary Table
MMIF	Mesoscale Model Interface Program
MMIF	Millimetre
NEMA	National Environment Management Authority (Kenya)
NGO	Non-Governmental Organisation

NLC	National Land Commission
NMK	National Museums of Kenya
NR	National Reserve
NTS	Non-Technical Summary
OHTL	Overhead Transmission Lines
PAP	Project Affected People
PMC	Project Management Company
PS	Performance Standard
RoW	Right of Way
SEP	Stakeholder Engagement Plan
TAN	Twiga, Amosing and Ngamia
TB	Tuberculosis
TKBV	Tullow Kenya B.V.
WBG	World Bank Group
WHO	World Health Organization

REFERENCES

WHO, 2010, WHO (World Health Organisation). 2010. Kenya: Seismic Hazard Distribution Map.

IUCN, 2019, International Union for Conservation of Nature. 2019. Available at: https://www.iucn.org/ [Last accessed 05/05/2020].

KWCMA, 2013, Kenya Wildlife Conservation and Management Act. 2013. No. 47 of 2013.

The Constitution of Kenya (2010)Republic of Kenya. 2010. Constitution of Kenya, 2010. National Council for Law Reporting.

IFC PS6, 2012, IFC (International Finance Corporation). 2019. Performance Standard 6 Biodiversity Conservation and Sustainable Management of Living Natural Resources. Washington, D.C. Available at: https://www.ifc.org/wps/wcm/connect/3baf2a6a-2bc5-4174-96c5-eec8085c455f/PS6_English_2012.pdf?MOD=AJPERES&CVID=jxNbLC0

IFC, 2013, IFC (International Finance Corporation). 2013. Good practice handbook: cumulative impact assessment and management - guidance for the private sector in emerging markets. IFC E&S. Washington, D.C. Available at: http://documents.worldbank.org/curated/en/787161468178468723/Good-practice-handbook-cumulative-impact-assessment-and-management-guidance-for-the-private-sector-in-emerging-markets

GOLDER

golder.com