TILENGA PROJECT

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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

Volume I

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TOTAL

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ESIA – OVERALL TABLE OF CONTENTS

ESIA VOLUME III:

Chapter 13: Terrestrial Vegetation

Chapter 14: Terrestrial Wildlife

Chapter 15: Aquatic Life

ESIA VOLUME IV:

Chapter 16: Social

Chapter 17: Archaeology and Cultural Heritage

Chapter 18: Health and Safety

Chapter 19: Ecosystem Services

ESIA VOLUME V:

Chapter 20: Unplanned Events

Chapter 21: Cumulative Impact Assessment

Chapter 22: Transboundary Impacts

Chapter 23: Environmental and Social Management Plan

Chapter 24: Residual Impacts and Conclusions

ESIA VOLUME VIa:

Appendix A: NEMA Approval for Scoping Report and Project Proponents Response

Appendix B: Key Project Component Fact Sheets

Appendix C: Early Works Project Brief (PB) Executive Summary and Enabling Infrastructure Geotechnical surveys PB Executive Summary

Appendix D: A3 copy of key figures

Appendix E: Additional Project Description material

Appendix F: CIA VEC Summary Report

Appendix G: Stakeholder Engagement Plan and supporting information

Appendix H: Air Quality supporting information

Appendix I: Noise and Vibration supporting information

ESIA VOLUME VIb:

Appendix J: Soils and Geology supporting information

Appendix K: Hydrogeology supporting information

Appendix L: Surface Water supporting information

Appendix M: Landscape and Visual supporting information

Appendix N: Terrestrial Vegetation supporting information

Appendix O: Terrestrial Wildlife supporting information

Appendix P: Aquatic Life supporting information

Appendix Q: Social supporting information

Appendix R: Archaeology and Cultural Heritage supporting information

Appendix: S: Ecosystem Services supporting information

Appendix T: ESMP Mitigation Checklist

Appendix U: Draft Management Plans/Templates

Standalone document: **ESIA Non-Technical Summary**

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List of Abbreviations

ACRONYM	*DESCRIPTION*
2D	Two Dimensional
3D	Three Dimensional
AA	Action Agenda
AAS	Atomic Absorption Spectrophotometer
ACDP	Agriculture Cluster Development Project
ACODE	Advocates Coalition for Development and Environment
ACOP	Africa Child Online Protection
ACP	African Caribbean and Pacific Countries
ADR	Alternative Dispute Resolution
AEAM	Adaptive Environmental Assessment and Management
AECOM	AECOM Limited
AERMIC	AMS/EPA Regulatory Model Improvement Committee
AEWA	Agreement on the Conservation of African-Eurasian Migratory Waterbirds
AFIEGO	African Institute for Energy Governance
AG EBM	Albertine Graben Environmental Baseline Monitoring Report
AG EMP	Albertine Graben Environmental Management Plan
AGIs	Above Ground Facilities
AGODA	Albertine Graben Oil and Gas Districts Association
AIDS	Acquired Immunodeficiency Syndrome
AIR	Aerospace Information Report
ALARP	As Low As Reasonably Practicable
ALC	Area Land Committee
AMS	American Meteorological Society
AMICAAL	Alliance of Mayors and Municipal Leaders' Initiative for Community Action on Aids at the Local Level
ANC	Antenatal care
AoI	Area of Influence
API	American Petroleum Institute

ACRONYM	*DESCRIPTION*
AQ	Air Quality
AR	Albertine Rift
ARDP	Albertine Rift Development Project
ARI	Acute Respiratory Infection
ARLPI	Acholi Religious Leaders' Peace Initiative
ART	Antiretroviral therapy
ATIA	Access to Information Act
AUOGS	Association of Ugandan Oil and Gas Service Providers
AUTO	Association of Uganda Tour Operators
AWE	Air Water Earth Ltd
BAP	Biodiversity Action Plan
BAT	Best Available Technique
BAU	Business as Usual
BCP	Border Control Post
BDL	Below Detection Limit
BFO	Biodiversity Field Officer
BHIC	Bugungu Heritage and Information Centre
BIRC	Bunyoro Inter-Religious Council
BIRUDO	Buliisa Initiative for Rural Development Organisation
BKK	Bunyoro-Kitara Kingdom
BLAC	Biodiversity and Livelihood Advisory Committee
BLFCS	Buliisa Livestock Farmers Cooperative Society
BMP	Biodiversity Management Plan
BMU	Beach Management Unit
BOCP	Blowout Contingency Plan
BP	Blood Pressure
BPEO	Best Practical Environmental Option

ACRONYM	*DESCRIPTION*
BS	Blood Slides
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
BTVET	Business, Technical, Vocational Education and Training
BUCAWA	Buliisa Catholic Women's Association
BULOGA	Bunyoro Local Oil and Gas Advocacy Group
BUWODA	Buliisa Women's Development Organisation
BVS	Block Valve Stations
bwpd	Barrels of water per day
BWR	Bugungu Wildlife Reserve
C&O	Commissioning and Operations
C&P-C	Construction and Pre-Commissioning
CA	Contract Area
CAA	Civil Aviation Authority
CAO	Chief Administrative Officer
CATR	Corrective Action Tracking Register
CBC	Complete Blood Count
CBD	Convention on Biological Diversity
CBNRM	Community Based Natural Resource/Forest Management
CBO	Community Based Organisation
CCC	Criterion Continuous Concentration
CCEDLP	Community Content, Economic Development and Livelihood Plan
CCFU	Cross-Cultural Foundation of Uganda
CCO	Certificates of Customary Ownership
CCR	Central Control Room
CCTV	Closed-Circuit Television
CDO	Cotton Development Organisation
CDP	Community Development Plan

ACRONYM	*DESCRIPTION*
CEC	Cation Exchange Capacity
CECP	Community Environmental Conservation Plan
CEDAW	Convention on the Elimination of All Forms of Discrimination against Women
CEFAS	Centre for Environment Fisheries and Aquaculture Science
CERD	Convention on the Elimination of Racial Discrimination
CFC	Chlorofluorocarbon
CFM	Collaborative Forest Management
CFPr	Chance Find Procedure
CFR	Central Forest Reserve
CFU	Colony Forming Units
CGCC	China Gezhouba Construction Company
CGV	Chief Government Valuer
CH_4	Methane
CH	Critical Habitat
CHA	Critical Habitat Assessment
CHARM	Chemical Hazard and Risk Management
CHMP	Cultural Heritage Management Plan
CHP	Combined Heat and Power
CHQS	Critical Habitat Qualifying Species
CHSSSP	Community Health, Sanitation, Safety, and Security Plan
CIA	Cumulative Impact Assessment
CIDI	Community Integrated Development Initiatives
CIEEM	Chartered Institute for Ecology and Environmental Management
CIfA	Chartered Institute for Archaeologists
CITES	Convention on International Trade in Endangered Species
CLA	Communal Land Association
CLO	Community Liaison Officer

ACRONYM	DESCRIPTION
CMC	Criteria Maximum Concentration
CMD	Community Medicine Distributors
CMO	Catchment Management Organisation
CMS	Convention on Migratory Species
CNOOC	China National Offshore Oil Company
CO	Carbon Monoxide
CO_2	Carbon Dioxide
COMAH	Control of Major Accident Hazards
COS	Carbonyl Sulphide
CPa	Conservative Party
CP	Cathodic Protection
CPF	Central Processing Facility
CPUE	Catch per Unit Effort
CR	Critically Endangered
CRA	Chemical Risk Assessment
CRC	Convention on the Rights of Children
CRED	Civic Response on Environment and Development
CRI	Cuttings Re-injection
CRPD	Convention on the Rights of Persons with Disabilities
CS_2	Carbon Disulphide
CSBI	Cross Sector Biodiversity Initiative
CSCO	Civil Society Coalition on Oil and Gas
CSEMP	Construction Environmental and Social Management Plan
CSF	Cerebrospinal fluid
CSM	Conceptual Site Model
CSO	Civil Society Organisation
CSR	Corporate Social Responsibility

ACRONYM	*DESCRIPTION*
CTLO	Community and Tourism Liaison Officer
CWA	Community Wildlife Area
DALYs	Disability-Adjusted Life Years
DCDO	District Community Development Officer
DCIC	Directorate of Citizenship and Immigration
DD	Data Deficient
DDP	District Development Plan
DEO	District Environmental Officer
DFR	Directorate of Fisheries Resources
DHIS2	District Health Information System 2
DHMT	District Health Management Team
DHO	District Health Officer
DHSV	Down-Hole Safety Valve
DIRCO	District Resettlement Committee
DLB	District Land Board
DLG	District Local Government
DLM	Directorate of Land Management
DLO	District Land Office
DLOs	District Labour Officers
DLSP	District Livelihood Support Programme
DMU	Discrete Management Units
DMM/DoMM	Department of Museums and Monuments
DMU	Discrete Management Unit
DO	Dissolved Oxygen
DP	Democratic Party
DPMD	District Production and Marketing Department
DPPUD	Directorate of Physical Planning and Urban Development

ACRONYM	*DESCRIPTION*
DRC	Democratic Republic of Congo
DSA	Drilling Support Area
DSIP	Development Strategy and Investment Plan
DVM	Dual Vertical Migration
DWC	District Wildlife Committee
DWD	Directorate of Water Development
DWRM	Directorate of Water Resource Management
EA	Exploration Area
EACOP	East African Crude Oil Pipeline
EAL	Environmental Assessment Level
EAR	East African Rift
EARS	East African Rift System
EAS	East African Standard
EBA	Endemic Bird Area
EBRD	European Bank for Reconstruction and Development
EBS	Environmental Baseline Study
EC	Easement Certificate
EC	Electrical Conductivity
ECAC	European Civil Aviation Conference
ECG	Electrocardiogram
ECO	Environmental Control Officer
ECoW	Ecological Clerk of Works
EDD	Environmental Due Diligence
EDG	Emergency Diesel Generator
EF	Elevated Flare
EFA	Education for All
EGF	Enclosed Ground Flare

ACRONYM	*DESCRIPTION*
EHA	Environmental Health Area
EHD	Environmental Health Division (of the Ministry of Health)
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EIS	Environmental Impact Study
EIN	Environment Information Network
EITI	Extractive Industries Transparency Initiative
ELC	European Landscape Convention
EMS	Environmental Management System
eMTCT	Elimination of HIV Transmission from Mother to Child
EN	Endangered
ENVIID	Environmental Impact Identification
EO	Environmental Officer
EOC	Equal Opportunities Commission
EOR	Enhanced Oil Recovery
EPA	See 'USEPA'
EPs	Equator Principles
EPSC	Engineering, Procurement, Supply, Construction
ERA	Environmental Risk Assessment
ERM	Emergency Response Manager
ERP	Emergency Response Plan
ERT	Emergency Response Team
ESDV	Emergency Shutdown Valve
ESIA	Environmental and Social Impact Assessment
ESIVI	Ecosystem Services Identification, Valuation and Integration
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System

ACRONYM	DESCRIPTION
ESO	External Security Organisation
ESP	Electric Submersible Pumps
ESR	Ecosystem Services Review
ESS	Ecosystem Services
EU	European Union
EUR	Euro
FBA	Freshwater Biological Association
FCTC	Framework Convention on Tobacco Control
FDC	Forum for a Democratic Change
FEED	Front End Engineering Design
FGD	Focus Group Discussion
FID	Final Investment Decision
FOC	Fibre Optic Cable
FR	Forestry Reserves
FWS	Fire Water System
FY	Financial Year
GBIF	Global Biodiversity Facility
GBV	Gender Based Violence
GC-FID	Gas Chromatography – Flame Ionisation Detector
GCIC	Government Citizens Interaction Centre
GCMS	Gas Chromatography Mass Spectrophotometer
GDP	Gross Domestic Product
GENACIS	Gender, Alcohol and Culture: An International Study
GHG	Greenhouse Gas
GIIP	Good International Industry Practice
GIS	Geographic Information System
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit

ACRONYM	DESCRIPTION
GMP	General Management Plan
GNA	Gunya Oil Field
GNI	Gross National Income
GoU	Government of Uganda
GPI	Gender Parity Index
GPS	Global Positioning System
GSHAP	Global Seismic Hazard Assessment Project
GSM	Global System for Mobile Communications
GLVIA	Guidelines for Landscape and Visual Impact Assessment
H3SE	Health, Safety, Security Social and Environment
HAZID	Hazard Identification
HAZOP	Hazard and Operability Study
HBA	Health Baseline Assessment
HBFC	Hydrobromofluorocarbon
HBV	Hepatitis B
HC	Health Centres
HDD	Horizontal Directional Drilling
HDPE	High-density polyethylene
HFC	Hydrofluorocarbon
HGV	Heavy Goods Vehicle
HIA	Health Impact Assessment
HIV	Human Immunodeficiency Virus
HKPPP	Hoima–Kampala Petroleum Products Pipeline
HMIS	Health Management Information System
HP	High Pressure
HPP	Hydropower Project
HQ	Headquarters

ACRONYM	*DESCRIPTION*
HR	Human Resources
HRIA	Human Rights Impact Assessment
HRW	Human Rights Watch
H&S	Health and Safety
H_2S	Hydrogen Sulphide
HSDP	Health Sector Development Plan
HSE	Health, Safety and Environment
HSEC	Health, Safety, Environment and Community
HSSE	Health, Safety, Security and Environment
HSSE-IMS	Health, Safety, Security and Environmental Integrated Management System
HSSP	Health Sector Strategic Plan
HV	High Voltage
HWCP	Hydraulic Works Construction Permit
I&AP	Interested and Affected Parties
IA	Impact Assessment
IAS	Invasive Alien Species
IBA	Important Bird Area
ICAO	International Civil Aviation Organization
ICCPR	International Covenant on Civil and Political Rights
ICD	Inland Container Depot
ICESCR	International Covenant on Economic, Social and Cultural Rights
ICOMOS	International Council on Monuments and Sites
ICSS	Integrated Control and Safety System
ICT	Information Communication Technology
ID	Internal Diameter
IDI	Infectious Disease Institute
IDP	Internally-Displaced Persons

ACRONYM	*DESCRIPTION*
IEC	International Electrotechnical Commission
IFC	International Finance Corporation
IFC PSs	IFC Performance Standards
IFI	International Finance Institutions
ILO	International Labour Organisation
IMO	International Maritime Organisation
IMS	Influx Management Strategy
INDC	Intended Nationally Determined Contribution
INM	Integrated Noise Model
InSAR	Interferometric Synthetic Aperture Radar
IOM	International Organisation for Migration
IOGP	International Association of Oil and Gas Producers
IPCC	Inter-governmental Panel on Climate Change
IPIECA	International Petroleum Industry Environment and Conservation Association
IRS	Indoor Residual Spraying
ISO	International Organisation for Standardisation
ISO	Internal Security Organisation
IT	Information Technology
ITN	Insecticide Treated Nets
IUCN	International Union for Conservation of Nature
IWMA	Integrated Waste Management Area
IWRM	Integrated Water Resources Management
JBR	Jobi Rii Oil Field
JEEMA	Justice Forum (Justice, Education, Economic Revitalisation, Morality and African Unity)
JICA	Japan International Cooperation Agency
JMP	Journey Management Plan
JV	Joint Venture

ACRONYM	*DESCRIPTION*
JVP	Joint Venture Partner
KBA	Key Biodiversity Area
KFDA	Kingfisher Development Area
KGG	Kigogole Oil Field
KII	Key Informant Interview
KIP	Kabaale Industrial Park
KOP	Key Operating Principles
KTCWA	Kaiso Tonya Community Wildlife Area
KW	Kasemene-Wahrindi Oil Field
KWR	Karuma Wildlife Reserve
KWR	Kabwoya Wildlife Reserve
LA	License Area
LABDC	Lake Albert Basin Development Committee
LACWADO	Lake Albert Children and Women's Development
LARF	Land Acquisition and Resettlement Framework
LC	Local Council / Local Community
LC	Least Concern
LCC	Local Council Courts
LCA	Landscape Character Areas
LDV	Light Duty Vehicles
LEA	Lakes Edward and Albert
LEAF	Lakes Edward and Albert Fisheries
LGBTI	Lesbian, Gay, Bisexual, Transgender and Intersex
LLINs	Long Lasting Insecticide Treated Nets
LEAF	Lakes Edward and Albert Fisheries
LGDP	Local Government Development Plans
LMP	Liquid Mud Plant

ACRONYM	*DESCRIPTION*
LP	Low Pressure
LQAS	Lot Quality Assurance Sampling
LRA	Lord's Resistance Army
LRP	Livelihood Restoration Programme
LSA	Late Stone Age
LSSP	Land Sector Strategic Plan
LUCF	Land Use Change and Forestry
LUMP	Land Use Management Plans
LVIA	Landscape and Visual Impact Assessment
MA	Millennium Ecosystem Assessment
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MAB	Man and the Biosphere Programme (UNESCO)
MADFA	Masindi D Farmers Association
MAH	Major Accident Hazard
MARP	Most at Risk Population
MATIP	Markets & Agriculture Trade Improvement Project
MAVA	Market Asset Valuation Assessment
MCH	Maternal and Child Health
MDG	Millennium Development Goal
MDR	Multi-Drug Resistance
MEDEVAC	Medical Evacuation
MEMD	Ministry of Energy and Mineral Development
MFCA	Murchison Falls Conservation Area
MFNP	Murchison Falls National Park
MFPA	Murchison Falls Protected Area
MGLSD/MoGLSD	Ministry of Gender Labour and Social Development
MIS	Malaria Indicator Survey

ACRONYM	DESCRIPTION
MIST	Management Information System
MIT	Mechanical Integrity Test
MLHUD	Ministry of Lands, Housing and Urban Development
MoC	Management of Change
MoD	Ministry of Defence
MoES	Ministry of Education and Sports
MoH	Ministry of Health
MoIA	Ministry of Internal Affair
MoICT&NG	Ministry of Information and Communications Technology and National Guidance
MoLG	Ministry of Local Government
MoU	Memorandum of Understanding
MoWT	Ministry of Works and Transport
MP	Member of Parliament
MPA	Management Plan Area
MPFM	Multi-Phase Flow Meter
MPP	Multi-Phase Pump
MRGI	Minority Rights Group International
MSA	Middle Stone Age
MSDS	Material Safety Data Sheets
MSL	Mineral Services Limited
MST	Marine Storage Terminal
MTBM	Micro Tunnel Boring Machine
MTIC	Ministry of Trade Industry and Cooperatives
MTWA (MTWH)	Ministry of Tourism, Wildlife and Antiquities (formerly known as Ministry of Tourism, Wildlife and Heritage)
MUIENR	Makerere University Institute of Environment and Natural Resources
MWE	Ministry of Water and Environment
N	Nitrogen

ACRONYM	DESCRIPTION
NAADS	National Agricultural Advisory Services
NADFs	Non-Aqueous Drilling Fluids
NaFIRRI	National Fisheries Resources Research Institute
NAPE	National Association of Environmental Practitioners
NBDB	National Biodiversity Databank
NBI	Nile Basin Initiative
NCCP	National Climate Change Policy
NCCP	National and Community Content Programme
NCD	Non Communicable Diseases
NCDC	National Curriculum Development Centre
NCG	Nordic Consulting Group
NCHE	National Council for Higher Education
NCR	Non-Conformance Report
ND	Nominal Diameter
NDP	National Development Plan
NE	Not Evaluated
NEC	No Effect Concentration
NEMA	National Environment Management Authority
NEMP	National Environment Management Policy
NERA	Network of European Research
NFA	National Forestry Authority
NFP	National Fisheries Policy
NGR	Ngiri Oil Field
NGWDB	National Groundwater Database
NHLSP	National Health Laboratory Strategic Plan
NIS	Network Information Services
NITA-U	National Information Technology Authority

ACRONYM	*DESCRIPTION*
NIV	Nile Isolation Valve
NG	Net Gain
NGO	Non-Governmental Organisation
NNL	No Net Loss
NOx	Nitric Oxide
N_2O	Nitrous Oxide
NO_2	Nitrogen Dioxide / Nitrite
NO_3	Nitrate
NOP	Normal Operation
NORM	Naturally Occurring Radioactive Material
NOx	Nitrogen Oxide
NPA	National Planning Authority
Npi	National Pollution Inventory
NPPB	National Physical Planning Board
NRA	National Resistance Army
NRM	National Resistance Movement
NRMM	Non-Road Mobile Machinery
NSBF	Nile Basin Sustainability Framework
NSO	Nsoga Oil Field
NSPP	National Social Protection Policy
NSR	Noise Sensitive Receptor
NT	Near Threatened
NTD	Neglected Tropical Diseases
NTS	Non-Technical Summary
NTU	Nephelometric Turbidity Unit
NUDEIL	Northern Uganda Development of Enhanced Local Governance, Infrastructure and Livelihoods Programme
NUSAF	Northern Uganda Social Action Fund Project

ACRONYM	*DESCRIPTION*
NWSC	National Water and Sewerage Corporation
O_3	Ozone
OAU	Organisation of African Unity
OECD	Organisation for Economic Cooperation and Development
OC	Operations Camp
OCNS	Oil Chemical National Scheme
O&G	Oil and Gas
OGP	Association of Oil and Gas Producers
OHS/OH&S	Occupational Health and Safety
OHSAS	Occupational Health and Safety Management System
OIW	Oil in Water
OPM	Office for Prime Minister
ORP	Oxidation Reduction Potential
ORS	Oral Rehydration Solution
OSB	Operation Support Base
OSCP	Oil Spill Contingency Plan
OSH	Occupational Safety and Health
OSPAR	Oslo Paris Commission
OSRL	Oil Spill Response Ltd
OTP	Operational Test Plan
PA	Protected Area
PAC	Project Affected Communities
PAH	Polynuclear Aromatic Hydrocarbon
PAPs	Project Affected Persons
PAU	Petroleum Authority of Uganda
PB	Project Brief
PC	Process Contribution

ACRONYM	DESCRIPTION
PCP	Progressive Cavity Pump
PDA	Personal Digital Assistant
PDP	Physical Development Plan
PDU	Polymer Dissolution Unit
PEC	Predicted Environmental Concentration / Predicted Exposure Concentration
PEPD	Petroleum Exploration and Production Department
PES	Payments for Ecosystem Services
PFA	Permanent Facilities Area
PFC	Perfluorocarbon
PFP	Private/ for Profit
PHL	Public Health Laboratory
PIG	Pipeline Inspection Gauges
PL	Pig Launcher
PLONOR	Pose Little or No Risk to the Environment
PMA	Plan for Modernisation of Agriculture
PMFM	Production Multi -Phase Flow Meter
PMG	Production and Marketing Grant
PMTCT	Prevention of Mother to Child Transmission
PNFP	Private Not for Profit
PO_4	Ortho-Phosphate
POPs	Persistent Organic Pollutants
PPP	Public Private Partnership
PR	Pig Receiver
PS	Performance Standards
PSt	Pumping Station
PSA	Production Sharing Agreement
PSR	Poverty Status Report

ACRONYM	*DESCRIPTION*
QA	Quality Assurance
QC	Quality Control
RAC	Resettlement Advisory Committee
RAP	Resettlement Action Plan
RCIM	Regional Cumulative Impacts Management
RDC	Resident District Commissioner
RDT	Rapid diagnostic test
REA	Rural Electrification Agency
REDD+	Reducing Emissions from Deforestation and forest Degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries.
RFSU	Ready for Start-Up
RMNCAH	Reproductive, Maternal, Neonatal and Child Health Improvement
Ro-Ro	Roll-on/roll-off
RoW	Right of Way
RPC	Resettlement Planning Committee
RRH	Regional Referral Hospital
RSL	Regional Screening Level
RTA	Road Traffic Accident
RTI	Right to Information
RvA	Raad voor Accreditatie (Dutch Accreditation Council)
RWH	Rainwater Harvesting
S	Sulfur
SACCOs	Savings and Credit Cooperative Societies
SARI	Severe Acute Respiratory Tract Infection
SBM	Synthetic Based Mud
SBS	Social Baseline Survey
SD	Systematic Demarcation

ACRONYM	*DESCRIPTION*
SDA	Seventh Day Adventists
SDG	Sustainable Development Goal
SDI	Silt Density Index
SDV	Shut Down Valve
SE	Standard Error
SE1	Social and Economic Indicator 1
SE4ALL	Uganda Sustainable Energy for All
SEA	Strategic Environmental Assessment
SEDC	Socio-Economic Data Centre
SEP	Stakeholder Engagement Plan
SF_6	Sulphur Hexafluoride
SGR	Standard Gauge Railway
SGV	Soil Guideline Value
SHBS	Social and Health Baseline Survey
SHRP	School Health and Reading Program
SIMPLE	Safety, In-country, Modularisation and Construction, Price, Logistics and Environmental
SiO_2	Silicon Dioxide
SLAAC	Systematic Land Adjudication and Certification
SMART	Spatial Monitoring and Recording Tool
SMEs	Small and Medium Sized Enterprises
SNC	Second National Communication
SO_2	Sulphur Dioxide
SO_3	Sulphur Trioxide
SOP	Standard Operating Procedure
SO_X	Sulphur Oxide
SP&EW	Site Preparation and Enabling Works
SRP	Spill Response Plan

ACRONYM	*DESCRIPTION*
SRTM	Shuttle Radar Topography Mission
STD	Sexually Transmitted Disease
STI	Sexually Transmitted Infection
SuDS	Sustainable Drainage System
SWAP	Surface Water Abstraction Permit
SWS	Schlumberger Water Services
TAP	Trigger Action Plan
TASO	The AIDS Support Organisation
TB	Tuberculosis
TC	Town Council
TCC	Thermomechanical Cuttings Cleaner
TCMP	Traditional and Complimentary Medical Practitioners
TDA	Tourism Development Areas
TDS	Total Dissolved Solids
TDU	Thermal Desorption Unit
TEA	Transboundary Environmental Assessment
TEC	Threshold Effect Concentration
TEP Uganda	Total Exploration & Production (E&P) Uganda B.V
TFA	Temporary Facilities Area
THF	Tropical High Forest
TLP	Tuberculosis and Leprosy Program
TMP	Traffic Management Plan
TOC	Total Organic Carbon
TOM	Total Organic Matter
ToR	Terms of Reference
TPH	Total Petroleum Hydrocarbons
TSP	Total Suspended Particulate

ACRONYM	*DESCRIPTION*
TSS	Total Suspended Sediment
TUOP	Tullow Uganda Operations Pty Ltd
TVET	Uganda Technical, Vocational Education and Training
UBOS	Uganda Bureau of Statistics
UCAA	Uganda Civil Aviation Authority
UCC	Uganda Communications Commission
UCI	Uganda Cancer Institute
UDHR	Universal Declaration of Human Rights
UEB	Uganda Electricity Board
UECCC	Uganda Energy Credit Capitalisation Company
UEDCL	Uganda Electricity Distribution Company Limited
UEGCL	Uganda Electricity Generation Company Limited
UETCL	Uganda Electricity Transmission Company Limited
UFL	Uganda Fisheries Laboratory Service
UFNP	Uganda Food and Nutrition Policy
UGX	Ugandan Shilling
UHA	Uganda Hotels Association
UHDR	Universal Declaration of Human Rights
UHF	Ultra-High Frequency
UHRC	Ugandan Human Rights Commission
UK	United Kingdom
ULA	Uganda Land Alliance
ULC	Uganda Land Commission
ULFS	Urban Labour Force Survey
UN	United Nations
UNATCOM	Uganda National Commission for UNESCO
UNAP	Uganda Nutrition Action Plan

ACRONYM	*DESCRIPTION*
UNBS	Uganda National Bureau of Standards
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNDRIP	United Nations Declaration on the Rights of Indigenous Peoples
UNEB	Uganda National Examination Board
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
UNGP	United Nations Guiding Principles
UNHCR	United Nations High Commission for Refugees
UNHS	Uganda National Household Survey
UNICEF	United Nations Children's Fund
UNJPGE	United Nations Joint Programme on Gender Equality
UNLA	Uganda National Liberation Army
UNMHCP	Uganda National Minimum Health Care Package
UNOC	Uganda National Oil Company
UNRA	Uganda National Roads Authority
UPC	United People's Congress
UPDF	Uganda Peoples Defence Forces
UPE	Universal Primary Education
UPF	Ugandan Police Force
UPIK	Uganda Petroleum Institute, Kigumba
UPWS	Uganda Potable Water Standard
URC	Uganda Railways Corporation
URTI	Upper Respiratory Tract Infection
USAID	United States Agency for International Development
USD	United States Dollars

ACRONYM	*DESCRIPTION*
USE	Universal Secondary Education
USEPA	United States Environmental Protection Agency
USF	Uganda Sanitation Fund
USGS	United States Geological Survey
USMID	Uganda Support to Municipal Infrastructure Development
UTA	Uganda Tourism Association
UTB	Uganda Tourism Board
UWA	Uganda Wildlife Authority
UWASNET	Uganda Water and Sanitation NGO Network
UWS	Uganda Wildlife Society
VECs	Valued Environmental and Social Components
VES	Visual Encounter Survey
VHT	Village Health Teams
VIP	Ventilated Improved Pit Latrine
VOC	Volatile Organic Compounds
VPSHR	Voluntary Principles for Security and Human Rights
VRU	Vapour Recovery Unit
VSLA	Village Savings and Loans Association
VU	Vulnerable
WAC	World Archaeological Congress
WAS	Water Abstraction System
WAP	Water Abstraction Point
WASH	Water, Sanitation and Hygiene
WAT	Wax Appearance Temperature
WBDFs	Water Based Drilling Fluids
WBM	Water Based Mud
WC	Water Closet

ACRONYM	*DESCRIPTION*
WCERP	Well Control Emergency Response Plan
WCPAP	Wildlife Crime Prevention Action Plan
WCS	Wildlife Conservation Society
WDP	Wastewater Discharge Permit
WEEE	Waste Electrical and Electronic Equipment
WHO	World Health Organisation
WHR	Waste Heat Recovery
WMD	Wetlands Management Department
WMZ	Water Management Zone
WR	Wildlife Reserve
WRI	World Resources Institute
WRAP	Western Regional Air Partnership
WTN	Waste Transfer Notes
WUC	Water User Committees
WWC	Wild Well Control
WWF	World Wildlife Fund
WWS	Wire Wrapped Screen
WWT	Wastewater Treatment
WWTP	Wastewater Treatment Plant
ZTV	Zone of Theoretical Visibility

UNIT OF MEASUREMENT	*DESCRIPTION*
‘’	Inch
°C	Degrees Celsius
µg/m^3	Micrograms per cubic metre
µm	Micrometre
µS/cm	MicroSiemens per centimetre

UNIT OF MEASUREMENT	*DESCRIPTION*
AD	Anno Domini
AGL	Above Ground Level
aMSL	Above Mean Sea Level
AOD	Above Ordnance Datum
ASL	Above Sea Level
barg	Bar Gauge
bbl	barrels of oil
BC	Before Christ
bgs	Below ground surface
BP	Before Present
cP	Centipoise
CPUE	Catch per Unit Effort
dBA / dB(A)	Decibel A-Weighted
dm	Dried Mass
Ft	Foot / Feet
g/dL	Grams per decilitre
g/kg	Grams per kilogram
ha	Hectares
Hz	Hertz
kbbl/d	Thousand Barrels per Day
kbopd	Thousand Barrels of Oil per Day
kg	Kilogram
km	Kilometre
km^2	Square Kilometre
KN	Kilonewton
kt	Kilo tons / kilo tonnes
kV	Kilovolt

UNIT OF MEASUREMENT	*DESCRIPTION*
kVA	Kilovolt-Ampere
KW	Kilowatt
L_{Aeq}	A-weighted, equivalent sound level - with the same Energy content as the varying acoustic signal measured
L_{AF10}	The noise level is exceeded for 10% of the measurement period, fast, A-weighted
L_{AF90}	The noise level is exceeded for 90% of the measurement period, fast, A-weighted
L_{AF95}	The noise level is exceeded for 95% of the measurement period, fast, A-weighted
L_{Amax}	A-weighted, maximum sound level
L_{eq}	Equivalent Sound Level
m	Metre
m^2	Square metre
m^3	Cubic metre
m^3/s	Cubic metres per second
Ma	Million Years Ago
Mb	Body-Wave Magnitude
MBOPD	Thousand Barrels of Oil per Day
mg/kg	Milligrams per kilogram
mg/l	Milligrams per litre
mg/m^3	Milligrams per cubic metre
mm	Millimetre
MMboe	Million Barrels of Oil Equivalent
mm/s	Millimetres per second
MMscf/d	Million Standard Cubic Feet per Day
m/s	Metres per second
Mstb	Thousand Stock Tank Barrels
MT	Metric Ton
$MtCO_2e$	Metric Tons of Carbon Dioxide Equivalent

UNIT OF MEASUREMENT	*DESCRIPTION*
Mw	Moment Magnitude
MW	Megawatt
MWL	Mean Water Level
MWth	Megawatts thermal
PGA	Peak Ground Acceleration
$PM_{2.5}$	Fine particulate matter (<2.5 micrometers diameter)
PM_{10}	Coarse particulate matter (<10 micrometers diameter)
ppm	Parts Per Million
PPV	Peak Particle Velocity
sg	Specific Gravity
sm^3/day	Standard Metres Cubed per Day
sm^3/h	Standard Metres Cubed per Hour
STOIIP	Stock Tank Oil-Initially-In-Place
t	Tonnes / Tons
tCO_2e	Tonnes Carbon Dioxide Equivalent
TCU	True Colour Unit
TKN	Total Kjeldahl Nitrogen
tpa	Tonnes per annum
TWh	Terawatt Hours
Yr	Year

Glossary of Terms

TERMINOLOGY	*DESCRIPTION*
Acceptance or Approval	The instruments of "acceptance" or "approval" of a treaty have the same legal effect as ratification and consequently express the consent of a state to be bound by a treaty.
Accession	"Accession" is the act whereby a state accepts the offer or the opportunity to become a party to a treaty already negotiated and signed by other states. It has the same legal effect as ratification. Accession usually occurs after the treaty has entered into force.
Active Air Sampling	Active sampling involves the use of an air sampling pump to actively pull air through a collection device such as a filter.
Active Stakeholder Consultation	Active stakeholder consultation/engagement includes meetings, public hearings and structured comment periods to support report disclosure where feedback about the Project is actively solicited.
Activity	Any action needed for the design, construction and completion of a project.
Additional Mitigation Measures	Mitigation measures which are identified when the outcome of the ESIA indicates that design controls/embedded mitigation measures are insufficient to manage an impact to an acceptable level.
ADMS 5 Model	An advanced dispersion model used to model the air quality impact of existing and proposed industrial installations, developed by the UK based Cambridge Environmental Research Consultancy.
Adverse (Impact)	A negative impact upon a receptor as a result of the Project. It includes short and long term negative and reversible impacts. The scale of the impact is further defined using the ESIA matrix as presented in chapter 3.
AERMOD Model	An integrated atmospheric dispersion modelling system developed by the American Meteorological Society (AMS)/United States Environmental Protection Agency (EPA) Regulatory Model Improvement Committee (AERMIC), and the preferred regulatory model of the EPA.
Airshed	Part of the atmosphere that behaves in a coherent way with respect to the dispersion of emissions.
Albertine Graben (Albertine Rift)	A sedimentary basin forming the western branch of the East African Rift, covering parts of Uganda, the Democratic Republic of the Congo, Rwanda, Burundi and Tanzania. It extends from the northern end of Lake Albert to the southern end of Lake Tanganyika. The geographical term includes the valley and the surrounding mountains.
Alien species	A species occurring in an area outside of its historically known natural range as a result of intentional or accidental dispersal by human activities.
Alluvial	Soils carried by water and deposited according to size and specific gravity as the flow rate decreases.
Alternatives Analysis	Examination of technically and financially feasible alternatives to the source of identified impacts, and documentation of the rationale for selecting the particular course of action proposed.

TERMINOLOGY	*DESCRIPTION*
Ambient Air Quality Limits	Ambient air quality limits are concentrations or air quality indicators recorded over a given time period, which are considered to be acceptable in terms of what is scientifically known about their effects on health and on the environment. They can be used as a benchmark to indicate whether air quality is being degraded.
Ambient Levels	Sharing the same physical and/or chemical properties as the immediate surroundings.
Anadromous	Fish that migrate up rivers from the sea to breed in fresh water.
Anaerobic	Relating to the absence of free oxygen.
Annulus	The area between a pair of concentric circles. For the purposes of this document, annulus refers to the space between the drill pipe and well bore.
Anoxic	Absence of oxygen.
Anthropogenic	Relating to, or resulting from, the influence of human activity on the environment.
Archaeology	The scientific study of the physical evidence of past human societies recovered through collection, artefact analysis, and excavation. Archaeologists not only attempt to discover and describe past cultures but also to formulate explanations for the development of cultures. Conclusions drawn from study and analyses provide answers and predictions about human behaviour that add, complement, and sometimes correct the written accounts of history and prehistory.
Archaeological Site	Location with physical evidence for where people once lived, hunted, farmed, camped, held ceremonies or were buried.
Arenic Soils	Soils in which at least the upper 0.5 m of the profile is non-gravelly and of sandy texture throughout. It is also loosely or weakly coherent and may have aeolian (wind-blown) cross-bedding.
Artefact	An object or part of an object that has been used or created by a human and provides physical clues to the activity carried out by humans in the area of discovery. These include worked stone tools and tool-making waste, bone, pottery and metalwork.
Associated and Supporting Facilities	Facilities that are not funded as part of the Project and that would not have been constructed or expanded if the Project did not exist and without which the Project would not be viable. For the Tilenga Project, these are the Tilenga Feeder Pipeline, EACOP, waste management storage and treatment facilities for the Project; and critical oil roads.
Associated Gas	The natural gas by-product of extracting oil, used to generate power.
Avoidance Survey	A survey conducted over a wide area in order to allow identification of sensitive features and inform the FEED process in order to locate facilities to avoid these areas to the extent possible.
A-Weighting	The most common weighting used in noise measurement which effectively cuts off the lower and higher frequencies that the average person cannot hear.
Backfill	Material used to refill an excavated area.

TERMINOLOGY	*DESCRIPTION*
Balaalo	Nomadic pastoralists who are hired by livestock owners to graze and care for their livestock on open access pasture.
Base Case Design	The base case design is the default Project design, and is reached following the consideration of alternative designs in relation to technical, environmental and socio-economic factors.
Baseflow	Contribution of groundwater flow to surface water flow.
Baseline Condition	Term used to describe existing condition of the physical, biological, socio-economic, and cultural heritage environmental aspects. The ESIA process assesses likely impacts on baseline conditions.
Bathymetric	Related to the measurement of depth of water in oceans, seas, or lakes.
Benthic	The ecological region at the lowest level of a body of water such as an ocean or a lake, including the sediment surface and some sub-surface layers.
Benthopelagic	Living and feeding near the bottom as well as in midwaters or near the surface. Feeding on benthic as well as free swimming organisms.
Bentonite	A natural, inert, non-toxic clay used as a filler, sealing or suspending agent.
Big 5	The five animals which provide the greatest draw to the Murchison Falls National Park – buffalo, elephant, leopard, lion and rhino.
Biodiversity	A term used to describe aspects of biological diversity, especially including species richness, ecosystem complexity and genetic variation.
Biomass	The total mass of living matter present in an ecosystem or at a particular trophic level in a food chain and usually expressed as dry weight or more accurately, as the carbon, nitrogen, or calorific content per unit area.
Biovolume	The volume of cells in a unit amount of water (a surrogate for biomass in the aquatic environment).
Black Start	Where the power generation facility needs to be restarted using diesel fuel (e.g. after a system shut-down or failure) rather than using associated gas on which it normally operates.
Blow out	Uncontrolled release of crude oil and/or natural gas from an oil well after pressure control systems have failed.
Borehole Yield	The volume of water that can be abstracted from a borehole.
Borrow Pit	An area where material (e.g. murram) has been dug for use at another location.
Building Massing	The general shape or shapes of a building.
Bunding	A constructed retaining wall around areas where potentially polluting substances are handled, processed or stored, for the purposes of containing any unintended escape of material from that area until such time as remedial action can be taken.
Bullheading	Forcibly pumping fluids into a well (to remove the gas and replace it with liquid) in order to reduce wellhead pressure to mitigate the potential for a blowout.

TERMINOLOGY	*DESCRIPTION*
Bushmeat	Meat from non-domesticated animals.
Catchment Area	The area from which rainfall flows into a river, lake, or reservoir.
Cenozoic	The most recent era of geologic time comprising the Tertiary and Quaternary Period, from about 65 million years ago to the present.
Central Processing Facility	Proposed facility within the Industrial Area which will include a number of key facilities to enable the processing of approximately 190 thousand barrels of oil per day. The key facilities include a water treatment facility, a power generation system, oil treatment, flare system and oil storage tanks.
Chance Find	An archaeological site or object that was unknown prior to discovery during construction (despite best efforts to identify all sites prior to construction through cultural heritage surveys).
Chance Find Procedure	Chance find procedure is a project-specific procedure that outlines what will happen if previously unknown physical resources are encountered during project construction or operation. The procedure includes record keeping and expert verification procedures, chain of custody instructions for movable finds, and clear criteria for potential temporary work stoppages that could be required for rapid disposition of issues related to the finds.
Clan Cultural Sites	Cultural sites belonging to a clan. Clan cultural sites are usually marked by large trees where the prayers and sacrifice rituals are conducted.
Coliform	Belonging to a group of rod-shaped bacteria typified by *E. coli*.
Colonial Period	Period in a country's history when it was subject to administration by a colonial power.
Commissioning and Operation Phase	Phase commencing subsequent to construction and pre-commissioning (currently estimated to be 2020). The Project will have an operational design life of 25 years.
Communication Register	A register aimed at tracking all communication activities within the project.
Construction and Pre-Commissioning Phase	Development of main facilities and infrastructure, including drilling and testing of oil wells and installation and testing of pipelines. Anticipated to take up to seven years, between 2018 and 2025.
Construction Permit	The authorisation by a competent environmental authority for commencement in or adjacent to natural waters (rivers or lakes).
Consultation	The process of formally consulting or discussing a subject. For the purposes of this document, consultation involves two-way communication between the project developers and affected or interested stakeholders.
Contaminated Water	Water contaminated by pollutants from on- or off-site activities; e.g. concrete-laden water and runoff from plant / personnel wash areas. Contaminated water must be treated to ensure that water released into the receiving environment meets minimum standards and guidelines.
Contamination	The introduction by man, directly or indirectly, of substances to the environment. Contaminants are biological, chemical, physical or radiological substance.

TERMINOLOGY	*DESCRIPTION*
Cretaceous Period	A period of the Mesozoic Era, from approximately 140 million to 65 million years ago.
Critical Cultural Heritage	Critical cultural heritage consists of one or both of the following types of cultural heritage: (i) the internationally recognised heritage of communities who use, or have used within living memory the cultural heritage for long-standing cultural purposes; or (ii) legally protected cultural heritage areas, including those proposed by host governments for such designation (IFC PS8).
Critical Habitat	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 (IFC PS6).
Critical Habitat Assessment	An IFC PS6 process that identifies significant biodiversity risks associated with a project. Critical Habitat Assessment (CHA) considers the conservation principles of threat (vulnerability) and geographic rarity (irreplaceability) for particular qualifying features. CHA is carried out at the landscape scale, using ecologically and/or administratively coherent Discrete Management Units, which are a means of determining the presence or absence of Critical Habitat-qualifying features. Under PS6 Criteria 1 to 3 these relate to the presence of populations of Critical Habitat Qualifying Species (CHQS)
Critical Habitat Qualifying Species	These are species present within the landscapes comprising the Project's Area of Influence and represent qualifying features that meet one or more of Criteria 1 to 3 of the IFC PS6. CHQS are defined on the basis of their international and/or national status. The presence of CHQS therefore defines the landscapes and habitats where they are found as Critical Habitat.
Cultural Heritage	The heritage that includes artefacts, monuments, groups of buildings and sites that have a diversity of values including symbolic, historic, artistic, aesthetic, ethnological or anthropological, religious, scientific and social significance (UNESCO 1972).
Cumulative Impact Assessment	An assessment of the cumulative effects of the Project together with other developments that will also have effects within the Project's Area of Influence.
Cumulative Impacts	Those that result from the incremental impact, on areas or resources used or directly affected by the Project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted (IFC PS1).
Cuttings	Fragments of rock and other material displaced during the drilling or boring process.
Cuttings Reinjection	The injection of cuttings and other drilling waste into sub-surface formations.
Data Gap Analysis	Review of available information sources to identify any areas for which further data collection would be advantageous to characterise baseline conditions.
Daub	Anthill soil which is smeared onto a structure (homestead) as a finish to the surface or as decoration.
Debitage	In archaeology, a term for tool-making waste.

TERMINOLOGY	DESCRIPTION
Decommissioning Phase	Permanent shut-down of equipment, plant, etc., planned for the end of the 25 year operation, currently estimated to be 2046.
Deltaic	Of or relating to a river delta.
Demersal	Demersal fish live and feed on or near the seabed.
Demography	The statistical study of the characteristics of human populations.
Dendritic	The most common form of drainage pattern. In a dendritic system, there are many contributing streams (analogous to the twigs of a tree), which are then joined together into the tributaries of the main rivers (the branches and the trunk of the tree, respectively).
Design Controls	See 'Embedded Mitigation Measures'.'
Diatomite	Diatomite(or 'diatomaceous earth') is a sedimentary deposit composed of the fossilised skeletons or remains of diatoms (microscopic algae).
Diffusion Tube Monitoring	A type of air quality monitoring equipment that passively absorbs air quality indicators over a given time (i.e., does not pump air over the sample medium). It provides an average concentration for the period of measurement.
Direct Impacts	Impacts that result from a direct interaction between a planned project activity and the receiving environment.
Directorate of Environmental Affairs	The authority responsible for the review and/or approval of an Environmental Management Plan.
Directorate of Petroleum	An entity within Uganda's Ministry of Energy and Mineral Development, responsible for policy making; coordinating the development of the sector; and undertaking licensing and national capacity building among other roles.
Directorate of Water Resource Management	The authority responsible for water management.
Disclosure	Release of information into the public domain. For the purposes of this document, disclosure refers to the release of the project and ESIA information to affected and interested stakeholders.
District Land Board	The function of the District Land Board is to hold and allocate land in the district, which is not owned by any person or authority; to facilitate the registration and transfer of interests in land; and to deal with any other matters connected with land in the district in accordance with laws made by Parliament.
District Technical Planning Committee	The authority mandated to plan for and deliver services to the local communities in their jurisdiction.
Drawdown (Aquifer)	The response in groundwater levels within an aquifer to pumping of groundwater.
Drilling Fluid/Mud	A mixture of clays, water and chemicals pumped down the drill string while a well is being drilled to lubricate the mechanism, cool the drill bit and flush out the cuttings.

TERMINOLOGY	*DESCRIPTION*
Dust	'Dust' is generally regarded as particulate matter less than 75 µm.
East African Rift	An active continental rift zone in East Africa. The rift is a narrow zone that is a developing divergent tectonic plate boundary, where the African Plate is in the process of splitting into two tectonic plates (Somali Plate and Nubian Plate).
Economic Displacement	Loss of assets or access to assets that leads to loss of income sources or other means of livelihood.
Economic Violence	Term used locally to describe a situation where a husband or parent withholds available money or resources for their own uses and fails to provide food or pay school fees for their family.
Ecosystem	A biological community of interacting organisms and their physical environment.
Ecosystem Services	The benefits that people, including businesses, obtain from ecosystems (IFC, 2012). There are three broad categories: • *Provisioning* services: The products obtained from ecosystems such as: crops, livestock, fish, shellfish, and game, wild foods and plants; water for drinking, irrigation, and industrial purposes; and biopharmaceuticals, construction materials and biomass for renewable energy. • *Regulating services* – The benefits obtained from the regulation of ecosystem processes including: local climate regulation and carbon storage and sequestration; natural hazard mitigation; purification of water and air; control of pests and disease; and pollination. • *Cultural services* – The cultural, educational, and spiritual benefits obtained from ecosystems including: cultural, spiritual, or religious inspiration from cultural heritage and/or spiritual or sacred sites; opportunities for recreation such as sport, hunting, fishing, ecotourism; and opportunities for scientific exploration, knowledge-building and education.
Elder	A leader or senior figure in a tribe or other group.
Electrofishing	Electrofishing (electric fishing) is a common scientific survey method used to sample fish populations to determine abundance, density, and species composition. When performed correctly, electrofishing results in no permanent harm to fish, which return to their natural state in as little as two minutes after being caught.
Embedded Mitigation Measures	Measures to avoid or minimise impacts which have been identified and incorporated within the pre-project design and Front End Engineering and Design (FEED) phases. Embedded mitigation measures (also known as design controls) include physical design features and management measures that are based on Good International Industry Practice (GIIP).
Emergency Flare	Burning of excess gas as a safety mechanism to minimise the risk of explosion or fire.
Emissions	The term used to describe the gases and particles which are put into the air or emitted by various sources.
Endemic Species	Endemic species are plants and animals that are native or restricted to a certain place.

TERMINOLOGY	DESCRIPTION
Environment	The surroundings in which humans exist and which comprise: • the land, water and atmosphere of the earth; • micro-organisms, plant and animal life; • any part or combination and interrelationships; and • the physical, chemical, aesthetic, historical, cultural and economic properties and conditions of the foregoing that can influence human health and wellbeing.
Environmental / Social Aspect	An element of an organisation or project's activities, products or services that can interact with the environment or a social receptor that affects or can affect the environment.
Environmental Audit	Systematic, documented, regular and objective evaluation of the performance of an organisation or facility in terms the implementation of the Environmental Management Programme and compliance with statutory requirements and the organisation's Environmental Policy.
Environmental Control Officer	An independent person who is responsible for undertaking site inspections to audit and report on compliance with all phases of environmental specifications with the Environmental Management Programme.
Environmental / Social Impact	Any change to the baseline (pre-project) environment or social status, whether adverse or beneficial, wholly or partially resulting from an organisation's activities, products or services.
Environmental Impact Assessment / Environmental and Social Impact Assessment	Systematic review of the environmental and/or socio-economic changes a proposed project may have on its surrounding environment.
Environmental Management Inspector	A person designated as an environmental management inspector.
Environmental and Social Management Plan	A tool used to identify the environmental and social management and mitigation actions required to implement the project in accordance with the requirements of the International Finance Corporation's (IFC) Performance Standards and applicable national legislation.
Environmental and Social Management System	A system established to plan, manage, document and monitor an organisation's activities and processes and resultant environmental and social impacts in accordance with requirements of ISO 14001:2004 and IFC Performance Standard 1.
Environmental Objectives	The overall environmental goal arising from the Environmental Policy that an organisation sets itself to achieve, and is quantified where practicable.
Environmental Receptor	An entity that receives a contaminant or pollutant and which can be subject to an environmental impact. It can be a body of water, air, parcel of land, community, ecosystem or individual organism, human being or property.
Ephemeral Watercourse	A wetland, spring, stream, river, pond or lake that only exists for a short period following precipitation.

TERMINOLOGY	DESCRIPTION
Equator Principles	The Equator Principles (EPs) are a credit risk management framework for determining, assessing and managing environmental and social risk in project finance transactions. The EPs are designed to help financial institutions overcome the challenges of incorporating risks associated with biodiversity and ecosystem services into their lending decision[1].
Etymological	Relating to the origin and historical development of words and their meanings.
Eutrophic	Lake or other body of water rich in nutrients and so supporting a dense plant population, the decomposition of which kills animal life by depriving it of oxygen.
Evaporites	Natural salt or mineral deposits left after the evaporation of a body of water.
External Water Resources	The part of the country's renewable water resources which is not generated in the country which includes inflows from upstream countries (groundwater and surface water), and part of the water of border lakes or rivers.
Family Cultural Sites	A family shrine of a household, believed to offer protection to a home. Shrines may be in the form of a small hut with a grassed roof, a table, or stones, and are sometimes associated with branches, poles or sacred trees.
Fast and Impulse Time Weighed (Sound)	Time weightings are a common specification provided on most sound level meters. Fast time weighting is typically the selected weighting for most noise measurements and corresponds to approximately 125 milliseconds. Impulse time weighting equates to approximately 4 times faster than the Fast weighting and is most commonly used to measure short bursts of sounds.
Fauna	All living biological creatures, usually capable of motion, including insects and predominantly of protein-based consistency.
Feasibility Study	An analysis and evaluation of a proposed project to determine if it is technically and financially feasible.
Ferralitic Soils	Soils which form in humid locales as a result of chemical weathering and decomposition of organic materials. They typically have low silica content and a high content of aluminium and iron.
Fire danger index	A relative number denoting an evaluation of rate of spread or suppression difficulty for specific combinations of fuel, fuel moisture and wind speed.
Fire hazard	The relative combination of fuel, oxygen and heat that will lead to the start and spread of a potential fire.
Flagship Species	A species used as the focus of a broader conservation marketing campaign based on its possession of one or more traits that appeal to the target audience e.g. Rothschild's giraffe. It is also considered to be a species that is selected to act as an ambassador, icon or symbol for a defined habitat,
Flaring	The controlled burning of natural gas that cannot be processed for sale or use because of technical or economic reasons.
Flood line	The line or mark to which a flood could rise every 50 (1:50 year flood line) or 100 (1:100 year flood line) years.

1 Definition as per the EP website available from www.equator-principles.com

TERMINOLOGY	DESCRIPTION
Flora	All living plants, grasses, shrubs, trees etc., that are typically incapable of easy natural motion and capable of photosynthesis.
Flowline	A pipe or series of pipelines within a network that allows for the transfers of fluids within an oilfield; typically oil or gas from a well pad to a processing facility.
Fluvial Deposits	Soils formed by rivers and streams.
Footprint	The spatial impact/ impression on the land from a project; may include areas that are not constructed upon such as buffer areas around project infrastructure.
Frack Out	The unintentional return of drilling fluids to the surface during HDD. Generally, the tunnelling machine requires the use of slurry made with bentonite to reduce friction and also to plug and seal the shaft. A frack out is when the slurry finds the path of least resistance and escapes through the soil or stream bed.
Front-End Engineering Design	Engineering that is conducted after completion of Feasibility Study.
Fugitive Emissions	Non-combustion related emissions, such as gas leaks from pressurised equipment.
Geomorphology	Refers to the study of the evolution and configuration of landforms and the processes which shape them.
Global Restricted Zone	See 'Industrial Area'
Global Warming	Global warming is an average increase in the temperature of the atmosphere near the Earth's surface and in the troposphere, which can contribute to changes in global climate patterns.
Good International Industry Practice	Good International Industry Practice (GIIP) is the exercise of professional skill, diligence, prudence and foresight that would reasonably be expected from skilled and experienced professionals engaged in the same type of undertaking under the same or similar circumstances globally[2].]
Graben	A depressed block of the Earth's crust bordered by parallel faults.
Greenhouse Gases	Atmospheric gases considered to be contributing to the greenhouse effect by absorbing and emitting radiation, They include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (NO_2), and water vapour.
Grievance	Formal complaint by individuals, groups or organisations who feel they have been adversely affected by project-related activities.
Grievance Mechanism	Process of recording and addressing grievances so that they can be tracked through to a resolution.
Groundwater	Water that fills the natural openings in below-surface rock or unconsolidated sands.

2 Definition as per the IFC Policy & Performance Standards and Guidance Notes. Glossary of Terms. Available from www.IFC.org

TERMINOLOGY	DESCRIPTION
Habitat	A terrestrial, freshwater, or marine geographical unit or airway that supports assemblages of living organisms and their interactions with the non-living environment (IFC, PS6).
Harmful Substances	Harmful substances are natural or man-made substances that adversely affect the functioning capability of organisms.
Hazard	The potential to cause harm, including ill health or injury; damage to property, plant, products or the environment; production losses or increased liabilities.
Hazardous substance	Natural or man-made chemicals that adversely affect human health or ecological functions.
Hazardous waste	Waste that, because of its chemical reactivity, toxic, explosive, corrosive, radioactive or other characteristics, causes danger or is likely to cause danger to health or the environment.
Heritage Resources	Any place or object of cultural, archaeological or palaeontological significance in terms of the Historical Monuments Act, Cap 46.
Herptiles	Term used to encompass both reptiles and amphibians.
Horizontal Directional Drilling	A trenchless technology that involves drilling into the earth to create a horizontal bore under the surface along a planned pathway through which pipes and conduits may pass.
Household	A group of people who normally live and eat together.
Hydraulic Conductivity	A coefficient that relates the discharge through an aquifer to the hydraulic head gradient.
Hydrocarbon	Organic chemical compounds of hydrogen and carbon atoms that form the basis of all petroleum products. They may exist as gases, liquids or solids, examples being methane, hexane and paraffin.
Hydromorphological	Physical characteristics of the shape, boundaries and content of a water body.
Hydrotesting	Hydrostatic testing is a type of pressure test that works by completely filling the component (e.g. pipeline) with water, removing the air contained within the unit, and pressurizing the system. The pressure is then held for a specific amount of time to visually inspect the system for leaks or deficiencies.
Illiteracy	The lack of ability to read and write with understanding in any language.
Impacts	Changes to the existing environment, whether adverse or beneficial, wholly or partially arising from the Project.
Impact Magnitude	Measure of the degree of change from the baseline conditions.
Impact Significance	Measure of how important or consequential an impact is, based on its magnitude, and the sensitivity of the affected receptors.
In-Built Design Controls	Measures to avoid or minimise impacts, identified and incorporated into the design as part of the Project design process. These include physical design features and management measures, and are based on Good International Industry Practice (GIIP).

TERMINOLOGY	DESCRIPTION
In-Combination Assessment	The in-combination assessment considers whether the residual impact of the Project would be exacerbated due to the potential impacts of supporting or associated facilities.
In-Combination Effects	The joint impacts of both the Project and the supporting infrastructure and associated facilities.
Indirect Impacts	Impacts that follow on from the primary interactions between the Project and its environment because of subsequent interactions in the environment (e.g. loss of part of a habitat could affect the population of a species over a wider area).
Induced Impacts	Impacts that result from other knock on activities that may happen as a consequence of the Project (e.g. they tend to be social in nature, such as in-migration, new businesses set up to cater for increased traffic on roads.
Induction training	The training provided to new / existing employees to (re)acquaint them with the company structure, their specific job requirements, practical or organisational issues and occupational health, safety and environmental considerations required on the project.
Industrial Area	Area located south of the Victoria Nile within Ngwedo sub-county, Buliisa District, comprising key permanent and temporary facilities, including the Central Processing Facility, Cuttings Reinjection Area, and support bases and camps for both the construction phase (temporary) and operational phase (permanent). Also referred to as the Global Restricted Zone.
Influx	Influx, or project-induced in-migration, involves the movement of people into an area in anticipation of, or in response to, economic opportunities associated with the development and/or operation of a new project.
In-migration	To move or settle into a different part of one's country or home territory.
Intangible Cultural Heritage	The Convention for the Safeguarding of the Intangible Cultural Heritage defines the intangible cultural heritage as the practices, representations, expressions, as well as the knowledge and skills (including instruments, objects, artefacts, cultural spaces), that communities, groups and, in some cases, individuals recognise as part of their cultural heritage. It is sometimes called living cultural heritage, and is manifested inter alia in the following domains: • Oral traditions and expressions, including language as a vehicle of the intangible cultural heritage; • Performing arts; • Social practices, rituals and festive events; • Knowledge and practices concerning nature and the universe; and • Traditional craftsmanship.
Interested and Affected Parties (I&AP)	Any person or group of people concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, customers and consumers, environmental interest groups, and the general public.
Internal Renewable Water Resource	Average annual flow of rivers and recharge of aquifers generated from endogenous precipitation that originates within the country's borders.

TERMINOLOGY	DESCRIPTION
International Finance Corporation	Organisation that is a member of the World Bank, and promotes sustainable private sector investment in developing countries.
International Finance Corporation Performance Standards	The Performance Standards provide guidance on how to identify environmental and social risks and impacts, and are designed to help avoid, mitigate, and manage risks and impacts as a way of doing business in a sustainable way. There are eight Performance Standards that clients must meet throughout the life of an investment by IFC.
International Union for Conservation of Nature (IUCN) Red List	The IUCN Red List of Threatened Species provides taxonomic, conservation status and distribution information on plants and animals that have been globally evaluated using the IUCN Red List Categories and Criteria. This system is designed to determine the relative risk of extinction, and the main purpose of the IUCN Red List is to catalogue and highlight those plants and animals that are facing a higher risk of global extinction (those listed as Critically Endangered, Endangered and Vulnerable).
Invertebrates	Any animal lacking a backbone, including all species not classified as vertebrates, such as an arthropod, mollusc, annelid, coelenterate, etc.
Iron Age	The period in the history of humankind, following the Stone Age and the Bronze Age, marked by the use of implements and weapons made of iron.
Ironstone	Sedimentary rock containing a substantial proportion of iron compounds.
Joint Venture	A commercial enterprise undertaken jointly by two or more parties which otherwise retain their distinct identities.
Lacustrine	Relating to, formed in, living in, or growing in lakes.
Land Acquisition and Resettlement Framework	Framework prepared by the Project Proponents in collaboration with the Government of Uganda in 2016, describing the legal and administrative framework, the land-use and land tenure of the Project Area, and providing guiding principles on valuation methodology, entitlements, resettlement action planning, and livelihood restoration.
Land Expropriation	The purchase of land from a private owner.
Land Tenure	Legal regime in which land is owned by an individual. The Government of Uganda Land Act, Cap 227 provides for four types of land tenure (Customary, Leasehold, Mailo and Freehold).
Land Use	The arrangements, activities and inputs people undertake in a certain land cover type to produce, change or maintain it. This definition establishes a direct link between the land cover and the actions of people in their environment; often includes natural or recreational areas such as parks.
Landscape	All the visible features of an area of land, often considered in terms of their aesthetic appeal.
Landscape Character Area	Areas which are unique, discrete geographical areas of the landscape which demonstrate a series of recognisable features and characteristics.

TERMINOLOGY	*DESCRIPTION*
Landscape Contexts	Six Landscape Contexts were identified in the Critical Habitat Assessment that illustrates a landscape-scale view of potential Project interactions with all of the Critical Habitat Qualifying Species.
Landscape Impact	Impact on the landscape as a resource in its own right.
Laterite	A soil and rock type rich in iron and aluminium, and is commonly considered to have formed in hot and wet tropical areas.
Laydown Area	Area used for storing construction materials and equipment.
Leachable	Prone to the loss of soluble or other substances from the top layer of soil by percolating precipitation.
Lentic Habitats	Lentic aquatic systems are those which contain still waters e.g. ponds and lakes.
Likelihood	The probability that an activity or effect will occur.
Lithic	In archaeology, the portions of a stone removed to make a tool.
Local Communities	Communities that have the potential to be affected by the Project.
Lotic Habitats	Lotic aquatic systems are those systems which contain flowing waters e.g. streams and rivers.
Macroinvertebrates	Invertebrate fauna that can be captured by a 500 micron net or sieve. This includes arthropods (insects, mites, scuds and crayfish), molluscs (snails, limpets, mussels and clams), annelids (segmented worms), nematodes (roundworms), and latyhelminthes (flatworms).
Main Watercourse	Surface water bodies designated as large permanent surface water bodies/watercourses such as rivers, lakes or wetlands of regional, national and local importance and are part of the main drainage network that drains the study area on regional, national and local scale.
Mammal	A class of warm-blooded vertebrates, Mammalia, having mammary glands in the female.
Marginalised Groups	Groups characterised by shared traits such as ethnicity, income levels, or disability that are not present or represented in the mainstream of social, economic or political life of a country. Thus, they may be disproportionally adversely affected by project impacts.
Memorandum of Understanding	A nonbinding agreement between two or more parties outlining the terms and details of an understanding, including each parties' requirements and responsibilities.
Migration	Any regular animal journeys along well-defined routes, particularly those involving a return to breeding grounds.
Miocene	The fourth epoch of the Tertiary Period, between the Oligocene and Pliocene.
Mitigation Measures	Management measures put forward to prevent, reduce and where possible, offset any adverse environmental or socio-economic impacts. For the purposes of this document, these measures also include enhancement strategies aimed at increasing beneficial impacts.

TERMINOLOGY	DESCRIPTION
Modified Habitats	Areas that may contain a large proportion of plant and/or animal species of non-native origin, and/or where human activity has substantially modified an area's primary ecological functions and species composition. Modified habitats may include areas managed for agriculture, forest plantations, reclaimed coastal zones, and reclaimed wetlands (IFC, PS6).
Murchison Falls Conservation Area	An area encompassing the Murchison Falls National Park (3,893 square kilometres), Bugungu Wildlife Reserve (748 square kilometres) and Karuma Wildlife Reserve (720 square kilometres).
Murchison Falls National Park	A national park in Uganda managed by the Ugandan Wildlife Authority. It is in north-western Uganda, spreading inland from the shores of Lake Albert, around the Victoria Nile, up to the Karuma Falls.
Murram	A form of laterite (clayey material) used for road surfaces in parts of Africa.
Natural Habitats	Areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species composition (IFC, PS6).
NEMA	A semi-autonomous institution, established in May, 1995, under the National Environment Act, Cap. 153, and became operational in December, 1995, as the principal agency in Uganda, charged with the responsibility of coordinating, monitoring, regulating and supervising environmental management in the country.
Neogene	Geological Period within the Cenozoic Era encompassing the interval between approximately 23 million and 2.6 million years ago and including the Miocene and Pliocene epochs.
No-go area	An area where construction activities are prohibited.
Noise	Unwanted sound.
Non-Destructive Testing	Methods of inspecting and testing the quality or integrity of infrastructure or equipment which do not involve the removal or testing to destruction of representative sections.
Non-Point Source Emissions	Gases and particles released over an area of land or linear line across the land, rather than a specific point.
Non-Probability Purposive Sampling	Samples are purpose driven and selected based on the subjective judgement of the researcher, rather than random selection.
Oil Seep	The emergence of liquid petroleum at the land surface as a result of slow migration from its buried source through minute pores or fissure networks.
Oligocene	The third epoch of the Tertiary Period, between the Eocene and Miocene.
Optioneering	Evaluating different options to solve a specific problem.
Order of Magnitude	Change in value by a power of ten i.e. 'one order of magnitude greater' means 10 times more.

TERMINOLOGY	*DESCRIPTION*
Ordinary Watercourse	Surface water bodies designated as permanent or perennial surface water bodies/watercourses named or unnamed rivers, streams, ponds watering holes, wetlands of national and local resource importance which sometimes forms part of the tributaries to the main water bodies/watercourses within the drainage network on a national or local scale.
Orogenic Belt	A strip of the earth's crust that has been subjected to folding or other deformation during the process of mountain formation.
Palaeogene	Geological Period within the Cenozoic Era encompassing the interval between approximately 66 million and 23 million years ago.
Perennial Watercourse	A watercourse which flows throughout the year.
Particulates	Matter in the form of minute separate solid or liquid particles.
Particulate Matter ($PM_{2.5}$)	Particulate matter less than 2.5 micrometres in diameter ($PM_{2.5}$) are called 'fine' particles. These particles can only be detected with an electron microscope. Sources of fine particles include all types of combustion, including motor vehicles, power plants, residential wood burning and some industrial processes.
Particulate Matter (PM_{10})	Particulate matter less than 10 micrometres diameter. They are small enough to penetrate deep into the lungs, potentially causing serious health problems. This is mainly due to the combustion of fossil fuels (construction dust for example is generally more coarse).
Passive Air Sampling	Passive or diffusive sampling which relies on the unassisted molecular diffusion of gaseous agents (analytes) through a diffusive surface onto an adsorbent.
Pastoralism	Social organisation based on livestock raising as the primary economic activity.
Pathway	The route a source can take to reach a particular receptor (see also Source-Pathway-Receptor).
Permeability	A measure of the ability of a porous material (i.e. a rock or an unconsolidated material) to allow fluids to pass through it.
Petroleum Authority of Uganda	The authority responsible for monitoring and regulating the exploration, development and production, together with the refining, gas conversion, transportation and storage of petroleum in Uganda.
Petroleum Exploration and Production Department	A department within the Directorate of Petroleum responsible for establishing the petroleum potential of the country and promoting it.
Phytoplankton	Plankton consisting of microscopic plants.
Physical Displacement	Relocation or loss of shelter.
Pigging	The practice of using pipeline inspection gauges (PIGs), to perform various maintenance operations on a pipeline. These operations include but are not limited to cleaning and inspecting the pipeline. This is usually done without stopping the flow of the product in the pipeline.

TERMINOLOGY	DESCRIPTION
Pisolite	A sedimentary rock made of pisoids, which are concretionary grains – typically of calcium carbonate which are 'pea-like' in appearance.
Plankton	Minute plants (phytoplankton) and animals (zooplankton) that drift in the surface waters of seas and lakes.
Pluvial	Relating to or characterised by rainfall.
Point Source Emission	Emission from a single, discrete source, such as a stack (or chimney), a generator, a fired heater, or a flare.
Pollutant	Substance or energy introduced into the environment that has undesired effects, or adversely affects the usefulness of a resource.
Pollution	The introduction by man, directly or indirectly, of substances or energy to the environment resulting in deleterious effects such as harm to living resources.
Potable Water	Water that is safe to drink or to use for food preparation, without risk of health problems. Also known as drinking water.
Potentially hazardous substance	A substance that can have a deleterious effect on the environment.
Pottery Sherds	The individual pieces of broken ceramic vessels.
Pre-Colonial Period	Before the beginning of colonial rule.
Pre-Commissioning	Pre-commissioning is the process of proving the ability of equipment to meet operational requirements prior to putting the equipment into service.
Precambrian	The oldest period of geologic time between about 3.8 billion and 540 million years ago.
Prehistoric	The time before recorded history and writing.
Primary Data	Data collected by the user.
Priority Ecosystem Service	Priority ecosystem services are defined as: (i) those services on which project operations are most likely to have an impact and, therefore, which result in adverse impacts to Affected Communities; and/or (ii) those services on which the project is directly dependent for its operations (e.g., water) (IFC PS6).
Priority Species	These are the species that have been assessed in the biodiversity sections of this ESIA. Priority species include CHQS as well as other species, which whilst not CHQS, may be: considered by stakeholders to be important receptors in the landscape; and/or are little known and therefore had not been included in species lists such as the Uganda Red Data List but were recorded specifically within the Project Area; and/or are specifically protected by Ugandan legislation (for example tree species included in the schedules to the National Forestry and Tree Planting Regulations (2016)).
The Project	Tilenga Project (see 'Tilenga Project').
Project Affected Community	Communities that are affected by the activities of a project.

TERMINOLOGY	DESCRIPTION
Project Area of Influence	Those areas likely to be affected by the main Project facilities, including the main Project Area for this Project, plus the area related to any Associated Facilities.
Project-Induced In-Migration	See 'Influx'.
Project Proponents	The developer, or sponsor, of a project. For this Project, the Proponents are Total Exploration & Production (E&P) Uganda B.V and Tullow Uganda Operations Pty Ltd.
Project Zone of Influence	The geographical area within which views of the construction and operational phases of the Project could potentially be possible, including views of vehicles and vessels on the land and sea delivery routes.
Psycho Social Effects	Social pathologies (such as drinking, drug use, violence, gender discrimination, crime, poverty) that are influenced by social determinants of health and can lead to social, psychological or economic problems that undermine wellbeing.
Public Disclosure	Public disclosure refers to the act of making information or data readily accessible and available to all interested individuals and institutions. Disclosure of Project or ESIA–related information to stakeholders for review and as an input to consultations.
Public Meeting	Open meeting which may be attended by any member of the public. Need not be a meeting required under specific legislation.
Quaternary Period	The most recent period in the Cenozoic Era spanning an interval of geological time from approximately 2.6 million years ago to present.
Ramsar Site	A wetland site designated of international importance under the Ramsar Convention, an intergovernmental treaty established in 1971 by UNESCO and coming into force in 1975.
Ratified	When a state makes a final approval and formal expression of its consent; for example, to be bound by a treaty or convention. This usually occurs after signature.
Receptive Stakeholder Consultation	Where stakeholders may contact the Project Proponents at any time (e.g. by email, post, telephone, or in person) to provide their views and ask questions. Feedback may be submitted by any individual or group (e.g. companies, organisations, societies, collectives), either verbally or in writing.
Receptor	The aspect of the environment (air, water, ecosystem, human, fauna, etc.) that is affected by/interacts with an environmental or socio-economic impact (see also Source-Pathway-Receptor).
Receptor Sensitivity	How a particular receptor may be more or less susceptible to a given impact.
Reinstatement Work	The process of returning the landscape affected by the construction of a development back to its previous state.
Relief Well	A new well that is drilled near to a well at which blowout has occurred in such a way to create a diversion route for the oil to the controlled relief well.

TERMINOLOGY	DESCRIPTION
Resettlement Action Plan	Document drafted by the parties responsible for resettlement, specifying the procedures it will follow and the actions it will take to properly resettle and compensate affected people and communities.
Residual Impacts	Impacts that remain after mitigation measures, including those incorporated into the project's base case design (i.e. embedded mitigation) and those developed in addition to the base case design, have been applied.
Reversibility	The degree and speed with which a receptor can recover from an impact.
Riparian Zone	The interface between land and a river or stream.
Risk	The probability that a specified event will occur and the severity of the consequences of the event.
Routine Activity	An activity that occurs during routine operations when plant, / vessels or equipment is operating as specified within the design base case.
Runoff	The draining of water e.g. rainfall (and/or substances carried in it) from the surface of an area of land.
Scoping	Early stage in the ESIA process that appraises the likely key issues requiring detailed assessment. A scoping process (in relation to IFC PS1) is the establishment and maintenance of a process for identifying the initial environmental and social risks and impacts of a project. The aspects of the project (i.e., type, scale and location) along with available baseline data is used to guide the scope and level of effort devoted to the risk and impacts identification in the ESIA. The process also involves a mechanism for the collection of comments made by different stakeholders[3].]
Secchi Disc	Metal disc used to measure transparency or turbidity in bodies of water. The disc is mounted on a pole or line, and lowered slowly down in the water. The depth at which the disc is no longer visible is recorded and used to estimate the transparency/turbidity of the water.
Secondary Data	Data collected by someone other than the user.
Sediment	Sediment is any particular matter that is broken down by processes of weathering and erosion, and is subsequently transported by the action of wind, water, or ice, and/or by the force of gravity acting on the particle itself.
Sensitivity	The recovery rate of the receptor from disturbance or degradation.
Site Preparation and Enabling Works Phase	Initial Phase of development expected to take approximately two years. The phase will include land acquisition and clearance, upgrades to the airstrips, and road modifications/construction. It is expected Project activities will commence in early 2018 upon receipt of approval from National Environment Management Authority.
Slurry	A suspension of small size solid particles and water.
Soakaway System	A pit that is typically filled with hard core medium such as stones or rubble, into which waste water is piped so that it drains slowly out into the surrounding soils.

3 Definition as per the IFC website. Taken from www.IFC.org

TERMINOLOGY	DESCRIPTION
Social Disarticulation	The process by which the social networks and support mechanisms within a social group are disrupted. It often happens as a result of resettlement and influx.
Soil	A material comprised of a mixture of mineral and organic materials that usually has the ability to support rooted plants in a natural environment.
Soil Guideline Value	A contaminant concentration in soil, below which no harm will occur i.e. a 'safe level'.
Soil Productivity	Capacity of soil, in its normal environment, to support plant growth.
Source	Hazards/activities which have the potential to cause harm to a given receptor e.g. an oil spill (see also Source-Pathway-Receptor).
Source-Pathway Receptor	Basis of a risk-based assessment model whereby a pollutant linkage is said to exist only when all three components of the model (potential source, potential pathway and potential receptor) can be identified at the subject site.
Speculation	When individuals intentionally move to a project site, purchase land, build or plant assets in an opportunistic way to so that they may receive compensation or receive additional compensation and other resettlement benefits.
Stakeholder	Any individual, group or organisation potentially affected by a project, or which has an interest in, or influence over, a project.
Stakeholder Engagement	As stated by IFC in PS 01 "Stakeholder engagement is the basis for building strong, constructive, and responsive relationships that are essential for the successful management of a project's environmental and social impacts." Thus, it is an activity covering different types of interactions with stakeholders over the life of a project. Can include, but is not limited to disclosure of Project information and consultation during preparation of an ESIA Report.
Stakeholder Engagement Plan	A Stakeholder Engagement Plan (SEP) forms part of the ESIA documentation and is intended to provide a plan and implementation strategy to guide stakeholder engagement throughout the project lifecycle.
Stakeholder Identification	A process of identifying individuals or groups likely to be affected by the project both directly and indirectly, and/or who may have an interest in the project or influence over the project.
Stone Age	The period in the history of humankind, preceding the Bronze Age and the Iron Age, and marked by the use of stone implements and weapons.
Storage Coefficient (Aquifer)	Volume of water released from storage per unit decline in hydraulic head (specific measurement of liquid pressure above a geodetic datum) in the aquifer, per unit area of the aquifer.
Stratigraphy	Branch of geology concerned with the order and relative position of strata and their relationship to the geological timescale.
Study Area	The mapped geographical area in which potential impacts are predicted (as determined through scoping) and therefore warrant investigation during the ESIA process. This is specific to each biophysical and social environmental aspect.
Sub-Basin	A sub-basin is a structural geologic feature where a basin forms within a larger basin.

TERMINOLOGY	DESCRIPTION
Supply Chain	Secondary contractors and sub-contractors who are supplying goods and services to the Project and over which the developers have less direct control or monitoring ability.
Surface Water	Ponded water on the surface of the land predominantly in the form of rivers, streams and lakes.
Sustainable Drainage System Approach	The SuDS philosophy to designing the drainage systems for the project is to replicate as closely as possible the natural drainage patterns from within the catchment area, taking into account the specific environmental and social sensitivities of the project area.
Tangible Cultural Heritage	Tangible cultural heritage relates to tangible moveable or immovable objects, property, sites, structures, or groups of structures, having archaeological (prehistoric), paleontological, historical, cultural, artistic, and religious values.
Temporal Boundary	Relating to, or limited by time.
Terms of Reference	This refers to the Terms of Reference for the ESIA which was submitted as part of the ESIA Scoping Report and agreed with NEMA in line with Ugandan EIA regulations.
Terrigenous	Sediments derived from the erosion of rocks on land.
Tertiary Period	A former name for the first period in the Cenozoic Era spanning an interval of geological time from approximately 66 million to 2.6 million years ago. The Tertiary Period is now known as the Palaeogene (66 million to 23 million years ago) and Neogene (23 million to 2.6 million years ago) Periods.
Tilenga Project	The development of six oil fields (Jobi-Rii, Ngiri, Gunya, Kasamene-Warindi, Nsoga and Kigogole) within Exploration Area 1A (EA-1A), Contract Area 1 (CA-1) and License Area 2 (LA-2) North. The name Tilenga is derived from the two local names for the Uganda Kob (Antelope), called "*Til*" in Acholi and "*Engabi*" in Lugungu.
Tilenga Project Area	The area within which the Tilenga Project is located. The Project Area is approximately 111,000 hectares and located within Buliisa and Nwoya Districts.
Transboundary	Crossing a provincial, territorial or national boundary or border.
Transboundary Impact	An impact which crosses any boundaries between two geopolitical boundaries (i.e. a border).
Transect	Line along which data is collected or observations made.
Transmissivity	The rate at which groundwater flows horizontally through an aquifer.
Trenching	Process by which excavation equipment is used to excavate a trench.
Turbid	Water containing suspended particles or sediment.
Turbidity (of water)	Water that is cloudy or hazy as a result of a density difference created by dispersed sediment within the body of the water. It is used as a test of water quality.

TERMINOLOGY	DESCRIPTION
Uganda Red List	The National Red Lists for Uganda (2016). Lists documenting the relative threat status of specific species, assembled by the seven taxonomic groups that have been assessed to date, comprising Mammals, Birds, Reptiles, Amphibians, Butterflies, Dragonflies and Plants. Threatened species are highlighted in three categories: Critically endangered (most at risk of extinction), Endangered and Vulnerable (i.e. vulnerable to extinction). The list also includes other categories such as Data Deficient (species for which sufficient data is not available to allow it to be assessed but are highly likely to be threatened), Regionally Extinct, Near Threatened and Least Concern.
Unplanned Events	Activities that are not expected to occur during the Project's normal activities, such as emergencies, accidents, and incidents.
USEPA Regional Screening Level	Regional Screening Levels were developed by the USEPA to assess the risk posed by contaminants at a site. They are risk-based concentrations derived from standardised equations combining exposure information assumptions with USEPA toxicity data. They do not constitute enforceable standards, but are useful to determine whether additional investigations at contaminated sites, and possibly response actions, are warranted.
Valued Environmental and Social Components	Sensitive or valued receptors whose desired future condition determines the assessment end points to be used in the Cumulative Impact Assessment process. VECs are environmental and social attributes that are considered to be important in assessing risks (IFC's Good Practice Handbook).
Vector Related Disease	Disease that results from an infection transmitted to humans or animals by arthropods, such as mosquitoes and flies. Vector related diseases include malaria, bilharzia and onchocerciasis.
Vertic Properties (Soil)	Soil material with a clayey field texture (i.e. light clay, medium clay, heavy clay) or 35% or more clay, which cracks strongly when dry and has slickensides (polished and striated surface) and/or lenticular peds (units of particles which are flat and plate-like).
Visual Amenity	The overall pleasantness of the views enjoyed by people of their surroundings.
Visual Envelope	The area of land from which the Project is theoretically visible, on the assumption that there are no intervening landforms, vegetation or other elements.
Visual Impact	Impact on specific views and on the general visual amenity experienced by people.
Volatile Organic Compounds	A group of chemicals (methane is excluded) that contain the element carbon in their molecular structure (i.e., are 'organic'). They easily vaporise at room temperature and most of them have no colour or smell.
Waste Management Facility	An installation which receives waste and either: transfers waste to another destination for processing; prepares the waste for reuse or recycling; carries out a recycling or recovery process; or permanently disposes of the waste.
Waste Stream	Waste stream is the complete flow of waste from generation through to final disposal.
Wastewater	Water contaminated with sanitary, commercial, industrial, agricultural or surface runoff wastes.

TERMINOLOGY	DESCRIPTION
Water Table	The water level in an unconfined aquifer at which the pressure head is equal to atmospheric pressure.
Watering Hole	A pool of water from which animals regularly drink.
Well Cellar	A dug-out area, lined with cement located below the rig. The cellar serves as a cavity in which the casing spool and casing head reside. The cellar also serves as the place where the lower part of the Blow out Preventer (BOP) stack resides.
Well Kick	Where the pressure in a wellbore is less than that of the formation fluids, thus causing formation fluids to flow into the wellbore.
Well Pad	Cleared and defined area to house the wellheads for a number of extraction wells and the required associated facilities. Each well pad will host between 4 and 21 wells.
Wetland	Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which in normal circumstances supports, or would support, vegetation that is typically adapted to live in saturated soil (as defined in the National Policy for the Conservation and Management of Wetland Resources (1995)).
Wildfoods	Anything edible that requires no human input to increase its production, e.g. leaves, berries, nuts and honey.
Workover	The process of performing intervention on an oil well. Well intervention can range from light intervention (lowering tools or sensors into a live well) to heavy intervention where production is ceased and equipment replaced (i.e. wellhead).
Works	Means the Permanent Works and the Temporary Works, or either of them as appropriate.
Zone of Influence	The geographical area and the ecological features within it which have the potential to be impacted by the Project.
Zoonotic / Zoonosis	An infection or disease that is transmissible from animals to humans under natural conditions or transmissible between animals and humans.
Zooplankton	Plankton consisting of small animals and the immature stages of larger animals.

Executive Summary

Table of Contents

1 Executive Summary

1.1 Introduction

The 'Tilenga Project' refers to the development of six oil fields within Contract Area CA-1, License Area LA-2 (North) and Exploration Area EA-1A in the Albertine Graben, Western Uganda by Total Exploration & Production Uganda B.V. (hereafter referred to as 'TEP Uganda'), Tullow Uganda Operations Pty Ltd (hereafter referred to as 'TUOP') and the China National Offshore Oil Company Uganda Limited (CNOOC) (referred to as the Project Proponents)[1]. The Project forms part of the wider oil and gas development being undertaken in the Albertine Graben region.

In summary, the Project consists of 34 well pads and a network of buried pipelines that will collect the oil produced from each well pad and transport it to a Central Processing Facility (CPF) located within the Industrial Area. The Project infrastructure will also include a water abstraction system on the shore of Lake Albert, and the construction of new roads and upgrades to existing roads.

The ESIA Report for the Tilenga Project has been prepared on behalf of the Project Proponents by independent environmental consultants, in accordance with the National Environment Act Cap 153, and the Ugandan Environmental Impact Assessment Regulations S.I. No 13/1998. The Project Proponents are committed to meeting best international practice for undertaking ESIA and thus the Project's environmental and social performance will meet the requirements of the International Finance Corporation (IFC) Performance Standards (PS) (2012).

This ESIA Report has been prepared in accordance with the requirements of applicable laws for purposes of the Project. It has been prepared with the specific circumstances of the Project in mind and the Project Proponents accept no responsibility for the use of this document other than for the purpose for which it was prepared.

1.2 Project Area Context

The Project is located in the Albertine Graben, Western Uganda. The Albertine Graben is recognised as one of Africa's most important areas for biodiversity and the entire Murchison-Semliki landscape in which the Project is situated is classed as Critical Habitat[2]. A large proportion of this qualifies as Tier 1 Critical Habitat (i.e. of high sensitivity for biodiversity).

Part of the development is within the Murchison Falls National Park (MFNP), which hosts a range of emblematic wildlife and attracts national and international tourism. MFNP is the largest and the second-most visited national park in Uganda. Together with the adjacent Bugungu Wildlife Reserve and the Karuma Wildlife Reserve, MFNP forms part of the Murchison Falls Protection Area (MFPA). The Murchison Falls-Albert Delta Wetland System Ramsar Site located along the Victoria River Nile (also an Important Bird Area (IBA)) is known to support rare, vulnerable and endangered species. There are also a number of forest reserves in the Project Area of Influence (AoI) such as Bugoma and Budongo Forest Reserves.

From a social context perspective, the Project is located within the Buliisa District (specifically, villages within the sub counties of, Buliisa Sub County, Ngwedo Sub County, Kigwera Sub County and Buliisa Town Council) and within parts of Nwoya District (specifically Purongo Sub County and Got Apwoyo Sub County) and Masindi Municipality (Masindi District). Other surrounding and nearby areas include wider parts of Buliisa District including Biiso Town Council; Hoima Municipality (Hoima District); and Pakwach Town Council (Pakwach District). The local communities in the Project Area depend heavily on natural resources (land for cultivation and grazing livestock, and Lake Albert for fishing, amongst other resource use). They are generally characterised by inadequate access to basic services and infrastructure, low levels of education and low incomes.

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[1] The current split in interest is TEP Uganda (28.3%), TUOP (28.3%), China National Offshore Oil Corporation (CNOOC) Uganda Ltd (28.3%) and the Uganda National Oil Company (UNOC) (15%).

[2] Critical Habitat is a concept developed by the International Finance Corporation (IFC) in its Performance Standard 6 (PS6) on Biodiversity Conservation and Sustainable Management of Living Resources. This concept is designed to identify areas of high biodiversity value in which development would be particularly sensitive and require special attention.

1.3 Project Description and Alternatives

1.3.1 Key Project Components

The Project will include the following permanent facilities:

A total of 34 **well pads** are planned to be located within CA-1 and LA-2 North and holding up to 22 wells. Ten of the well pads are within MFNP. Each well pad will include a concreted area where the wells will be located. There will be a 15 metre (m) wide buffer from the perimeter security structure, which will remain cleared of vegetation.

Production and Injection Network: A network of buried pipelines totalling approximately 180 kilometres (km) in combined length, including production pipelines to transport the oil and produced gas, the water abstraction line from Lake Albert to the CPF and water injection lines to transport water from the CPF to the well pads for reinjection. The network will also include three pipelines (production pipeline, water injection pipeline and, electrical and fibre optic cables) crossing under the Victoria Nile a minimum of 15 m beneath the riverbed.

The **CPF** is a facility within the **Industrial Area** which will separate the produced oil, water and gas arriving from the well pads and operate on a 24-hour basis. It will include a treatment facility, power generation facility and export facilities, and will house a number of systems such as water treatment plant.

A **Lake Water Abstraction System** will be constructed at Lake Albert to supply water for use during operations. Water will be abstracted from the lake at a water intake structure fixed to the lake bottom approximately 1.5 km from the shoreline and transferred to the shoreline via an intake pipe laid along the lakebed.

Victoria Nile Ferry Crossing: Approximately 135 m east of the existing Paara ferry crossing, a new dedicated ferry will be used to service the Project activities. The Victoria Nile Ferry Crossing Facilities will comprise a number of onshore facilities and landing approaches extending from both the north and south banks of the Victoria Nile River.

To meet the access requirements for the Project a number of existing local **Roads** will be upgraded (widened and surfaced with asphalt or gravel) and new roads will be constructed. The **Bugungu Airstrip** and existing **Tangi Operation Support Base** (north of Victoria Nile) will be upgraded.

A number of additional **temporary facilities** will also be required as summarised below:

- Buliisa and Bugungu Construction camps;
- Temporary facilities in the Industrial Area including Construction Support Bases and Community Visitor Centre.
- Tangi Construction Support Base (to support the Project north of the Victoria Nile);
- Masindi Vehicle Check Point; and
- Existing and new borrow pits and quarries.

Peak oil production is expected to generate about 190 Thousand barrels of oil per day. The volume of produced oil and gas will remain constant for several years before gradually declining.

1.3.2 Supporting and Associated Facilities

There are a number of supporting and associated facilities that are being developed with the Tilenga Project, all of which are subject to separate ESIAs. The facilities include:

- The Tilenga Feeder Pipeline and the East African Crude Oil Pipeline (EACOP). A 24-inch Feeder Pipeline will transport the oil from the CPF to the delivery point at Kabaale in Buseruka sub county, Hoima District. From Kabaale (delivery point), the oil will be distributed to the refinery or to EACOP export pipeline. EACOP will export the crude oil via a 24-inch pipeline for about 1,450 km up to Tanga on the Tanzanian coast;

- Waste management facilities;
- 132 Kilovolt (kV) Transmission Line from Tilenga CPF to Kabaale Industrial Park; and
- Major road upgrades being undertaken by Uganda National Roads Authority (UNRA) for the purpose of supporting the construction and operation of the Project.

1.3.3 Project Schedule and Phases

For the purposes of the ESIA, four Project phases have been considered:

- **Site Preparation and Enabling Works** – activities for enabling infrastructure works including site preparation, airstrip upgrade works, civils works for well pads and the water abstraction system, road modifications/construction and construction of the Victoria Nile Ferry Crossing and Masindi Vehicle Check Point. Anticipated to start end of 2018 and take approximately five years;
- **Construction and Pre-Commissioning** – associated with the main facilities at the Industrial Area (including the CPF), well pads (including drilling), production and injection network (i.e. pipeline and flowline network), and water abstraction system, and is anticipated to take around seven years. This phase will commence once the enabling infrastructure is in place and the Construction Camps and Construction Support Bases are established. Note that this phase will run concurrently with Site Preparation and Enabling Works;
- **Commissioning and Operations** – start-up and operation of the facilities. It is expected to commence approximately 36 months after effective date of the main construction contract award. The duration of this phase is estimated to be 25 years; and
- **Decommissioning** – removal of infrastructure and restoration of the land.

1.3.4 Alternative and Avoidance Protocol in the Design Process

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 has evolved. The design of the Project has been developed with the impact mitigation hierarchy being prominent in the decision making process of the Front End Engineering Design (FEED), where the preference is the avoidance of negative environmental and social impacts where practicable, followed by minimisation, prior to restoration and as a last resort compensation / offsetting.

An overview of the process is provided in ***Chapter 4: Project Description and Alternatives*** of the ESIA. This alternatives analysis process has benefited the overall layout of the Project facilities whilst ensuring that the environmental and social impacts are reduced to as low as reasonably practicable (ALARP). The siting options considered for key facilities such as the Industrial Area, well pads and Water Abstraction System took into account both environmental and social sensitivities. As a result, where feasible, the chosen options avoided the more sensitive areas/receptors. With regards to the Construction Camps, a decision was made to use and expand existing camps to avoid further land take and disturbance to the local area.

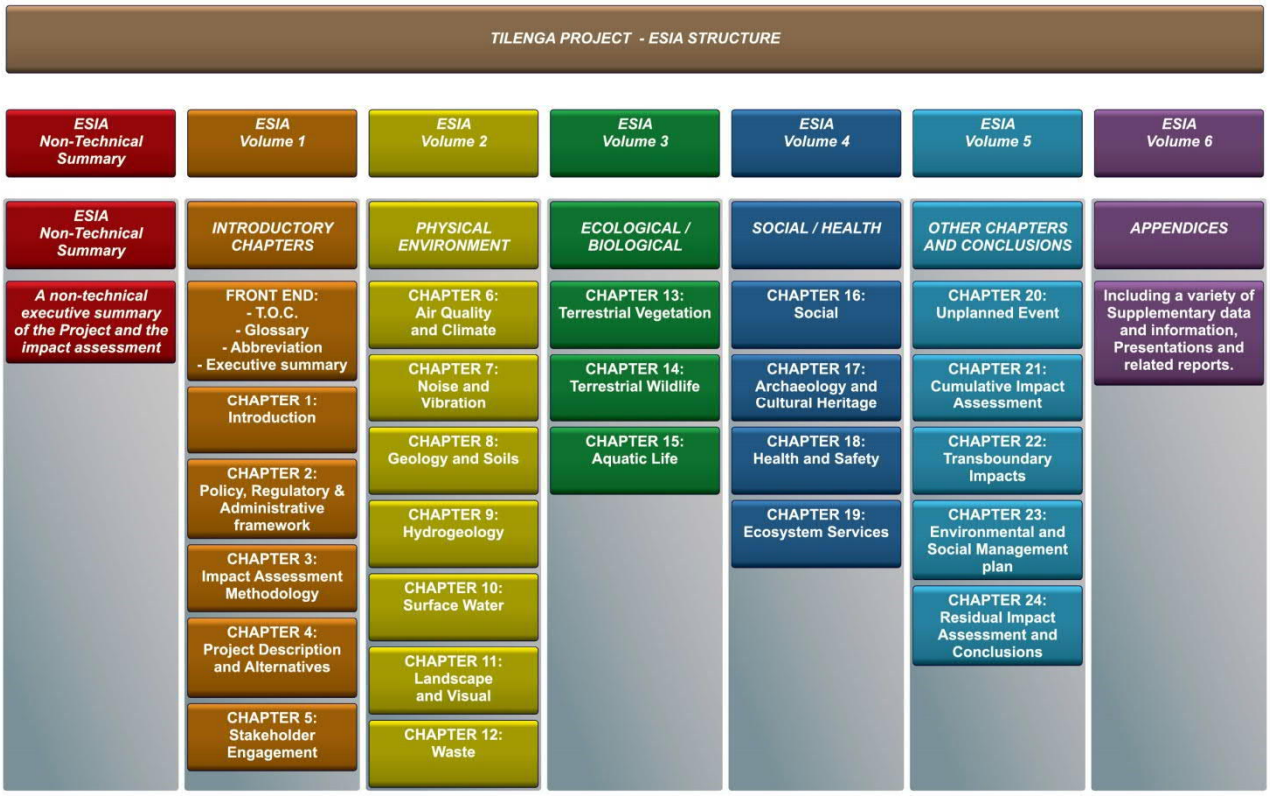
Minimisation consisted of both reducing the number of individual components required for the Project as well as reducing the individual footprint for each Project component.

1.3.5 Embedded Mitigation

In addition to minimisation of the Project footprint and avoidance of key environmentally and socially sensitive areas, the Enabling Infrastructure and FEED design teams have also incorporated embedded mitigation measures into the design of the Project. The potential impacts identified within the impact assessment sections of each technical chapter in the ESIA (and summarised in Section 1.5 below) are based on an assumption that all the embedded mitigation measures will be implemented.

1.4 Structure of the ESIA Report

This ESIA Report has been designed to organise a large amount of information associated with this complex Project into a series of topic specific chapters and associated appendices. An overview of the ESIA structure is provided below and more information is presented in ***Chapter 1: Introduction***.



The proposed structure of the ESIA is specifically designed to help ensure that National level agencies can readily find the information relating to their specific interests and which they would need to review as part of their own remit. This approach has been deemed to bring the following benefits:

- Considering all Project components in combination is the only way to accurately and comprehensively assess effects on receptors across the Project AoI;
- It is the best way that comprehensive mitigation measures can be identified and implemented;
- All information relating to a topic or receptor can be provided in one chapter;
- A single comprehensive project description provided in one chapter;
- Avoids duplication of information in multiple documents;
- More efficient – for such a complex project there is a need to avoid complicating the assessment process; and
- Supports a clear review and approval process for the Project.

1.5 Required contents of the ESIA

This ESIA Report has been produced in accordance with regulation 14 of the Environmental Impact Assessment Regulations, S.I. No 13 (1998). The table below outlines the stated requirement of regulation 14 and a roadmap which shows where the content is covered within the ESIA.

Regulation 14 of EIA Regulations stated Requirement	Location within the ESIA
(a) description of the project and of the activities it is likely to generate;	***Chapter 4: Project Description and Alternatives***
(b) description of the proposed site and reasons for rejecting alternative sites;	***Chapter 4: Project Description and Alternatives***
c) a description of the potentially affected environment including specific information necessary for identifying and assessing the environmental effects of the project;	***Technical Chapters 6 to 19***.
(d) description of the material in-puts into the project and their potential environmental effects	***Chapter 4: Project Description and Alternatives; Technical Chapters 6 to 19***.
(e) an economic analysis of the project;	***Chapter 16: Social***
(f)description of the technology and processes that shall be used, and a description of alternative technologies and processes, and the reasons for not selecting them;	***Chapter 4: Project Description and Alternatives***
(g) description of the products and by-products of the project;	***Chapter 4: Project Description and Alternatives***
(h) description of the environmental effects of the project including the direct, indirect, cumulative, short-term and long-term effects and possible alternatives;	***Technical Chapters 6 to 19***. ***Chapter 20: Unplanned Events***, ***Chapter 21: Cumulative Impact Assessment*** and ***Chapter 22: Transboundary Impacts***
(i) description of the measures proposed for eliminating, minimising, or mitigating adverse impacts;	***Technical Chapters 6 to 19***. ***Chapter 23: Environmental and Social Management Plan*** and ***Appendix T: ESMP Mitigation Checklist***
(j) an identification of gaps in knowledge and uncertainties which were encountered in compiling the required information;	***Technical Chapters 6 to 19***.
k) an indication of whether the environment of any other State is likely to be affected and the available alternatives and mitigating measures;	***Chapter 22: Transboundary Impacts***
(l) a description of how the information provided for in this regulation has been generated; and	***Chapter 2: Policy, Regulatory and Administrative Framework. Technical Chapters 6 to 19***.
(m) such other matters as the Executive Director may consider necessary	***Appendix A: Response to comments from NEMA on Scoping Report and ESIA TOR***

1.6 ESIA Process and Methods

The Environmental Impact Assessment Regulations, S.I. No 13/1998 (provided under section 107 of the National Environmental Act Cap 153) are the key legislative regulations to which this ESIA Report must abide and comply with. In addition to national laws and regulations, further guidance on ESIA practice in Uganda is provided through a number of general and sector-specific guidelines. These are listed in ***Chapter 2: Policy, Regulatory and Administrative Framework*** of the ESIA, and include the Guidelines for Environmental Impact Assessment in Uganda (NEMA, 1997) and the Environmental Impact Assessment Guidelines for the Energy Sector (NEMA, 2014). In addition, as noted above, the Project's environmental and social performance will meet the requirements of the IFC PSs.

The key stages in the ESIA Process are as follows:

Screening: An early exercise to identify how the Project might interact with the environment. Screening is used to inform project planning and design;

Scoping: A process of analysis and consultation with stakeholders in order to identify the topics and methodologies which will be followed to complete the ESIA. A Scoping Report for the Tilenga Project which contained a detailed terms of reference was submitted to NEMA in December 2015. NEMA subsequently provided formal approval of the Scoping Report and Terms of Reference on 21st April 2016, including a number of requirements which NEMA expect to be included within the ESIA;

Baseline Studies: Detailed desk-based and field-based research to provide a baseline against which changes can be measured, impacts predicted and to inform the design and mitigation of the Project. Environmental and social specialists completed numerous baseline surveys to understand the existing conditions in the Project Area, the results of which are reported in the ESIA;

Impact Assessment and ESIA Report: Predicts and assesses the expected impacts of the Project, based on the Project description, baseline studies, and feedback from stakeholders, engineering teams and professional expertise. The impact assessment categorises potential impacts based on their significance, which may be rated as either Insignificant, or of Low, Moderate or High significance. This also includes the development of mitigation and management measures and the re-evaluation of the potential impacts after measures are applied (residual impacts). Positive impacts are also determined and any enhancement measures which may be implemented as part of the Project identified. The output of this phase is contained within the ESIA Report;

Mitigation, Management, and Monitoring: Commitments relating to proposed mitigation measures in order to avoid, minimise, restore or offset negative impacts, and enhance beneficial measures, is contained in the ESIA Report. ***Chapter 23: Environmental and Social Management Plan*** (ESMP) of the ESIA provides high level mitigation and monitoring measures and forms the basis for the preparation of detailed management and implementation plans covering Project activities or potentially affected receptors; and

Stakeholder Engagement: Stakeholder engagement has taken place throughout each and every phase of the Project as described below.

1.7 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 risks, impacts and opportunities of the Project.

Consultation with stakeholders is a key aspect of the ESIA process and essential to building a longer term relationship. Consultation has been undertaken at all key stages in the assessment process including Scoping, agreeing the coverage of baseline studies, and during the assessment phase. The

process aimed to give stakeholders an opportunity to comment on the proposed Project and share their apprehensions, grievances and concerns. Stakeholder feedback was an essential part of the process of identifying real and perceived impacts and suitable mitigation and enhancement measures.

A Project Stakeholder Engagement Plan (SEP) has also been developed by the Project Proponents that will continue to be updated throughout the Project lifecycle. Some of the stakeholder groups engaged to date include:

- Ugandan local, national and regional governmental authorities;
- Project-affected communities (PACs) – both those whose boundaries fall within the Project Areas and those outside the Project Area but who are likely to be indirectly affected by the Project;
- Traditional and religious authorities;
- Local businesses and tourism operators;
- Developers of Associated Facilities;
- Civil society and non-governmental organisations (NGOs);
- Academic and research organisations; and
- Intergovernmental organisations.

Within PACs, special efforts were made to identify potentially vulnerable groups such as women, children, youth, elderly, persons with disabilities, migrants, sex workers, minority ethnic groups and others as described in ***Chapter 5: Stakeholder Engagement***.

Stakeholder engagement will continue over the life of the Project, including throughout site preparation activities, construction, operations and decommissioning. Stakeholders will be able to provide feedback and receive responses to questions and comments from the Project Proponents and their contractors and consultants. The Project Proponents have established a formal complaints procedure (also known as a 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.

The ESIA Report will be publicly disclosed and announced in press releases and public announcements in local newspapers and on local radio. During the disclosure period, public disclosure meetings which will be held will be organised by NEMA.

1.8 Summary of Potential Impacts

Based on the results of the ESIA, a summary of the potential direct, indirect and induced impacts assessed is provided below:

- *Air Quality and Climate*: fugitive (combustion, dust, odour), controlled (vehicles, plant) and greenhouse gases emissions;
- *Noise and Vibration*: generation of noise and vibration as a result of construction, drilling, traffic and equipment;
- *Geology and Soils*: potential compaction, erosion, impact on soil quality;
- *Hydrogeology and Surface water*: potential reduction in water quantity, quality, flood risk and impacts on surface water streams morphology;
- *Landscape and visual*: potential changes in the quality of landscape character areas and visual impacts from project infrastructure;
- *Waste*: potential impacts associated with waste management;
- *Terrestrial vegetation, wildlife and aquatic life*: potential impacts on priority flora and fauna species, on threatened ecosystem habitats, freshwater habitats and protected areas;

- *Social*: potential impacts associated with displacement, labour and working conditions, on social infrastructure and services, social cohesion and cultural identity, employment and economic development, governance, tourism;
- *Archaeology and Cultural Heritage*: potential loss of access to sacred sites and places of worship, disruption places, damages to cemeteries and graves, impact on palaeontological and archaeological remains;
- *Health and Safety*: potential impacts associated with vector-related, respiratory, zoonotic, sexually transmitted, non-communicable diseases, diseases related to soil, water and sanitation, food and nutrition, accidents and injuries, exposure to potentially hazardous materials, psychosocial effects, cultural health practices, health services infrastructure; and
- *Ecosystem Services*: potential impacts on Priority Ecosystem Services including: Crop Production, Livestock and Fodder/ Pastoralism, Capture Fisheries, Timber and Woody Biomass, Water, Wildfoods and Bushmeat, Fibres and Ornamental Resources, Biochemicals / Natural Medicines, Local and Global Climate Regulation, Hazard Regulation, Cultural and Spiritual Values, Tourism and Recreation Values and Wild Species Diversity, Scientific and Knowledge Values.

For each technical topic, a dedicated assessment is made in the associated chapter, and specific additional mitigation measures have been devised when relevant. These are detailed in the ESIA and will be implemented through the ESMP.

1.8.1 Potential Unplanned Events, Cumulative Impacts and Transboundary Impacts

In addition to the core assessment and management of the potential impacts of the Project described above, the ESIA Report also considers potential unplanned events, cumulative impacts and transboundary impacts, as outlined below:

Unplanned events: Potential unplanned events are activities that are not expected to occur during the Project's normal activities, such as emergencies, accidents, and incidents. The Project follows a defined process for ensuring that potential 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 ALARP.

Cumulative impacts: This ESIA adopts the IFC definition of cumulative impacts which are "*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*". The assessment of potential cumulative impacts focusses on a number of priority valued environmental and social components (VECs) as a result of the Project together with other proposed developments that are within the Project AoI (including other oil and gas development, transport infrastructure, hydro power projects, industrial development, agricultural and tourism development). The Cumulative Impact Assessment (CIA) identified a number of potential cumulative high negative impacts on biodiversity, ecosystem service, social and health VECs, but also cumulative benefits to the local economy. The CIA identifies the Project level mitigation that could be promoted and extended to other developments to address potential negative cumulative impacts. In order to promote and implement collaboration between developers and with government agencies, the need for a Regional Cumulative Impacts Management (RCIM) initiative has been identified in order to ensure the sustainable management of priority VECs.

Transboundary impacts: Potential transboundary impacts may be considered as potential impacts that extend to multiple countries, beyond the host country of the Project (in this case, beyond Uganda), but are not global in nature. There are several potential, theoretical pathways for transboundary effects on neighbouring countries; however, due to the nature and type of the Project and environmental context, it is unlikely to significantly impact upon other countries and states. Where potential transboundary impacts have been identified, mitigation measures have been in-built into the design or identified as additional mitigation in the technical assessments of the ESIA to ensure that any remaining residual transboundary impacts are considered to be not significant.

1.9 Environmental and Social Management Plan

Each technical chapter of the ESIA includes a section specifically relating to the identification of additional mitigation and enhancement measures. ***Chapter 23: Environmental and Social Management Plan*** provides a framework for implementation of the identified mitigation measures. The Framework ESMP presented in the ESIA outlines the requirements and standards on which the Project ESMP will be based, its structure, the roles and responsibilities of key members, and outlines the environmental and social documentation and compliance procedures that will be required.

The ESMP will form part of the wider Project Proponents Health, Safety, Security, Social and Environment Integrated Management System (HSSSE-IMS). 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. 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 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 also been collated into an *ESMP Mitigation Checklist*.

1.10 Overview

The ESIA has systematically reviewed the effects of the Project on the existing environmental, social and ecological sensitive receptors. The impact assessment covered the entire life of the Project, split into four individual phases including Site Preparation and Enabling Works, Construction and Pre-Commissioning, Commissioning and Operations and Decommissioning. The assessment was undertaken in accordance with the Ugandan EIA Regulations (1998) and the IFC PSs (2012).

Potential short and long term, direct and indirect impacts were identified using standard assessment methodology and subsequently additional mitigation measures and enhancement controls were identified to try and help ensure that any potentially 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 potentially 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 Low or Insignificant. However, a number of potential negative residual impacts remain which have been outlined 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 potential benefits that it will bring to the Country, which will far outweigh any short term localised potential 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.

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01 - Introduction

Table of Contents

Table of Figures

List of Tables

1 Introduction

1.1 Oil and Gas Exploration and Production in Uganda

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

Commercial accumulations of oil were first discovered in Uganda in 2006 within the Albertine Graben. The current estimate of the country's petroleum oil in place is 6.5 billion stock tank oil-initially-in-place (STOIIP) barrels of oil (bbl), of which 1 billion bbl is estimated as recoverable. In addition, gas resources are currently estimated at 160 billion cubic feet of gas (Ref 1-1).

The Government of Uganda (GoU) has plans for commercialisation of the discovered resources, which includes the phased development of a refinery, use of crude oil to generate electricity and export of crude oil to international markets by pipeline via Tanzania.

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.

This Environmental and Social Impact Assessment (ESIA) Report relates to the oil and gas development of Contract Area – CA-1, License Area – LA-2 North and Exploration area EA-1A. It should be noted that exploration fields and well pads in the Exploration area EA-1A are not part of the current plan for development and are therefore excluded from this ESIA. However a number of Project components located within EA-1A, including a camp and roads are included.

The development is known as the "Tilenga Project" (and referred to as "the Project" throughout this ESIA). The name Tilenga is derived from the two local names for the Uganda Kob (Antelope), called "*Til*" in Luo and "*Engabi*" in Runyoro. The antelope is also one of the main animals found in the Murchison Falls National Park (MFNP) and it depicts the rich environment and biodiversity of the area where the Project is located and the Project Proponents willingness to preserve it.

Tilenga is a strategic Project because of the anticipated benefits for the country including improved infrastructure such as roads and job opportunities (skilled and unskilled). The Project is also anticipated to provide businesses with opportunities to supply goods and services to the oil companies and their contractors.

1.2 Overview of the Tilenga Project

1.2.1 Project Location

The Project is located within Buliisa and Nwoya Districts in the Albertine Graben, in Western Uganda. The exact location of the Project is outlined in Figure 1-1 and Figure 1-2. The Albertine Graben is recognised as one of Africa's most important areas for biodiversity, and approximately 30% of CA-1 recoverable reserves and EA-1A, east of the Albert Nile, and part of LA-2 (North), are within the MFNP, which hosts a range of emblematic wildlife and attracts national and international tourism. MFNP is the largest and the second-most visited national park in Uganda after Queen Elizabeth National Park and is ecologically important for a number of globally and regionally threatened species. Together with the adjacent Bugungu Wildlife Reserve and the Karuma Wildlife Reserve, MFNP forms part of the Murchison Falls Conservation Area (MFCA).

There are also a number of forest reserves in the Project Area of Influence (AoI) such as the Budongo and Bugoma Forest Reserves. MFCA plus the forest reserves form important animal corridors and are biodiversity hotspot areas of tourism and recreational importance. Based on the studies performed, Murchison and Semiliki landscape is known to comprise Critical Habitat as defined by the guidance notes to International Finance Corporation (IFCs) Performance Standards (PS) (Ref. 1-3). Parts of the development footprint qualify as Natural Habitat and in some cases Critical Habitat.

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

In a social context, the Project is located within the Buliisa District (specifically, villages within the sub counties of, Buliisa Sub County, Ngwedo Sub County, Kigwera Sub County and Buliisa Town Council) and within parts of Nwoya District (specifically Purongo Sub County and Got Apwoyo Sub County) and Masindi Municipality (Masindi District). Other surrounding and nearby areas include wider parts of Buliisa District including Biso Town Council; Hoima Municipality (Hoima District); and Pakwach Town Council (Pakwach District).

1.2.2 Project Overview

Total Exploration & Production (E&P) Uganda B.V (hereafter referred to as “TEP Uganda”), Tullow Uganda Operations Pty Limited (hereafter referred to as ‘TUOP’) and the China National Offshore Oil Company Uganda Limited (CNOOC) (referred to as the Joint Venture Partners (JVPs) or Project Proponents) plan to develop the discovered oil fields located in the Lake Albert region of Western Uganda.

Each of the three partners: TEP Uganda, TUOP and CNOOC, holds a 33.33% interest in each area (CA-1, LA-2, EA-1A, and the Kingfisher Development Area (KFDA)). The GoU at award of the Production Licenses exercised its right to participate in these Joint Ventures at a 15% interest through its private subsidiary, Uganda National Oil Company (UNOC). With this back-in interest by the GoU, the JVPs interest is split as follows:

- TEP Uganda - 28.3%;
- TUOP - 28.3%;
- CNOOC - 28.3%; and
- UNOC - 15%

However, currently discussions are also underway among the partners and the GoU to finalise the transfer of equity of about 22% of TUOP’s interest equally to TEP Uganda and CNOOC, leading to TEP Uganda and CNOOC owning 37.5%, TUOP 10% and UNOC 15%.

The overall objective of the Project is to establish production of the oil fields located within CA-1, LA-2 North and EA-1A in an economically prudent manner using sound reservoir management principles

and best industry practice. This includes ensuring the safety of workers and the public and limiting as far as practicable adverse environmental and social impacts of the Project activities, enhancing the beneficial impacts, and also seeking to achieve a net gain in biodiversity and ecosystem services as relevant, in compliance with applicable laws and IFC standards.

Ownership and control of minerals and petroleum in, on, or under any land or waters in the country is vested in the Government by Article 244 of the Constitution of the Republic of Uganda, 1995 (Ref. 1-4). The Directorate of Petroleum in the Ministry of Energy and Mineral Development (MEMD) and the Petroleum Authority of Uganda (PAU), promotes and regulates the exploration of oil and gas in the country. Petroleum exploration and production activities in the country are guided by the terms and conditions of the relevant Production Agreements between JVPs and GoU, and applicable Uganda law, in particular the Petroleum (Exploration, Development and Production) Act 2013 (Ref. 1-5) and the Petroleum (Exploration, Development and Production) Regulations (Ref. 1-6) made thereunder.

Figure 1-1: Geographic Context of Project Location

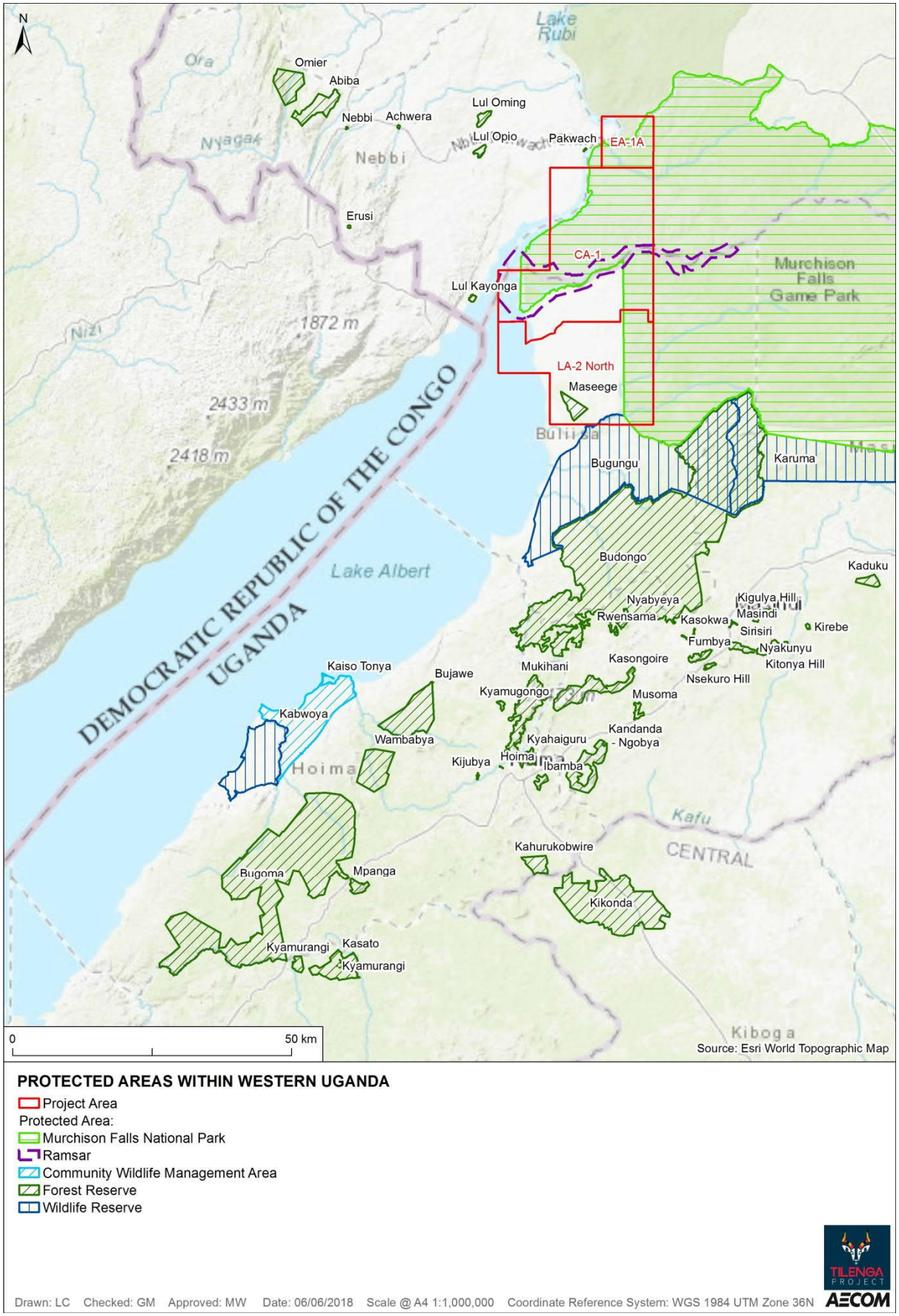


Figure 1-2: Protected Areas located within and surrounding the Project Area

The Project is part of the wider oil and gas development being undertaken in the Lake Albert region (Figure 1-3). The Project Area, as illustrated in Figure 1-4, is approximately 111,000 hectares (ha). For the purposes of this assessment the Tilenga Project Area covers the entire area of Block CA-1, EA-1A and LA-2 (northern part). Specifically, it comprises of six oil fields — Jobi-Rii, Ngiri, Gunya located in CA-1 and Kasamene-Wahrindi, Nsoga and Kigogole located in LA-2 North.

This ESIA has been produced in accordance with The Environmental Impact Assessment Regulations, S.I. No 13/1998 (Ref. 1-7) (provided under section 107 of the National Environmental Act Cap 153 (Ref. 1-8)), as discussed further in section 1.4. In addition, the ESIA has been developed to comply with the IFC Performance Standards (Ref. 1-3).

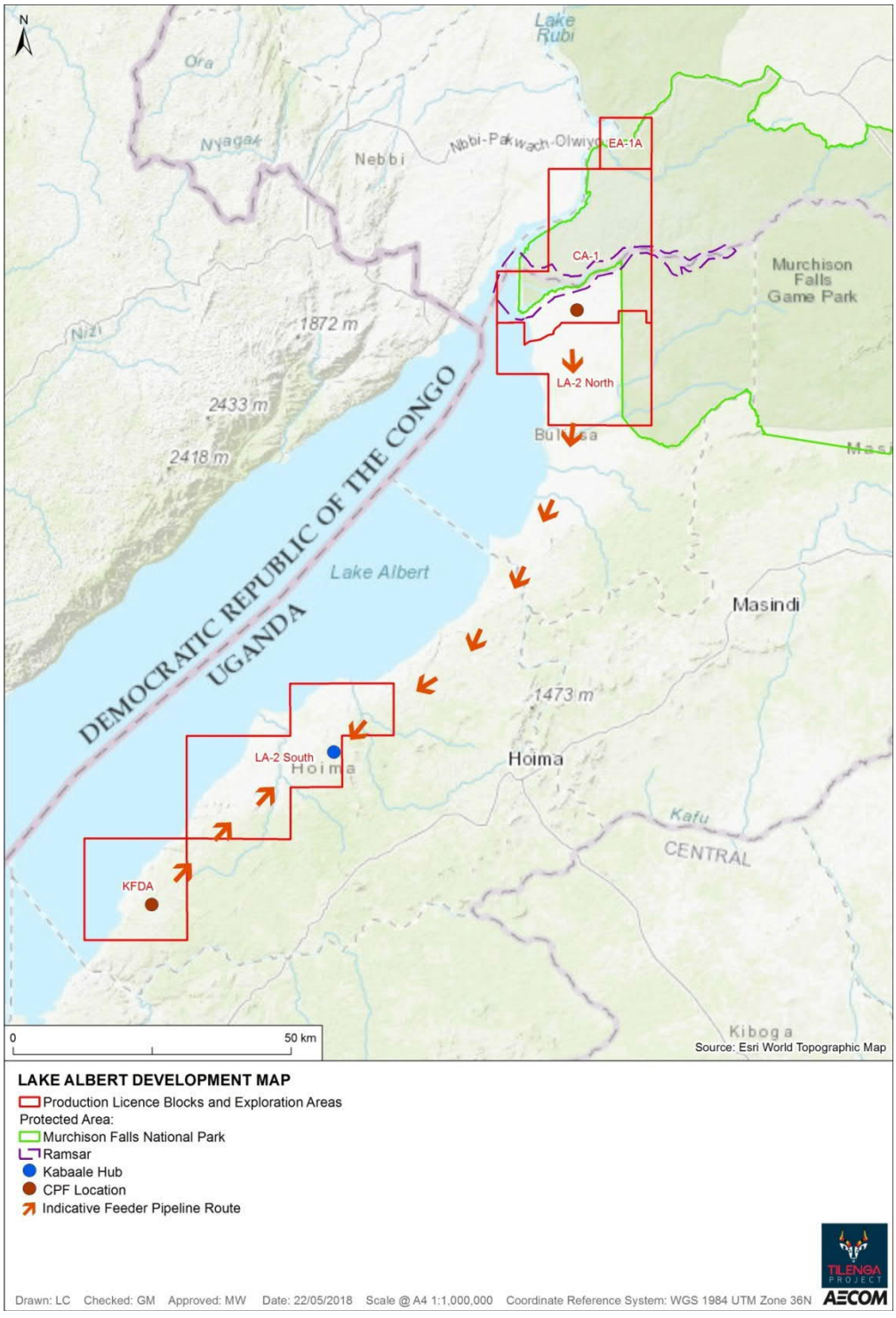


Figure 1-3: Lake Albert Development Map

Figure 1-4: Proposed Tilenga Project Development Infrastructure

The permanent Project components comprise the following key elements:

- 34 well pads, each containing up to 22 wells;
- A network of buried pipelines and flowlines[1] (referred to as the Production and Injection Network), including a Victoria Nile river crossing beneath the riverbed;
- An Industrial Area, which will include the following facilities:
  - Central Processing Facility (CPF);
  - Utilities;
  - Operation Camp;
  - Operations Support Base;
  - Drilling Support Base including Liquid Mud Plan;
  - Community / Visitors Centre;
  - Security Camp; and
  - Logistics Support Centre;
- A Water Abstraction System (WAS) located at Lake Albert; and
- Victoria Nile Ferry Crossing Facility including associated jetty;

In addition to the components listed above, a number of existing facilities will be upgraded and used for the duration of the Project. These include:

- Tangi Operation Support Base (north of Victoria Nile);
- Bugungu Airstrip; and
- Roads to allow access to CPF and well pads (the Project will also require the construction of new roads in addition to road upgrades).

The development of the Project will also involve a number of temporary facilities as summarised below:

- Construction Camps located in:
  - The Industrial Area;
  - Buliisa;
  - Bugungu; and
  - Tangi.
- Construction Support Bases at:
  - Industrial Area (to support the Project south of the Victoria Nile); and
  - Tangi (to support the Project north of the Victoria Nile).
- Masindi Vehicle Check Point.

Further details on the Project components are provided within ***Chapter 4: Project Description and Alternatives***.

A 24-inch feeder pipeline will transport the oil from the CPF to the delivery point at Kabaale in Buseruka sub county, Hoima District. From Kabaale (Delivery point), the oil will be distributed to the refinery or to the planned East African Crude Oil Pipeline (EACOP). EACOP will export the crude oil

[1] A flowline is defined as a pipe that transfers fluid from an oil or gas well to a processing facility.

via a 24-inch pipeline for about 1,450 km up to Tanga on the Tanzanian coast. The EACOP system will include associated pumping stations, electrical heating systems and an oil export terminal located at the Chongeleani peninsula near Tanga port in Tanzania. The Tilenga feeder and EACOP pipelines are subject to separate ESIA reports. A Scoping Report and terms of reference for the pipelines was submitted to National Environment Management Authority (NEMA) in July 2017 and the ESIA Terms of Reference approved in September 2017.

The Pre-project phase consisted of a number of high level feasibility studies which have been used to assist in the Front End Engineering Design (FEED) of the Project and help avoid potential impacts wherever possible. For the purposes of this ESIA, the Project is broken down into four phases as follows:

- ***Site Preparation and Enabling Works*** – consisting of activities for enabling infrastructure works (including site preparation, new roads, road upgrades, well pad and water abstraction system civil works, airstrip upgrade works, and construction of the Victoria Nile ferry crossing facility and logistic checkpoint);
- ***Construction and Pre-commissioning*** - associated with the main facilities (at the Industrial Area (including the CPF), well pads, production and injection network (i.e. pipeline and flowline network), and water abstraction system);
- ***Commissioning and Operations*** - of the main facilities; and
- ***Decommissioning*** - including final restoration at the end of the Life of the Field.

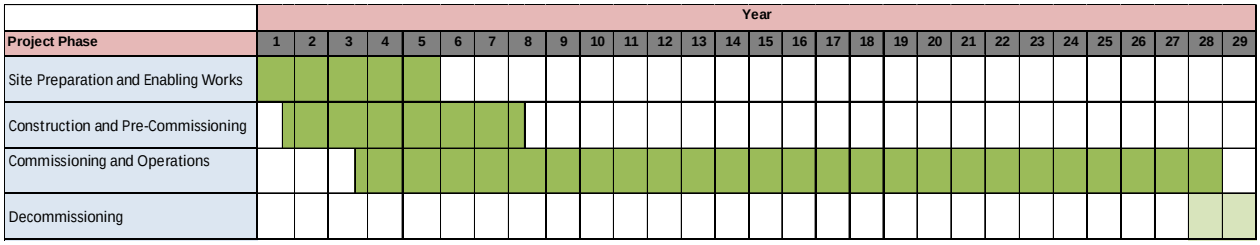
The GoU has also committed to support development of oil and gas operations within the Albertine Graben through providing the required infrastructures and appropriately resourced reviews for approval of applications. Government will provide infrastructure which will include upgrades to existing infrastructure and development of new including roads, bridges and power transmission lines. These are being developed by various government ministries and agencies, and are subject to separate ESIA reports.

Additional information on the key components of the Project is described in ***Chapter 4: Project Description and Alternatives*** of this ESIA Report. This ESIA has been developed in conjunction with the FEED process of the Project. This has been beneficial as it allows provisional results of the impact assessment to feedback into the FEED process, thus avoiding any potentially significant negative impacts and also allowing for any design changes to also be assessed within the ESIA.

1.2.3 Tilenga Project Phases and Timeline

The description of the Project has been split into a number of phases as outlined in section 1.2.2 above. An indicative schedule of the overall Project is provided in Figure 1-5.

Figure 1-5: Project Schedule



1.3 Background

1.3.1 Executing Arrangements for Petroleum Development Operations

The principle legislation governing the petroleum exploration and production activities in the country is the Petroleum (Exploration, Development and Production) Act 2013 (Ref. 1-5). Under this law, a license is required for any person to carry out petroleum exploration, development and production operations.

The GoU has, to date, used a production sharing form of petroleum agreement known as a Production Sharing Agreement (PSA). The parties to PSA's are the Government and licensees (oil companies). The PSA details the specific obligations and requirements of the parties to the Agreement. These include work programmes, financial obligations, and Health, Safety and Environment (HSE) requirements together with other data and reporting obligations.

1.3.2 Lake Albert Integrated Development

In February 2012, TEP Uganda and CNOOC were each granted the acquisition of a one-third interest in Exploration Areas EA-1 and EA-1A, EA-2 and EA-3A in Uganda. These had all previously been held by Tullow's two entities in Uganda i.e. Tullow Uganda Operation Pty Limited and Tullow Uganda Limited hereafter referred to as "TUOP". TUOP retained the remaining one-third interest.

The integrated development[2] of the Lake Albert fields (Figure 1-3), was originally sub-divided into three license areas:

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

Of the 40% area in the Graben that is currently explored, approximately 10% is operated by these three oil companies. In 2016, EA-1 JVPs represented by TEP Uganda as EA-1 Operator and EA-2 JVPs represented by TUOP as EA-2 Operator (i.e. the Project Proponents) were granted Production Licenses for Ngiri, Jobi Rii, Gunya Fields in EA-1 and Mputa-Nzizi-Waraga, Kasemene-Wahrindi, Kigogole-Ngara, Nsoga and Ngege fields in EA-2 by the GoU. The EA-3A JVPs represented by CNOOC as EA-3A Operator had been earlier issued a production license for the Kingfisher field in 2013. On issuing the Production licences, this also led to a change in name to some of the key development areas (e.g. EA-1 now became Contract Area 1 (CA-1), EA-2 became License Area 2 (LA-2) and EA-3A became Kingfisher Development Area (KFDA)). The next step for the Project Proponents is to proceed with activities required to make a Final Investment Decision (FID) for the development of the integrated Lake Albert project fields in 2018.

This ESIA Report relates specifically to the Tilenga Project (CA-1, LA-2 North and EA-1A – as shown on Figure 1-2 and Figure 1-3), and whose key components are shown in Figure 1-4 and are described in section 1.2.2.

A3 versions of all the key figures presented within this ESIA Report are provided within Appendix D.

1.4 Requirement to undertake an ESIA for the Project

In accordance with Section 19 of the National Environment Act Cap 153 (Ref. 1-8) and Regulation 3 of the Environmental Impact Assessment Regulations, 1998 (Ref. 1-7), an ESIA is required before commencement of the Project. The Third Schedule of the Act lists the projects that shall be considered for ESIA. This Project specifically lies within "*Category 6. Mining, including quarrying and open-cast extraction of (j) exploration for the production of petroleum in any form*".

[2] The integrated development includes the Kingfisher Field (formerly EA-3A), the Kaiso Tonya Development in the South of Block LA-2 and the Buliisa Development in Block CA-1 and the north of Block LA-2).

Therefore, the main purpose of the ESIA is to provide the relevant authorities and stakeholders with sufficient information on the Project development so that an informed decision for approval on the environmental and social aspects of the Project can be made and a Certificate of Approval issued.

Additionally, the Project Proponents have also ensured that through the development of this ESIA, an iterative process has been followed which has enabled suitable management and mitigation measures to be developed which seek to avoid and minimise potential negative environmental and social impacts and enhance any beneficial impacts. The FEED engineers have been provided with detailed information on the environmental and social baseline as it became available to ensure that design development is undertaken in consideration of environmental and social aspects. The main focus has been on avoidance of key sensitive features as well as identification of key management and mitigation measures to be adopted through the various Project phases. These are discussed throughout the ESIA Report.

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

A Scoping Report for the Tilenga Project which contained detailed proposed ToR for the ESIA was submitted to NEMA in December 2015. NEMA subsequently provided formal approval of the Scoping Report and ToR on 21st April 2016. A copy of the approval is contained within Appendix A of this ESIA, along with a summary table which shows where the recommendations have been considered and addressed within the ESIA.

This ESIA Report has been developed in line with the ToR submitted and approved by NEMA as well as in consideration of the comments made when the approval was granted. The development of the ESIA also adheres to the specific requirements outlined in "*Part IV: The Environmental Impact Statement*" of the Environmental Impact Assessment Regulation, S.I No 13/1998 (provided under section 107 of the National Environmental Act Cap 153) (Ref 1-7).

Additionally, TEP Uganda and TUOP have a commitment to meet best international practice for undertaking environmental and social impact assessment and thus this ESIA and proposed mitigation measures also meet the requirements outlined in the IFC PS (2012). Ahead of a formal categorisation, the Project Proponent has proceeded with this ESIA process on the assumption that it would be given the categorisation of "A" on the basis that it fits the Category A description: *'Projects with potential significant adverse environmental or social risks and/or impacts that are diverse, irreversible or unprecedented"* as outlined in the Environmental and Social Review Procedures Manual (IFC, 2016) (Ref. 1-9).

1.4.1 Overview of ESIA Standards and Guidelines

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

- National policies;
- National laws;
- National regulations (and associated standards);
- National guidelines;
- International standards, guidelines and conventions ratified by Uganda;
- IFC PS (Ref. 1-3); and
- Internal TEP Uganda and TUOP Policies and Guidance.

Legislation that is in draft form and not yet promulgated has also been reviewed during the ESIA process such that the ESIA and associated plans (i.e. Environmental and Social Management Plan (ESMP)) are responsive and meet the anticipated relevant standards and guidelines. A more detailed overview of the relevant national legislation and international standards and guidelines is contained within ***Chapter 2: Policy, Regulatory and Administrative Framework***.

1.5 ESIA Project Team

1.5.1 The Project Proponents

The Project is being developed by TEP Uganda and TUOP, as identified and discussed above in section 1.2.2. Further information on each of the key Project Proponents is provided below.

1.5.1.1 Tullow Uganda Operation PTY (TUOP)

Tullow is a leading independent oil & gas, exploration and production group, quoted on the London, Irish and Ghanaian stock exchanges (symbol: TLW). The Group has interests in over 80 exploration and production licences across 16 countries which are managed as three delivery teams: West Africa, East Africa and New Ventures. In Uganda TUOP is the designated operator of EA 2. For further information please refer to website at www.tullowoil.com.

Tullow entered into three Ugandan exploration licences in 2004 (as Tullow Uganda Limited) following the acquisition of Energy Africa. The Group added further equity and operatorship to the licences in the Lake Albert Rift Basin when it acquired Hardman Resources in 2007 (as Tullow Uganda Operations Pty Ltd).

A series of transactions took place in 2010-2012 whereby Tullow acquired 100% of the three licences after acquiring the commercial interests of Heritage Oil and Gas before sharing a third of the equity to both CNOOC and Total in 2012. TUOP expects to further reduce their shareholding on the Project in 2018 as highlighted in section 1.2.2.

1.5.1.2 Total E&P Uganda B.V

Total S.A. is a French multinational integrated oil and gas company operating in over 130 countries in the world. The Group has been operating in Uganda in the downstream /retail market as Total Uganda since 1955 and has a market share of around 25+%. In February 2012, the Group joined the upstream oil and gas industry in Uganda (as TEP Uganda) by announcing the acquisition of a one-third interest in the four Ugandan licenses held by an affiliate of Tullow Oil plc.

In 2017, TEP Uganda announced a further interest to increase the company stake that it had acquired in the PSA. More information about Total in Uganda can be found on the website: www.ug.total.com.

Table 1-1: Details of the Project Proponents

ITEM	DESCRIPTION	
Name of Proposed Project	Tilenga Project	
Proponents (Operators)	Total E&P Uganda B.V. (TEP Uganda)	Tullow Uganda Operations Pty Ltd (TUOP)
Addresses	Course View Towers, Plot 21, Yusuf Lule Road, P.O. Box 34867, Kampala, Uganda	2nd Floor, Lotis Towers, Plot 16, Mackinnon Road PO Box 16644, Kampala, Uganda
Proposed Project Owner[3]	TEP Uganda 33.3%, TUOP 33.3%, (with CNOOC owning a further 33.3%)	
Contact Person	Pierre Jessua (TEP Uganda)	Jimmy D. Mugerwa (TUOP)

[3] The respective interest shares will change pending government approval of proposed changes by the JVPs. UNOC are anticipated to become a partner with a share of around 15%.

1.5.2 Details of the Environmental Assessment Practitioners

The Project Proponents appointed independent international and local environmental assessment practitioners, to undertake the ESIA for the Project, from AECOM Limited (hereafter referred to as "AECOM") and Eco & Partner Consult. This partnership offers the perfect balance of personnel who have the necessary experience and knowledge of oil and gas projects, international standards and local Ugandan context and regulations.

1.5.3 ESIA Project Team

An overview of the key members of the Project Team is presented in Table 1-2.

Table 1-2: Key Project Team Members

NAME	PROJECT ROLE
NEMA certified EIA practitioners	
Iain Bell	Project Director and Cumulative Impact Assessment (CIA) Lead
Michael Williams	Project Manager and ESIA Lead
Eddie Luyima	In country ESIA Team Leader
Amos Mafigiri	ESIA Quality Control
Gail Muirhead	Deputy Project Manager
Frank Lugemwa	Social/Stakeholder Expert
Brian Cuthbert	Lead Terrestrial Flora and Fauna
Contributing experts	
Kat Nolan	Lead Stakeholder and Social
Robert Kityo	Terrestrial Fauna Expert
James Kalema	Terrestrial Flora Expert
Derek Pomeroy	Bird Expert
Timothy Twongo	Aquatic Biology Expert
Alison Williams	Lead Project Description and Alternatives
Gregg Somermeyer	Geologist/Soils Expert

NAME	PROJECT ROLE
NEMA certified EIA practitioners	
Philip Smart	Surface Water Expert
Jane Sladen	Groundwater Expert
Stuart Heather	Noise Expert
Gareth Hodgkiss	Air Quality Expert
Deo Okure	Air Quality/Noise Expert
Mike Bains	Waste Expert
Dr. Elizabeth Kyazike	Lead Archaeologist
Leonora O'Brien	Archaeology/Cultural Heritage Expert
Syliver Wadamba	Hydrologist Expert
Robert Naguyo	Geologist/Hydrogeologist Expert
Julius Opio	Soil Expert
Mark Westbury	Social/Socio Economic Expert
Laura Craggs	Lead GIS
Peter Nsiimire	GIS Support
Usha Vedagiri	Health Expert
Nick Chisholm-Batten	Ecosystem Services Expert
Karen Clifford	Landscape and Visual Expert
Neil Titley	Lead ESMP and Commitment Register

1.6 ESIA Strategy

Discussions between the Project Proponents and the key Ugandan Regulators including NEMA, PAU and the Directorate of Petroleum in the MEMD in relation to the development of the ESIA strategy for the Project have taken place on a number of occasions throughout the period of 2016 to 2018.

Following the meeting held on 14th July 2015 between TEP Uganda, TUOP the Environmental Assessment practitioners, NEMA and the Petroleum Exploration and Production Department (PEPD) (who are a department of the Directorate of Petroleum in the MEMD), an agreement was reached ensuring that the assessment of the Project would be undertaken within one integrated ESIA, covering all of the Project components. A list of the Project components is contained within ***Chapter 4: Project Description and Alternatives*** of this ESIA, along with details of the corresponding supporting infrastructure and associated facilities.

At the time of writing the Scoping Report, the Project Proponents operated the two separate concession blocks (EA-1A/CA-1 and LA-2 North) relatively independently and it was agreed at that stage that logistically it would be appropriate for two ESIA Reports to be submitted covering each block, though the content of each document would be identical as it would need to cover the Project as a whole. However, in 2017, TUOP began the process to reduce its shareholding, leaving TEP Uganda as the leading Company in undertaking activities for both the EA-1A/CA-1 and LA-2 North blocks. Consequently, it is now deemed more appropriate to submit a single ESIA covering the Tilenga Project as a whole (excluding the Tilenga feeder pipeline). This approach is deemed beneficial for all parties as it will help to avoid unnecessary duplication. This approach is also in line with the agreement of developing this as an integrated Project.

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

However it is important to note that the ESIA will only cover those elements of the Project which are covered by FEED and described in ***Chapter 4: Project Description and Alternatives*** of this ESIA Report. Other developments such as the Tilenga Feeder Pipeline and the EACOP will be assessed separately via the undertaking of their own ESIA Reports.

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

1.7 Objectives of this ESIA

In accordance with the Equator Principles and Organisation for Economic Cooperation and Development (OECD) Common Approaches (Ref. 1-10), the objectives of this ESIA Report are based on those of IFC PS1: Assessment and Management of Environmental and Social Risks (Ref. 1-3), which are:

- *"To identify and evaluate environmental and social risks and impacts of the project;*
- *To adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimize, and, where residual impacts remain, compensate / offset for risks and impacts to workers, affected communities, and the environment;*
- *To promote improved environmental and social performance of clients through the effective use of management systems;*
- *To ensure that grievances from affected communities and external communications from other stakeholders are responded to and managed appropriately; and*

- *To promote and provide means for adequate engagement with affected communities throughout the project cycle on issues that could potentially affect them and to ensure that relevant environmental and social information is disclosed and disseminated."*

Additionally, and in line with feedback provided by NEMA, the purpose of this ESIA Report is not only to identify and assess potential negative impacts, but also identify and enhance any beneficial impacts associated with the Project.

1.8 Area of Influence of the Project

The ESIA predominantly focuses on the baseline conditions and potential impacts anticipated within and surrounding the Project Area. However, the ESIA has also been prepared taking into consideration the definition of the Project AoI provided by IFC PS1 (Ref. 1-3) which states:

- *"Where the project involves specifically identified physical elements, aspects, and facilities that are likely to generate impacts, environmental and social risks and impacts will be identified in the context of the project's area of influence. This area of influence encompasses, as appropriate:*
- *The area likely to be affected by:*
    - *The project and the client's activities and facilities that are directly owned, operated or managed (including by contractors) and that are a component of the project;*
    - *Impacts from unplanned but predictable developments caused by the project that may occur later or at a different location; or*
    - *Indirect project impacts on biodiversity or on ecosystem services upon which Affected Communities' livelihoods are dependent.*
- *Associated Facilities, which are facilities that are not funded as part of the project and that would not have been constructed or expanded if the project did not exist and without which the project would not be viable; and*
- *Cumulative impacts that result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted."*

Consistent with the definition provided above, the Project AoI includes those areas potentially affected either directly or indirectly, by the activities associated with the development of the Project (including those within the main Project Area for Tilenga, plus the area related to any Associated Facilities), and in the case of cumulative impacts, incremental impacts from other developments, unrelated to the Project, that will take place within the vicinity of the Project Area. Figure 1-6 provides an overview of the identified Project AoI along with displaying the area defined as the Project Area. A list of associated facilities is provided in section 1.10 below.

The assessment of the potential environmental and social impacts of Associated Facilities has been carried out taking into account the limited existing information available and the timing and location of their construction. Reasonable efforts have been made to benchmark against relevant national standards using the available information where possible. This is covered in each technical chapter within the "*In-combination Assessment*" section. In the event of risks and impacts in the Project's AoI resulting from a third party's actions, the Project Proponents will address those risks and impacts in a manner commensurate with the Project Proponents control and influence over the third parties, and with due regard to any potential conflict of interest.

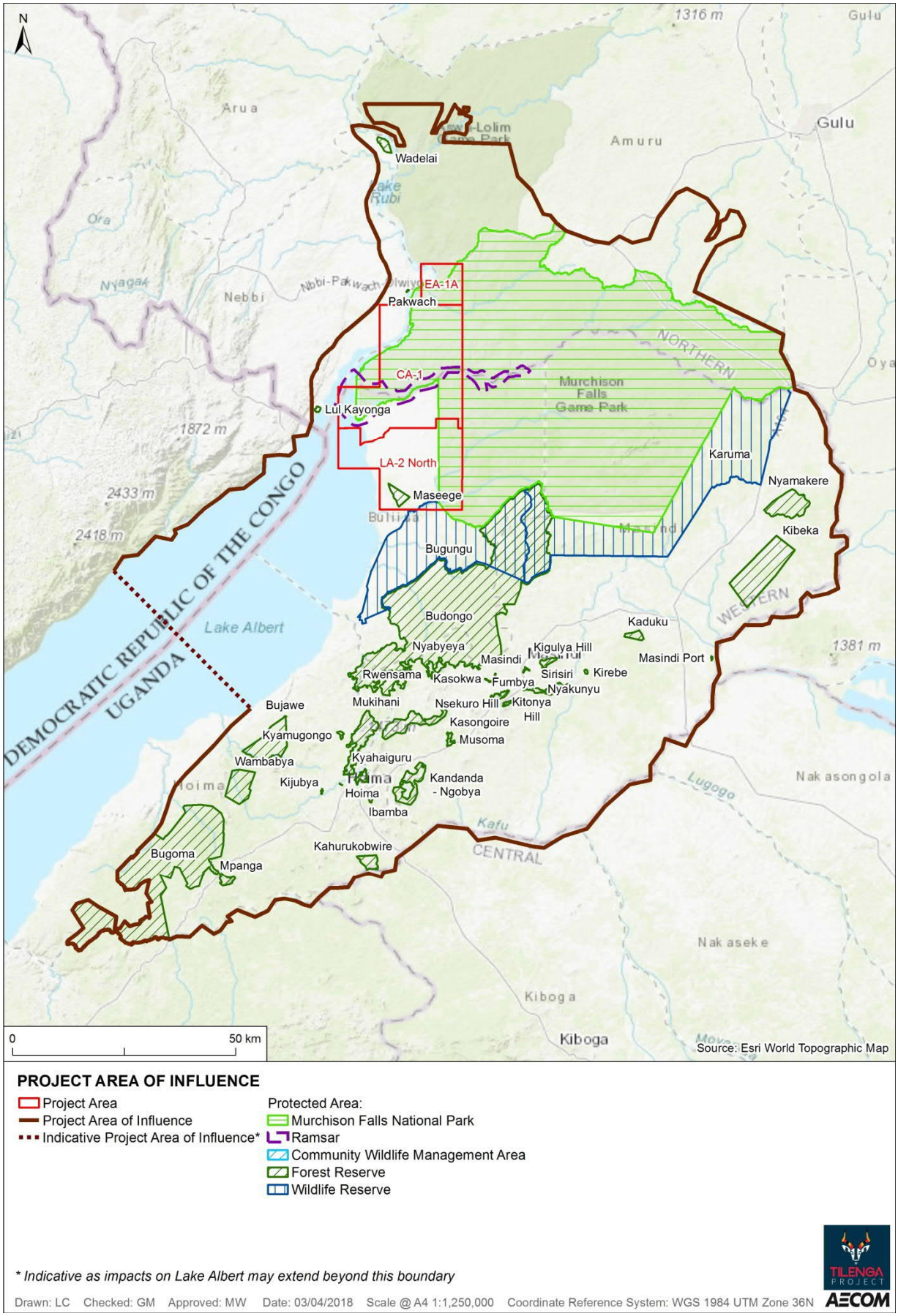


Figure 1-6: Project Area and Project Area of Influence

1.9 Cumulative Impacts

This ESIA adopts the IFC PS (Ref. 1-3) definition of cumulative impacts which are *"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".*

The assessment of potential cumulative impacts includes a number of other proposed developments that are also likely to result in impacts within the Project AoI. Further details of the approach and schemes considered within the cumulative impact assessment are provided in ***Chapter 21: Cumulative Impact Assessment*** of this ESIA.

1.10 Supporting and Associated Facilities

There are a number of supporting and associated facilities that are being developed with the Tilenga Project. The facilities include:

- Tilenga Feeder Pipeline;
- East African Crude Oil Pipeline;
- Waste management facilities;
- 132 Kilovolt (kV) Transmission Line from Tilenga CPF to Kabaale Industrial Park; and
- Major road upgrades being undertaken by Uganda National Roads Authority (UNRA) for the purpose of supporting the construction and operation of the Project (referred to as "critical oil roads").

1.11 Structure of the ESIA Report

Table 1-3 and Figure 1-7 provide an overview of the structure and content of this ESIA Report which we have kept consistent with what was presented within the ESIA Scoping Report and ToR documents.

Table 1-3: ESIA Report Structure

Chapter	Approach
Main ESIA Report	
ESIA Volume I – Introductory Chapters	
Table of Contents	Provides an overview of each section of the ESIA including the main level headings.
List of Abbreviations	Provides a list of all abbreviations used in the ESIA Report.
Glossary	Provides an explanation of the key terms used within the ESIA.
0. Executive Summary	In line with the EIA Regulations, this section provides a brief written summary of the findings of the ESIA.
1. Introduction	Presents an overview of the Tilenga Project and the objectives of the ESIA. This chapter also details the purpose, structure and scope of the ESIA Report.
2. Policy, Regulatory and	Includes:

Chapter	Approach
Administrative Framework	• A description of the Ugandan regulatory process to be followed for all Project Activities; • Identification of Ugandan environmental and social legislation of relevance to the Project; • Identification of international treaties and conventions to be adhered to; and • Identification of international standards and guidelines of relevance to the Project.
3. Impact Assessment Methodology	Includes: • A description of the ESIA process; and • A general description of the impact assessment methodology and of the adopted impact significance criteria.
4. Project Description and Alternatives	A detailed description of: • Overall design of the Project; • Site Preparation and Enabling Works; • Construction and Pre-Commissioning works and staging; • Commissioning and Operations; and • Review of Decommissioning. Review of the alternative locations and designs for the Project incorporating best practices analysis. Provides a comparison of the developmental options considered in the Project design phase including the 'zero' option, and alternative development plans and options which have been considered.
5. Stakeholder Engagement	Provides a summary of Project consultation undertaken, the general issues raised, and an outline of where these issues have been addressed within the ESIA documentation.
ESIA Volume II – Physical Environment	
6. Air Quality and Climate	Includes: • A description of the methods used and results from surveys and secondary data review to define baseline conditions relevant to the technical discipline; • A description of mitigation measures incorporated into the Project design • An assessment of potential impacts arising from all phases of the Project and related activities; • The identification of practicable additional mitigation measures to be applied; • An assessment of residual impacts associated with the Project following mitigation; and • A review of in-combination impacts relating to associated facilities.
7. Noise and Vibration	
8. Geology and Soils	
9. Hydrogeology	
10. Surface Water	
11. Landscape and Visual	
12. Waste	

Chapter	Approach
ESIA Volume III – Ecological/Biological	
13. Terrestrial Vegetation	Includes: • A description of the methods used and results from surveys and secondary data review to define baseline conditions relevant to the technical discipline; • A description of mitigation measures incorporated into the Project design; • An assessment of potential impacts arising from all phases of the Project and related activities; • A review of No Net Loss/Net Gain accounting results; • The identification of practicable additional mitigation measures to be applied; • An assessment of residual impacts associated with the Project following mitigation; and • A review of in-combination impacts relating to associated facilities.
14. Terrestrial Wildlife	
15. Aquatic Life	
ESIA Volume IV - Social/Health/Ecosystem	
16. Social	Includes: • A description of the methods used and results from surveys and secondary data review to define baseline conditions relevant to the technical discipline; • A description of mitigation measures incorporated into the Project design; • An assessment of potential impacts arising from all phases of the Project and related activities; • The identification of practicable additional mitigation measures to be applied; • An assessment of residual impacts associated with the Project following mitigation; and • A review of in-combination impacts relating to associated facilities.
17. Archaeology and Cultural Heritage	
18. Health and Safety	
19. Ecosystem Services	
ESIA Volume V – Other chapters and Conclusions	
20. Unplanned Events	Includes: • A description of the potential unplanned events and impacts that may arise as a result of the Project; and • The identification of design control and mitigation measures to be implemented.
21. Cumulative Impact Assessment	A summary of the potential cumulative impacts as a result of other existing and proposed developments and associated facilities in the vicinity of the Project Area and the Project AoI.
22. Transboundary Impact Assessment	A description of the potential for transboundary impacts that may arise as part of the Project.
23. Environmental and Social Management Plan	This chapter provides a framework of the ESMP and outlines the Project Proponents Environmental and Social Management System (ESMS). It also provides reference to the identified mitigation and management measures, to be implemented throughout the Project, based on the outcomes of the impact assessment.
24. Residual Impact Assessment and Conclusions	A summary of the residual impacts arising as a result of the Project and provision of overall conclusions as to the overall environmental and social significance of impacts arising from the Project.

Chapter	Approach
ESIA Volume VI - Appendices	
ESIA Appendices A to U	The ESIA Appendices include an array of supplementary data, information, presentations and reports which help support the findings of the ESIA, as referenced throughout the ESIA Report. These include: Appendix A: NEMA Approval for Scoping Report and Project Proponents Response Appendix B: Key Project Component Fact Sheets Appendix C: Early Works Project Brief (PB) Executive Summary and Enabling Infrastructure Geotechnical surveys PB Executive Summary Appendix D: A3 copy of key figures Appendix E: Additional Project Description material Appendix F: CIA VEC Summary Report Appendix G: Stakeholder Engagement Plan and supporting information Appendix H: Air Quality supporting information Appendix I: Noise and Vibration supporting information Appendix J: Soils and Geology supporting information Appendix K: Hydrogeology supporting information Appendix L: Surface Water supporting information Appendix M: Landscape and Visual supporting information Appendix N: Terrestrial Vegetation supporting information Appendix O: Terrestrial Wildlife supporting information Appendix P: Aquatic Life supporting information Appendix Q: Social supporting information Appendix R: Archaeology and Cultural Heritage supporting information Appendix: S: Ecosystem Services supporting information Appendix T: ESMP Mitigation Checklist Appendix U : Templates of Management Plans
ESIA Non-Technical Summary	
ESIA NTS	The purpose of the Non-Technical Summary (NTS) is to provide a helpful summary of each of the chapters of the main ESIA and also ensure that the conclusions and overview of required mitigation measures are clearly expressed.

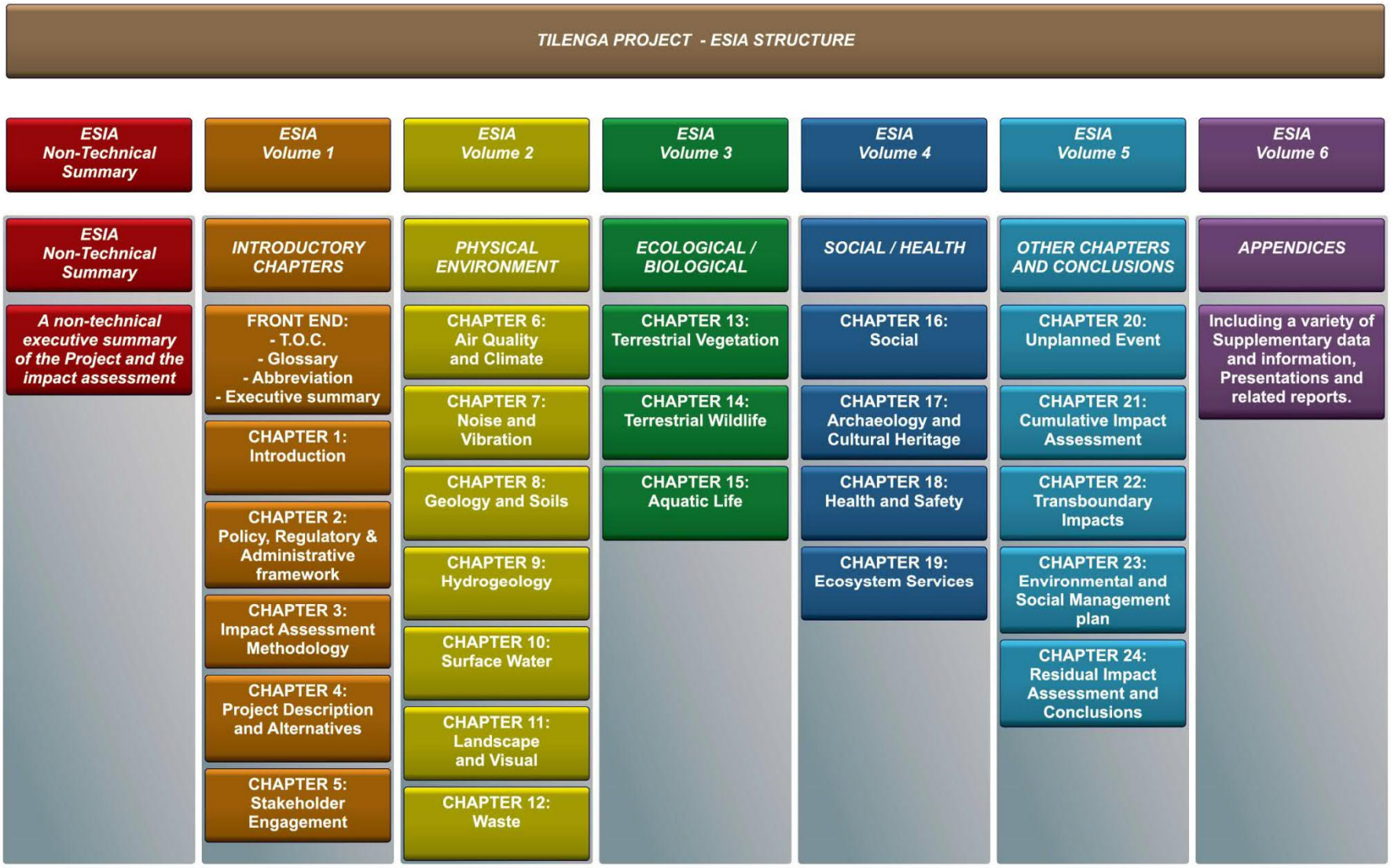


Figure 1-7: Structure of Tilenga ESIA

1.12 Example Structure of the Technical Chapters of the ESIA

In addition to the overall ESIA Strategy (section 1.6) and the overview of the ESIA Structure (1.11) above, it is useful to help further define the contents of each of the technical chapters (i.e. Chapters 6 to 19) to illustrate that it covers all of the required information. It is also important that the information contained in the technical chapters is presented in a logical, easy to follow and well-structured format which relates to the components of the Project and the requirements of the Ugandan EIA requirements and IFC PS and guidelines.

Figure 1-8 provides an overview of the typical structure and contents of the ESIA technical chapters. Further information is provided within ***Chapter 3: ESIA Methodology*** and in each of the technical chapters of this ESIA.

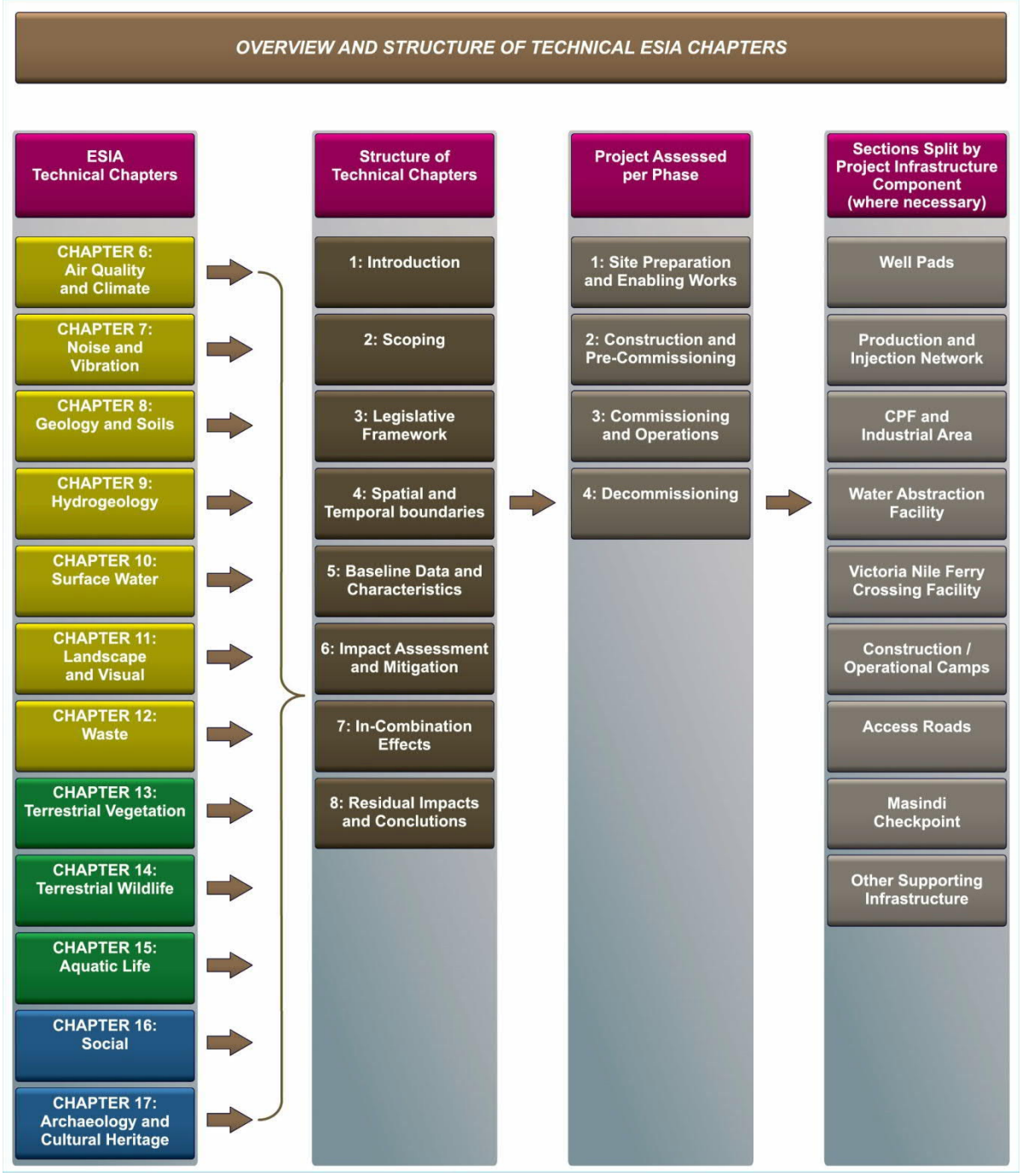


Figure 1-8: Structure of Technical Chapters of the ESIA

1.13 References

Ref. 1-1 National Oil and Gas Policy for Uganda (2014), Ministry of Energy and Mineral Development.

Ref 1-2 PAU website: http://pau.go.ug/exploration; accessed 21 February 2018.

Ref. 1-3 International Finance Corporation, (2012), Performance Standards.

Ref. 1-4 The Republic of Uganda (1995) Government by Article 244 of the Constitution of the Republic of Uganda.

Ref. 1-5 The Republic of Uganda (2013) The Petroleum (Exploration, Development and Production) Act.

Ref 1-6 The Republic of Uganda (2016) Petroleum (Exploration, Development and Production) Regulations.

Ref. 1-7 The Environmental Impact Assessment Regulations, Statutory Instruments No. 13, Government of Uganda. (1998).

Ref. 1-8 The National Environment Act, Cap. 153, (1995) Government of Uganda.

Ref. 1-9 International Finance Corporation (2013) Environmental and Social Review Procedures Manual.

Ref. 1-10 Organisation for Economic Co-operation and Development (2016) Recommendation of the Council on Common Approaches for Officially Supported Export Credits and Environmental and Social Due Diligence.

02 – Policy, Regulatory and Administrative Framework

Table of Contents

Table of Figures

List of Tables

2 Policy, Regulatory and Administrative Framework

This chapter outlines the national policies, laws, regulations, standards and guidelines, as well as international conventions (to which Uganda as a sovereign state is a signatory) that apply to the environmental, health, safety, human rights and social aspects of the Project. The requirements stipulated within this framework encompass all phases of the Project including Project engineering; land acquisition and resettlement; development of early infrastructure and temporary facilities; and development of production infrastructure.

National policies present the general principles that guide the Government in achieving its various strategic goals, and act as foundational instruments for the formulation of Acts of Parliament and Statutory instruments/ regulations or subsidiary legislation under these Acts of Parliament. The national environmental standards are prescribed under some of these regulations which were passed under the Acts of Parliament.

In association with this chapter, each technical chapter of this Environmental and Social Impact Assessment (ESIA) report outlines and identifies the relevant legislation and guidelines applicable to the content developed in the respective chapter.

The specific objectives of the regulatory framework review are:

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

2.1 Ugandan National Framework

2.1.1 National Policies, Laws and Regulations

Table 2-1 presents a summary of the national policies, laws, and regulations applicable to the proposed Project and its environmental and social aspects. Legislation that is specific to certain aspects is presented in the respective technical chapters.

Table 2-1: National Policies, Laws and Regulations

INSTRUMENT / LEGISLATION	OVERVIEW	RELEVANCE TO THE PROJECT
National Policies		
The National Environment Management Policy (NEMP) (1994) (Ref. 2-1)	The National Environment Management Policy (1994) provides an enabling framework for management of environmental resources in all aspects of national planning including providing a system of environmental impact assessment so that the adverse impacts of development activities can be foreseen, avoided or mitigated.	Requirement for ESIA to be carried out prior to commencement of the Project in line with relevant legislation.

INSTRUMENT / LEGISLATION	OVERVIEW	RELEVANCE TO THE PROJECT
The National Water Policy (1999) (Ref. 2-2)	The policy was developed to promote the proper planning, development and wise use of water resources. Its overall policy objective is to manage and develop the water resources of Uganda in an integrated and sustainable manner, with environmental impact assessment as one of the strategies for water resources management.	The Project has water needs that will be met with the use of available water resources in the Project Area. This will be done in line with relevant legislation.
The National Oil and Gas Policy (2008) (Ref 2-3)	The policy seeks to establish and efficiently manage the country's oil and gas resources. One of its objectives is to ensure that oil and gas activities are undertaken in a manner that conserves the environment and biodiversity by ensuring the availability of the necessary institutional and regulatory framework to address environment and biodiversity issues relevant to oil and gas activities. Guiding principles of the Policy include among others; the use of oil and gas revenues to create lasting benefits to society through investment in areas such as skills development, infrastructure, technology and health; protection of the environment and biodiversity; Importance of disclosing relevant information to stakeholders including transparency on payments and revenues; emphasis on system of co-operation extending to local communities, taking into account their interests, sharing royalties in line with the Constitution and relevant laws, and managing conflicts; expectation for oil companies to contribute to institutional capacity building and in transfer of technology.	A Project will have potential impacts on the environment and biodiversity. This ESIA identifies the significance of potential impacts of the Project and mitigation measures to be implemented to ensure that the Project activities are undertaken in a manner that conserves the environment and biodiversity; in line with legislation.
The National Energy Policy (2002) (Ref 2-4)	The policy goal is to meet the energy needs of Uganda's population for social and economic development in an environmentally sustainable manner. Specifically the energy policy seeks to meet the following objectives: • To establish the availability, potential and demand for various energy resources in the country. • To increase access to modern affordable and reliable energy services as a contribution to poverty eradication. • To improve energy governance and administration. • To stimulate economic development. • To manage energy-related environmental impacts.	This Project is aimed at developing one of the country's energy resources (oil and gas) and therefore fits in the long-term planning approach for the country. This ESIA was also conducted in line with the requirement for environmental impact assessment (EIA) of energy investments.
National Industrial Policy (2008) (Ref. 2-5)	The Policy sets out the strategic direction for industrial development in Uganda. Policy objectives include the promotion of environmentally sustainable industrial development and participation of disadvantaged sections of society in industrial development (s 1.3).	Disadvantaged and vulnerable groups are likely to be more vulnerable to potential negative Project impacts and less able to benefit from positive impacts. These groups were therefore identified as part of the ESIA process.

INSTRUMENT / LEGISLATION	OVERVIEW	RELEVANCE TO THE PROJECT
The Uganda Wildlife Policy (2014) (Ref 2-6)	The policy is an update of the Uganda Wildlife Policy (1999) which forms the basis of the Uganda Wildlife Act, Cap 200. One of the strategies to achieve the objectives of this policy is ensuring that all new developments and interventions within protected areas are subjected to appropriate EIA. The Policy sets a framework to conserve wildlife resources of Uganda in a manner that contributes to the sustainable development of the country and the well-being of its people. Among the specific objectives: (1) to promote sustainable management of wildlife, protected areas (in and outside), sustainable and equitable utilisation of wildlife resources a viable form of land use, (2) to effectively mitigate human wildlife conflicts, and (3) to ensure net positive impacts of exploration and development of extractive industries and other forms of development in wildlife conservation areas. The policy identifies key strategies for tourism development including: (1) promote eco-tourism, (2) diversify tourism product, (3) develop or improve infrastructure in wildlife conservation areas, (4) support the private sector to effectively participate in conservation related enterprise development.	Part of the Project area is located within the Murchison Falls National Park (MFNP), which is a protected area. This ESIA was conducted in line with the requirements of this policy, and relevant legislation.
Tourism policy (2013) (Ref 2-7)	The aim of the national Tourism Policy is to ensure that tourism becomes a vehicle for poverty reduction in the future to the extent possible within the resource base and market limitations. The specific objectives are: (1) Derive greater revenues from an increasing number of pleasure tourist arrivals, longer lengths of stay and higher daily expenditure, (2) Distribute revenue earnings widely, with the large scale participation of communities and district in the development, and (3) encourage the development of eco-tourism, agro-tourism and community tourism products.	As part of the Project is located within the MFNP, therefore, the Project has the potential to impact tourism. Impacts on tourism are assessed as part of the ESIA.
The National Fisheries Policy (2004) (Ref. 2-8)	The National Fisheries Policy (NFP) 2004 is a policy framework aimed at improving the livelihoods and alleviating poverty in fishing communities through the sustainable management of Uganda's lake resources. The overall fisheries goal is to ensure increased and sustainable fish production and utilisation by properly managing capture fisheries, promoting aquaculture and reducing post-harvest losses. The policy has 13 policy areas each with its policy objectives and policy strategies. Among the ways to achieve this goal was to support decentralised co-management practices (Beach Management Units (BMU)), strengthen the capacity of local governments and set up a Fisheries Authority with strengthened capacity to regulate. However, this policy, although debated in and enacted by Parliament, has not been turned into a fisheries bill approved and implemented by the government. This means that many of the suggestions in the fisheries policy, for example, for the establishment of a semi-autonomous Fisheries Authority to replace the Department of Fisheries	The Project has the potential to impact fisheries in Lake Albert. Any interventions to address such impacts will be developed in line with government objectives for fisheries.

INSTRUMENT / LEGISLATION	OVERVIEW	RELEVANCE TO THE PROJECT
	Resources, have never materialised.	
National Policy for the Conservation and Management of Wetland Resources (1995) (Ref. 2-9)	The overall objective is to promote the conservation of Uganda's wetlands in order to sustain their ecological and social economic functions. The policy makes provision for the Ramsar Convention on Wetlands of International Importance, and provides for the requirement of ESIA for all planned developments in protected wetland areas.	Some sections of the Project area lie within the Ramsar along the Victoria Nile. Some Project activities will be conducted within this Ramsar Area. This ESIA put into consideration the Project activities that will be conducted in the Ramsar and surrounding areas.
The Uganda National Land Policy (2013) (Ref 2-10)	The Uganda National Land Policy provides a framework for having an efficient and effective land delivery system. Among its other objectives, the policy seeks to harmonise and streamline the complex tenure regimes in Uganda for equitable access to land, and to clarify the complex constitutional and legal framework for sustainable management and stewardship. It also aims to ensure sustainable utilisation, protection and management of environmental, natural and cultural resources on land for socio-economic development. Paragraph 3.8 of the Policy outlines Government strategies for managing land resources with respect to minerals and petroleum development.	Land will need to be acquired for various Project components. Land Acquisition is therefore a key factor for the Project; hence this policy is relevant to guiding the required actions. All land acquisition for the Project recognises the land rights of customary owners, individuals and communities owning land and that prompt, adequate and fair compensation is paid for those displaced from their land. This ESIA was conducted in line with the Policy aim to ensure sustainable utilisation, protection and management of environmental, natural and cultural resources of the Project area for socio-economic development.
The National Housing Policy (2016) (Ref. 2-11)	The policy seeks to provide a national framework for housing development that shall increase access to affordable housing, and improve the quality of existing housing stock and security of land tenure, among other objectives. Policy Statement 10 states that "*the Government shall develop a mechanism for the construction and management of institutional / employer housing, and outlines strategies that include a review of guidelines on standards, construction and management of employer housing*". Additionally, Policy Statements 6 and 14 outline strategies to promote the use of indigenous materials and energy efficient construction technologies, and to revise and implement housing planning, housing and building standards.	The requirements of this policy will be vital during the planning and construction of workers' accommodation camps and resettlement houses.
The National Policy for Disaster Preparedness and Management (2011) (Ref. 2-12)	The policy defines the framework for management of disasters at national, regional and local levels. Paragraph 4.15 stipulates that private sector organisations have a responsibility to ensure that their operations do not pose a risk to their workers, the general public, or the environment. It further states that the owners of installations are responsible for educating workers on safety measures and emergency response measures.	The Project involves activities that potentially can result in an accident. The Project Proponents will implement measures to reduce all associated risks to levels that are as low as reasonably practicable. In addition, emergency procedures will be in place to address unplanned events if they occur.

INSTRUMENT / LEGISLATION	OVERVIEW	RELEVANCE TO THE PROJECT
The National Employment Policy for Uganda, 2011 (Ref. 2-13)	The policy provides a framework for achieving the goal of decent and remunerative employment for all women and men seeking such work, in conditions of freedom, equity, security and human dignity. Paragraph 6.6 emphasises the need for employers to comply with Uganda's legal and regulatory framework to promote the rights of workers.	The policy will guide the recruitment and employee management procedures of Project workers, including contractors.
National Content Policy for the Petroleum Industry in Uganda (2017) (Ref. 2-14)	The Policy establishes a framework for significant national participation in the petroleum sector for the benefit of the Ugandan economy, the sector itself and society at large.	The Project Proponents will implement requirements specified under s. 4.3 (role of the private sector) that include among others: • preparation of plans for promotion of national content; • ensuring that national content is a criterion in the evaluation and award of bids and tenders; • utilising locally available goods; and • promoting best employment practices and industry standards.
The Uganda Gender Policy, 2007 (Ref. 2-15)	The policy provides a framework for redressing gender imbalances as well as a guide to all development practitioners. Paragraph 6.1 outlines roles and responsibilities of the private sector in implementation of the policy. These include, among others: ensuring that corporate policies and practices incorporate gender equality principles; providing incentives and support to women entrepreneurs; collaborating with the Department of Occupational Safety and Health, Ministry of Gender Labour and Social Development (MGLSD) and other appropriate institutions on matters of gender mainstreaming; and implementing Affirmative Action measures.	The Social baseline indicates that women make up a significant composition of the population in the Project Area (Section 19.3.2.2.1). This policy will be utilised in ensuring gender mainstreaming in all aspects of the Project.
The National Health Policy (2010) (Ref. 2-16)	The National Health Policy II (2010) guides the development of Uganda's health sector in line with the Government's constitutional obligation to provide health services and promote healthy nutrition and lifestyles. Among other guiding principles, the policy emphasises: • The role of the community in decision making and planning for health services delivery; • Delivery of health services within the framework of decentralisation; • The need for alternative, equitable and sustainable options for health financing; and • Partnerships with the private sector in increasing the geographical scope of health services and the scale of services provided.	The Project has the potential to impact (positively and negatively) community health and safety. Health sector stakeholders at local and national levels were consulted as part of the evaluation of impacts on delivery of health services in the Project Area of Influence (AoI).

INSTRUMENT / LEGISLATION	OVERVIEW	RELEVANCE TO THE PROJECT
Uganda National HIV and AIDS Policy, 2011 (Ref. 2-17)	The policy provides a broad framework for delivering Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS) services in the country. It stipulates policies and legal requirements that guide planning and action in social and economic sectors and at the various levels of the response to HIV and AIDS. Under Paragraph 3.1 (Policy: Coordination and Management of the National Response), Government requires all stakeholders involved in development efforts to mainstream HIV and AIDS in their policies and plans.	The Project Proponents will, in compliance to the provisions of this policy, develop an HIV/AIDS Workplace Policy, which will also include checks for Project Contractors to embed this within their policies, plans and procedures.
National Population Policy for Social Transformation and Sustainable Development, 2008 (Ref. 2-18)	The policy provides a framework through which Government may implement policies and programmes to address population trends and patterns. The policy outlines strategies to advocate planned urbanisation and human settlement, and provides for the establishment of the National Population Council as the institution responsible for promoting integration of population factors into development planning.	The proposed Project activities are likely to induce in-migration within the operating areas and this has been considered within this ESIA.
The National Youth Policy (2001) (Ref. 2-19)	The Policy provides an operational framework to facilitate meaningful involvement of youth in national development efforts and to respond to their various needs. Section 8.8 highlights the significance of youth education and awareness in promoting the conservation of natural resources. The Policy aims to enhance the participation of youth in the development process.	The Project has the potential to impact (positively and negatively) youth. Concerns of youth were documented and addressed during the stakeholder engagement process.
National Policy for Older Persons, 2009 (Ref. 2-20)	The policy outlines various interventions intended to improve the quality of life for older persons.	Buliisa District Development plan II indicates that about 4.6% of the population are above 65 years old. The policy outlines the responsibilities of private sector stakeholders in its implementation. These include among others ensuring that corporate policies and practices incorporate the concerns of older persons.
Uganda National Culture Policy, 2006 (Ref 2-21)	The policy provides strategies to enhance the integration of culture into development. These strategies include advocating for culture, ensuring capacity building, ensuring research and documentation, promoting collaboration with stakeholders and mobilising resources for culture.	This Project is located within Bunyoro Kingdom and Acholi Chiefdom. This ESIA identified these cultural institutions as key stakeholders and involved them during all phases of the consultation process, including in the identification of cultural resources in the Project Area.
Oil and Gas Revenue Management Policy, 2012 (Ref 2-22)	The policy articulates the operational framework for prudent management of oil and gas resources, through establishment of legal institutional framework.	This Project will result in revenues from oil production, and as such will work with the responsible government financial institutions as provided in this policy.

INSTRUMENT / LEGISLATION	OVERVIEW	RELEVANCE TO THE PROJECT
Vision 2040 (Ref. 2-23)	The objective is to operationalise the National Vision Statement: "A transformed society from a peasant to a modern and prosperous country within 30 years". The benchmark for the Vision is to raise Gross Domestic Product (GDP) per capita to 9,500 United States Dollars (USD) with real GDP growth of 8.25% per annum. The identified opportunities in this Vision include; oil and gas, tourism, minerals, Information and Communications Technology (ICT) business, abundant labour force, geographical location and trade, water resources, industrialisation, and agriculture. **Tourism**: The tourism industry is expected to play a major role in the economy and a major contributor to GDP by 2040, with "enormous employment opportunities". **Agriculture:** Recognised as the largest source of employment and a major contributor to GDP. The goal is to transform the agriculture sector from subsistence farming to commercial agriculture and a number of Government actions to achieve this are set out. **Oil and Gas:** presents the country with opportunity to spur economic growth, create employment, foster technology transfer and generate revenues for investments in development of other strategic sectors such as infrastructure and human resource development. Over the Vision period, Government will strengthen the policy, legal, institutional and regulatory framework to foster transparency, protect environment and good governance in the oil and gas sector. The Vision also recognises that one of the key infrastructure areas to invest in will be oil and gas.	This Project is aimed at the development of infrastructure to harness the country's oil and gas resources, and is therefore in line with Vision 2040.
National Laws		
The Constitution of the Republic of Uganda, 1995 (as amended) (Ref. 2-24)	The Constitution, as the supreme law, provides the legal and regulatory framework in the country. It provides for all aspects pertaining to land, to the environment and other related aspects.	Objective XXVII (iii) provides a duty for the state to promote and implement energy policies that ensure that people's basic needs and those of the environment are met, thus laying the foundation for sustainable energy development. It also guarantees the right of access for all people of Uganda to basic health care services.
The National Environment Act, Cap. 153 (Ref. 2-25)	The National Environment Act is the principal environmental law of Uganda and it establishes the National Environment Management Authority (NEMA) as the principal agency in Uganda for the management of the environment. Under Section 19, the Act states the criteria under which EIA shall be required.	In accordance with Section 19(1) (a) and Schedule Three to the Act, the proposed Project qualifies for EIA.

INSTRUMENT / LEGISLATION	OVERVIEW	RELEVANCE TO THE PROJECT
The Petroleum (Exploration, Development and Production) Act, 2013 (Ref. 2-26)	The Petroleum (Exploration, Development and Production) Act operationalises Article 244 of the Constitution, and the National Oil and Gas Policy of Uganda. The Act seeks to establish institutions to manage petroleum resources and regulate petroleum activities including licensing, exploration, development, production and decommissioning. Section 3 outlines the environmental principles to which all licensees shall comply including the duty to comply with the principles of the National Environment Act: to manage waste arising out of petroleum activities in accordance with the National Environment Act and all applicable legislation; and to contract a separate entity to manage the transportation, treatment and disposal of waste arising out of petroleum activities.	This Project will operate in accordance with all relevant provisions of this law.
The Petroleum (Refining, Conversion, Transmission and Midstream Storage) Act, 2013 (Ref. 2-27)	The Act establishes the legal framework for sustainable management of the midstream oil and gas sector.	Section 3 outlines the duty of the Licensee to comply with environmental principles under the National Environment Act including management of transportation, storage, treatment and disposal of waste arising from midstream operations. This Project has connectivity with midstream operations and as such, some regulations under this law may be relevant to the Project.
The Physical Planning Act, 2010 (Ref. 2-28)	The Physical Planning Act, 2010 repeals the Town and Country Planning Act, Cap 246 as the principal law pertaining to physical planning requirements, and makes it mandatory for any person undertaking a development within a designated planning area to obtain development permission. Section 24 (1) of the Act, however, stipulates that The Minister may, on the recommendation of the Board, by statutory instrument, declare an area with unique development potential or problems, a special planning area for the purposes of preparation of a physical development plan.	The Albertine Graben was earmarked as a special planning area by the Ministry of Lands, Housing and Urban Development (MLHUD). A physical development plan was subsequently prepared and the Proponent will develop the Project in harmony with this plan.
The Roads Act, Cap 358 (Ref. 2-29)	The Act provides for the establishment of road reserves and for maintenance of roads.	New roads developed as part of the Project, along with associated facilities described in Chapter 4 shall be subject to this Act.
The Access to Roads Act, Cap 350 (Ref. 2-30)	The Act provides for the procedure by which a private landowner may access a public highway.	Requires the Proponent to obtain leave from adjoining landowners for the construction of access roads to Project facilities.

INSTRUMENT / LEGISLATION	OVERVIEW	RELEVANCE TO THE PROJECT
The Water Act, Cap 152 (Ref. 2-31)	Objectives of the Act include, among others, the promotion of rational management and use of the waters of Uganda; and the control of pollution and promotion of the safe storage, treatment, discharge and disposal of waste. The Act stipulates under Section 18 that the necessary permits shall be obtained prior to any abstraction of water from natural surface waters (lake, river or stream) and groundwater (aquifer, spring, etc.). Section 31 prohibits the discharge of waste into any natural waters unless authorised under the Act.	The proposed activities will require abstraction of water from surface water and groundwater sources to meet Project water needs. Abstraction and waste discharge permits will be sought as per the requirements of this Act.
The Fish Act, Cap 197 (as amended) (Ref. 2-32)	The Act makes provision for the control of fishing, the conservation of fish, purchase, sale, marketing and processing of fish and matters connected therewith. Section 12, subsection (4) stipulates that 'except where otherwise expressly provided by any written law, no person shall divert the waters of any lake, river, stream, pond or private waters in which fish, their eggs or progeny have been introduced with the consent of the chief fisheries officer, unless the ditch, channel, canal or water pipe conducting the water is equipped at or near the entrance or intake with a screen or a filter of a design approved in writing by the chief fisheries officer, that is capable of preventing the passage of fish, their eggs or progeny into the ditch, channel, canal or water and where the chief fisheries officer so directs there is also provided a by-pass.	Construction activities conducted near water courses along with water abstraction activities will be conducted in line with the provisions of this law, and relevant permissions sought as required.
The Uganda Wildlife Act, Cap 200 (Ref. 2-33)	The Act provides for sustainable management of wildlife, consolidation of the laws relating to wildlife management, establishment of a coordinating, monitoring, and supervisory body for that purpose and all associated matters. Section 15 of the Act requires that any project that may have a significant effect on any wildlife species or community will be subject to EIA in accordance with the National Environment Act.	Part of the proposed Project is within MFNP and will hence put into consideration the relevant provisions of this Act.
The National Forestry and Tree Planting Act, 2003 (Ref. 2-34)	The Act prohibits the destruction, damage or disturbance of natural forests and forest reserves except in the course of carrying out activities for their sustainable management, or in accordance with a licence issued under this Act. Section 38 also requires any person tending to undertake a project or activity which may, or is likely to have a significant impact on a forest, to undertake an environmental impact assessment.	There are a number of forest reserves within the Project area of influence, such as Budongo forest reserve. This ESIA was conducted with consideration of these forest reserves, and while there will be no direct impacts on the forest reserves, mitigation measures are made to minimise indirect impacts on these forest resources.

INSTRUMENT / LEGISLATION	OVERVIEW	RELEVANCE TO THE PROJECT
The Prohibition of the Burning of Grass Act, Cap 33 (Ref. 2-35)	The Act prohibits the unauthorised burning of grass within a forest reserve, national park, wildlife reserve or wildlife sanctuary.	Requires the Project Proponents to take appropriate measures to prevent burning of grass within the Project Area as a consequence of Project activities.
The Historical Monuments Act, Cap 46 (Ref. 2-36)	Section 8 provides for the protection of objects declared to be preserved or protected under the Act and outlines activities that shall be prohibited where such objects are found. Section 11 of the Act requires that any person who discovers any object, which may reasonably be considered to be of archaeological, paleontological, ethnographical, historical or traditional interest shall, within fourteen days, report to the conservator of antiquities or a district commissioner or the curator of the museum.	The Archaeological surveys identified sites of cultural importance in the Project Area, therefore provisions of this act will be put into consideration during land acquisition and construction phases. The Project Proponents will implement chance find procedures in compliance with Section 11 of this Act.
The Local Governments Act, Cap 243 (as amended) (Ref. 2-37)	The Local Governments Act, Cap 243 establishes a decentralised form of government based on the District as the main unit of administration. The Districts are given legislative and planning powers under this Act. They also plan for the conservation of environment within their local area.	District Environment Committees and Local Environment Committees established under Sections 14 and 16 of the National Environment Act help guide the district authorities in matters relating to conservation of the environment. District and lower local government authorities have been engaged during the production of this ESIA.
The Land Act, Cap. 227 (1998) (Ref. 2-38) and Land (Amendment) Act, 2010 (Ref. 2-39)	The Land Act, Cap 227 provides for the ownership and management of land. It provides for four different types of land tenures (Customary, Leasehold, Mailo and Freehold) and the procedure for applying for grant of any of the tenures. The Land (Amendment) Act 2010 aims to enhance the security of occupancy of lawful and bona fide occupants on registered land in accordance with article 237 of the Constitution, and for related matters. The Act stipulates that the developer of an energy project should seek to enter into mutual agreement with the occupier or owner of the affected land, and provides the valuation principles for compensation.	The proposed Project requires permanent land take and temporary land access. The Project land acquisition and land access processes will be conducted in line with the provisions of this Act.
The Land Acquisition Act, Cap 229 (Ref. 2-40)	The Act makes provision for the compulsory acquisition of land for public purposes and for other matters incidental thereto. The Act stipulates that in the case of compulsory land acquisition for the Project, the Project affected persons (PAPs) must be adequately compensated.	The Project Proponents intends to undertake Resettlement Action Plans (RAPs) for the various components as geographically clustered in section 19.4.2.2 of this ESIA and hence compensate the PAPs in conformance with the provisions of this Act
The Survey Act, Cap 232 (Ref. 2-41)	The Act provides for and guides the survey of land in Uganda including aspects such as access to lands under survey, and compensation for injury caused during survey activities.	All surveys conducted for this Project are being (and will continue to be) conducted in line with the provisions of this Act.

INSTRUMENT / LEGISLATION	OVERVIEW	RELEVANCE TO THE PROJECT
The Registration of Titles Act, Cap 230 (Ref. 2-42)	The Act stipulates the requirements relevant to the registration and issuance of titles to land transfer of registered land.	The Project Proponents will require titles for the acquired land for the Project and resettlement land for eligible PAPs. These will be obtained in consideration of the requirements of this Act.
The Illiterates Protection Act, Cap 78 (Ref. 2-43)	The Act provides for the protection of illiterate persons in relation to writing and signing of documents on behalf of such persons.	Literacy levels in the Project Area are low as in any other rural areas in Uganda. The Project Proponent will ensure adherence to this Act during any writing, signing or endorsement of documents pertaining to land acquisition or compensation related to the Project.
The Occupational Safety and Health Act, 2006 (Ref. 2-44)	The Occupational Safety and Health Act consolidates, harmonises, and updates the law relating to occupational safety and health; and repeals the Factories Act, Cap 220. The Act sets out regulations on the duties, obligations and responsibilities of employers, the self-employed, and manufacturers, suppliers and transporters in relation to occupational, health and safety. It also provides for the duties, rights and responsibilities of workers and covers regulations on the registration of workplaces; health and welfare; general safety requirements; fire preparedness; machinery, plant and equipment; hazardous materials; chemical safety and special provisions; and offences, penalties and legal proceedings. The Act details the process for administration and enforcement of the Act including appointment of inspectors and power of inspectors, and provides for the establishment of an Occupational Safety and Health Board.	The Act lays out the general safety, health and environmental requirements for workplace safety to be applied during the construction and operational phases of the Project including obligations to inspect statutory equipment and register workplaces. All Project phases will be implemented in line with the provisions of this Act, and requisite permits obtained.
The Public Health Act, Cap 281 (Ref. 2-45)	The main objective of the Public Health Act is to safeguard and promote public health. Section 54 provides a general prohibition of nuisances or conditions liable to be hazardous to health to health.	The proposed operations particularly during construction may generate dust and noise which may be a nuisance to communities. In compliance with this Act, the Project Proponents will ensure that impacts are minimised.
The Workers' Compensation Act, Cap 225 (Ref. 2-46)	The Act provides for compensation of workers in the event of personal injury arising out of or in the course of a worker undertaking his or her duties. The Act entitles employees to automatic compensation for any personal injury from an accident arising out and in the course of his employment even if the injury results from the employee's negligence. It also stipulates that for an injury that leads to death, the compensation should be equivalent to an employer's monthly pay multiplied by 60 months.	In the event of a work-related personal injury on any of the Project sites, compensation of the affected worker(s) will be provided in line with the provisions of this Act.

INSTRUMENT / LEGISLATION	OVERVIEW	RELEVANCE TO THE PROJECT
The Employment Act, 2006 (Ref. 2-47)	The Act outlines the conditions of employment including, contract of service, termination of contract, termination notices, and protection of wages, hours of work, rest and holidays, employment of women, employment of children and care of employees.	The Act will guide the Project Proponents compliance with labour and safety conditions during Project activities.
The Penal Code Act (as amended), 2007 (Ref. 2-48)	The Act criminalises acts of prostitution, defilement and rape, corruption and abuse of office, among other offences.	The Act will regulate the Project Proponents interactions with Project affected communities and other stakeholders.
The Children Act (as amended), 2016 (Ref. 2-49)	The Act provides for the protection of children and prohibits the use of child labour or employment in any activity that may be harmful or hazardous to his or her health (s.8). It stipulates that the minimum age of employment of a child shall be 16 years.	The Act will regulate the Project Proponent's labour and recruitment policies during Project activities.
The Traffic and Road Safety Act, Cap 361 (Ref. 2-50)	The Act stipulates laws relating to road traffic (among others: registration of vehicles, drivers' permits, vehicle load limits, vehicle condition and road safety). This Act sets out regulations regarding the use of a motor vehicle trailer or engineering plant on any road; need for the registration of all motor vehicles; the need for obtaining driving permits; the requirement to comply with road signs and speed limits; the procedure to be followed at the time of an accident; the need for the employer to keep a record of drivers, and so forth.	The Project will involve haulage of equipment in and out of the respective sites. The provisions of this act will be vital in ensuring safety on the roads.
The Electricity Act, Cap 145 (Ref. 2-51)	The Act provides for: the generation, transmission, distribution, sale and use of electricity; and licensing and control of activities in the electricity sector. It establishes the Electricity Regulatory Authority whose functions include issuing licences for generation, transmission, distribution or sale of electricity, and for ownership or operation of transmission systems.	This Project will include electricity generation from produced gas. The Project Proponent will apply for a licence for any generation, transmission or distribution or sale of electricity that will constitute the Project in line with the provisions of this Act.
The Atomic Energy Act, 2008 (Ref. 2-52)	Amongst its other functions, the Act regulates the peaceful application of ionising radiation; establishes the Atomic Energy Council; and provides for the safety and protection of individuals, society and the environment from the dangers of ionising radiation among other functions. The Act regulates the handling, use, transportation and disposal of radioactive materials and devices emitting ionising radiation.	If Project activities result in any naturally occurring radioactive material / waste, this will be handled in line with the provisions of this Act.
The Explosives Act, Cap 298 (Ref. 2-53) including Explosives Rules, S.I. 298- 1 (Ref. 2-88)	This Act regulates the import, export, transport, storage and use of explosives.	If any of the Project activities requires the use of explosives, the Act will guide the Project Proponents to ensure that they obtain all requisite licences for transport, storage and use.
The Nile Basin Initiative Act, 2002 (Ref. 2-54)	The Act establishes legal status in Uganda to the Nile Basin Initiative (NBI) - an intergovernmental partnership of Nile Basin countries and grants it powers to perform any of the functions conferred upon it by and under the Agreed Minute No. 7 of the annual meeting of the Council of Ministers of the Nile Basin States held in Cairo, Egypt, on 14th February, 2002.	The Act establishes the NBI as a key stakeholder in the management of transboundary water resources within the Nile Basin and provides for regulation of projects that may have an impact on the flow of the Nile waters.

INSTRUMENT / LEGISLATION	OVERVIEW	RELEVANCE TO THE PROJECT
The Investment Code Act, Cap 92 (Ref. 2-55)	The Act establishes a code to regulate local and foreign investment in Uganda, and provides for the establishment of the Uganda Investment Authority.	The Act requires the holder of an investment licence to take necessary steps to ensure that the operations of his or her business enterprise do not cause injury to ecology or the environment.
The Rivers Act, 1962 (Ref. 2-56)	The Act requires that any dredging in a river be licensed. It states that it shall not be lawful to dredge in any river without a license from the Minister.	This Act will regulate the construction, operation and maintenance of Project components in, across and around rivers that fall within the Project footprint.
The Uganda National Roads Authority Act, 2006 (Ref. 2-57)	The Act provides for establishment of the Uganda National Roads Authority (UNRA) responsible for the provision and maintenance of national roads.	The Authority will regulate the proposed upgrade and construction of roads that are planned as part of the Project.
Tourism Act 2008 (Ref. 2-58)	To reform, consolidate and streamline the law relating to tourism; to provide for licensing, regulating and controlling of the tourism sector etc.	Informs approaches to tourism assessment, including heritage tourism. This is addressed within this ESIA.
The Public Finance Management Act, 2015 (Ref. 2-59)	The Act provides for fiscal and macroeconomic management, among other things, to establish the Petroleum Fund and the collection and deposit of revenues into and the withdrawal of revenue from the Petroleum Fund and for the management of the Petroleum Revenue Investment Reserve; to provide for the financial reports, annual reports and annual plans of the Petroleum Fund and the Petroleum Revenue Investment Reserve.	The Project Proponents will manage the petroleum resources in accordance with the provisions of this Act, and work with the responsible institutions such as the National Oil Company, and Uganda Revenue Authority as required by this Act.
The Uganda Human Rights Commission Act 1997 (Ref. 2-60)	The Act makes provision in relation to the Uganda Human Rights Commission.	Any human rights issues of concern as a result of the Project will be addressed in line with the provisions of this Act. This ESIA discusses relevant aspects of human rights.
Traditional Rulers (Restitution of Assets and Properties) Act 1993 (Ref. 2-61)	To restore to traditional rulers' assets and properties previously owned by them or connected with or attached to their offices but which were confiscated by the State.	Informs procedures related to traditional rulers' assets.
Institution of Traditional Leaders or Cultural Leaders Act 2011 (Ref. 2-62)	To provide for the existence of traditional or cultural leaders, their privileges and benefits, and the resolution of issues relating to traditional or cultural leaders.	
Copyright Act and Neighbouring Rights Act 2006 (Ref. 2-63)	To provide for the protection of literary, scientific and artistic intellectual works and their neighbouring rights, including traditional folklore and knowledge, handicrafts.	
The Income Tax Act, Cap 340 and the Income Tax (Amendment Act) 2011 (Ref. 2-64)	The Act consolidates and amends the law relating to income tax payable by persons or businesses in Uganda and for other connected purposes.	The Project Proponents shall pay taxes due on chargeable income as stipulated in Part IV of the Act.

INSTRUMENT / LEGISLATION	OVERVIEW	RELEVANCE TO THE PROJECT
The Uganda Human Rights Commission Act (No 4), 1997, Cap 24 (Ref. 2-65)	The Act provides for the establishment of the Uganda Human Rights Commission and also covers witness attendance and immunities and application of High Court Rules and appeals.	The Project will conform to the Human Rights requirements as set out in the act.
National Regulations		
The Environmental Impact Assessment Regulations, 1998 (Ref. 2-66)	The EIA Regulations, 1998 specify the general requirements for good EIA practice in Uganda. The Proponent is required to undertake an ESIA in accordance with the regulations including, preparation and submission of Terms of Reference, and provision of all contents for an environmental impact statement outlined under Regulation 14. Public participation: Sub-regulation (1) of Regulation 12 requires the developer to take all measures necessary to seek the views of the people in the communities that may be affected by the Project. Regulations 19, 20, 21, 22 and 23 outline further requirements for public participation.	This ESIA has been undertaken in accordance with these regulations.
The National Environment (Wetlands, River Banks and Lake Shores Management) Regulations, 2000 (Ref. 2-67)	The regulations provide for the conservation and wise use of wetlands, riverbanks and lakeshores and their resources in Uganda.	The Project Proponents are required to adhere to the provisions pertaining to activities carried out in wetlands and regulated lakeshores and riverbanks. Permits will be required where activities are within or near wetlands and riverbank / lakeshore protection zones, for example in the Ramsar along the Victoria Nile.
The National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations, 1999 (Ref. 2-68)	The Regulations prescribe the requisite standards for effluent or wastewater that may be discharged from industries and establishments into water or on land.	All discharge related to the proposed Project shall conform to the standards specified in these regulations. The Project Proponents will also maintain records of discharge that will be periodically submitted to NEMA and relevant authorities.
The Water (Waste Discharge) Regulations, 1998 (Ref. 2-69)	These regulations prescribe limits for the discharge of waste into water resources, specifying among others restricted activities for which waste discharge permits must be acquired. The regulations stipulate that the Proponent shall acquire a permit where the discharge of effluent or waste into water or on land is deemed necessary (Regulation 4 (1)).	The Project Proponents will obtain all requisite permits for waste water discharge in accordance with these regulations. Waste water from the Project will result from processes and sewage.
The Water Resources Regulations, 1998 (Ref. 2-70)	The regulations outline requirements applicable to any person intending to construct, own, occupy or control works affecting water resources as defined by the regulations.	The Project Proponents will apply for and obtain permits prior to abstraction of surface water or groundwater to meet the Project needs.

INSTRUMENT / LEGISLATION	OVERVIEW	RELEVANCE TO THE PROJECT
The National Environment (Waste Management) Regulations, 1999 (Ref. 2-71)	These regulations outline the requirements for the management of hazardous and non-hazardous waste in Uganda including transport, storage, treatment, disposal and licensing of waste contractors. Among other requirements prescribed in these regulations, the Proponent is required to hire licensed waste contractors to undertake transportation and disposal/treatment of hazardous waste, and obtain requisite permits for the temporary storage of waste where may be necessary.	The Project will generate significant amounts of waste. All Project waste will be managed in accordance with these regulations.
The National Environment (Noise Standards and Control) Regulations, 2003 (Ref. 2-72)	These regulations prescribe the maximum permissible noise levels from a facility or activity to which a person may be exposed, and set provisions for control of noise.	The Project Proponents are required to implement appropriate measures to keep construction and operational noise within the prescribed limits, and where excessive noise is deemed unavoidable, to obtain a licence to permit noise in excess of permissible limits.
National Environment (Mountainous and Hilly Areas Management) Regulations, 2000 (Ref. 2-73)	These provide for the sustainable management of mountainous and hilly areas, and prescribe rules for soil conservation. The regulations also prohibit the introduction of invasive alien species.	The Project will involve vegetation clearance and material stockpiling which will increase the potential for soil erosion or introduction of invasive species. The Project Proponents will apply appropriate measures necessary to prevent soil erosion in hilly areas, and to prevent the introduction of invasive alien species in accordance with these regulations.
The National Environment (Management of Ozone Depleting Substances and Products) Regulations 2001 (Ref. 2-74)	The regulations operationalise Uganda's commitment to the Montreal Protocol, through restrictions on the trade of controlled substances and licensing of persons intending to import or export controlled substances.	The Project Proponents will ensure and also take responsibility over Project Contractors that resourcing of materials is not from a country that is not a signatory of the Montreal Protocol. Additionally, any imports of controlled substances should be licensed by the relevant authority, and free of listed materials.
The National Environment (Minimum Standards for Management of Soil Quality) Regulations, 2001 (Ref. 2-75)	The regulations establish and prescribe minimum soil quality standards to maintain, restore and enhance the inherent productivity of soil, and for the management of soil quality for specified agricultural practices.	The regulations provide applicable standards and guidelines for soil conservation for areas where soil could be adversely affected by the Project. The Project Proponents will put measures in place to promote soil conservation as discussed in this ESIA.

INSTRUMENT / LEGISLATION	OVERVIEW	RELEVANCE TO THE PROJECT
The National Environment (Conduct and Certification of Environmental Practitioners) Regulations, 2003 (Ref. 2-76)	The regulations establish the code of conduct for certification, registration of Environmental Practitioners and for the practice of environmental impact assessment in Uganda.	This ESIA has been conducted by a competent team of registered environmental practitioners as required by these regulations.
The National Forestry and Tree Planting Regulations, 2016 (Ref. 2-77)	The regulations provide rules for establishment and management of central and local forest reserves as well as community and private forests. The regulations require any person intending to disturb, uproot or cut any tree to obtain the consent of the owner (reg. 80); and provide for the declaration of reserved tree species (reg. 31).	This ESIA identified the various tree species in the Project Area. The Project Proponents will implement the Project in line with these regulations, including obtaining any permission as required.
The Petroleum (Exploration, Development and Production) Regulations, 2016 (Ref. 2-6278)	The regulations operationalise a number of requirements enabled by the Petroleum (Exploration, Development and Production) Act, 2013. The regulations provide for EIA prior to opening up new areas; prescribe information to be provided in the assessment; and for submission of study proposals prior to conducting any study within a licence area. They also provide for consideration of environmental protection measures during application for related permits and licences	This ESIA was undertaken for the Project.
The Petroleum (Exploration, Development and Production) (Health, Safety and Environment) Regulations, 2016 (Ref. 2-79)	The regulations define requirements pertinent to management of health safety and environment in upstream oil and gas operations. Requirements are provided for risk assessment and management; occupational health and safety; accident prevention; community health and safety; occupational hazards; electrical installations; working environment; safety appliances, equipment materials, devices and clothing; fire and explosion protection; emergency preparedness; safety requirements for plants and equipment; medical facilities and first aid services; and incident handling, investigation, recording and reporting.	The regulations confer upon the licensee and respective contractors the duty to ensure occupational safety and health in all petroleum activities is satisfactory for all employees, and for the environment. Additionally, the licensee has to take measures to protect the community where the facility is located or where a petroleum activity is taking place. The Project Proponents will conduct all Project activities in line with these regulations, and will take responsibility for Contractors.
The Petroleum (Exploration, Development and Production) (National Content) Regulations, 2016 (Ref. 2-80)	These regulations promote the development of capacity within Uganda for provision of goods and services in the oil and gas sector. Among other stipulations, the regulations require licence holders to submit procurement forecasts; prioritise Ugandans during procurement of goods and services; and submit plans for training and recruitment of Ugandans.	The Project Proponents recruitment plans and processes will be conducted in line with these regulations, and will take responsibility for Contractors.
The Civil Aviation (Aerodromes) Regulations, 2007 (Ref. 2-81)	The regulations specify safety and design requirements that shall apply to all aerodromes operated by the Civil Aviation Authority in Uganda.	The Project proposes to upgrade Bugungu Airstrip. Works need to be conducted in line with these regulations.

INSTRUMENT / LEGISLATION	OVERVIEW	RELEVANCE TO THE PROJECT
The Uganda Wildlife (Murchison Falls National Park) Regulations-S.I 200-3 (Ref. 2-82)	The regulations set out guidelines of how to conduct activities within the park ranging from entry fees, permissible tourism activity and waste management within the park, among others.	The proposed footprint of the Project covers parts of the MFNP and therefore shall be subject to these regulations.
The Electricity (Primary Grid Code) Regulations, 2003 (Ref. 2-83)	The regulations provide the guidelines and procedures for the licensees of the electric power system to operate the Uganda power system.	The code will guide the generation and transmission of electricity from the planned power generation facility at the Central Processing Facility (CPF).
The Electricity (Quality of Service Code) Regulations, 2003 (Ref. 2-84)	The regulations seek to regulate licensees activities relating to generation, transmission, system operation, bulk supply, distribution, sale, import and export of electricity so that those activities are carried out in a fair and reliable manner.	The regulations will guide the Project Proponents activities relating to the generation and transmission of electricity from the planned power generation facility.
The Electricity (Safety Code) Regulations, 2003 (Ref. 2-85)	The regulations establish mandatory safety precautions applicable to electrical systems, and to associated plant and apparatus under their ownership or control.	The regulations will guide the Project Proponents compliance with respect to operation and maintenance of electrical systems within the Project.
Atomic Energy Regulations 2012, (Ref. 2-86)	The regulations seek to specify minimum requirements for the protection of individuals, society and environment from the dangers resulting from ionising radiation and provide for the safety and security of radiation sources.	If Project activities result in any naturally occurring radioactive material / waste, this will be handled and disposed of in line with the these regulations.
Medical and Dental Practitioners Act, 1998 (Ref. 2-87)	The Act establishes the Medical and Dental Practitioners Council, whose duties include, among others; to promote the maintenance and enforcement of professional medical and dental ethics; to exercise general supervision of medical and dental practice at all levels; and to exercise disciplinary control over medical and dental practitioners. Section 28, Subsection (1) makes provision for application for a licence to engage in private practice by a registered medical or dental practitioner. Article 29, Subsection (2) makes provision for registration of health units.	Medical Health Clinics at the Workers Camps will apply for licences in line with the provisions of this Act. The medical practitioners operating the clinics will be licenced as required by this Act.

More aspect-specific policies, laws, regulations and guidelines are detailed on the respective technical chapters, including:

Policies

- National Oral Health Policy;
- National Medicines Policy, 2015;
- Uganda National Policy on HIV/AIDS and the World of Work (2007);
- The National Food and Nutrition Policy (2003);
- National Orphans and other Vulnerable Children policy (2004);
- The National Child Labour Policy (2006);
- National Equal Opportunities Policy (2006);

- The National Policy on Persons with Disability (2006);
- Gender in Education Policy (2010);
- National Social Protection Policy (2015); and
- Special Needs and Inclusive Education Policy.

Laws

- Tobacco Control Act, 2015;
- Medical and Dental Practitioners Act, 1998;
- The Domestic Violence Act (2010);
- The Education (Pre-primary, primary and Post primary) Act; and
- The Business, Technical Vocational Education and Training Act (2008).

Standards

- Occupational Health and Safety Management Systems, US 534 (2008).

2.1.2 The EIA Regulations, 1998

The Environmental Impact Assessment Regulations, S.I. No 13/1998 (Ref. 2-66) (provided under section 107 of the National Environmental Act Cap 153 (Ref. 2-16)) are the key legislative regulations to which this ESIA Report must abide and comply with. In particular, these regulations provide an overview of what is required for producing an EIA and cover the following key areas:

- Part I: Preliminary (covers the general implementation of these regulations).
- Part II: Project Briefs.
- Part III: Environmental Impact Studies:
    - 10. Terms of reference for environmental impact study;
    - 11. Approval of persons to conduct assessment; and
    - 12. Public participation in making the study.
- Part IV: The Environmental Impact Statement:
    - 13. Environmental Impact Statement (i.e. ESIA Report);
    - 14. Contents of the Environmental Impact Statement;
    - 15. Executive summary of statement (i.e. the ESIA Non-Technical Summary); and
    - 16. Signature of statement.
- Part V: Review Process of the Environmental Impact Statement:
    - 17. Submission of the Environmental Impact Statement;
    - 18. Comments of the lead agency;
    - 19. Invitation of general public comments;
    - 20. Invitation for comments by persons specifically affected by the project;
    - 21. Determination to make a decision or hold a public hearing;
    - 22. The public hearing; and
    - 23. Persons eligible to make presentations at public hearings.
- Part VI: Decision of the Executive Director on Environmental Impact Statements:
    - 24. Basis of decision;
    - 25. Decision of the Executive Director;
    - 26. Conditions of approval of a project;
    - 27. Reasons for rejecting the project; and
    - 28. Cancellation of approved environmental impact assessment.
- Part VII: Access to Environmental Impact Assessment Reports and Information.
- Part VIII: Post Assessment Environmental Audits.

- Part IX: Miscellaneous Provisions.
- Schedules.

Of particular relevance to the development of this ESIA Report is regulation "*14. Contents of the Environmental Impact Statement*", which states the following requirements:

- *(1) Without prejudice to the generality of the terms of reference specified under regulation 10, the environmental impact statement shall provide a description of:*
    - *(a) the project and of the activities it is likely to generate;*
    - *(b) the proposed site and reasons for rejecting alternative sites;*
    - *(c) a description of the potentially affected environment including specific information necessary for identifying and assessing the environmental effects of the project;*
    - *(d) the material in-puts into the project and their potential environmental effects;*
    - *(e) an economic analysis of the project;*
    - *(f) the technology and processes that shall be used, and a description of alternative technologies and processes, and the reasons for not selecting them;*
    - *(g) the products and by-products of the project;*
    - *(h) the environmental effects of the project including the direct, indirect, cumulative, short-term and long-term effects and possible alternatives;*
    - *(i) the measures proposed for eliminating, minimising, or mitigating adverse impacts;*
    - *(j) an identification of gaps in knowledge and uncertainties which were encountered in compiling the required information;*
    - *(k) an indication of whether the environment of any other State is likely to be affected and the available alternatives and mitigating measures;*
    - *(l) of how the information provided for in this regulation has been generated; and*
    - *(m) such other matters as the Executive Director may consider necessary.*

Additionally, information contained within the First Schedule of the EIA regulations provides a useful overview of the anticipated issues which should be considered within any EIA. In particular, they include:

- 1. Ecological Considerations:
    - *(a) Biological diversity including:*
        - *i) effect of proposal on number, diversity, breeding habits, etc. of wild animals and vegetation.*
        - *ii) gene pool of domesticated plants and animals e.g. monoculture as opposed to wild types.*
    - *(b) Sustainable use including:*
        - *i) effect of proposal on soil fertility.*
        - *ii) breeding populations of fish and game or wild animals.*
        - *iii) Natural regeneration of woodland and sustainable yield.*
        - *iv) Wetland resource degradation or wise use of wetlands.*
    - *(c) Ecosystem maintenance including:*
        - *i) effect of proposal on food chains.*
        - *ii) Nutrient cycles.*
        - *iii) Aquifer recharge, water run-off rates etc.*
        - *iv) Areal extent of habitants.*
        - *v) Fragile ecosystems.*

- 2. Social considerations including:
    - *i) effects of proposal on generation or reduction of employment in the area.*
    - *ii) social cohesion or disruption.*
    - *iii) effect on human health.*
    - *iv) immigration or emigration.*
    - *v) communication - roads opened up, closed, re-routed.*
    - *vi) local economy.*
    - *vii) effects on culture and objects of cultural value*.

- 3. Landscape:
    - *i) views opened up or closed.*
    - *ii) visual impacts (features, removal of vegetation, etc.).*
    - *iii) compatibility with surrounding area.*
    - *iv) amenity opened up or closed, e.g. recreation possibilities.*

- 4. Land Uses:
    - *i) effects of proposal on current land uses and land use potentials in the project area.*
    - *ii) possibility of multiple use.*
    - *iii) effects of proposal on surrounding land uses and land use potentials.*

2.1.3 National Standards

All relevant environmental regulations and standards prescribed in accordance with the National Environment Act Cap 153 shall apply to the Project. Wherever applicable, the national standards shall take precedence over international standards except where no applicable national standards exist.

Standards currently in place include:

- Standards for Discharge of Effluent or Wastewater (National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations, 1999) (Ref. 2-89);
- Soil Quality Parameters – First Schedule to the National Environment (Minimum Standards For Management of Soil Quality) Regulations, 2001 (Ref. 2-90);
- Maximum Permissible Noise Levels – First Schedule to the National Environment (Noise Standards And Control) Regulations, 2003 (Ref. 2-91);
- Draft national air quality standards (Ref. 2-92);
- Uganda Standard for Drinking (Potable) Water (US EAS 12: 2014) (Ref. 2-93);
- Standard Guide for Consensus-based Process for an Occupational Safety and Health Standard that Includes an Occupational Exposure Guideline (US 1820:2017) (Ref. 2-159); and
- Environmental protection - Onshore oil and gas production operation requirements (US 1585:2017) (Ref. 2-160).

The application of these standards to the Project is further discussed in the respective technical chapters of this ESIA.

2.1.4 National Guidelines

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

- Guidelines for Environmental Impact Assessment in Uganda (NEMA 1997) (Ref. 2-94);
- Environmental and Social Impact Assessment Guidelines for the Energy Sector in Uganda (Ministry of Energy and Mineral Development / NEMA 2014) (Ref. 2-95);
- Environmental Impact Assessment Guidelines for Water Resources Related Projects in Uganda (Ministry of Water and Environment (MWE) 2011) (Ref. 2-96);
- National Physical Planning Standards and Guidelines, 2011 (Ref. 2-97);
- Environmental Impact Assessment Guidelines for Road Projects (Ministry of Works, Housing and Communications 2004) (Ref. 2-98);
- Water Source Protection Guidelines for Uganda (MWE 2013) (Ref. 2-99);
- Sensitivity Atlas for Murchison Falls National Park (Ref. 2-100);
- Uganda Wetlands Atlas (Government of Uganda 2016) (Ref. 2-101);

- Consolidated Hydrological Year Book 1978-2014 for Uganda (Ref. 2-102);
- Wetland inventory reports (accessible from the respective districts and MWE) (Ref. 2-103);
- Uganda Wildlife Authority Operational Guidelines for Oil and Gas Exploration and Production in Wildlife Protected Areas (2014) (Ref. 2-104);
- Guidelines for Revenue Sharing Between Wildlife Protected Areas and Adjacent Local Governments and Communities (UWA, 2012) (Ref. 2-105);
- Operational Waste Management Guidelines for Oil and Gas Operations (NEMA 2012) (Ref. 2-106); and
- Land Acquisition Resettlement Framework (LARF) 2016 (Ref. 2-107).

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

The Environmental Impact Assessment Guidelines for the Energy Sector 2014 (Ministry of Energy and Mineral Development / NEMA, as listed above), provide some useful guidance and background information as to what should be included within an ESIA. Section 4.8 in particular focuses on environmental impact mitigation and enhancement measures which are recommended after an assessment of likely impacts has been completed. It makes the important point that impacts may be of a positive and negative nature and in addition to identifying mitigation measures intended to avoid, cancel or reduce adverse effects, measures should be sought to enhance any positive impacts which may arise as a result of a project.

2.1.5 National and Regional Plans

A number of documents describing national-level development plans for Uganda and critical economic sectors have been published by respective line ministries. Regional-level development plans are also in place to guide the physical development of special planning areas. These plans were considered for the Project and include:

- Agriculture Sector Development Strategy and Investment Plan 2010/11 - 2014/15 (Ref. 2-108);
- Albertine Graben Physical Development Plan (Ref. 2-109);
- Health Sector Development Plan 2015/16 - 2019/20 (Ref. 2-110);
- Health Sector Strategic and Investment Plan 2010/11 - 2014/15 (Ref. 2-111);
- Murchison Falls Protected Area General Management Plan 2013-2023 (Ref. 2-112);
- National Environment Action Plan (1994) (Ref. 2-113);
- National Forest Plan 2011/12 - 2021/22, 2013 (Ref. 2-114);
- National Transport Master Plan 2008-2023 (Ref. 2-115);
- Strategic Implementation Plan for the National Transport Master Plan (2015) (Ref. 2-116);
- Strategic Plan for the North Albertine Rift of Uganda, 2011–2020 (Ref. 2-117);
- Uganda Second National Development Plan (NDP II) 2015/16–2019/20, 2015 (Ref. 2-118);
- Uganda Wildlife Authority Strategic Plan 2013-2018 (Ref. 2-119);
- Tourism Development Master Plan (2014-2024) (Ref. 2-120);
- Plan for Modernisation of Agriculture (2000) (Ref. 2-121);
- Agricultural Sector Development Strategy and Investment Plan 2010/2011-2014/2015 (Ref. 2-122);
- Government's White Paper on Education (1992) (Ref. 2-123);

- Revised Education Sector Strategic Plan 2007-2015 (2008) (Ref. 2-124);
- Skilling Uganda Strategic Plan 2011-2020 (Ref. 2-125); and
- Solar Power Subsidy (2007) (Ref. 2-126).

2.1.6 Local Development Plans

The Physical Planning Act, 2010 (s.25) (Ref. 2-19) provides for the preparation of district physical development plans by district physical planning committees. Among its other functions, the development plan operationalises the district structure plan and indicates the present and future land use and development within the planning area. The following plans will be considered for the proposed Project:

- Nwoya District Development Plan 2015/16 - 2019/2020 (Ref. 2-127);
- Buliisa District Development Plan 2015/16 - 2019/2020 (Ref. 2-128); and
- Masindi District 2015/2016 – 2019/2020 Development Plan (Ref. 2-157).

2.1.7 Upcoming Changes to National Legislation

NEMA is currently coordinating a review of the NEMP (formulated in 1994) (Ref. 2-1). The main drivers behind this review are to:

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

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

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

National legislation under review includes:

- The National Environment Act, Cap 153 (Ref. 2-25);
- The Environmental Impact Assessment Regulations, 1998 (Ref. 2-66);
- The National Environment (Audit) Regulations, 2006 (Ref. 2-127);
- The National Environment (Noise Standards and Control) Regulations, 2003 (Ref. 2-72);
- The National Environment (Waste Management) Regulations, 1999 (Ref. 2-71);
- The National Environment (Minimum Standards for Management of Soil Quality) Regulations, 2001 (Ref. 2-75);
- The National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations, 1999 (Ref. 2-68); and
- The Ugandan Wildlife Act (Ref. 2-33).

The Government of Uganda is also drafting new regulations on:

- air quality;
- industrial and consumer chemicals control;
- oil spill prevention, control and management; and
- petroleum waste management.

2.1.8 Approvals, Licences and Permits

In addition to the ESIA, the national legislation of Uganda establishes a number of approvals, permits and licences required prior to commencement of the Project or specific activities within the scope of the Project. These are summarised in Table 2-2.

Table 2-2: Other Approvals, Permits and Licences

TYPE OF PERMIT/APPROVAL	SUPPORTING LEGISLATION	REQUIREMENT	APPLIES TO	APPROVING AUTHORITY	TYPE OF APPLICATION SUBMITTED	STAGE AT WHICH APPROVAL IS REQUIRED
Groundwater Abstraction Permit/Surface Water Abstraction Permit	The Water Act, Cap 152	Section 18: Subsection (1): No person shall construct or operate any works unless authorised to do so under this Part of the Act. Section 18: Subsection (2): A person wishing to construct any works or to take and use water may apply to the director in the prescribed form for a permit to do so.	Any abstraction of water from natural surface waters (lake, river or stream) and groundwater (aquifer, spring, etc.).	Directorate of Water Resource Management (DWRM)	Form A: Application for a Surface Water Permit; or Form B: Application for a Groundwater Permit	Prior to any Project-related surface or groundwater abstraction.
	The Water Resources Regulations, 1998	Regulation 3, sub-regulation (1): A person who, (a) occupies or intends to occupy any land; (b) wishes to construct, own, occupy or control any works on or adjacent to the land referred to in Regulation 10; may apply to the Director for a water permit.				
		Regulation 3, Sub-regulation (2): An application referred to under sub-regulation (1) shall, (a) be in the form specified in the First Schedule to these regulations except that, i) Form A shall be used for surface water permits; and ii) Form B shall be used for groundwater permits.				
Construction Permit	The Water Act, Cap 152	Section 18: Subsection (1): No person shall construct or operate any works unless authorised to do so under this Part of the Act. Section 18: Subsection (2): A person wishing to construct any works or to take and use water may apply to the director in the prescribed form for a permit to do so.	Any works or structures constructed in or adjacent to natural waters (rivers or lakes) whether temporary or permanent Any abstraction of groundwater requiring construction of a borehole.	DWRM	Form F1: Application for Construction Permit	Prior to any Project-related construction works including water abstraction boreholes in or adjacent to natural waters.
	The Water Resources Regulations, 1998	Regulation 16, Sub-regulation (2): A person who wishes to engage a driller under sub-regulation (1) to construct a borehole on his or her land for the purpose of, (a) using water; (b) re-charging an aquifer; or (c) fitting a motorised pump to a borehole. May apply to the Director for a construction permit in Form F1 of the Sixth Schedule.				
Waste Water Discharge Permit	The Water (Waste Discharge) Regulations, 1998	Regulation 4, sub-regulation (1): No person shall discharge effluent or waste on land or into the aquatic environment contrary to the standards established under regulation 3 unless he or she has a permit in the format specified in the First Schedule issued by the Director.	Any project likely to result in the discharge of effluent or waste water (treated or untreated) onto land or into a water body.	DWRM	Form A: Application for a Waste Discharge Permit	Prior to any Project-related waste water discharge activities.
Licence to Emit Noise in Excess of Permissible Noise Levels	The National Environment (Noise Standards And Control) Regulations, 2003	Regulation 12, Sub-regulation (1): An owner or occupier of premises whose works or activities are likely to emit noise in excess of the permissible noise levels shall apply to the Executive Director in the form prescribed in Part I of the Second Schedule, for a Licence to Emit Noise in Excess of the Permissible Levels.	Projects in which it is highly likely that noise levels generated by the proposed activity will exceed permissible levels and cause a significant nuisance effect (e.g. flaring and quarrying).	NEMA	Form NEMA/NC: Application For A Licence To Emit Noise In Excess Of Permissible Noise Levels	Prior to commencement of activities likely to emit noise in excess of permissible levels.
Permit to Carry Out a Regulated Activity in a Wetland/River Bank/Lake Shore	The National Environment (Wetlands, River Banks and Lake Shores Management) Regulations, 2000	Regulation 12, Sub-regulation (1): Subject to the provisions of Regulations, a person shall not carry out any activity in a wetland without a permit issued by the Executive Director. Regulation 12, Sub-regulation (2): Any person intending to carry out an activity listed in the Second schedule to these Regulations shall apply to the Executive Director for a permit in Form A of the First Schedule.	Any regulated activity (listed in the Second Schedule to the Regulations) undertaken in a wetland, or within the protection zone of a riverbank: 100m from the highest watermark of a river listed in the Sixth Schedule or 30m for a non-listed river; 200m from the low watermark for a listed lake or 100m for a non-listed lake.	NEMA	Form A: Application for a Permit to Carry Out a Regulated Activity in a Wetland/River Bank/Lake Shore	Prior to undertaking any Project activities within wetlands, riverbanks or lake shores.
		Regulation 23, Sub-regulation (1): A person who intends to carry out any of the following activities shall make an application to the executive Director in Form A set out in the First Schedule to these Regulations - (a) use, erect, reconstruct, place, alter, extend, remove or demolish any structure or part of any structure in, under, or over the river banks or lake shore; (b) excavate, drill, tunnel or otherwise disturb the river bank or lake shore; (c) introduce or plant any of a plant whether alien or indigenous on a river bank or lake shore; (d) introduce any animal or micro-organism, whether alien or indigenous in any river bank or lake shore; or (e) deposit any substance on a riverbank or lakeshore if that substance would or is likely to have adverse effects on the environment.				

TYPE OF PERMIT/APPROVAL	SUPPORTING LEGISLATION	REQUIREMENT	APPLIES TO	APPROVING AUTHORITY	TYPE OF APPLICATION SUBMITTED	STAGE AT WHICH APPROVAL IS REQUIRED
Registration of a Workplace	The Occupational Safety and Health Act, 2006	Section 40, Subsection (2): a person shall not less than one month before he or she begins to occupy any premises as a workplace, serve on the Commissioner, a notice with the particulars prescribed in Schedule 3.	Any project requiring the establishment of a work place (e.g. drill site or camp).	Department of Occupational Safety and Health MGLSD	Particulars to be Submitted When Applying for the Registration of a Workplace or a Change in the Registered Occupier	Immediately upon (not later than one month) prior to undertaking any site works (construction, operation, pre-construction surveys).
Certificate for examination of steam boilers	The Occupational Safety and Health Act, 2006	Section 77, Subsection (1):A steam boiler and all its fittings and attachments shall be thoroughly examined by an authorised person at least once every fourteen months, or a longer period as the Commissioner may, by notice in the gazette direct, and after any extensive repairs.	Boilers for steam turbines used for electricity production (if option is selected after detailed design)	Department of Occupational Safety and Health MGLSD	Particulars to be Submitted When Applying for the Registration of a Workplace or a Change in the Registered Occupier	
Certificate for examination specifying safe working load for lifting appliances and machines	The Occupational Safety and Health Act, 2006	Section 71, Subsection (2): Lifting gear used to lift loads exceeding fifty kilograms shall not be used unless it is tested and examined by or on behalf of the manufacturer or by an authorised person and a certificate of the test and examination, specifying the safe working load, signed by or on behalf of the manufacturer or by the authorised person, is obtained and kept available for inspection.	Statutory equipment such as lifting equipment (loads exceeding fifty kilograms)	Department of Occupational Safety and Health MGLSD	Schedule 6 Form: Register of lifting gear, lifting appliances and lifting machines	
Certificate for examination of air receiver	The Occupational Safety and Health Act, 2006	Section 80, Subsection (4): Every air receiver shall be thoroughly cleaned and examined at least once every twenty-six months or such longer period as the Commissioner may, by statutory order, direct.	Separators and other pressure vessels for the Project.	Department of Occupational Safety and Health MGLSD	Particulars to be Submitted When Applying for the Registration of a Workplace or a Change in the Registered Occupier	
Development Permission	The Physical Planning Act, 2010	Section 33, Subsection (1): A person shall not carry out a development within a planning area without obtaining development permission from a physical planning committee.	Any development involving construction of permanent or semi-permanent structures or establishments such as base camps.	District Technical Planning Committee	Form PPA 1: Application for Development Permission	Before commencement of any Project activities.
Licence for Storage of Hazardous /Non Hazardous Waste	The National Environment (Waste Management) Regulations, 1999	Regulation 6, Sub-regulation (1): A person intending to store waste on his or her premises shall apply to the Authority for a licence in Form III set out in the First Schedule.	Any project requiring construction or operation of a storage facility for hazardous or non-hazardous waste (e.g. drill cuttings).	NEMA	Form III: Application for a Licence for Storage of Hazardous Waste	Prior to commencement of any activity requiring temporary storage of hazardous waste.
License to operate a waste treatment plant or waste disposal site	The National Environment (Waste Management) Regulations, 1999	Regulation 13, Sub-regulation (1): A person intending to operate a waste treatment plant or disposal site shall apply to the Authority for a licence in Form V set out in the First Schedule and shall accompany the application with the appropriate fee prescribed in the Sixth Schedule. Regulation 15 (1): A waste treatment plant or disposal site shall not be licenced under these Regulations unless an environmental impact assessment has been carried out in accordance with sections 19, 20 and 21 of the Act. (1) Where a disposer intends to dispose of or treat waste, the disposer shall, in addition to the matters required under regulations 13 and 14, indicate in his or her application for a licence, the disposal operations he or she intends to carry out in accordance with the categories identified in the Fifth Schedule and shall enclose - (a) a detailed description of the process he or she intends to employ and its possible effects; (b) a detailed description of the soil structure and geology of the area; (c) a plan for managing the leachate and other by-products from the waste; (d) a detailed drawing indicating the structure, construction and surroundings of the waste treatment plant or disposal site; (e) a plan of the surrounding areas, including water bodies and residences; and (f) any other matter that may be required by the Authority.	Any activity requiring treatment and disposal of waste as defined by these regulations.	NEMA	Form V: Application for a Licence to Own/Operate a Waste Treatment Plan or Disposal Site	Prior to any treatment or disposal of waste
Authorisation to use radioactive sources	The Atomic Energy Act, (Cap 143), the Atomic Energy (Ionising Radiation Protection) (Standards) Regulations. The Atomic Energy Regulations, 2012.	Section 32, Subsection (1): Subject to section 33, no person shall acquire, own, possess, operate, import, export, hire, loan, receive, use, install, commission, decommission, transport, store, sell, distribute, dispose of, transfer, modify, upgrade, process, manufacture or undertake any practice related to the application of atomic energy and regulated by this Act unless permitted by an authorisation issued under this Act.	Projects requiring the use of radioactive materials e.g. oil well drilling.	Atomic Energy Council, Ministry of Energy and Mineral Development	Notification of Council (requirements listed in Section 34 (2)) Application for an Authorisation (required information listed in Section 35 (1) of the Act	Prior to commencement of Project activities (specifically well drilling).

TYPE OF PERMIT/APPROVAL	SUPPORTING LEGISLATION	REQUIREMENT	APPLIES TO	APPROVING AUTHORITY	TYPE OF APPLICATION SUBMITTED	STAGE AT WHICH APPROVAL IS REQUIRED
Licence to erect or carry on a magazine	The Explosives Act, (Cap 298)	Section 22, Subsection (1): Any person desiring to erect or carry on a magazine for the storage of explosives shall make application for a licence to erect or carry on a magazine.	Activities requiring the temporary storage of explosives.	Ministry of Internal Affairs	Licence to erect or carry on a magazine	Prior to procurement and/or use of explosives.
Permits to set up a power plant, sell power to the grid, etc.	The Electricity Act, Cap 145 and the Regulations there under	Section 52, Subsection (1): No person shall construct, own or operate a generating station with a capacity of or exceeding 0.5 megawatts without a generation licence issued under this Act. Section 60, Subsection (1): The sale of electricity shall be subject to a sale licence granted by the Authority.	Power generation facilities at the CPF.	Electricity Regulatory Authority	Generation Licence Sale Licence	Prior to establishment of power generation facilities
Runway Renovation Approval	Civil Aviation (Aerodromes) Regulations, 2014	Regulation 54, Sub-regulation (1): An operator shall notify and report to the Authority, the air traffic control unit and pilots, within the specified time limits, information on— (b) any changes to the aerodrome facilities, equipment and level of service planned in advance	Upgrade to Bugungu Airstrip	Civil Aviation Authority	Notification of Civil Aviation Authority	Prior to upgrade to airstrip.
Lease Agreement	The Registration of Titles Act, (Cap 230)	Section 101: The proprietor of any freehold under the operation of this Act may, subject to any law or agreement for the time being in force, lease that land for any term exceeding three years by signing a lease of it in the form in the Eighth Schedule to this Act.	Access to or use of land for project activities.	District Land Board	Application for Lease	Prior to temporary use of or access to land for Project activities.
	The Land Act, (Cap 227)	Section 73: Where it is necessary to execute public works on any land, an authorised undertaker shall enter into mutual agreement with the occupier or owner of the land in accordance with this Act; and where no agreement is reached, the Minister may, compulsorily acquire land in accordance with section 42.				
	The Land Acquisition Act, (Cap 226)	Section 19: Nothing in this Act shall prevent the Government from entering into an agreement with a person having an interest in land by which that person's interest in land is acquired by the Government; or that person's claim to compensation for land under this Act is settled by the grant of other land or in any other way.				
Licence for health unit	Medical and Dental Practitioners Act, 1998	Section 28, Subsection (1) makes provision for application for a licence to engage in private practice by a registered medical or dental practitioner. Article 29, Subsection (2) makes provision for registration of health units	New medical Clinic at Industrial Area Workers' Camp	Uganda Medical and Dental Practitioners Council		Prior to establishment of clinic at the camp
Tree Removal Permit	National Forestry and Tree Planting Act	Section 31, Subsection (4)	Cutting of reserved tree species within the Project Area	National Forestry Authority (NFA)		Prior to site clearance
Facility licence	The Petroleum (Exploration, Development and Production) Act, 2013; The Petroleum (Exploration, Development and Production) Regulations, 2014	Section 81, Subsection (1): The Minister may in consultation with the Authority, on application duly made for a licence to install, operate or use a facility to carry out a petroleum activity, grant to the applicant a facility licence in such a manner and on such conditions as the Minister may determine. Regulation 24, Sub-regulation (1): An application for a facility licence under section 81 of the Act shall be submitted to the Minister in Form 13 prescribed in Schedule 1	Installation and operation of petroleum facilities	PAU	Application for a Facility Licence	Prior to construction of facilities for petroleum activities
Approval to modify a facility	The Petroleum (Exploration, Development and Production) Regulations, 2014	Regulation 27: A licensee shall not modify a facility or use a facility after it has been modified without the approval of the Authority.	Modification of a facility for petroleum activities	PAU	Application for Approval to Modify a Facility	Prior to modification of a facility for petroleum activities

TYPE OF PERMIT/APPROVAL	SUPPORTING LEGISLATION	REQUIREMENT	APPLIES TO	APPROVING AUTHORITY	TYPE OF APPLICATION SUBMITTED	STAGE AT WHICH APPROVAL IS REQUIRED
Permit to operate a drilling rig	The Petroleum (Exploration, Development and Production) Act, 2013	Section 93, Subsection (1): A licensee shall not operate a drilling rig without a valid permit issued by the Authority in accordance with terms and conditions specified in regulations issued by the Authority.	Well drilling	PAU	Application for a Permit to Operate a Drilling Rig	Prior to deployment of a drilling rig
Approval to drill a well	The Petroleum (Exploration, Development and Production) Act, 2013; The Petroleum (Exploration, Development and Production) Regulations, 2014	Section 94, Subsection (1): An operator shall not drill a well without the written approval of the Authority. Regulation 43, Sub-regulation (1): The licensee shall not drill a well without the written approval of the Authority.	Well drilling	PAU	Application for Approval to Drill a Well	Prior to drilling of a well
Approval of test production	The Petroleum (Exploration, Development and Production) Regulations, 2014	Section 96, Subsection (5): The Minister, shall in consultation with the Authority require a licensee to produce a report on field related matters, including alternative schemes for production and, if applicable, for injection and the total recovery factor for various petroleum production schedules. Regulation 73, Sub-regulation (1): Where the licensee intends to carryout test production, the licensee shall make an application in writing to the Minister at least three months before the proposed test production.	Test production of petroleum	PAU	Application for Approval of Test Production	Prior to test production
Production permit	The Petroleum (Exploration, Development and Production) Act, 2013; The Petroleum (Exploration, Development and Production) Regulations, 2014	Section 96, Subsection (1): The Minister shall, in consultation with the Authority, before or concurrently with a petroleum production licensee approve the production schedule contained in the field development plan and issue an annual production permit to the licensee. Regulation 74, Sub-regulation (1): The licensee shall submit an application for a production permit annually to the Minister in Form 12 prescribed in Schedule 1 in accordance with section 96 of the Act.	Production or injection of petroleum	PAU	Application for a Petroleum Production Permit	Prior to initial production, and annually throughout duration of the licence
Consent for construction of onshore facilities	The Petroleum (Exploration, Development and Production) Regulations, 2014	Regulation 81, Sub-regulation (1): The licensee shall submit to the Authority an application for consent to construct and operate a facility including, central processing facility, production plants, pipeline systems, group gathering stations, and pumping stations.	Construction and operation of onshore facilities	PAU	Application for consent to construct and operate a facility	Prior to construction of a facilities for petroleum production activities
Decommissioning Plan	The Petroleum (Exploration, Development and Production) Act, 2013; The Petroleum (Exploration, Development and Production) Regulations, 2014	Section 112, Subsection (1): A licensee shall submit a decommissioning plan to the Authority— (a) before a petroleum production licence or a specific licence to install and operate facilities expires or is surrendered; or (b) before the use of a facility is terminated permanently Regulation 24, Sub-regulation (2): An application for a facility licensee shall, as may be relevant for each facility contain- (s) a decommissioning plan for the facility	Decommissioning of production facilities	PAU	Decommissioning Plan	Before complete or partial removal, disposal or abandonment of production facilities

2.1.9 Strategic Environmental Assessment

In 2015, the Cabinet approved the framework for implementation of Strategic Environmental Assessment (SEA) for the Albertine Graben (Ref. 2-130), the objectives of which were to ensure that environmental and sustainability issues associated with oil and gas activities are taken into account during early stages of decision making and integrated into laws/regulations and Policies, Plans and Programs, and that high-level environmental strategic aspects related to the oil and gas sector are addressed to achieve the goals of the National Oil and Gas Policy. The Ministry of Energy and Mineral Development and that of Water and Environment jointly undertook the SEA of oil and gas operations in the Albertine Graben from April 2010 to September 2013. The Assessment involved various stakeholders, who included Government institutions (at national, regional and district levels), civil society (non-governmental organisations, faith-based organisations, community-based organisations), business and industry players (private enterprises) and cultural institutions.

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

Key Issues were divided into groupings for ease of management:

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

Group 2 - Co-existence with Local Communities;

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

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

Group 5 - Co-existence with Tourism;

Group 6 - Co-existence with Fisheries;

Group 7 – Sharing of Revenues and Wellbeing between the National and the Local / Regional level (Co-operation);

Group 8 – Discharge and Emissions from the Petroleum Industry;

Group 9 – Waste Management;

Group 10 – Water Management;

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

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

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

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

Annex 10 – Resettlement Policy Framework.

The development of this ESIA Report has been made with due consideration to the key findings and recommendations of the SEA process, which include:

- *The current planning for development of the petroleum sector has a positive drive. However, it is recommended to moderate the speed of development to ensure balanced capacity building*

amongst relevant institutions, such as NEMA, to manage the sector. Furthermore, this adjustment would benefit the local district governments and population to adapt to the new sector;

- *Activities in areas which are formally designated for ecosystem protection and biodiversity conservation should be in accordance with the official protection status of the area. As an example, the National Parks fall into category II of the IUCN classification. The activities should also ensure maintenance of the status quo of the ecosystem and the biodiversity or even improving it. Any decision-making regarding potential future petroleum activities in protected or environmentally sensitive areas need to be based on an Integrated Management Plan according to the principles outlined in Appendix 12. Therefore the detailed content of the Integrated Management Plan should be developed and implemented urgently;*
- *Petroleum exploration activities that are already licensed to take place in protected and environmentally sensitive areas should continue to be based on approved EIAs and relevant national policies and guidelines such as the National Policy on conservation and sustainable development of wildlife resources. In addition such activities should follow international best practice for operations in protected and environmentally sensitive areas;*
- *The legal framework has to be further adapted to the new petroleum sector. An important element is to further develop the EIA legislation and guidelines according to international best practice;*
- *Co-existence of the petroleum sector with other sectors is of high importance. The petroleum industry should proactively train potential local service providers to reach a high local content. In order to ensure sustainable co-existence with the fisheries, this sector needs stronger regulation and management. The tourism sector is depending on the preservation of ecosystem and recreational functions. Mechanisms have to be established to avoid that the petroleum industry is undermining these values. The sectors should establish common communication platforms where relevant concerns can be resolved;*
- *Local communities will experience opportunities as well as risks. The capacity to adapt to the changing framework conditions has to be a key focus and long-term socioeconomic benefits have to be ensured. A social development plan should therefore be developed. The scenario analysis reveals the presence of large numbers of workforce, especially during construction periods and points at significant in-migration. The planning of urbanization and required associated infrastructure has to be advanced in line with petroleum development planning to avoid social tension and lack of capacity of infrastructure;*
- *The Scenario Analysis also reveals that the pressure on public roads is a major concern. Adequate infrastructure to meet the industry needs while ensuring public road safety has to be in place;*
- *Selected areas have been designated for industry development and land take is ongoing. There is concern that resettlement and compensation mechanisms are not adequate. The SEA advices to implement mechanisms in accordance with international best practice;*
- *The National Oil Spill Contingency Plan is under development. Timely preparation and implementation including the relevant training is essential;*
- *Waste management has already received increasing attention. Waste management strategies and facilities covering the existing legacy waste as well as future waste have to be developed in the very near future in line with international best practice. Although produced water is not yet a key concern, it requires dedicated attention already now;*
- *Water management is a major concern. The petroleum industry requires large amounts of water during their operations and this adds to the pressure on water resources in AG. The government should establish water management planning considering the resource needs, sources and associated environmental impacts;*

- *The National Oil and Gas Policy outline the spirit of cooperation and the roles of the government and the oil industry. The oil industry should be encouraged to take an active role in developing technology to meet the challenges of ecologically vulnerable areas and reduce their footprint;*
- *The government has taken a proactive role in communication with neighbouring states regarding transboundary issues such as sharing of petroleum reserves across borders with DR Congo. Further efforts should be made regarding shared oil spill contingency for Lake Albert and the Nile, fisheries management, security of oil and gas installations, public and border security;*
- *The National Oil and Gas Policy outlines goals, strategies and actions for revenue management and transparency. Proper mechanisms and measures should be put in place to ensure that long-term benefits are created and shared fairly with due consideration of the oil and gas bearing regions;*
- *Stakeholder engagement is a key principle of the Ugandan government and the SEA builds on this principle. The disparities in the Ugandan society require attention to ensure that consultation is meaningful and that information is transparent and easily accessible for stakeholders. This will contribute to achieving the social license to operate and minimize the potential for social conflict; and*
- *To ensure that the conclusions from the SEA are adequately considered an Implementation Plan should be developed. This should include the collection of and access to adequate baseline data. In addition, the SEA should be updated regularly.*

2.1.10 Institutional Framework

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

2.1.10.1 National Level

2.1.10.1.1 Ministry of Energy and Mineral Development

The Ministry of Energy and Mineral Development (MEMD) is responsible for the Energy and Mineral Sector in Uganda. Its mandate is to establish and promote the development, strategically manage and safeguard the rational and sustainable exploitation and utilisation of energy and mineral resources for social and economic development. Within the Ministry, the Directorate of Petroleum is responsible for promoting petroleum exploration in the country by attracting oil companies to invest in the sector; while the Petroleum Exploration and Production Department (PEPD) leads the implementation of the National Oil and Gas Policy for Uganda, 2008 (Ref. 2-131) and regulates licensees undertaking petroleum exploration and production.

2.1.10.1.2 Petroleum Authority of Uganda

The Petroleum Authority of Uganda (PAU) is a statutory body established under the Petroleum (Exploration, Development and Production) Act 2013 with a mandate to monitor and regulate the exploration, development and production, together with the refining, gas conversion, transportation and storage of petroleum in Uganda. The authority is also responsible for implementing functions under the Petroleum (Refining, Conversion, Transmission and Midstream Storage) Act, 2013.

2.1.10.1.3 Petroleum Exploration and Production Department

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

2.1.10.1.4 Electricity Regulatory Authority

The Electricity Regulatory Authority was established under the Electricity Act 1999, and is the authority responsible for regulating the generation, transmission, distribution, sale, export, import and distribution of electrical energy in Uganda. Its functions include issuing licences for generation, transmission, distribution or sales of electricity; and for ownership or operation of transmission systems.

2.1.10.1.5 Ministry of Gender, Labour and Social Development

The Ministry of Gender Labour and Social Development (MGLSD) has a mandate to empower communities to harness their potential through skills development, labour productivity and cultural growth. It promotes issues of social protection, gender equality, equity, human rights, culture, decent work conditions and empowerment for different groups such as women, children, the unemployed youth, internally displaced persons, the older persons and persons with disabilities. The institutional structure of the Ministry comprises two directorates responsible for Gender and Community Development; and Labour, Employment, and Industrial Relations each of which include a number of departments to manage the various functions of the Ministry.

The Department of Occupational Safety and Health within the MGLSD is responsible for administering the Occupational Safety and Health Act, 2006, and carries out regular statutory inspections to ensure proper management of health and safety in the work place including in the oil and gas industry.

2.1.10.1.6 National Environment Management Authority

The National Environment Management Authority (NEMA) is the principal agency in Uganda for the management of the environment, mandated to coordinate, monitor and supervise all activities in the field of the environment. In accordance with its functions stipulated under Section 6, Subsection (1) of the National Environment Act Cap 153, the authority is mandated to ensure observance of proper safeguards in the planning and execution of all development projects, including those already in existence that have or are likely to have significant impacts on the environment.

2.1.10.1.7 Ministry of Water and Environment

The Ministry of Water and Environment (MWE) is the parent ministry responsible for environmental conservation in Uganda. The Ministry comprises three directorates, namely: the Directorate of Water Resources Management; Directorate of Water Development; and the Directorate of Environmental Affairs. Reporting to the Ministry are NEMA, National Forestry Authority (NFA) and the National Water and Sewerage Corporation (NWSC).

2.1.10.1.8 Directorate of Water Resources Management

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

2.1.10.1.9 Wetlands Management Department

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

2.1.10.1.10 Ministry of Tourism, Wildlife and Antiquities

The Ministry of Tourism, Wildlife and Antiquities (MTWA) formulates and implements policies, strategies, plans and programmes that promote tourism, wildlife and cultural heritage conservation. It is responsible for conservation and development of wildlife resources and provision of advice to government. The Ministry also promotes and protects cultural and national heritage, and oversees the Uganda Wildlife Authority among other institutions.

The Department of Museums and Monuments within the MTWA is mandated to protect, promote and present the cultural and natural heritage of Uganda. Its key functions include the conservation and maintenance of important physical cultural resources or heritage collections.

2.1.10.1.11 Uganda Wildlife Authority

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

2.1.10.1.12 Directorate of Fisheries Resources

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

2.1.10.1.13 National Forestry Authority

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

2.1.10.1.14 Uganda National Roads Authority

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

2.1.10.1.15 Ministry of Lands, Housing and Urban Development

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

The office of the Chief Government Valuer (CGV) is located in the MLHUD. The CGV provides reliable real property valuations to Government. The responsibilities of the CGV include: advising Government on the real property valuation; valuing property for purchase and compensation by Government; valuing property for rent by Government; assessing Stamp Duty; and advising Government on rating properties.

The Department of Physical Planning is also part of the MLHUD, and is responsible for national and regional planning, developing policy, laws, guidelines and standards in relation to physical planning, and providing technical support to local governments in the field of physical planning.

2.1.10.1.16 Civil Aviation Authority

The Civil Aviation Authority (CAA) was established following the enactment of the Civil Aviation Authority Act, (Cap 354). Its objective is to promote the safe, regular, secure and efficient use and development of civil aviation inside and outside Uganda. The functions of the Authority include among others the establishment, maintenance, development, operation and ownership of aerodromes. These (aerodromes) include Pakuba and Bugungu Airfields located inside the MFNP.

2.1.10.1.17 Uganda Land Commission

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

2.1.10.1.18 National Physical Planning Board

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

2.1.10.1.19 Uganda National Bureau of Standards

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

2.1.10.1.20 Uganda Electricity Transmission Company Limited

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

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

2.1.10.1.21 Uganda Human Rights Commission

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

2.1.10.1.22 Office of the Prime Minister (with regards to Disaster Preparedness

The Ministry for Relief and Disaster Preparedness is part of the Office of the Prime Minister, and is responsible for ensuring effective preparedness and response to disasters and providing relief to victims of disasters.

2.1.10.1.23 Ministry of Education and Sports (regarding capacity building so nationals can benefit from O&G jobs)

The mandate of the Ministry of Education and Sports (MoES) is to provide quality education and sports services in the country, which are constitutional obligations for the Ugandan State and Government.

2.1.10.1.24 Ministry of Defence (regarding security and cross border issues)

Ministry of Defence is the Government Ministry responsible for the National Defence and Security of the country. The Constitution of Uganda (Article 209) establishes the roles and responsibilities of this Ministry, namely: to preserve and defend the sovereignty and territorial integrity of Uganda; to cooperate with the civilian authority in emergency situations and in cases of natural disasters; to foster harmony and understanding between the defence forces and civilians; and to engage in productive activities for the development of Uganda.

2.1.10.1.25 Ministry of Internal Affairs (regarding immigration and security)

Ministry of Internal Affairs is a Government Ministry to facilitate the legal and orderly movement of persons to and from Uganda, regulate the residence of immigrants in the country, verify and process Uganda citizenship and enforce national and regional immigration laws for the development and security of Uganda. The Ministry is the overseer of a number of Government bodies which include Uganda Police Force, Uganda Prisons Services and the Directorate in charge of Citizenship.

2.1.10.1.26 Uganda Police (traffic and oil & gas police)

The Ugandan Police Force (UPF) was established under Article 211 of the Constitution of the Republic of Uganda and the Police Act, Cap 303. The UPF has a number of directorates that include but are not limited to the Directorate of Traffic and Road Safety and Directorate of Oil and Gas. The function of the Directorate of Traffic and Road Safety is to enforce traffic and road safety laws, while the Directorate of Oil and gas ensures that the country's oil and gas resources are adequately safeguarded.

2.1.10.2 Local Level

2.1.10.2.1 District Local Government

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

2.1.10.2.2 Lower Local Government

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

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

2.1.10.2.3 Non-Governmental Organisations and Civil Society Organisations

These organisations play a role in oil and gas activities through advocacy, mobilisation and dialogue with communities. They may also be contracted in the delivery of various services, especially in the communities where oil and gas activities are to be undertaken. Non-governmental organisations (NGOs) and Civil Society Organisations (CSOs) can contribute to holding the different players

accountable with regard to oil, gas issues, and participate in getting the voices of the poor into designing, monitoring and implementation of programmes in the oil and gas sector.

2.1.10.3 Cultural Traditional Institutions

Traditional institutions were abolished in 1966 but then restored by the government in 1993. A legislative framework was developed to regulate their operation and they have a special status in the 1995 Constitution under Article 246 (also refer to The Institution of Traditional or Cultural Leaders Act 2011), which sets out the role and responsibilities of these institutions. Traditional institutions are not allowed to collect revenues and traditional leaders are not allowed to participate in partisan politics, nor exercise any administrative, legislative or executive powers at any government level. The MGLSD is responsible for regulating the traditional institutions. The government provides financial support and works with the institutions on areas of common interest.

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. In some cases clan leaders are elected by clan members and the council of elders are elected by residents of the village, while in others clan heads are hereditary positions and not elected. These systems of traditional leadership continue to be recognised and respected by community residents. Women can also hold leadership positions on the council of elders. However, this is rare and women cannot be clan leaders.

Traditional leaders work primarily around the following principles: preservation of culture and traditions, promotion of ethnic unity, and promotion of development. Clan leaders play an important role in resolving civil conflict in communities using an informal system of arbitration that aims to maintain peace. Often, formal courts refer issues back to clan leaders to try to arbitrate and cases only return to court if clan leaders have failed (Various Focus Group Discussions (FGDs), Tilenga ESIA SBS, December 2016). Traditional leaders have also often been involved in wider conflict resolution processes. For example, in 2007 the cultural leader Rwot David Onen Acana of Acholi Chiefdom held a peace conference (wan goo) to mediate between Uganda and the Lord's Resistance Army (LRA) in Juba, South Sudan.

The Project falls within the Acholi Chiefdom and the Bunyoro-Kitara Kingdom: two of 12 traditional cultural institutions recognised by the government. The Bunyoro-Kitara Kingdom is formed of Lake Albert and falls within the districts of Buliisa, Hoima, Kagadi, Kakumiro, Kibaale, Kiryandongo and Masindi. The Acholi Chiefdom is north of Bunyoro-Kitara Kingdom and includes the districts of Gulu, Amuru, Nwoya, Pader Agago, Kitgum and Lamwo. Each institution has a legal mandate, a council or parliament with ministers, which parallel the official state institutions.

Buganda is the largest traditional kingdom in Uganda and comprises Uganda's entire central region including the capital, Kampala. The people from the Buganda kingdom, known as the Baganda, make up the largest ethnic group in Uganda.

2.1.10.3.1 The Bunyoro-Kitara Kingdom

The Bunyoro-Kitara Kingdom (BKK) is represented by a traditional ruler (King) and the structure of the Kingdom is similar to the Local Councils, with a county chief, sub county chief, parish chief, sub parish chief, and several clan committees. The office of the Prime Minister heads the civil service of the kingdom and all county chiefs report to him and he in turn reports to the King. The King is also assisted by the Principal Private Secretary and a Cabinet of Minister. The Bunyoro-Kitara traditional governance is responsible for cultural matters, such as funeral rites and marriage ceremonies and is involved in other matters including arbitration, community development programs for health and education. The BKK Land Board (which is separate to the District Land Board) was established in 2011 with the aim of recovering and protecting kingdom land that was restituted to the Kingdom in 1993 following the restoration of kingdoms, from occupation and encroachment by individuals and institutions. People must apply to the BKK Land Board for tenancy rights and pay an annual fee for ground rent if they want to settle on kingdom land.

The Kingdom of Bunyoro-Kitara was established in the 16th century. It has a capital in Hoima as well as a palace in Masindi. The population of the Kingdom is approximately 1.4 million people. The main ethnic group is Banyoro and the official language is Runyoro. The Bagungu are also part of the Kingdom in Buliisa District; however, in 2013 a group of Bagungu represented by a 15 member

committee declared their intention to secede from BKK to form a Bugungu Kingdom. This was reported to be as a result of feeling marginalised and wanting a leader to preserve their culture. In 2018, the committee passed a resolution to secede and pledged to communicate the resolution to the government in order to proceed with process of forming the institution.

2.1.10.3.2 The Acholi Chiefdom

The Acholi are closely related to the Alur (West Nile Sub Region), the Japadhola (eastern Uganda), and the Joluo (Kenya). The Acholi Chiefdom is led by a paramount chief, currently Rwot David Onen Achana II who is the 25th paramount chief of the Kingdom. The paramount chief is the cultural head and custodian of Acholi culture and oversees 54 chiefdoms. The council of chiefs (Ker Kwaro Acholi) elects the paramount chief (Rwot). The population is approximately 1.6 million people.

The traditional leaders in Acholi Chiefdom were influential in promoting peace in northern Uganda after 90% of the population in Acholi land had to abandon their homes and live in camps as Internally Displaced Person (IDPs). Religious leaders of all the main religions set up the Acholi Religious Leaders' Peace Initiative (ARLPI) and had strong links to the local communities as well as direct access to Sudanese leaders, such as Joseph Kony. Despite the traditional leaders efforts it is reported that the conflict in northern Uganda has eroded the Acholi cultural traditions, particularly among the youth.

2.2 International Guidelines and Standards

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

- International Finance Corporation (IFC) (particularly the Environmental, Health, and Safety Guidelines for Onshore Oil and Gas Development (Ref. 2-132));
- International Union for Conservation of Nature (IUCN) (Oil exploration in the tropics: guidelines for environmental protection) (Ref. 2-133);
- International Union for the Conservation of Nature (IUCN) Red List (2017) (Ref 2-134);
- The Energy and Biodiversity Initiative (Integrating Biodiversity Conservation into Oil and Gas Development (Ref. 2-5);
- World Health Organisation (WHO) (including the Air Quality Guidelines, Global Update 2005 (Ref. 2-136)) and Community Noise Guidelines (Ref. 2-137) as well as others listed within technical chapters as necessary;
- International Organisation for Standardisation (ISO) (including ISO 9001:2015 (Quality management systems), ISO 14001:2015 (Environmental management systems), and ISO 18001:2004 (Information technology – Radio frequency identification for item management)) (Ref. 2-138);
- International Association of Oil and Gas Producers (IOGP); Cross Sector Biodiversity Initiative (CSBI) (Ref. 2-139);
- International Petroleum Industry Environment and Conservation Association (IPIECA) (Ref. 2-140); and
- United Nations Development Program (UNDP) (2017) Guidelines on Integrating Health and Gender into Environmental and Social Impact Assessments in Sub-Saharan Africa (Ref. 2-141).

2.2.1 International Finance Corporation

The ESIA will document the alignment of the Project with the standards and guidelines of International Financial Institutions (IFIs) such as the requirements of a Category A project under the Equator Principles (EPs) and the Organisation for Economic Cooperation and Development (OECD) Revised Council Recommendation on Common Approaches on the Environment and Officially Supported Export Credits (hereafter referred to as the 'OECD Common Approaches'). Both the EPs and the OECD Common Approaches are underpinned by the IFC Performance Standards (PSs). The IFC

PSs, EPs and OECD Common Approaches current as of 1st January 2012 are applicable to the Project.

The IFC PSs are directed towards project developers, providing guidance on how to identify risks and impacts, and are designed to help avoid, mitigate, and manage risks and impacts as a way of doing business in a sustainable way, including stakeholder engagement and disclosure obligations for the Project. There are eight performance standards, as presented in Table 2-3 below.

Table 2-3: IFC Performance Standards

IFC	Standard	Overview	Relevant
PS 1	*Assessment and Management of Environmental and Social Risks and Impacts*	Establishes requirements for social and environmental performance management throughout the life of a project.	**YES** - ***Chapter 4: Project Description and Alternatives*** details the Project components and the technical chapters assess which parts of the development may pose significant harm to the social and bio-physical environment if not well managed.
PS 2	*Labour and Working Conditions*	Highlights the need for workers' rights regarding income generation, employment creation, relationship management, commitment to staff, retention and staff benefits.	**YES** - The Project is likely to employ up to 4,000 personnel during the peak construction period. Details are provided in ***Chapter 16: Social***.
PS 3	*Resource Efficiency and Pollution Prevention*	Defines an approach to pollution prevention and abatement in line with current internationally disseminated technologies and good practice.	**YES** - Each technical chapter of the ESIA includes measures which the Project will put in place to help prevent pollution. Embedded mitigation measures are also presented in ***Chapter 4: Project Description and Alternatives***.
PS 4	*Community Health, Safety and Security*	Specific requirements for mitigating any potential for community exposure to risks and impacts arising from equipment accidents, structural failures and releases of hazardous materials.	**YES** - ***Chapter 18: Health and Safety*** provides further information relating to existing baseline conditions and related impact assessment.
PS 5	*Land Acquisition and Involuntary Resettlement*	Recognises that project related land acquisition and restrictions could have adverse effect on communities or persons that use the land and outlines a policy to avoid or minimise involuntary physical resettlement as a consequence of development.	**YES** - The Project will require permanent acquisition of land as outlined in ***Chapter 4: Project Description and Alternatives***. The Land Acquisition and Resettlement Framework produced for the Project details the procedures for acquisition of land.

IFC	Standard	Overview	Relevant
PS 6	*Biodiversity Conservation and Sustainable Management of Living Natural Resources*	Sets out an approach to protect and conserve biodiversity, including habitats, species and communities, ecosystem diversity, and genes and genomes, all of which have potential social, economic, cultural and scientific importance.	**YES** – The Project is located within a sensitive environment and substantial consideration has been given to Biodiversity conservation and management of natural resources. Further detailed information is provided within ***Chapter 13: Terrestrial Vegetation***; ***Chapter 14: Terrestrial Wildlife***; ***Chapter 15: Aquatic Life*** and ***Chapter 19: Ecosystem Services***
PS 7	*Indigenous Peoples*	Recognises that Indigenous Peoples can be marginalised and vulnerable (e.g. if their lands and resources are encroached upon by or significantly degraded by a project).	**NO** - This is not considered relevant to this Project as no indigenous people have been identified within the Project Area. Further information provided in ***Chapter 16: Social***
PS 8	*Cultural Heritage*	Aims to protect irreplaceable cultural heritage and to provide guidance for protecting cultural heritage throughout a project's life cycle.	**YES** - ***Chapter 17: Archaeology and Cultural Heritage*** details the findings from the cultural heritage surveys, possible impacts and mitigation measures

2.2.2 IFC Industry Specific Environmental, Health and Safety Guidelines

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

- EHS Guideline Onshore Oil and Gas Development (2007) (Ref. 2-142);
- EHS Guideline on Electric Power Transmission and Distribution (2007) (Ref. 2-143);
- EHS General Guidelines (2007) (Ref. 2-144), including but not limited to:
    - Hazardous Materials Management;
    - Noise;
    - Waste Management;
    - Occupational Health and Safety;
    - Water and Sanitation; and
    - Community Health and Safety.
- Good Practice Handbook for Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets (2013) (Ref. 2-145).

2.2.3 IFC Social and Stakeholder Engagement Guidelines

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

- 2002 Handbook for Preparing a Resettlement Action Plan (Ref. 2-146);
- 2007 Stakeholder Engagement Handbook (Ref. 2-147);
- 2009 Good Practice Note Addressing Grievances from Project-Affected Communities (Ref. 2-148);

- 2009 Handbook for Addressing Project-Induced In-Migration (Ref. 2-149); and
- 2009 Introduction to Health Impact Assessment (Ref. 2-150).

2.2.4 WHO Guidelines

Relevant WHO guidelines relevant and used within this ESIA include:

- WHO Air Quality Guidelines (2005) (Ref. 2-136);
- WHO Guidelines for Community Noise (1999) (Ref. 2-137); and
- WHO Guidelines for Drinking Water Quality (2011) (Ref. 2-158).

2.2.5 Equator Principles

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

2.3 International Conventions and Agreements

Uganda is signatory to a number of international agreements relevant to the Project. These are outlined in Table 2-4.

Table 2-4: Summary of International Conventions and Agreements

TREATY, CONVENTION, AGREEMENT	SUBJECT	SIGNED/ ACCEPTED	RATIFIED	APPLICATION TO PROPOSED PROJECT
Bonn Convention, 1979	Convention on the Conservation of Migratory Species of Wild Animals	-	01/08/2000	The Project Area includes the MFNP and Ramsar site that contain globally vulnerable species of birds as well as others among which are migrant birds (Byaruhanga and Kigoolo, 2005 (Ref. 2-111)). There are specific resolutions and instruments such as species action plans under this convention that apply to Uganda.
Convention on Biological Diversity, 1992	Conservation, sustainable and equitable use of biodiversity	-	08/09/1993	Requires, under Principle 17, that EIA shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority. At the ninth meeting of the Conference of Parties in 2008, one of the decisions of the Conference was to consider biodiversity offset mechanisms where relevant and appropriate while ensuring that they are not used to undermine unique components of biodiversity. The biodiversity offsets are designed to achieve no net loss (or a net gain) in the context of development projects (United Nations Environment Programme (UNEP) 2010).

TREATY, CONVENTION, AGREEMENT	SUBJECT	SIGNED/ ACCEPTED	RATIFIED	APPLICATION TO PROPOSED PROJECT
Nile Basin Initiative, 1999	Agreement between riparian countries of the Nile to develop and manage water resources in a sustainable and equitable manner.	-	08/2002	The NBI, through its Focal Point in the Ministry of Water and Environment, are key stakeholders for the management of transboundary water resources within the Nile Basin.
United Nations Convention to Combat Desertification (UNCCD), 1994	United Nations Convention to Combat Desertification (UNCCD)	21/11/1994	25/06/1997	The Project has an obligation to try and not contribute to the occurrence of desertification. The Convention is supported by the following Acts that shall apply to the Project: the National Environment Act, Cap 153; the Environmental Impact Assessment Regulation, 1998; the Land Act, Cap. 227 as amended; the Local Governments Act, Cap 243; the Water Act, Cap 152; the Uganda Wildlife Act, Cap 200; the National Forestry and Tree Planting Act, 2003; the Prohibition of the Burning of Grass Act, Cap 33; and the Physical Planning Act, 2010.
The Kyoto Protocol, 1997	The Kyoto Protocol is a protocol to the United Nations Framework Convention on Climate Change (UNFCCC), aimed at fighting global warming. The UNFCCC is an international environmental treaty with the goal of achieving the "*stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system*."	25/03/2002 acceptance	16/02/2005 entered into force	The Project Proponents must demonstrate they have explored all alternatives and identified the least polluting solution according to best available techniques and best practical environmental option.
The Montreal Protocol, 1987	The Montreal Protocol on Substances that Deplete the Ozone Layer	-	15/09/1988	In accordance with supporting local legislation, resourcing of materials should not be from a country that is not a signatory of the Montreal Protocol. Additionally, any imports of controlled substances should be licensed by the relevant authority, and free of listed materials.

TREATY, CONVENTION, AGREEMENT	SUBJECT	SIGNED/ ACCEPTED	RATIFIED	APPLICATION TO PROPOSED PROJECT
Stockholm Convention on Persistent Organic Pollutants (POPS), 2001	Stockholm Convention on Persistent Organic Pollutants is an international environmental treaty, signed in 2001 and effective from May 2004, that aims to eliminate or restrict the production and use of persistent organic pollutants. Initially, twelve POPs have been recognized as causing adverse effects on humans and the ecosystem.	20/07/2004 accession	-	The Proponent should take appropriate steps to prevent the use of chemicals listed under this Convention.
Convention for the Safeguarding of the Intangible Cultural Heritage, 2003	Intangible Cultural Heritage	-	13/05/2009	The Proponent should consider the potential impact of the Project on intangible cultural heritage and implement measures to safeguard it where it exists.
Convention on International Trade in Endangered Species of Wild Fauna and Flora (1973) (CITES)	Trade in endangered species of wild fauna and flora	18/07/1991 accession	16/10/1991 entered into force	The Murchison Falls Protected Area (MFPA), which comprises a part of the Project Area, is home to endangered species protected by this Convention.
Ramsar, 1971	Convention on Wetlands of International Importance especially as Waterfowl Habitat	-	04/03/1988	The Project Area includes a part of the Murchison Falls-Albert Delta Wetland System (a Ramsar site).
Convention on the Elimination of All Forms of Discrimination against Women (CEDAW)	United Nations Convention on discrimination against women	30/07/1980	22/07/1985	The Project Area likely includes many women who are single parents and others who are constantly being cheated out of their rights to property or discriminated against by men. The responsibility for implementation of CEDAW in Uganda lies with the UHRC which was established by the Constitution of the Republic of Uganda (Article 51). The MGLSD provides the national machinery for gender mainstreaming (CEDAW 2015). The MGLSD, the UHRC and relevant departments within the Ministry are to be engaged as part of the ESIA.

TREATY, CONVENTION, AGREEMENT	SUBJECT	SIGNED/ ACCEPTED	RATIFIED	APPLICATION TO PROPOSED PROJECT
International Convention on the Elimination of All Forms of Racial Discrimination	United Nations Covenant on racial discrimination	21/10/1980	-	The UHRC, established by the Constitution of the Republic of Uganda (Article 51), is responsible for combating the violation of human rights in Uganda and implementation of the international conventions. The Project Proponents will engage in consultation with the UHRC as necessary.
International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families		14/10/1995	-	Uganda is a State Party to the convention. The Project Proponents will ensure that the employment of migrant workers is aligned with Uganda's commitment to the implementation of this convention.
Convention against Torture and Other Cruel Inhuman or Degrading Treatment or Punishment		03/10/1986	-	Aspects of this convention are covered under Chapter 3 of the Constitution of Uganda. The Project Proponents will ensure that they are in compliance with these legal requirements during the implementation of the Project.
Convention on the Rights of Persons with Disabilities		30/03/2007	25/09/2008	The Constitution under Article 35 provides for the rights of persons with disabilities. The UHRC will monitor government's compliance with this convention (Article 52 (h)). The Project Proponents will engage with the UHRC as necessary and ensure the rights of people with disabilities affected by the project are protected in line with Uganda's commitment to the convention.
International Covenant on Economic, Social and Cultural Rights	United Nations Covenant on equal economic, social, cultural, civil and political rights within State Parties	21/01/1987	-	The Constitution under chapter 3, provides for social, cultural and economic human rights. The UHRC, established by the Constitution of the Republic of Uganda (Article 51), is responsible for combating the violation of human rights in Uganda and implementation of the international conventions.
International Covenant on Civil and Political Rights (ICCPR) (including the First Optional Protocol on the ICCPR with reservations on Article 5)	United Nations Covenant on civil and political rights within State Parties	21/06/1995 (acceptance of Optional Protocol 14/11/1995)	-	The Constitution provides for civil and political rights.

TREATY, CONVENTION, AGREEMENT	SUBJECT	SIGNED/ ACCEPTED	RATIFIED	APPLICATION TO PROPOSED PROJECT
Convention on the Rights of the Child Optional Protocol to the Convention on the Rights of the Child on the involvement of children in armed conflict Optional Protocol to the Convention on the Rights of the Child on the sale of children, child prostitution and child pornography	United Nations Convention on the rights of the child	17/08/1990 06/05/2002 30/11/2001	17/08/1990	Aspects of this convention are covered under national legislation such as the Constitution, Children Act, Children rules, The Employment Act 2006. The Project Proponents will follow the requirements of the law during the implementation of the Project.
African Charter on Human and Peoples' Rights	International human rights instrument to promote and protect human rights and basic freedoms on the African continent	18/08/1986	10/05/1986	Chapter 4 of the 1995 Constitution of the Republic of Uganda fully domesticates the rights enshrined in the African Charter on Human and Peoples' Rights. The Constitution of the Republic of Uganda empowers the UHRC to carry out various human rights related functions including monitoring the Government's compliance with international treaties and conventions.
African Charter on the Rights and Welfare of the Child	International human rights instrument on the rights and welfare of the child on the African continent	26/02/1992	17/08/1994	Article 34 of the Constitution provides for the rights of children including orphans and other vulnerable children, and establishes the UHRC as the institution responsible for monitoring Government's compliance with international treaties and conventions. The Project Proponents will ensure the rights of children affected by the project are protected in line with Uganda's commitment to this convention.
Protocol to the African Charter on Human and Peoples' Rights on the Rights of Women in Africa	International human rights instrument on human rights and the rights of women on the African continent	18/12/2003	22/07/2010	Article 33 of the Constitution provides for the rights of women, and establishes the UHRC as the institution responsible for monitoring Government's compliance with international treaties and conventions. The Project Proponents will ensure the rights of women affected by the Project are protected in line with the Constitution and Uganda's commitment to this convention.

TREATY, CONVENTION, AGREEMENT	SUBJECT	SIGNED/ ACCEPTED	RATIFIED	APPLICATION TO PROPOSED PROJECT
Labour Inspection Convention, 1947 (No. 81) (Excluding Part II)	International Labour Organisation (ILO) Convention concerning labour inspection in industry and commerce	-	04/06/1963	The Occupational Safety and Health Act, 2006 operationalises Uganda's commitments to the convention, the requirements of which shall apply to the Project. The Project shall also engage the Department of Occupational Safety and Health under the MGLSD – the lead Ministry responsible for labour administration.
Forced Labour Convention, 1930 (No. 29)	ILO Convention concerning forced or compulsory labour	-	04/07/1963	Local supporting legislation that shall apply to the Project includes: the Employment Act, 2006; the Employment Regulations, 2011; the Employment (Employment of Children) Regulations, 2011; the Equal Opportunities Act, 2007; the Labour Disputes (Arbitration and Settlement) Act, 2006; the Labour Disputes (Arbitration and Settlement) (Mediation and Conciliation) Regulations, 2011; the Labour Unions Act, 2006; the Labour Unions (check - off) Regulations, 2011; the Labour Union (Access of Union Officials to a Workplace) Regulations, 2011; the Minimum Wages Boards and Wages Councils Act, 2000; Workers Compensation Act, 2000; and Workers Compensation Regulations, 2011. The Project is going to be labour intensive with local, foreign/expatriate, skilled, semi-skilled and unskilled employees all of whose rights need to be effectively protected during the life of the Project.
Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87)	ILO Convention concerning freedom of association and protection of the right to establish workers' and employers' organisations	-	02/06/2005	This too is provided for under the Labour Unions Act, 2006. The Project Proponents will follow the requirements of the law during the implementation of the Project
Right to Organise and Collective Bargaining Convention, 1949 (No. 98)	ILO Convention concerning the application of the principles of the right to organise and to bargain collectively	-	04/06/1963	This too is provided for under the Labour Unions Act, 2006. The Project Proponents will follow the requirements of the law during the implementation of the Project.
Equal Remuneration Convention, 1951 (No. 100)	ILO Convention concerning equal remuneration for men and women workers for work of equal value	-	02/06/2005	The Project Proponents will follow the requirements of the law during the implementation of the Project.

TREATY, CONVENTION, AGREEMENT	SUBJECT	SIGNED/ ACCEPTED	RATIFIED	APPLICATION TO PROPOSED PROJECT
Abolition of Forced Labour Convention, 1957 (No. 105)	ILO Convention concerning the abolition of forced labour	-	04/06/1963	Local supporting legislation that shall apply to the Project includes: the Employment Act, 2006; the Employment Regulations, 2011; the Employment (Recruitment of Uganda Migrant Workers Abroad) Regulations, 2005; the Employment (Employment of Children) Regulations, 2011; the Equal Opportunities Act, 2007; the Labour Disputes (Arbitration and Settlement) Act, 2006; the Labour Disputes (Arbitration and Settlement) (Mediation and Conciliation) Regulations, 2011; the Labour Unions Act, 2006; the Labour Unions (check - off) Regulations, 2011; the Labour Union (Access of Union Officials to a Workplace) Regulations, 2011; the Minimum Wages Boards and Wages Councils Act, 2000; Workers Compensation Act, 2000; and Workers Compensation Regulations, 2011.
Discrimination (Employment and Occupation) Convention, 1958 (No. 111)	ILO Convention concerning discrimination in respect of employment and occupation	-	02/06/2005	The Project Proponents will follow the requirements of the law during the implementation of the Project.
Minimum Age Convention, 1973 (No. 138)	ILO Convention concerning minimum age for admission to employment	-	25/03/2003	The Project Proponents will follow the requirements of the law during the implementation of the Project.
Worst Forms of Child Labour Convention, 1999 (No. 182)	ILO Convention concerning the prohibition and immediate action for the elimination of the worst forms of child labour	-	21/06/2001	The Project Proponents will follow the requirements of the law during the implementation of the Project.
Migrant Workers (Supplementary Provisions) Convention, 1975 (No. 143)	ILO Convention concerning migrations in abusive conditions and the promotion of equality of opportunity and treatment of migrant workers	-	31/03/1978	The Project Proponents will follow the requirements of the law during the implementation of the Project.

TREATY, CONVENTION, AGREEMENT	SUBJECT	SIGNED/ ACCEPTED	RATIFIED	APPLICATION TO PROPOSED PROJECT
Paris Climate Agreement	An agreement within the UNFCCC to respond to the global climate change threat. Under the agreement, each country determines, plans, and reports its own contribution to mitigate global warming.	04/11/2016	21/09/2016	In accordance with the agreement, The MWE issued an Intended Nationally Determined Contribution (INDC) for Uganda in October 2015 (Ref. 2-112). On the basis of the INDC, the Proponent must comply with the requirements of the Uganda Second National Development Plan 2015/16–2019/20, 2015, which incorporates the priorities of the Uganda National Climate Change Policy, 2015.
Bamako Convention, 1991	Bamako Convention on the Ban on the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa	-	01/10/1998	Uganda acceded to the Bamako Convention which bans the importation of hazardous and radioactive wastes into Africa, as well as all forms of ocean disposal. The Convention requires that, for intra-African waste trade, parties must minimise the transboundary movement of wastes and only conduct it with consent of the importing and transit states, among other controls. Management of hazardous waste generated by this Project will be in line with the requirements of this Convention.
Basel Convention, 1989	Transboundary Transportation and Disposal of Hazardous Wastes	11/03/1999	-	Uganda acceded to the Basel Convention, which regulates transboundary movements of hazardous wastes and provides obligations upon its Parties to ensure that such wastes are managed and disposed of in an environmentally sound manner. The main principles of the Convention are as follows: i. Transboundary movements of hazardous wastes should be reduced to a minimum; ii. Hazardous wastes should be treated and disposed of as close as possible to their source of origin; and iii. Hazardous waste generation should be reduced and minimised at source. Management of hazardous waste generated by this Project will be in line with the requirements of this Convention.
– No date specified				

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

2.3.1 Convention on Biological Diversity (Rio Declaration), 1992[1]

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

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

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

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

- establishing protected areas to conserve biological diversity while promoting environmentally sound development around these areas;
- rehabilitating and restoring degraded ecosystems such as riverbanks, lakeshores, hilly and mountainous areas;
- promoting the recovery of threatened species in collaboration with local communities;
- promoting public participation, particularly in regard to assessing the environmental impacts of development projects that threaten biological diversity;
- establishing biodiversity offsets (and the principle of No Net Loss) as a tool for management of impacts on biodiversity; and
- identifying and monitoring important components of biological diversity that need to be conserved and used sustainably.

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

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

In addition to complying with national legislation, the Project Proponents should identify prevailing practices that lead to biodiversity loss in the Project Area, and identify measures to avoid compounding any adverse impacts that may have occurred.

2.3.2 Ramsar Convention on Wetlands of International Importance

The 'Convention on Wetlands of International Importance especially as Waterfowl Habitat' (Ref. 2-151), more commonly known as the Ramsar Convention, is an intergovernmental treaty adopted on 2nd February 1971 in the Iranian city of Ramsar. The Convention's mission is "*the conservation and wise use of all wetlands through local and national actions and international cooperation, as a*

[1] *National Environment Management Authority, 2002, provided an update on the relevant aspects of the Rio Declaration.*

contribution towards achieving sustainable development throughout the world". The convention was ratified by Uganda on 4th July 1988, at which time the country's first Ramsar site at Lake George was designated. Uganda now has 12 Ramsar sites (http://ramsar.wetlands.org).

Ramsar sites are designated based on their containing representative, rare or unique wetland types, and/or being sites of international importance for conserving biological diversity. Ramsar sites represent a sub-set of all wetlands, which are areas where water is the primary factor controlling the environment and the associated plant and animal life. Wetlands provide many values and benefits to human society, which may include those listed in Table 2-5.

Table 2-5: Wetland Values and Benefits

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

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

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

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

Wise use of wetlands, as defined by the Ramsar Convention, is *"the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development"*. 'Ecological character' is *"the combination of the ecosystem components, processes and benefits/services that characterise the wetland at a given point in time"* (Ramsar Convention Secretariat, 2010a (Ref. 2-152)). Ecological character is essentially an indicator of the health of the wetland (Wetlands Management Department and Nature Uganda, 2008 (Ref. 2-153)).

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

ecosystem component, process, and/or ecosystem benefit/service" (Ramsar Convention secretariat, 2010a).

This requirement to be aware of any change in the ecological character of a Ramsar site implies a need to have the ability to anticipate and predict the effects of actions on wetland ecosystems; i.e. the need to undertake EIA (Ramsar Convention Secretariat, 2010b (Ref. 2-152)). As noted in Regulation 5 (b), the National Environment (Wetlands, River Banks and Lake Shores Management) Regulations (2000) require EIA to be undertaken for any activity that may have an adverse impact on a wetland.

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

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

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

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

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

The Convention on International Trade in Endangered Species (CITES) of Wild Fauna and Flora is an international agreement between governments, whose aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival (CITES Secretariat, 2015 (Ref. 2-154)). The Convention was acceded by Uganda on 18th July 1991, and entered into force on 16th October 1991.

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

Uganda, as a party to the Convention, is obligated to adhere to the recommendations of the Conference of Parties with respect to trade in endangered species. The Murchison Falls Conservation Area (MFCA), which constitutes a part of the Project Area, is home to endangered species most notably elephants that are protected by the Convention (UWA, 2014 (Ref. 2-6)).

2.3.4 The Convention on Migratory Species of Wild Animals

The Convention on Migratory Species of Wild Animals (CMS), also known as the Bonn Convention, brings together the states through which migratory animals pass (Range States) and lays the legal foundation for internationally coordinated conservation measures throughout a migratory range. Uganda ratified the Convention on 1st August 2000. The Convention aims to improve the status of all threatened migratory species through national action and international agreements between range states of a particular group of species. The CMS therefore acts as a framework Convention and the agreements may range from legally binding treaties (called Agreements, such as the Agreement on the Conservation of African-Eurasian Migratory Waterbirds as described in section 2.3.5) to less formal instruments, such as Memoranda of Understanding, and can be adapted to the requirements of particular regions (UNEP/CMS Secretariat 2014 (Ref. 2-155)).

The Convention has two appendices that list threatened migratory species (Appendix I) and species to the subject to agreements (Appendix II). The primary enabling legislation for the protection of migratory species is the Uganda Wildlife Act, Cap 200, which stipulates under Section 27, (2) that "*species which migrate to or through Uganda which are protected under any international convention or treaty to which Uganda is party and to which Section 90 applies shall be protected species under this Act*". Classification as a 'protected species' prohibits any hunting or taking of plants or animals classified as such unless under conditions contained in a licence issued or wildlife use right granted under the Act.

2.3.5 Agreement on the Conservation of African-Eurasian Migratory Waterbirds

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

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

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

2.4 Project Policies and Standards

In line with the Project Proponents directives on Hygiene-Health, Safety, Security, Social and Environment, the Project will strive to act and be recognised as:

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

The Project will also:

- Follow the mitigation hierarchy approach (i.e. Avoid, Minimise, Restore and Offset);
- Reduce both direct and indirect environmental and social impacts at every stage of the Project (from early site preparation work to field abandonment including operations);
- Identify and minimise risks to ensure prompt and effective response in case of any accidental pollution;
- Reduce any significant impact of the future activities on the natural and human environment. Mitigation measures shall be identified and selected according to the Best Available Technique (BAT);

- Continuously engage with all stakeholders including regulators, central government, local government, local communities and civil society; and
- Strive to achieve a Biodiversity Net Gain in MFNP and No Net Loss for the overall Project.

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

2.4.1 Emissions

- No routine flaring, with minimal natural gas flaring that may be required for emergency situations;
- No continuous venting of associated gas;
- keeping GHG emissions as low as possible, with a good energy integration and thermal management included in the current facilities design;
- Design shall minimise volatile organic carbon emissions;
- Odour emissions shall be minimised; and
- Noise emissions shall also be minimised.

2.4.2 Discharges and waste management

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

2.4.3 Energy efficiency

- Energy efficiency features shall be incorporated into the design.

2.4.4 Exclusion areas

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

2.4.5 Visual impact and footprint

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

2.4.6 TEP Uganda Policies and Standards

Total Exploration & Production (E&P) Uganda B.V (TEP Uganda) considers people's safety and health protection, safety in regards to operations, and respect for the environment as paramount priorities.

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

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

In addition to the TEP Uganda HSE Charter and Biodiversity charters (discussed below), other key policies and charters to which the project will adhere to include:

- Total Group Code of Conduct;
- Total Group Security Charter;
- Total Group Societal Policy;
- Total Group Corporate Social Responsibility;
- Total Group Ethics Charter; and
- Total Human Rights Guide.

Furthermore, a number of in-house guidance documents prepared by Total globally have been reviewed as part of the ESIA process, including:

- General Specification: Sustainable Development GS EP SDV 101 – Social Baseline Study;
- General Specification: Sustainable Development GS EP SDV 102 – Social Impact Assessment;
- General Specification: Environment GS EP ENV 111 – Environmental Baseline and Monitoring Studies: Onshore Sites;
- General Specification: Environment GS EP ENV 120 – Environmental Impact Assessment of E&P Activities; and
- General Specification: Environment GS EP ENV 501 – GIS deliverables for HSE.

2.4.6.1 TEP Uganda HSE Charter

A copy of the TEP Uganda HSE charter is included within Figure 2-1. Compliance with this Charter is an important element in the performance evaluation of all employees, as well as in the selection of industrial and business partners and contractors.

2.4.6.2 TEP Uganda Biodiversity Charter

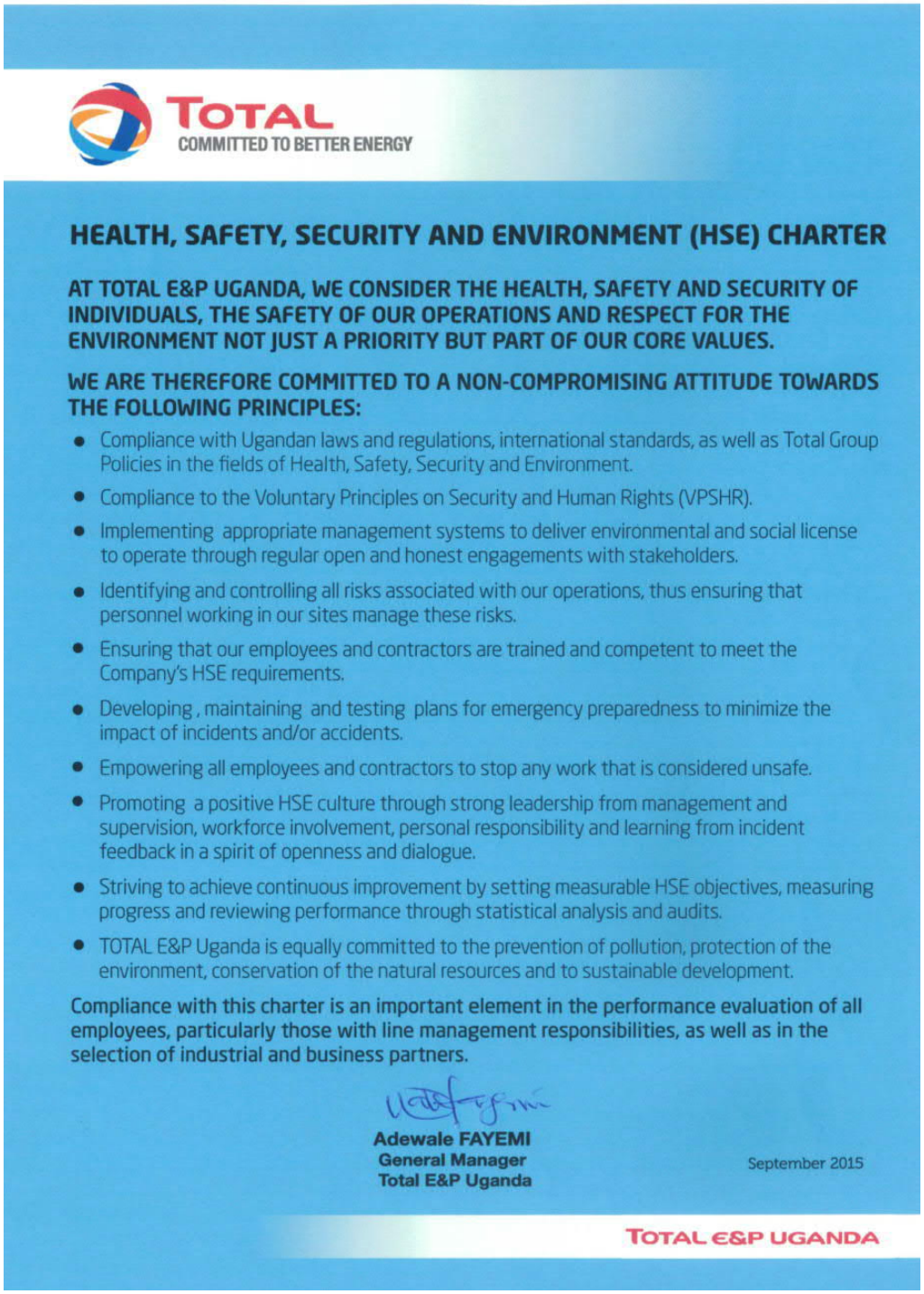
TEP Uganda applies the Code of Conduct of Total and conducts its operations in compliance with the Safety Health Environment Quality Charter and the principles of the Biodiversity Policy of the Group.

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

- avoiding any unnecessary damage to the ecosystem and the biodiversity;
- minimising any unavoidable damage to the ecosystem and the biodiversity;

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

By applying this mitigation hierarchy, as described above, TEP Uganda will seek to achieve net positive gains to biodiversity and endeavour not to undermine the ecological value of MFNP. It will facilitate all of the above in accordance with the applicable laws and regulations and in full transparency, through studying and monitoring biodiversity where it operates, using Total's best practices and leveraging partnerships with experts. A copy of the Biodiversity charter is included in Figure 2-2.


TOTAL
COMMITTED TO BETTER ENERGY

HEALTH, SAFETY, SECURITY AND ENVIRONMENT (HSE) CHARTER

AT TOTAL E&P UGANDA, WE CONSIDER THE HEALTH, SAFETY AND SECURITY OF INDIVIDUALS, THE SAFETY OF OUR OPERATIONS AND RESPECT FOR THE ENVIRONMENT NOT JUST A PRIORITY BUT PART OF OUR CORE VALUES.

WE ARE THEREFORE COMMITTED TO A NON-COMPROMISING ATTITUDE TOWARDS THE FOLLOWING PRINCIPLES:

- Compliance with Ugandan laws and regulations, international standards, as well as Total Group Policies in the fields of Health, Safety, Security and Environment.
- Compliance to the Voluntary Principles on Security and Human Rights (VPSHR).
- Implementing appropriate management systems to deliver environmental and social license to operate through regular open and honest engagements with stakeholders.
- Identifying and controlling all risks associated with our operations, thus ensuring that personnel working in our sites manage these risks.
- Ensuring that our employees and contractors are trained and competent to meet the Company's HSE requirements.
- Developing , maintaining and testing plans for emergency preparedness to minimize the impact of incidents and/or accidents.
- Empowering all employees and contractors to stop any work that is considered unsafe.
- Promoting a positive HSE culture through strong leadership from management and supervision, workforce involvement, personal responsibility and learning from incident feedback in a spirit of openness and dialogue.
- Striving to achieve continuous improvement by setting measurable HSE objectives, measuring progress and reviewing performance through statistical analysis and audits.
- TOTAL E&P Uganda is equally committed to the prevention of pollution, protection of the environment, conservation of the natural resources and to sustainable development.

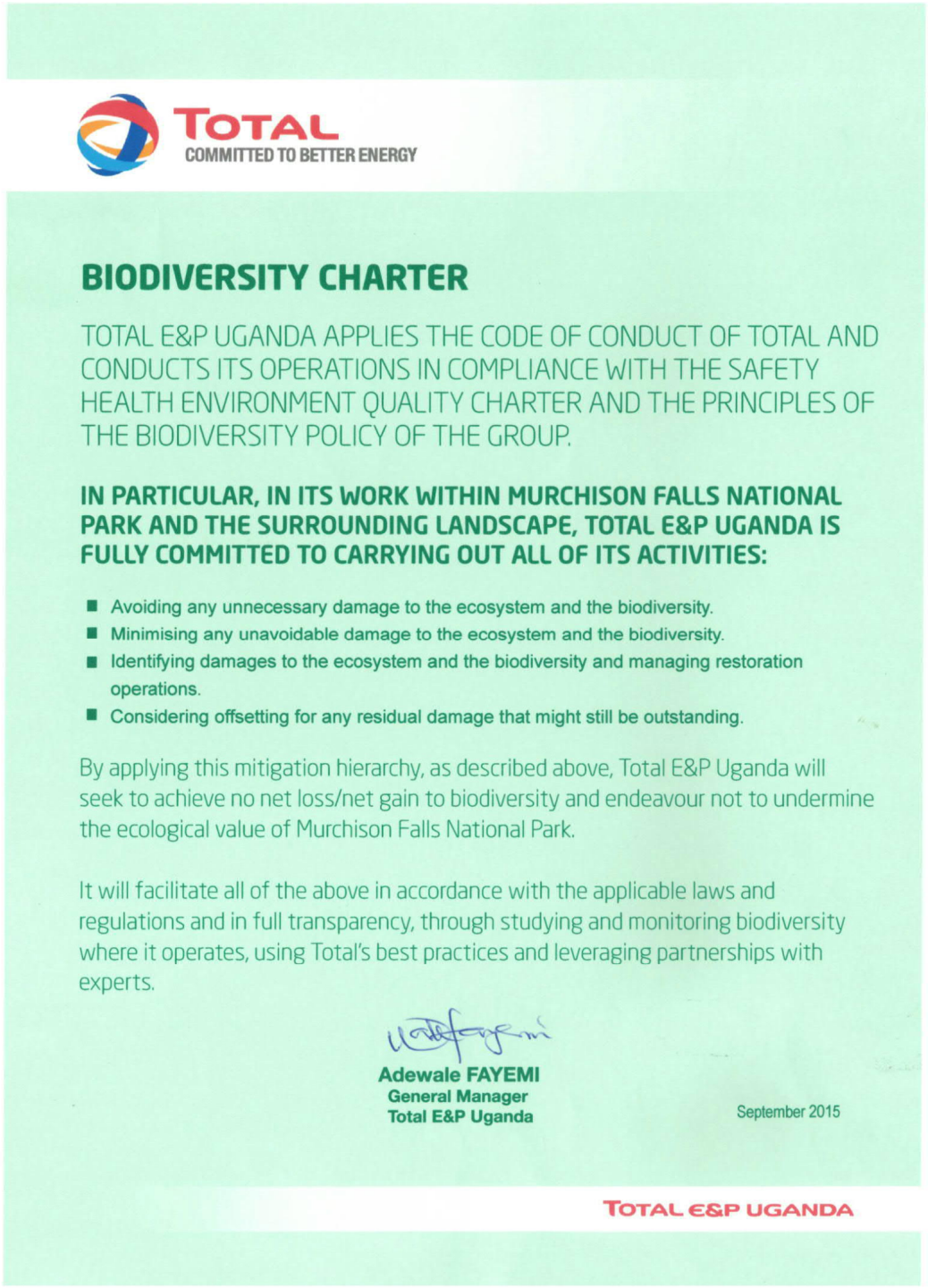
Compliance with this charter is an important element in the performance evaluation of all employees, particularly those with line management responsibilities, as well as in the selection of industrial and business partners.

Adewale FAYEMI
General Manager
Total E&P Uganda

September 2015

TOTAL E&P UGANDA

Figure 2-1: TEP Uganda HSE Charter



TOTAL
COMMITTED TO BETTER ENERGY

BIODIVERSITY CHARTER

TOTAL E&P UGANDA APPLIES THE CODE OF CONDUCT OF TOTAL AND CONDUCTS ITS OPERATIONS IN COMPLIANCE WITH THE SAFETY HEALTH ENVIRONMENT QUALITY CHARTER AND THE PRINCIPLES OF THE BIODIVERSITY POLICY OF THE GROUP.

IN PARTICULAR, IN ITS WORK WITHIN MURCHISON FALLS NATIONAL PARK AND THE SURROUNDING LANDSCAPE, TOTAL E&P UGANDA IS FULLY COMMITTED TO CARRYING OUT ALL OF ITS ACTIVITIES:

- Avoiding any unnecessary damage to the ecosystem and the biodiversity.
- Minimising any unavoidable damage to the ecosystem and the biodiversity.
- Identifying damages to the ecosystem and the biodiversity and managing restoration operations.
- Considering offsetting for any residual damage that might still be outstanding.

By applying this mitigation hierarchy, as described above, Total E&P Uganda will seek to achieve no net loss/net gain to biodiversity and endeavour not to undermine the ecological value of Murchison Falls National Park.

It will facilitate all of the above in accordance with the applicable laws and regulations and in full transparency, through studying and monitoring biodiversity where it operates, using Total's best practices and leveraging partnerships with experts.

Adewale FAYEMI
General Manager
Total E&P Uganda

September 2015

TOTAL E&P UGANDA

Figure 2-2: TEP Uganda Biodiversity Charter

2.4.7 Tullow Uganda Operations Pty Ltd (TUOP) Policies and Standards

2.4.7.1 Tullow Safety Rules

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

Tullow Safety Rules apply to all parts of Tullow's operations and to all employees and contractors, involved in those activities. Tullow's Businesses are required to manage EHS risks by developing and

implementing procedures that define the relevant standards and processes intended to support the implementation of these rules.

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

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

The Tullow Safety Rules cover the following activities:

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

2.4.7.2 The Tullow Environmental and Social Performance Standard

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

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

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

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

2.4.7.3 Other TUOP Policies and guidelines

In addition to the TUOP Safety Rules and Environmental and Social Performance Standard (discussed above), other key policies and charters to which the project will adhere to include:

- Tullow Plc Human Rights Policy;
- Tullow Plc Environmental, Health and Safety Policy;
- Tullow Plc Code of Ethical Conduct; and
- Tullow Plc Business Ethics Policy.

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03 – ESIA Methodology

Table of Contents

Table of Figures

List of Tables

3 ESIA Methodology

3.1 Introduction

The impact assessment methodology used in this Environmental and Social Impact Assessment (ESIA) Report provides a basis to characterise the environmental and social impacts of the Project. The methodology is based on national legislation and guidelines and international commonly employed guidance in relation to the undertaking of impact assessments and takes into consideration the International Finance Corporation (IFC) Performance Standards (PS).

Potential impacts arising from planned and unplanned activities linked to the development of the Project are assessed. These are split into four Project phases, which include:

- Site Preparation and Enabling Works;
- Construction and Pre-Commissioning;
- Commissioning and Operations; and
- Decommissioning.

Planned activities include routine and non-routine Project activities or events required for each phase of the Project. Unplanned events are those not anticipated to occur during the normal course of Project activities.

The impact assessment methodology for planned activities takes into consideration impact magnitude and receptor sensitivity. A matrix is used to derive impact significance. The concept of likelihood is included in the methodology for unplanned events. The likelihood of the event occurring, and the likelihood of impacts arising are considered.

The assessment of discipline-specific impacts is presented in Chapters 6 to 19 of this ESIA Report, as outlined within Table 1-3 of ***Chapter 1: Introduction***. Unplanned Events are addressed in ***Chapter 20: Unplanned Events***, Cumulative Impacts are assessed in ***Chapter 21: Cumulative Impact Assessment*** and Transboundary Impacts are presented within ***Chapter 22: Transboundary Impact Assessment.***

3.2 ESIA Approach

3.2.1 General Overview

ESIA is a systematic approach to identifying the potential impacts of a project, and describing the mitigation, management and monitoring measures that will be implemented to address these impacts. Beneficial impacts are also identified. Ultimately, the results of this ESIA will allow the National Environment Management Authority (NEMA) and other Government agencies to make informed decisions about the development proposals, and allow potentially affected stakeholders to participate in the process.

To ensure a robust and detailed impact assessment, the ESIA process was structured over a series of progressive and iterative stages. Stakeholders, the Project Proponents, and the Consultant Assessment team provided input to these stages during the ESIA process.

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

This ESIA study and Project design process were iterative i.e. as part of the Project design process, measures to avoid or minimise impacts were identified and incorporated into the design. These are referred to as “embedded mitigation” and include physical design features and management measures. These embedded mitigation considered the Ugandan legislation and IFC mitigation hierarchy as discussed in IFC PS1 (see section 3.3.6). The measures are based on Good International Industry Practice (GIIP) and Best Available Techniques (BAT) and are intended to assist

in the avoidance and control of significant adverse impacts. Specific design controls are described in greater detail in ***Chapter 4: Project Description and Alternatives*** as well as where necessary within each technical chapter. Where the outcome of the impact assessment indicates that design controls are insufficient to manage an impact to an acceptable level, further measures have been identified. These measures have been termed "additional mitigation and enhancement measures" and are described in the respective chapters and detailed in Appendix T (Environmental and Social Management Plan (ESMP) Mitigation Checklist). Enhancement measures relate to trying to further improve any identified positive impacts. These measures were also discussed and agreed with the Project design team.

The impact assessment process has been summarised within Figure 3-1:

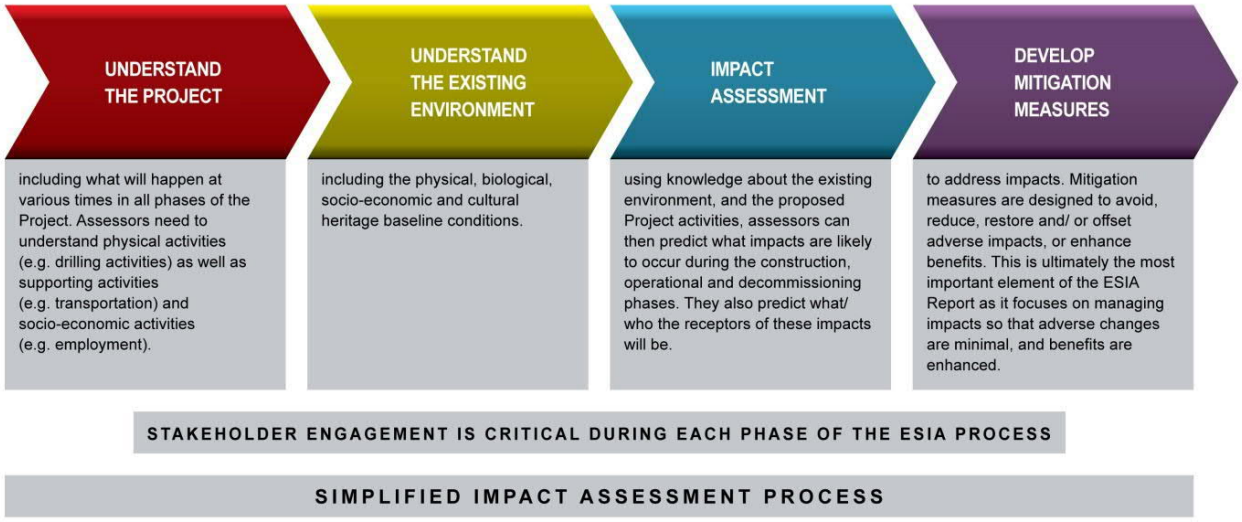


Figure 3-1: Simplified Impact Assessment Process

The steps identified in Figure 3-1 are simplified but convey the general approach to an ESIA. Potential impacts during each phase of the Project lifecycle (i.e. Site Preparation and Enabling Works; Construction and Pre-Commissioning; Commissioning and Operations; and Decommissioning) are considered separately in this ESIA. The potential for these phases to overlap is also considered where necessary.

Figure 3-2 provides more detail on the Ugandan Environmental Impact Assessment (EIA) process. A number of the key phases include:

Screening: An early exercise to identify how the Project might interact with the environment. Screening focuses the ESIA on the most likely interactions and receptors and assists in incorporating environmental and social considerations into Project planning and design. The Screening stage also determines whether an ESIA is required for a Project;

Scoping: Utilises more detailed engineering data along with some preliminary baseline data and feedback from stakeholders. Scoping asks; what adverse impacts might occur? How significant might these potential impacts be? What can be done to mitigate them? What benefits might the Project have? What can be done to enhance the benefits? The Scoping stage also identifies the topics and methodologies to be used for the detailed ESIA study;

Baseline Studies: A process to understand the existing environment through desk-based and field-based research including stakeholder engagement so that impacts can be more accurately predicted, and to provide a baseline against which changes brought about by the Project can be measured. It is important to note that baseline studies commence during the Scoping stage and continue throughout the development of the ESIA Report;

Impact Assessment and Production of ESIA Report (this report): Predicts and assesses the potential impacts of the Project, based on the Project description, baseline studies, and feedback from stakeholders, engineering teams and professional expertise. The impact assessment categorises

potential adverse impacts based on their significance, which may be rated as either Insignificant, or of Low, Moderate or High significance. This also includes the development of mitigation and management measures and the re-evaluation of the impacts after measures are applied (i.e. residual impacts). Positive impacts are also determined and any enhancement measures which may be implemented as part of the Project identified. The output of this phase is contained within this ESIA Report;

Mitigation, Management, and Monitoring (subject of this report): Commitments relating to proposed mitigation measures in order to avoid, reduce, restore or offset adverse impacts, and enhance beneficial measures, are contained in this ESIA Report. The ESMP presented within Chapter 23 of this ESIA provides high level mitigation and monitoring measures and forms the basis for the preparation of detailed management and implementation plans covering Project activities or potentially affected receptors; and

Stakeholder Engagement: Stakeholder Identification and engagement is a key part of the ESIA process. Stakeholder engagement was conducted throughout each phase of the Project and the results of these consultations have been incorporated into this ESIA.

Additional Project Specific information is provided relating to each of these key phases in sections 3.2.2 to 3.2.6.

For the purposes of this report, we have used the term ESIA which is interchangeable with the term Environmental Impact Statement (EIS) which is used within the Ugandan regulations.

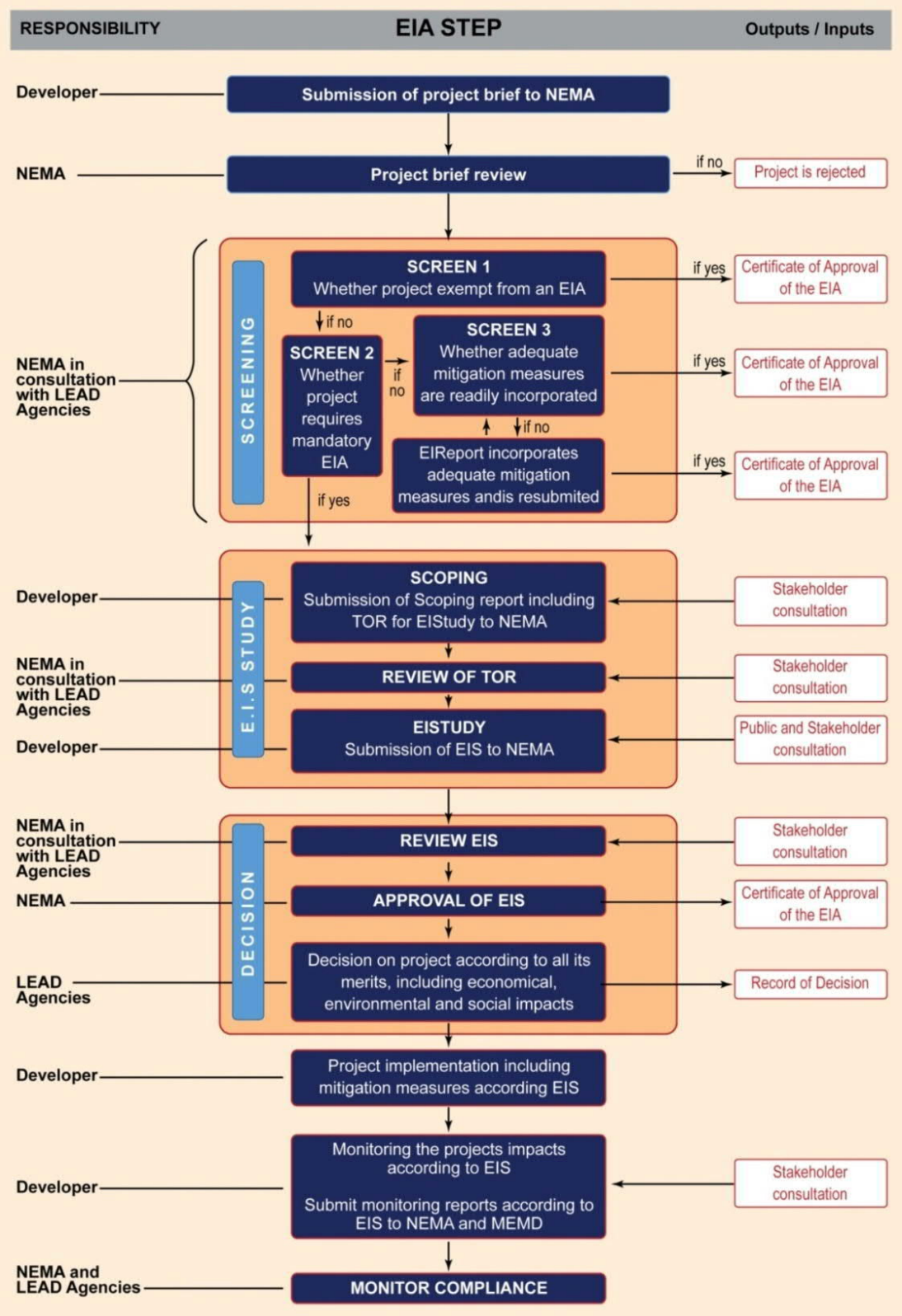


Figure reproduced from EIA Guidelines for the Energy Sector (NEMA 2014, Ref. 3-1)[1].

Figure 3-2: Ugandan EIA Process

[1] It is recognised that Monitoring report shall also be submitted to the Petroleum Authority of Uganda (PAU) as per the update to the Uganda Petroleum Industry regulatory framework in 2016

3.2.2 Project Brief

Due to the size and scale of the Project, it was agreed with NEMA early in the process that it was not necessary to develop a Project Brief (PB) (as outlined in the Ugandan EIA regulations and included within Figure 3-2) and instead go straight to the screening and Scoping stages, which ultimately led to the development of this ESIA Report.

3.2.3 Screening

Screening was the first stage undertaken during the ESIA process to identify potential interactions between the Project and existing physical, ecological, and human receptors. This was undertaken in 2015. Undertaking screening early in the ESIA process facilitated the incorporation of environmental and social considerations into the development of the Project design.

The Screening Stage included the following key steps:

- Identification of Project components and activities;
- Identification of potential physical, ecological and human receptors based on existing knowledge of the environmental and social baseline conditions and professional expertise;
- Examination of relevant national legislative requirements and international guidelines; and
- Development of a screening matrix to illustrate the potential interactions of Project activities with the physical, ecological and human receptors.

3.2.4 ESIA Scoping and Terms of Reference

Following the Screening Stage, scoping was undertaken to provide further detail of potential environmental and social effects of the Project using additional engineering and baseline data. The Scoping Stage intended to facilitate impact identification in a consistent and robust manner.

Scoping was aimed to ensure that the impact assessment process was focussed on the potentially significant environmental and social impacts which might arise from the Project. The ESIA Scoping study also served to initiate early engagement with stakeholders and define the ESIA stakeholder engagement process going forward. As part of the ESIA, a number of reconnaissance and stakeholder engagement visits by the key environmental and socials specialists were undertaken during the summer of 2015 within the Project Area (details of which were included within the Scoping Report and Stakeholder Engagement Plan (SEP), Appendix G). The Project Proponents submitted the Tilenga Project ESIA Scoping Report (including the terms of reference for the main ESIA) to NEMA on 19th December 2015. In summary, in line with Regulation 10 of the Ugandan EIA Regulations 1998 (Ref. 3-2), the ESIA Scoping Report included:

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

NEMA subsequently provided formal approval of the Scoping Report and Terms of Reference on 21st April 2016. The approval also contained a number of recommendations and requirements which NEMA expects to be included within the ESIA. A copy of the approval, and a checklist on how the NEMA recommendations and requirements were addressed, is contained within Appendix A of this ESIA.

3.2.5 Baseline Studies - Secondary data and Primary data

An important component of the Scoping Stage was to identify baseline conditions (i.e. the prevailing environmental and social characteristics against which the potential impacts of the Project could be assessed). Baseline conditions were defined during the Scoping Stage through a review of existing environmental and social information. A significant body of information was available in environmental, social and geotechnical survey data and reports prepared for the Project since 2012. This information included the results of terrestrial and aquatic ecology, water quality, social and health, sediment and geology, soil and groundwater, cultural heritage, air quality and noise surveys undertaken within the defined Study area for each topic. In addition to Project-specific information, reports by government agencies and other groups, and scientific journals, were reviewed for relevant baseline information.

As a result of the above Scoping stage activities, a number of data gaps were identified. This led to the detailed planning and undertaking of a suite of additional primary baseline data surveys and specialist studies specifically designed to feed into this ESIA. The results of these primary baseline data collection activities have been used in conjunction with the vast amount of available secondary data to help explain and illustrate the current baseline conditions which occur within the Project Area of Influence (AoI). Each technical chapter of this ESIA provides a number of dedicated sections covering the topic of baseline conditions, including reference to threats and trends where relevant and where data is available.

3.2.6 Analysis of Alternatives

The design process started with consideration of high level strategic options and progressively focused in on more detailed alternatives. Total Exploration & Production (E&P) Uganda B.V (TEP Uganda) and Tullow Uganda Operations Pty Ltd (TUOP) initiated a detailed front end engineering design (FEED) process for the Project. This included the appointment of a number of contractors who were given the brief of developing an efficient scheme design which took into consideration the Project environmental and social avoidance requirements and baseline data. The technical sections of this ESIA have assessed the impacts associated with the chosen base-case Project design. However, an assessment of alternatives is included within ***Chapter 4: Project Description and Alternative Assessment*** and looks at:

- The 'No Project' Alternative;
- Optioneering; and
- Design and Layout Alternatives.

3.3 Impact Assessment Methodology

3.3.1 Introduction

This section summarises the overall approach taken to identify and characterise the environmental, social and socioeconomic impacts associated with the Project, during each of the Project phases.

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

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

An impacts and activities register was subsequently developed taking into account the range of anticipated Project activities and related aspects. This included aspects over the full life cycle of the development such as waste management and resource use, and activities related to Site Preparation

and Enabling Works (e.g. site clearing), Construction and Pre-Commissioning (e.g. construction of facilities, camps, and drilling), Commissioning and Operations (e.g. operations of wells, pipelines, and facilities), and Decommissioning (e.g. abandonment).

As part of this process, potential receptors within the Project AoI that might be affected by any Project activities were then identified based on the baseline information. An environmental receptor can be defined as:

- *''An entity that receives a contaminant or pollutant and which can be subject to an environmental impact. It can be a body of water, air, parcel of land, community, ecosystem or individual organism, human being or property" (Ref. 3-4).*

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

3.3.2 Assessing Impact Significance

For each potential impact identified, an assessment of impact significance was made.

The impact assessment methodology took into account the following in order to make a prediction of the impact's 'significance':

- an impact's nature (adverse or beneficial);
- type (direct, indirect or induced, in combination, transboundary, cumulative);
- magnitude; and
- the sensitivity of the affected receptors.

The basic process adopted for assessing potential Project impacts in this ESIA is illustrated in Figure 3-3.

Professional judgment and experience, data, models, and regulatory and industry standards all contributed to the assessment of impacts, which ranged from technical analysis using quantitative criteria (such as quality standards for water or air) to more subjective measures, such as loss of visual amenity. Most impact assessments combined both quantitative and qualitative analysis and the criteria used to evaluate impacts are clearly defined in each technical chapter of this ESIA.

It should be noted that impact significance was first assessed taking into account existing design control measures (i.e. embedded measures) that were incorporated into the Project design such as the avoidance work which has already happened to avoid sensitive environmental or social receptors as well as practical measures such as the use of bunding for storage tanks or liners for drilling fluid retention. These are discussed in more detail in ***Chapter 4: Project Description and Alternatives***. After the remaining potential impacts were identified and this preliminary impact significance assessment conducted, strategies to further avoid or mitigate the impacts were then developed as needed. In some cases this also included measures to enhance or optimise potential benefits of the Project.

The significance of the impacts was then re-evaluated based on these additional mitigation measures. The resulting potential impact is known as the 'residual' impact, and represents the impact that could remain following the application of mitigation and management measures, and thus the level of impact associated with that receptor and Project component. The assessment of unplanned events was approached in a different manner due to the very low probability of an event happening. Further details are included with ***Chapter 20: Unplanned Events.***

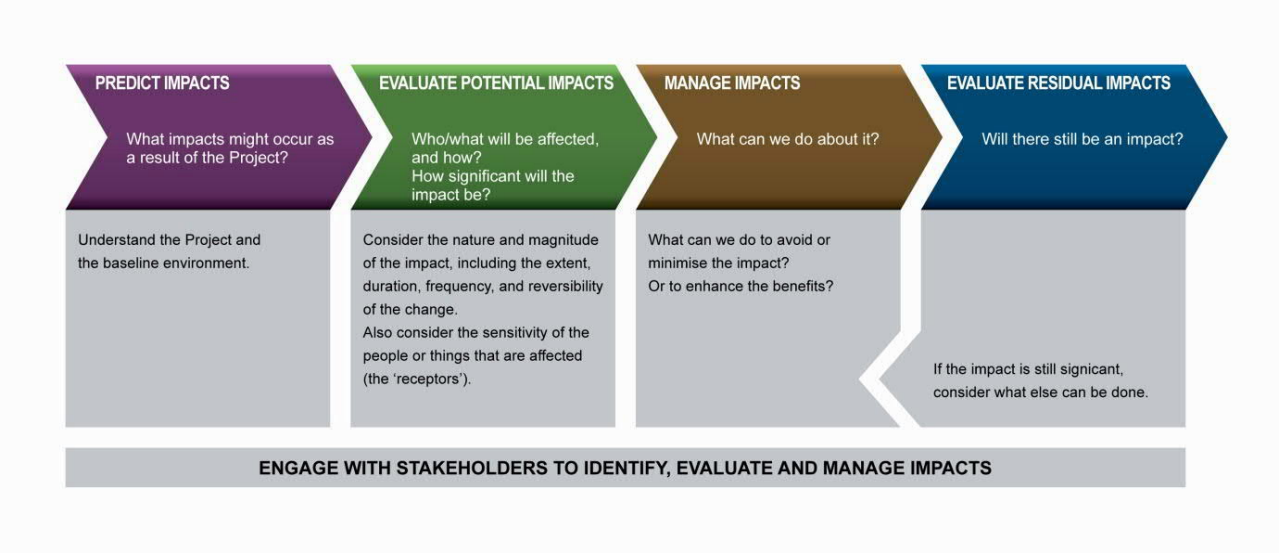


Figure 3-3: Impact Identification and Assessment Process

3.3.2.1 Impact Magnitude

Within the assessment of significance for each potential impact, a determination of the magnitude of the potential impact was made.

The magnitude of a given impact is a measure of the degree of change from the baseline conditions, and was typically determined through the consideration of the following factors (which can be considered in parallel):

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

The magnitude of an impact was rated as **negligible**, **low**, **moderate**, or **high**. The criteria for each of these ratings were tailored for each study topic, and are defined in each technical chapter of this ESIA Report.

3.3.2.2 Identifying Receptors

As outlined in section 3.3.1 above, receptors are environmental components (e.g. physical, ecological or biological), people and cultural heritage assets that may be affected, adversely or beneficially, by the Project. Potential receptors were identified through both desk and field-based studies, taking into consideration potential Project impacts. Based on the review of existing information, four high-level categories of Project receptors were identified:

- ***Physical:*** i.e. non-living environmental components, including air quality, water bodies, landscapes, terrestrial soils and geology;
- ***Terrestrial ecology:*** i.e. terrestrial habitat, flora and fauna;
- ***Aquatic Ecology:*** i.e. aquatic flora and fauna; and
- ***Social:*** i.e. humans – be it landowners and residents of local communities, local economy or water users; and cultural heritage.

3.3.2.3 Receptor Sensitivity

Receptor sensitivity considers the degree to which a receptor may be susceptible to an environmental aspect. More sensitive receptors may experience a greater degree of change, or have less ability to deal with the change, compared with less sensitive receptors that may be more resilient or adaptable. As with magnitude, the concept of receptor sensitivity was based on multiple characteristics, typically:

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

The sensitivity of a receptor was rated as **negligible**, **low**, **moderate** or **high**. The criteria for each of these ratings were tailored for each study topic, and are defined in each technical chapter of this ESIA Report.

3.3.2.4 Types of Impacts

Impacts were also characterised using the following descriptors:

- ***Direct*** – impacts that may result from a direct interaction between a planned Project activity and the receiving environment (e.g. construction of a well pad within the MFNP);
- ***Indirect*** – impacts that may follow on from the primary interactions between the Project and its environment because of subsequent interactions in the environment (e.g. loss of part of a habitat could affect the population of a species over a wider area);
- ***Induced*** – impacts that may result from other knock on activities that may happen as a consequence of the Project (e.g. they tend to be social in nature, such as in-migration, new businesses set up to cater for increased traffic on roads);
- ***In-Combination effects***: for the purpose of this ESIA, potential in-combination impacts were determined when we considered the joint impacts of both the Project and the Supporting Infrastructure and associated facilities (additional information provided in section 3.3.5 below);
- ***Transboundary*** – impacts that may extend or occur across a national boundary (additional information provided in section 3.3.4 below);
- ***Cumulative*** – impacts that may result from the incremental impact, on areas or resources used or directly affected by the Project, from other existing, planned or reasonably defined developments (additional information provided in section 3.3.4 below).

3.3.3 Impact Significance

Once the receptor sensitivity and impact magnitude were rated, the overall significance of the impact was predicted. This was assisted by an impact assessment matrix (see Table 3-1) and the impact significance definitions (see Table 3-2), which ensured a consistent approach throughout the impact assessment.

Table 3-1: Impact Significance Matrix

		Receptor Sensitivity (vulnerability, value and resilience)			
		Negligible	Low	Moderate	High
Impact Magnitude (extent, duration, frequency, reversibility)	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 3-2: Impact Significance Definitions (Adverse Impacts)

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

It should be noted that impacts classed as 'High' or 'Moderate' are classed as being **significant**; whilst those classed as 'Low' or 'Insignificant' are deemed to be **not significant**. This allows the Project Proponents to primarily focus resources and mitigation measures on those potential impacts which are considered significant, although measures are incorporated to reduce the significance of all impacts.

The matrix and significance definitions have been used to assess adverse impacts of the Project. Where possible, the same criteria have been used to identify the significance of **beneficial impacts** (only looking at the positive changes). However, where this was not possible the beneficial impact has been described in qualitative terms and, where applicable, measures to maximise benefits have also been described. This is the approach that has been adopted for each of the technical topics unless clearly stated otherwise in the following technical ESIA chapters.

3.3.4 Cumulative, Unplanned Events and Transboundary Impact Assessment

In addition to the core assessment and management of the potential impacts of the Project, in line with Ugandan regulations and IFC PS requirements, the ESIA also assessed a number of other types of potential impacts including:

- ***Potential impacts from Unplanned events***: Impacts may also arise as a result of unplanned events (i.e. activities or events that are not anticipated to occur in the normal course of operations of the Project, including accidents and malfunctions). These impacts were also assessed as part of the ESIA process, along with measures to manage risks and respond to unplanned events. Examples include damage to a pipeline resulting in release of oil to the environment, emergency flaring of gas and transportation incidents. Although the likelihood of unplanned events is low, appropriate management plans will be developed and implemented to ensure that impacts are avoided, minimised and contained (e.g. an Oil Spill Contingency Plan). Appropriate unplanned event contingency planning therefore minimises the likelihood of remote probability events occurring, as well as minimising the consequences of such events. More details are provided within ***Chapter 20: Unplanned Events***;
- ***Potential Cumulative impacts:*** While an impact may be large or even relatively small when considering the Project on its own, the impact may be magnified in combination with impacts from other planned future, or under construction developments; these combined effects are known as 'cumulative' impacts. A cumulative impact is an impact that results from incremental changes caused by other past, present, or reasonably foreseeable actions by others outside of the Project scope together with those from the Project, for example the incremental noise from a number of separate developments. When assessing the overall effects of a project, it is important that potential cumulative impacts are considered. The significance of cumulative impacts has been evaluated using the same method as the impact assessment, where possible. The cumulative impact assessment (CIA) has however been based on the identification of valued environmental and social components (VECs) and based on "*IFC Good Practice Handbook, Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets"* (Ref. 3-7). More detail is provided in ***Chapter 21: Cumulative Impact Assessment*** of this ESIA; and
- ***Transboundary Impacts:*** Potential impacts that may 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. The Protocol on Environment and Natural Resources Management, prepared by the East African Community (2005) (Ref. 3-5) and the Nile Basin Initiative (NBI) Sustainability Framework (Ref. 3-6), also require transboundary assessment to be undertaken for shared resources that may be affected by a project. Further details are provided in ***Chapter 22: Transboundary Impacts***.

3.3.5 Consideration of the In-Combination Impacts of the Project and its Supporting and Associated Facilities

As described in ***Chapter 4: Project Description and Alternatives***, the Project has a number of supporting and associated facilities that are being developed separately (i.e. they are subject to separate permitting processes and separate ESIAs). These facilities include:

- Tilenga Feeder Pipeline;
- East Africa Crude Oil Export Pipeline (EACOP);
- Waste management storage and treatment facilities for the Project;
- 132 Kilovolt (kV) Transmission Line from Tilenga Central Processing Facility (CPF) to Kabaale Industrial Park; and
- Critical oil roads.

As these facilities are directly linked to the Project and would not be constructed or expanded if the Project did not exist, there is a need to consider the in-combination impacts of the Project and the supporting and associated facilities. This is distinct from the Cumulative Impact Assessment which considers all defined major developments identified within the Project's Area of Influence (and not just

the associated facilities) following a specific methodology which is focussed on priority VECs (see ***Chapter 21: Cumulative Impact Assessment***).

In each technical chapter of the ESIA, the significance of the residual impacts of the Project have been described. The in-combination assessment considered whether the residual impact of the Project would be exacerbated due to the potential impacts of supporting or associated facilities. Where the potential for in-combination impacts was identified a comment was made on the need for additional collaborative mitigation or management measures.

The in-combination assessment was based on information available on the supporting and associated facilities at the time of writing this report (April 2018). To date, the only assessment reports available are for the Critical Oil Roads that are associated with the Project and were published by the Uganda National Roads Authority (UNRA):

- *The Environmental & Social Impact Statement for the upgrading of; Paraa-Pakwach; Kisanja - Park Junction; Sambiya-Murchison Falls; Buliisa-Paraa; Wanseko-Kasenyi-Kirango-Bugungu camp Roads and associated Bridges (169 km) (UNRA, September 2017)*; and
- *The Environmental & Social Impact Statement for the proposed upgrade of the Masindi-Biiso Road, located in Masindi and Buliisa districts of Uganda (UNRA, October 2017)*[2].

The ESIAs for the Tilenga Feeder Pipeline and EACOP are in preparation, and the waste management storage and treatment facilities are subject to an on-going feasibility study. Consequently, it should be noted that the environmental and social impacts of these facilities had not yet been assessed in detail and thus no specific information was available to inform the in-combination assessment.

Only high level information on the 132 Kilovolt (kV) Transmission Line from Tilenga Central Processing Facility (CPF) to Kabaale Industrial Park currently exists and thus no specific information was available to inform the in-combination assessment.

The limitations of our in-combination assessments are therefore recognised, however, it should be noted that it is anticipated that more detailed assessment of these impacts will be included within the ESIAs for the Tilenga Feeder Pipeline, EACOP and waste management facilities. During the production of those future ESIA documents, the authors will have more available information, including the contents of this ESIA and will be able to provide a more accurate assessment of any potential in-combination impacts anticipated between the projects. Given these limitations, only a brief description of the potential impacts is presented and no attempt has been made to assign a level of significance.

In line with the Project Proponents procedures and protocols, the supporting and associated facilities will follow the mitigation hierarchy and will seek to avoid, minimise, restore or offset any identified adverse impacts relevant to their own development as far as reasonably practicable. Consequently, it will remain the responsibility of each project to limit the significance of any identified adverse impacts, which in turn, will reduce the likelihood of any significant adverse in-combination impacts.

3.3.6 Mitigation and Management

Where an adverse potential impact has been identified, efforts have been made to develop strategies to primarily avoid (e.g. through the design process) or minimise the impact. The application of mitigation measures is an iterative process that will continue until an adverse impact is deemed as low as reasonably practicable (ALARP). The selection of mitigation measures has considered a standard mitigation hierarchy (Figure 3-4), in line with IFC PS1 (Ref. 3-4), whereby preference is given to avoiding impacts altogether and subsequently to minimising the impact, repairing its effects, and/ or offsetting the impact through actions in other areas.

[2] UNRA are developing 11 roads to support oil and gas activity. The roads which are considered to be associated with the Project are described in Chapter 4: Project Description and Alternatives.

Figure 3-4: Mitigation Hierarchy

Each technical chapter of the ESIA includes a section specifically relating to the identification of additional mitigation and enhancement measures which are required to help ensure the significance of the predicted impacts is at an acceptable level. ***Chapter 23: Environmental and Social Management Plan*** and the associated Appendix T (ESMP Mitigation Checklist) provide a framework for implementation of the identified mitigation measures. A suite of detailed and individual environmental and social management plans will be developed by the Project Proponents ahead of the commencement of construction activities and continually updated for operations. Adherence to these plans will be a condition of any Project construction and operation contracts awarded. Further details are provided in ***Chapter 23: Environmental and Social Management Plan***.

3.3.7 Residual Impacts

After suitable mitigation measures were identified, the significance of each potential impact was re-evaluated to predict the post-mitigation ('residual') significance. It is this ***residual significance*** that has been used to support decision making and conclusions about the Project's impacts.

3.4 Stakeholder Engagement

As part of the ESIA process, stakeholder engagement was, and continues to be, undertaken throughout the development of the Project to ensure that all interested parties are aware and informed of the Project and have an opportunity to provide input regarding potential Project impacts and mitigation measures. ESIA related consultations have been undertaken with:

- National authorities;
- Municipal and local authorities;
- Local communities and cultural leaders;
- Local businesses and business organisations;
- Non-governmental organisations (NGOs) and civil society organisations (CSOs); and
- Academic and scientific organisations.

The Project has developed a Stakeholder Engagement Plan (SEP) which identifies stakeholders and their interests, describes the consultation undertaken and that planned as part of the Project's ESIA process, and establishes a framework for stakeholder engagement activities to be undertaken as the Project progresses beyond the ESIA phase.

The stakeholder consultation process has helped the ESIA to scope receptors, VECs as part of the CIA, and potential impacts and concerns identified by the public. Stakeholder consultation was initiated by the Project Proponents prior to ESIA start, and has been a part of the ESIA process from the initial screening phase, and will continue with the submission of this ESIA. Further engagement will be ongoing during Project implementation to ensure the management and consideration of stakeholder's concerns, including the ongoing operation of a grievance mechanism.

This ESIA Report will be released to the public for review and comment by NEMA in line with the Ugandan EIA regulations. Additionally, a copy will be disclosed on TEP Uganda's website. The purpose of this disclosure is:

- To help stakeholders understand the potential impacts, following the application of mitigation measures, that may arise as a result of the Project;
- To provide an opportunity for stakeholders to raise comments about the Project; and
- To confirm to stakeholders that their opinions obtained through the stakeholder engagement process have been considered in both Project design and ESIA evaluation.

Details of the stakeholder engagement process for the ESIA are discussed further in ***Chapter 5: Stakeholder Engagement***.

3.5 Data Limitations

This ESIA Report has been based on design information available at the time of its preparation. Where necessary assumptions have been made and discussed in the relevant chapters.

Consequently the ESIA has been undertaken on Project engineering design information at a FEED level.

During further detailed design work, amendments may occur that might result in a deviation from what is presented in the Project Description provided within this ESIA. The Project has a management of change process to manage and track any such amendments, which is also intended to assess their potential consequences with respect to environmental and social impact. Further information is provided in ***Chapter 4: Project Description and Alternatives***.

All key design changes will be added to a register of changes, which will summarise the change, the assessment of potential consequences with respect to environmental and social impact, and the justification. The management of change process will be incorporated into the ESMS, which is described in further detail in ***Chapter 23: Environmental and Social Management Plan***.

Comprehensive data have been used to inform this ESIA Report to enable sufficient confidence in the assessment conclusions. Notwithstanding the data set used, where any information has not been available, conservative assumptions have been made and are outlined in the relevant chapters of this ESIA Report.

In this ESIA Report, predictions were made using accepted ESIA methods ranging from qualitative assessment and expert judgement to quantitative modelling. The impact assessment sections in Chapters 6 to 19 detail specific relevant data and assumptions made as necessary.

3.6 References

Ref. 3-1 National Environment Management Authority, Uganda, Environmental Impact Assessment Guidelines for the Energy Sector, (2014).

Ref. 3-2 Republic of Uganda, Environmental Impact Assessment Regulation, S.I. No. 13/1998. Statutory Instruments, (1998).

Ref. 3-3 International Organization for Standardization, ISO 14001 Environmental Management Systems, (2015).

Ref. 3-4 International Finance Corporation (IFC) (2012), Performance Standards.

Ref. 3-5 Protocol on Environment and Natural Resources Management (2005), East African Community.

Ref. 3-6 Nile Basin Initiative Sustainability Framework. Nile Basin Initiative (2011).

Ref. 3-7 IFC's Good Practice Handbook to Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets (2013).

04 – Project Description and Alternatives

Table of Contents

Table of Figures

List of Tables

4 Project Description and Alternatives

4.1 Introduction

This chapter of the Environmental and Social Impact Assessment (ESIA) Report describes the technical components of the Project and forms the basis of the assessment undertaken in the technical studies found in Chapters 6 to 19 of this ESIA Report. The description of the Project has been broken down into the following phases:

- Site Preparation and Enabling Works;
- Construction and Pre-Commissioning;
- Commissioning and Operations; and
- Decommissioning.

As described in Section 1.3 of ***Chapter 1: Introduction***, the Project is located to the northeast of Lake Albert, in the Buliisa and Nwoya districts. The Project comprises the upstream development of six production fields across 34 well pads in Contract Area 1 (CA-1), License Area 2 (LA-2) and Exploration Area 1A (EA-1A) with a total Project area of approximately 111,000 hectares (ha) (the Project itself covers around 1.1% of this area). As illustrated in Figure 4-1, the Project is naturally split between the two banks of the Victoria Nile River. The field located North of Victoria Nile is inside the Murchison Falls National Park (MFNP) and the fields south of the Victoria Nile are wholly located outside the MFNP. The Project Area is located within the East Africa Rift System (EARS), in which natural ground movements, seismicity and hydrocarbon seeps are common. A detailed overview of the geological conditions of the Project Area is presented in ***Chapter 8: Geology and Soils***.

The Project will extract oil and gas from the Miocene reservoirs, which are located between 250 metres (m) and 900m beneath ground level. The extraction of oil and gas will be coupled with water injection into the reservoir, via dedicated water injection wells, to maintain pressure and facilitate the extraction. Reservoir pressure will thus be maintained throughout the lifetime of the Project.

In total 412 wells are planned to be drilled (190 producers, 190 water injectors and 32 observation wells) from 34 well pads. The Production and Injection Network will transport produced fluids and associated gas from the well pads to a single Central Processing Facility (CPF). Production fluids and gas will be gathered, treated and stabilised in the CPF, which will be situated with the Industrial Area located south of the Victoria Nile. From the CPF, the treated and stabilised oil will be sent to the oil export system via Tilenga Feeder pipeline (addressed in separate ESIA Report) and gas will be used for power generation.

As part of the on-going Project design process, measures to avoid or minimise potential impacts have been identified and incorporated within the pre-project and Front End Engineering and Design (FEED) phases. These are referred to as "*embedded mitigation measures"* and include physical design features and management measures. They are based on Good International Industry Practice (GIIP) and are intended to avoid or control potentially negative impacts. Their role in controlling environmental, social and cultural heritage impacts is discussed more in ***Chapter 3: ESIA Methodology***. Where the outcome of the ESIA indicates that embedded mitigation measures are insufficient to minimise potential impact as far as technically and financially feasible, further measures have been identified. These measures have been termed "*additional mitigation measures*" and are described in respective chapters and detailed in ***Chapter 23: Environmental and Social Management Plan***.

Chapter 20: Unplanned Events presents an overview of the procedures and processes associated with the Project to respond to and minimise the impact of emergency and unplanned events, including those related to the geological nature of the region and the reservoir characteristics. An emergency preparedness and response structure will be established; skilled personnel will attend all emergency situations. Specific emergency response documentation will be developed and implemented for all Project phases including Emergency Response Plans and Oil Spill Contingency Plans (OSCP).

Figure 4-1: Indicative Layout of Project

In line with the Montreal Protocol on Substances that Deplete the Ozone Layer, the Project will not use ozone depleting substances including chlorofluorocarbon (CFCs), halons, 1,1,1-trichloroethane, carbon tetrachloride, methyl bromide or hydrobromofluorocarbon (HBFCs).

4.2 Overview of the Project

4.2.1 Production Profile

The production profiles for produced gas, oil, water, total liquid (oil and produced water) and injection water are shown in Figure 4-2. A feature of the production profile is that increasing amounts of water will be produced from the fields, such that a well producing 100% oil at the start of its production will end up producing more than 95% water and only 5% oil after several years.

From start up, the Project's heating requirement and power generation will be fuelled using produced gas associated with the oil production (refer to Section 4.3.4). Excess power will be used to supply the Tilenga Feeder Pipeline, the East Africa Crude Oil Export Pipeline (EACOP) Kabaale Pumping Station 1 and Pumping Station 2 (refer to Section 4.3.4).

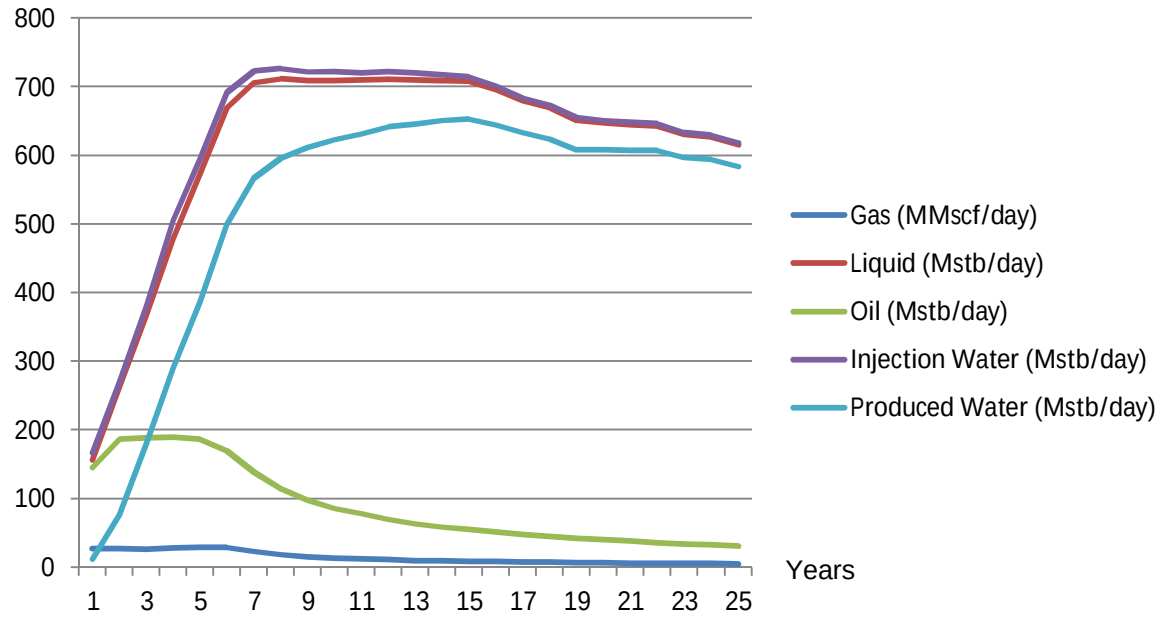


Figure 4-2: Preliminary Production Profile

4.2.1.1 Oil Characteristics

The expected oil characteristics for the Project Area are presented in Figure 4-3 and include:

- Heavy and viscous oil (within MFNP) in the north of the Victoria Nile with a pour point of 15 degrees Celsius (°C), and a wax appearance temperature (WAT) of 34-28°C. Viscosities reach 250 centipoise (cP) at 50°C; and
- Waxy oil in the south of the Victoria Nile with a relatively high pour point of 39-45°C and a high WAT of 46-70°C.

The oil in the north is heavy and viscous while the oil in the south is waxy and has a WAT higher than ambient temperature. The principal function of the CPF is to act as a gathering, processing and send out facility for the oil produced from the well pads.

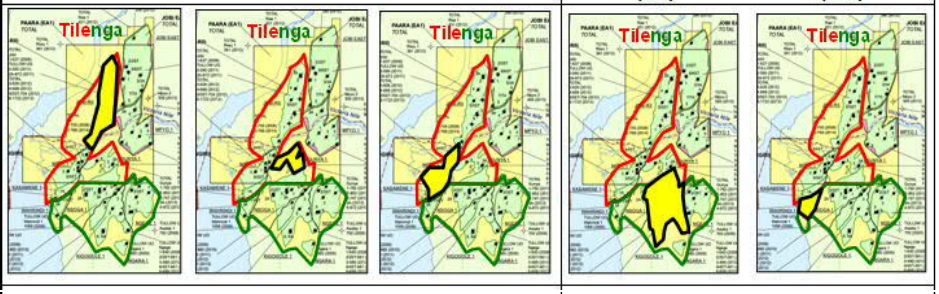
Block	CA-1			LA-2N	
Field	Jobi-Rii	Gunya	Ngiri	Kigogole Nsoga (KN)	Kasamene Wahrindi (KW)
Map					
Well pads	10	4	5	12	3
OP	56	20	34	68	12
WI	61	20	34	62	12
Burial (mTVD)	250-530	450-700	540-740	340-680	650-860
Oil Type	Heavy	Waxy	Waxy	Waxy	Waxy
°API	21.8-15.8	24.9	31	29.2	30
in-situ viscosity (cp)	70-250	15-30	5	8-20	5
GOR (scf/bbl)	75	101	240	129	310
WAT (°C)	34-28	46	60	50	70
Pour Point (°C)	15	39	45	39	45
Pres (Bars)	45	57	72	55	80

Figure 4-3: Oil Characteristics across the Project Area

4.2.2 Project Components

The Project will comprise both permanent and temporary components to enable the construction of the facilities. Full details on each of the key components is presented in Section 4.3.

4.2.2.1 Permanent Components

The permanent Project components will comprise a number of key elements, which are summarised below:

- Development of six production fields: Jobi-Rii (JBR), Ngiri (NGR), Gunya (GNA), Kasamene / Wahrindi (KW), Kigogole (KGG); and Nsoga (NSO) within which 412 wells will be drilled across the 34 well pads;
- Production and Injection Network will transfer production fluids from the well pads to the CPF and injection water to the well pads from the CPF. It will include a tunnelled section under the Victoria Nile using the Horizontal Directional Drilling (HDD) technique to connect the JBR production field located north of the Victoria Nile with the CPF. The Network will comprise:
  - Production pipelines to transport oil, gas and produced water extracted from the producing wells to the CPF;
  - Water pipeline to transport water abstracted from both Lake Albert and produced water from the fields to the CPF to the well pads for injection into the reservoir via the water injection wells;
  - An electrical distribution system to transport power generated at the CPF to each well pad; and
  - A fibre optic cable (FOC) providing two way communications between the well pads and the CPF for monitoring, control and leak detection purposes.
- The Industrial Area will comprise the following key facilities:

- The CPF, which will separate the produced oil, water and gas arriving from the well pads into its three constituent parts. This will include stabilised oil at export specifications, associated gas for power generation and produced water for re-injection (no produced water will be discharged to the environment; all produced water will be re-injected into the reservoirs). The CPF main facilities will include:
  - Pig[1] receivers and manifolds[2] of the incoming production lines from the well pads. The inlet manifold will have Emergency Shutdown Valves (ESDVs);
  - Two oil/gas/water separation trains producing an export quality stabilised oil, capable of treating 190 thousand barrels per day (kbopd) of oil and 700 kbbl/d total liquids (oil plus water);
  - Oil storage, measurement and export pumping system;
  - Gas treatment and compression for peak gas production of some 30 million standard cubic feet per day (MMscf/d);
  - Produced water treatment system;
  - Lake water treatment system;
  - Power generation system to provide operational power and heat;
  - Central Control Room housing control, monitoring and safety systems together with fire and gas detection and protection systems;
  - Flare system;
  - Sludge treatment; and
  - Information Technology (IT), communications and telecoms system.
- Utilities;
- Permanent Operation Camp;
- Permanent Operation Support Base with warehouses, workshops, maintenance facilities, offices including an Integrated Waste Management Area;
- Drilling Support Base including Liquid Mud Plant (LMP);
- Community / Visitors Centre;
- Security Camp; and
- Logistics Support Centre.

- Water Abstraction System to abstract water from Lake Albert and transport it to the CPF; the main use for the water will be to reinject it at the well pads to maintain pressure at the production fields; and
- Victoria Nile Ferry Crossing Facility to provide a transport link between the Project Area located north and the south of the Victoria Nile.

In addition to the components listed above a number of existing facilities will be upgraded and used for the duration of the Project:

- Tangi Operation Support Base located north of the Victoria Nile to provide operational support to the JBR production field;
- Bugungu Airstrip; and

[1] Bullet-shaped, cylindrical or spherical capsules which are inserted into pipeline to clean wax and other build-ups to prevent blockages.
[2] An assembly of pipe, valves, and fittings by which fluid from one or more sources is selectively directed to various process systems.

- Roads to allow access to the CPF and well pads (the Project will also require the construction of new roads in addition to road upgrades).

Table 4-1 presents the permanent footprint required by the Project broken down by component.

Table 4-1: Permanent Footprint of the Project

Project Component	Approximate Footprint (ha)
Well pads^	228
Production and Injection Network permanent Right of Way (RoW)***	263
Industrial Area (including the CPF)	307
Water Abstraction System onshore facility (including RoW for W1 road)^^, ^^^	9.2
Victoria Nile Ferry Crossing Facility	1.3
Tangi Support Base	5
New roads (C1, C3)^^^	15.8
District new roads (N1, N2)^^^	17.8
Upgrade roads (A1, A2, A3, A4, B1, B2)^^	189
Inter field access roads south of the Victoria Nile (D roads)*	25
Bugungu Airstrip**	-
TOTAL	**1061.1**

Notes:
1. The entire footprint of the Industrial Area will be retained for the lifetime of the Project.
2. The existing footprint of Tangi Support Base is about 11 ha and this will be expanded by about 11 ha for the duration of the Construction and Pre-Commissioning Phase. Following this, with the exception of 5 ha, the site will be reinstated to its pre-Project condition.

^^ Footprint for Water Abstraction System is associated with the onshore facility option only.
^^^ Roads N1, N2, A1, B1, B2 and sections of A2 and A3 will have a permanent RoW of 50 m. A 30 m permanent RoW will be acquired for roads W1, C1, and C3, sections of A2 and A3 and A4.
* D roads will have a 15 m permanent RoW.
** The Bugungu Airstrip will be upgraded as part of the Project scope, but it will not be used exclusively for Project activities.
*** The Project Proponent will acquire a 30 m Production and Injection Network RoW, which will be retained for duration of Project activities.

4.2.2.2 Temporary Components

The temporary Project components will comprise a number of key elements, which are summarised below and described in further detail in Section 4.3:

- Buliisa and Bugungu Construction Camps (existing facilities originally constructed to support exploration activities);
- Temporary facilities at the Industrial Area will comprise:
  - Construction Camp to accommodate for works south of the Victoria Nile;
  - Construction Support Base to support the Project south of the Victoria Nile as described in Section 4.3.4; and
  - Community / Visitors Centre.
- Temporary facilities at the Tangi Construction Support Base to support the Project north of the Victoria Nile as described in Section 4.3.9; and
- Masindi Vehicle Check Point to provide support to vehicles accessing the Project Area to the South of the Victoria Nile.

In addition to the facilities listed above a number of additional areas will be required for temporary use to support the upgrade and construction of the roads, construction of the Production and Injection Network, including HDD activities under the Victoria Nile.

Table 4-2 presents the temporary footprint required by the Project broken down by component. All temporary areas will be restored following the completion of the Construction and Pre-Commissioning Phase.

Table 4-2: Temporary Footprint of the Project

Project Component	Approximate Footprint (ha)
Buliisa Camp^	9
Bugungu Camp^	3.5
17 ha of Tangi Support Base^^	17
Victoria Nile Crossing HDD Construction Areas (north and south of the Victoria Nile)	20
Victoria Nile Crossing HDD Stringing Area (north of the Victoria Nile)	8
Masindi Vehicle Check Point (including M1 road)*	25
TOTAL	**82.5**

Notes:

1. A 40 m construction (temporary) RoW is required for N1, N2, B1, B2, A1, asphalt sections of A2 and A3. A 30 m construction RoW will be required for A4, gravel sections of A2 and A3, W1, C1, C3 and M1. A 15 m construction RoW is required for the D roads. In all cases the construction RoW will be contained within the permanent RoW and as such there are no temporary land requirements for the roads.
2. The temporary footprint of the Production and Injection Network are contained within the footprint of the 30 m permanent RoW.
3. Borrow pits and quarries to be utilised for the Project will be confirmed during the detailed design of the Project (Section 4.8.8) and as such temporary land required are not available at the time the ESIA Report was prepared

^The entire footprints of the Buliisa and Bugungu camps will be restored to pre-Project conditions following the completion of the Construction and Pre-Commissioning Phase.
^^17 out of the 22 ha footprint of Tangi Support Base will be restored to pre-Project conditions following the completion of the Construction and Pre-Commissioning Phase. This will include approximately 6 ha of the existing camp.
*Total includes the area of the existing Masindi Airstrip and a 30 m temporary RoW for M1.

4.3 Description of Project Components

This section of the Chapter presents a detailed description of the Project components once operational. Sections 4.8 and 4.9 provide a description of the construction of these components including temporary facilities installed for the duration of construction.

Table 4-3 presents a summary of the embedded mitigation measures of all Project Components. A full list of embedded mitigation measures is included in Appendix E.

Table 4-3: Embedded Mitigation Measures of the Project Components

Aspect	Description
Storage of Hazardous Materials	All fuels and hazardous materials will be stored with appropriate containment including impermeable areas, kerbing, bunding and drip trays. 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.
Refuelling	Main refuelling facilities will be located within the Industrial Area, the camps and the Masindi Vehicle Check Point. Facilities will be located within a 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. Flow meters will be integrated on all refuelling points to monitor usage. Sampling points will also be established to enable spot sampling of fuel composition.
Drainage	With the exception of the CPF which has a bespoke drainage arrangement detailed in Section 4.3.4.2, 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)[3] 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.
Lighting	Lighting will be reduced to the minimum and its design consider need to limit associated nuisances (e.g. light directed inwards, of warm/neutral colour) without impacting safety and security
Waste Management	To be managed in line with detail presented in Section 4.14.
Sewage	To be managed in line with detail presented in Section 4.14.
Power	During normal Operations, power will be provided by the CPF; there will be no back-up generators other than black-start and emergency generators.

4.3.1 Existing Facilities

There are three existing worker camp facilities within the Project Area (Figure 4-4), which were used to support early exploration activities as summarised in Table 4-4. These facilities will be used to support both the Site Preparation and Enabling Works Phase and the Construction and Pre-Commissioning Phase of the Project.

[3] The SuDS approach will deliver the most benefits for water quantity, quality, and amenity/biodiversity as it replicates as closely as possible the natural drainage from a site before development. The SuDS design provides a more flexible and efficient approach to traditional “hard pipe” drainage design, which takes into account the seasonal variations in localised hydrology and wildlife sensitivity such as in the MFNP.

The Tangi Support Base/Camp will be expanded by approximately 11 ha to accommodate up to 800 people for the duration of the Construction and Pre-Commissioning Phase.

Table 4-4: Summary of Existing Workers Camps

Camp	Location	Existing Capacity (persons)	Approximate Footprint (ha)	Facilities
Buliisa	South of the Victoria Nile	100	9.0	Accommodation, kitchen, dining, water and waste treatment plants, power generators, gym, recreation and ablutions.
Bugungu		350	3.5	
Tangi	North of the Victoria Nile	350	11	

There are existing boreholes located within the existing camp facilities as shown in and summarised in Table 4-5. However, it may be necessary to drill additional boreholes during the Site Preparation and Enabling Works Phase to ensure a sufficient water supply is available when the camps are operating at peak capacity during the Construction and Pre-Commissioning Phase (refer to Section 4.8.7).

Table 4-5: Borehole Coordinates (Existing and Proposed) at Buliisa, Bugungu and Tangi Camps

Camp	Location	Reference	Status	Easting	Northing
Buliisa	South of the Victoria Nile	DWD 21661	Existing	316968	200172
		n/a	Proposed	325532	233459
		n/a	Proposed	325526	233448
		n/a	Proposed	325520	233475
Bugungu		DWD29475	Existing	336840	241907
		DWD 35634	Existing	336965	241926
		n/a	Proposed	336850	241907
Tangi	North of the Victoria Nile	DWD 29472	Existing	336250	271919
		DWD 35670	Existing	336310	271815
		DWD 35646	Existing	336318.3	271883.1
		n/a	Proposed	336311	271889

Figure 4-4: Location of Existing and Proposed Boreholes at the Buliisa, Bugungu and Tangi Camps

4.3.2 Well Pads

The 34 well pads planned to be located in CA-1 and in LA-2 North (refer to Figure 4-1) are presented in Table 4-6, which also includes the approximate size of the well pads.

Table 4-6: List of Well Pads

Block	Field	Well Pad Name	Approximate Area of Well Pad (ha)	Approximate Land Acquisition Required (ha)
South of the Victoria Nile				
CA-1	Gunya	GNA-01	3.2	6.5
CA-1	Gunya	GNA-02	3.7	5.6
CA-1	Gunya	GNA-03	3.4	5.8
CA-1	Gunya	GNA-04	4.0	5.9
CA-1	Ngiri	NGR-01	3.6	5..5
CA-1	Ngiri	NGR-02	3.7	7.6
CA-1	Ngiri	NGR-03A	4.4	8.4
CA-1	Ngiri	NGR-05A	3.8	8.4
CA-1	Ngiri	NGR-06	3.2	6.4
LA-2	Kigogole	KGG-01	3.9	5.8
LA-2	Kigogole	KGG-03	3.9	5.8
LA-2	Kigogole	KGG-04	4.0	8.3
LA-2	Kigogole	KGG-05	3.7	5.6
LA-2	Kigogole	KGG-06	3.5	7.3
LA-2	Kigogole	KGG-09	3.5	5.3
LA-2	Kasamene	KW-01	3.3	7.1
LA-2	Kasamene	KW-02A	4.1	8.9
LA-2	Kasamene	KW-02B	3.6	6.7
LA-2	Nsoga	NSO-01	4.3	8.1
LA-2	Nsoga	NSO-02	3.4	5.2
LA-2	Nsoga	NSO-03	3.8	7.7
LA-2	Nsoga	NSO-04	3.1	5.3
LA-2	Nsoga	NSO-05	3.4	5.5
LA-2	Nsoga	NSO-06	3.8	5.8
TOTAL			**88.3**	**153**
North of the Victoria Nile				
CA-1	Jobi Rii	JBR-01	3.7	8.3
CA-1	Jobi Rii	JBR-02	3.5	5.8
CA-1	Jobi Rii	JBR-03	4.0	8.0
CA-1	Jobi Rii	JBR-04	4.0	7.1
CA-1	Jobi Rii	JBR-05	3.7	7.9
CA-1	Jobi Rii	JBR-06	4.0	6.4
CA-1	Jobi Rii	JBR-07	3.2	7.6
CA-1	Jobi Rii	JBR-08	3.7	6.3
CA-1	Jobi Rii	JBR-09	3.4	7.5
CA-1	Jobi Rii	JBR-10	3.8	9.8
TOTAL			**37**	**74.7**

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.

Each well pad will include a concreted area where the wells will be located. Each well will be located within an individual cellar protected with an individual hatch/cover, spaced in two rows approximately 8 m apart from the adjacent wells (Figure 4-5). Where practicable, equipment will be located under shelters to prevent the ingress of rainwater.

The wells will be a mix of producers, injectors and observation and the individual production wells will each have two flowlines connected to two manifolds in order to:

- Gather oil from the main production line of the oil producer wells, and

- Gather off-gas from the producing wells annulus[4].

Each well pad will be equipped with Emergency Shut Down Valves (ESDVs). Production from each individual well will be measured using a dedicated multi-phase flowmeter (MPFM). The off-gas will be compressed where required and reinjected back into the oil production manifold. The production fluids will be transferred across the well pad to Production and Injection Network for onward transfer to the CPF. The well pad departure point will be equipped with a Shut Down Valve (SDV) and a pig launcher/receiver (if required).

The well pads will include three manifolds: one for production, one for gas production and the other for water injection. The water injection manifold will receive injection water pumped from the CPF and will distribute it to the individual water injection wells. The volume of water injected into each well will be metered. There is also the functionality on the manifold to reinject water into the production wells, if required.

Technical building(s) will be located within the footprint of the well pad to house the main electrical supply and switchgear required for electrical consumers at each well pad (primarily the downhole Electric Submersible Pumps (ESP) in the producing wells used to lift oil from the reservoir). Power will be distributed to the well pads from the CPF via the Fibre Optic Cable (FOC), which will be located within the Production and Injection Network. There will also be a building to house instrumentation, control and communication systems.

There will be no automatic depressurisation system, depressurisation will be undertaken manually as required (refer to Section 4.10.6.3).

Each well pad will include an emergency pit with capacity for up to 50 cubic metres (m^3) for use should there be an unplanned event i.e. blowout. The pit will be lined and covered to prevent rainwater ingress.

The well pads will be linked by access roads to the main road network (refer to Section 4.3.6 for details).

The indicative layouts of the well pads during the Construction and Pre-Commissioning Phase and the Commissioning and Operations Phase are shown in Figure 4-5 and Figure 4-6, respectively.

[4] The space between the wellbore and casing.

Figure 4-5: Indicative Well Pad Layout during the Construction and Pre-Commissioning Phase

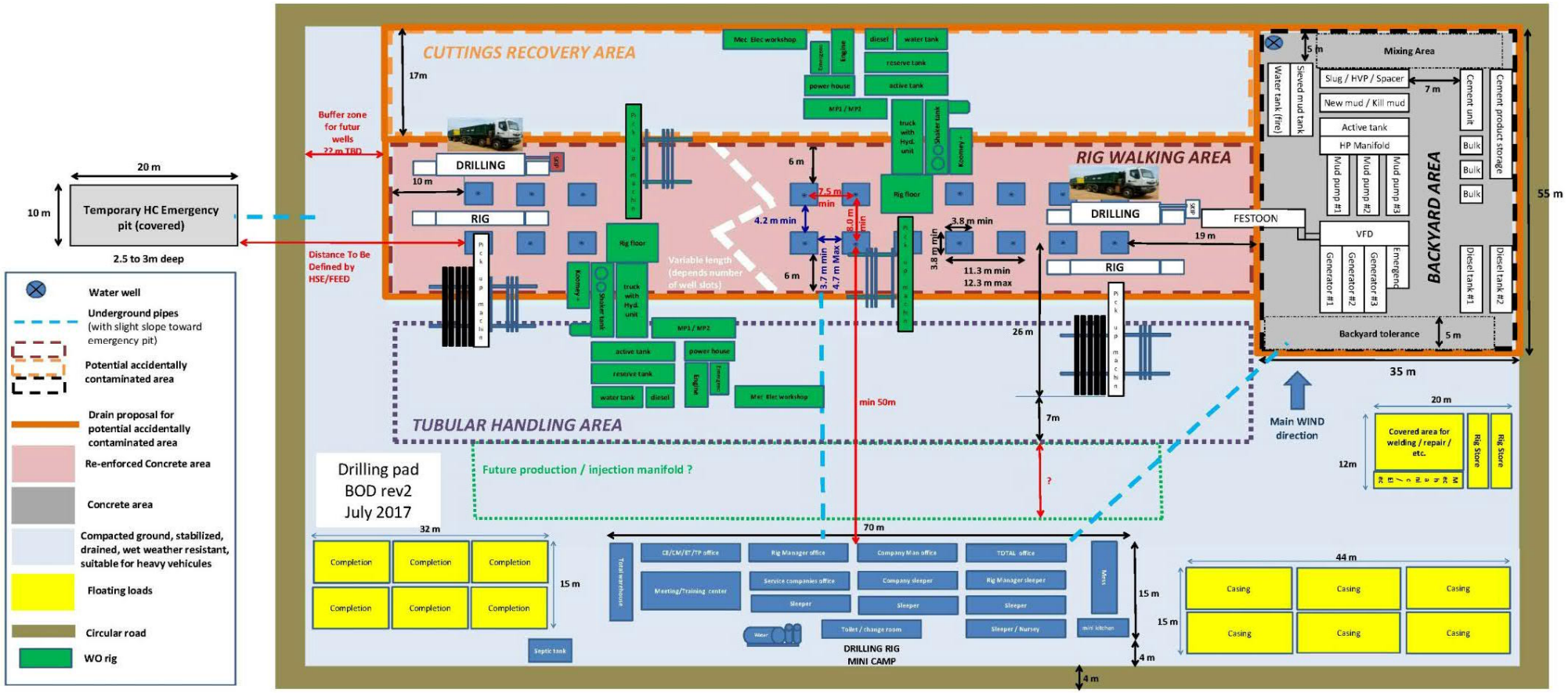
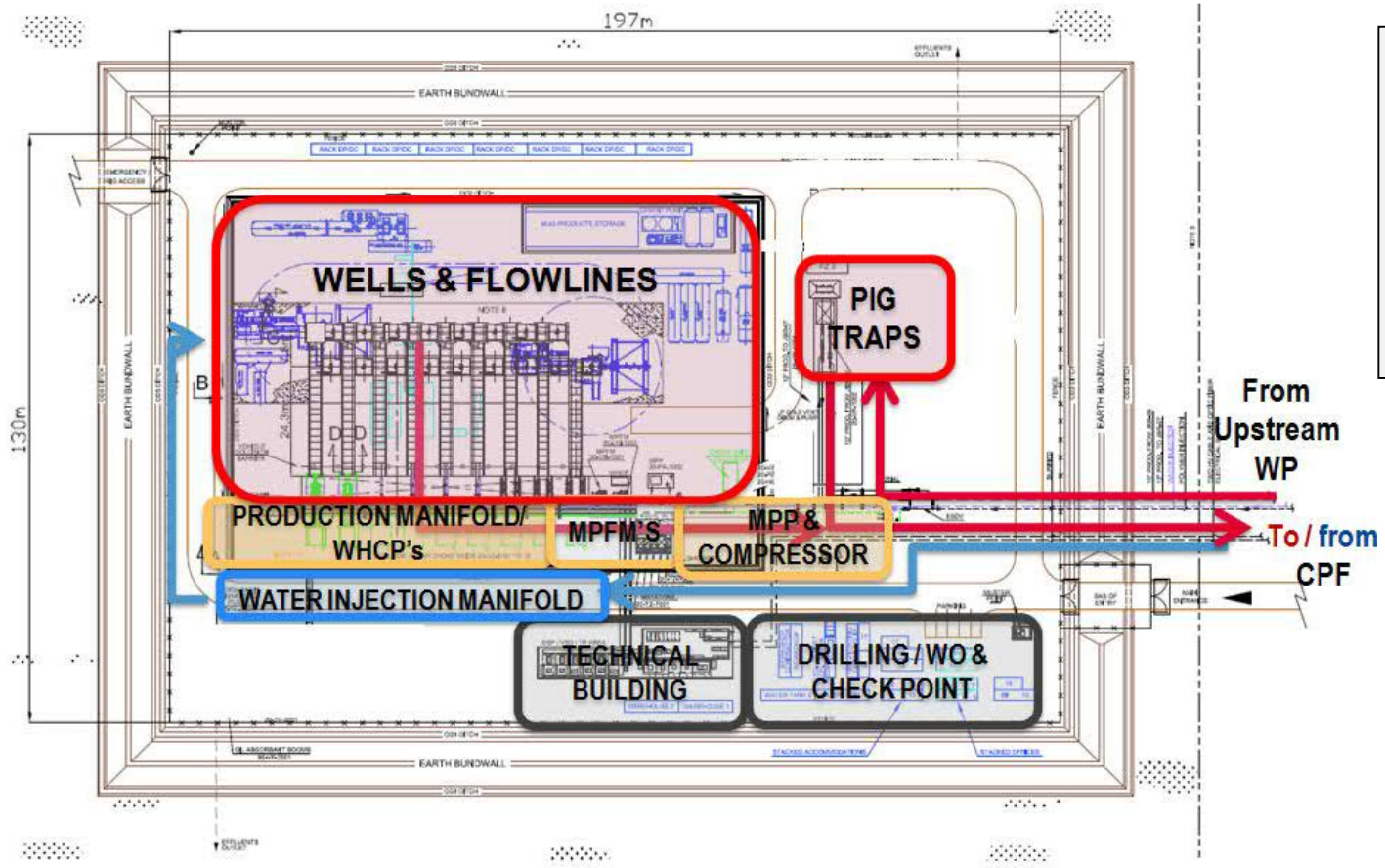


Figure 4-6: Indicative Well Pad Layout during the Commissioning and Operations Phase[5]



Key

MPFM – Production multi-phase flow meter

MPP – multi phase pump

WHCP – Well Head Control Panel

WO – Work over

[5] It should be noted that the final well pad layout will be dictated by the reservoir engineering requirements; consequently the well pad design may be modified slightly to determine optimum well trajectories and lengths.

Table 4-7 summarises the numbers and type of wells at each of the 34 well pads, including spare and future use slots for further field development, if required.

Table 4-7: Summary of Wells and Slots at Each Well Pad

Block	Field	Name	Total Number of Wells	Oil Producer	Water Injection	Observation Well	Unused Slots^	Future Slots^
CA-1	Gunya	GNA-01	12	6	5	1	3	2
CA-1	Gunya	GNA-02	11	5	5	1	4	0
CA-1	Gunya	GNA-03	8	3	4	1	3	2
CA-1	Gunya	GNA-04	13	6	6	1	4	2
CA-1	JobiRii	JBR-01	6	2	4	0	2	1
CA-1	JobiRii	JBR-02	15	8	6	1	5	1
CA-1	JobiRii	JBR-03	11	4	6	1	4	6
CA-1	JobiRii	JBR-04	22	10	11	1	8	1
CA-1	JobiRii	JBR-05	12	5	6	1	4	10
CA-1	JobiRii	JBR-06	19	8	10	1	6	1
CA-1	JobiRii	JBR-07	6	3	2	1	3	8
CA-1	JobiRii	JBR-08	14	6	7	1	4	5
CA-1	JobiRii	JBR-09	14	6	7	1	3	0
CA-1	JobiRii	JBR-10	13	6	7	0	3	6
CA-1	Ngiri	NGR-01	13	7	5	1	4	0
CA-1	Ngiri	NGR-02	16	7	8	1	4	0
CA-1	Ngiri	NGR-03A	9	3	5	1	3	0
CA-1	Ngiri	NGR-05A	14	9	4	1	4	0
CA-1	Ngiri	NGR-06	11	4	6	1	4	0
LA-2	Kigogole	KGG-01	18	9	8	1	4	6
LA-2	Kigogole	KGG-03	13	7	5	1	6	4
LA-2	Kigogole	KGG-04	13	7	5	1	4	0
LA-2	Kigogole	KGG-05	15	7	7	1	4	0
LA-2	Kigogole	KGG-06	6	2	3	1	3	2
LA-2	Kigogole	KGG-09	4	1	2	1	3	8
LA-2	KW	KW-01	5	2	2	1	3	0
LA-2	KW	KW-02A	13	6	6	1	4	2
LA-2	KW	KW-02B	13	6	6	1	4	2
LA-2	Nsoga	NSO-01	21	11	9	1	9	0
LA-2	Nsoga	NSO-02	7	3	3	1	6	5
LA-2	Nsoga	NSO-03	9	4	4	1	4	0
LA-2	Nsoga	NSO-04	11	5	5	1	3	0
LA-2	Nsoga	NSO-05	11	5	5	1	3	6
LA-2	Nsoga	NSO-06	14	7	6	1	5	6
TOTAL			**412**	**190**	**190**	**32**	**140**	**86**

Notes:
^well slots enable the potential further expansion of the fields in future years.

4.3.3 Production and Injection Network

The network of buried pipelines as summarised below will total approximately 180 kilometres (km) in combined length, including:

- Production pipelines (from 4 to 24-inch Nominal Diameter (ND) with a combined length of approximately 85 km;
- Water abstraction pipeline (24-inch ND) transferring water from Lake Albert to the CPF, approximately 10 km in length; and
- Water injection pipelines (from 4 to 20-inch ND) with a combined length of approximately 85 km.

The production, water abstraction and water injection pipelines, together with electrical power distribution and FOC systems, will be located in the same 30 m RoW.

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 and a corrosion inhibitor will be injected for internal protection.

The Production and Injection Network outside the Industrial Area will be buried at least 0.8 m below the ground surface; markers will be used to denote the location (including the water abstraction pipeline in Lake Albert). Table 4-8 provides the length of the Production and Injection Network sections.

Table 4-8: Approximate Length of the Production and Injection Network

Production and Injection Network		Length (m)	Permanent RoW (m)
From	To		
GNA-01	CPF	3,876	30
GNA-02	GNA-04	1,984	
GNA-04	GNA-01	2,016	
GNA-04	GNA-03	2,032	
JBR-02	JBR-01	871	
JBR-03	JBR-01	2,751	
JBR-04	JBR-03	1,111	
JBR-05	JBR-03	2,459	
JBR-06	JBR-05	585	
JBR-07	JBR-06	1,506	
JBR-08	JBR-07	679	
JBR-09	JBR-08	2,283	
JBR-10	JBR-01	4,832	
JBR-10	Victoria Nile HDD Crossing (north of Victoria Nile)	841	
KGG-01	KGG-04	3,049	
KGG-03	KGG-01	1,568	
KGG-04	NSO-04	2,548	
KGG-05	NSO-02	891	
KGG-06	KGG-04	1,663	
KGG-09	KGG-04	1,869	
KW-01	KW-02A	2,705	
KW-02A	KW-02B	1,446	
KW-02B	NGR-06	4,116	
NGR-02	NGR-01	2,321	
NGR-03A	NGR-05A	2,095	
NGR-05A	CPF	3,126	
NGR-06	NGR-05A	1,440	
Victoria Nile HDD Crossing (north of Victoria Nile)	Victoria Nile HDD Crossing (south of Victoria Nile)	1,423	
NSO-01	NSO-05	2,298	
NSO-02	NSO-06	1,909	
NSO-03	CPF	3,701	
NSO-04	NSO-03	2,495	
NSO-05	NSO-03	4,283	
NSO-06	NSO-01	1,926	
Water Abstraction System	KW-02B	1,490	

It is will be necessary to install a section of the Production and Injection Network beneath the Victoria Nile riverbed to connect the JBR well pads located to the north to the rest of the network and CPF which lies to south of the Victoria Nile (as shown in Figure 4-1). The crossing will be installed using HDD and will comprise one production pipeline, one water injection pipeline and electrical/FOC. Additional details of the Victoria Nile HDD crossing are provided in Section 4.9.6.

4.3.4 Industrial Area and CPF

4.3.4.1 Industrial Area

The Industrial Area will be located to the south of Victoria Nile, outside of the MFNP at the following coordinates:

- Northeast corner: 330101, 242958;
- Northwest corner: 328214, 242157;
- Southeast corner: 330687, 241578; and
- Southwest corner: 328800, 240777.

The Industrial Area will comprise both permanent and temporary areas (Figure 4-7) and upon completion will occupy an area of approximately 307 ha. The main features of the Industrial Area are:

- Permanent Facilities Area as detailed in Section 4.2.2; and
- Temporary Facilities Area:
    - Construction Support Base:
        - Offices and medical facility;
        - Material warehouses and laydown areas;
        - Construction workshops for fabrication, painting and maintenance;
        - Concrete batching plant;
        - Storage (chemical and diesel);
        - Logistics Support Centre, which will include control tower; and
        - Integrated Waste Management area to support all waste management activities for construction phase equipped with adequate capacity and containment for storage of solid and liquid waste.
    - Construction Camp to provide accommodation for up to 4,400 workers.

Other facilities will include support services such as refuelling area, car park area, security and visitors centre. Fencing will be present around the perimeter for security and to prevent the ingress of wildlife.

It should be noted that the facilities presented in Figure 4-7 will be located within the Industrial Area plot boundaries taking into account geotechnical information, cut and fill balance optimisation, hydrology and topography of the area.

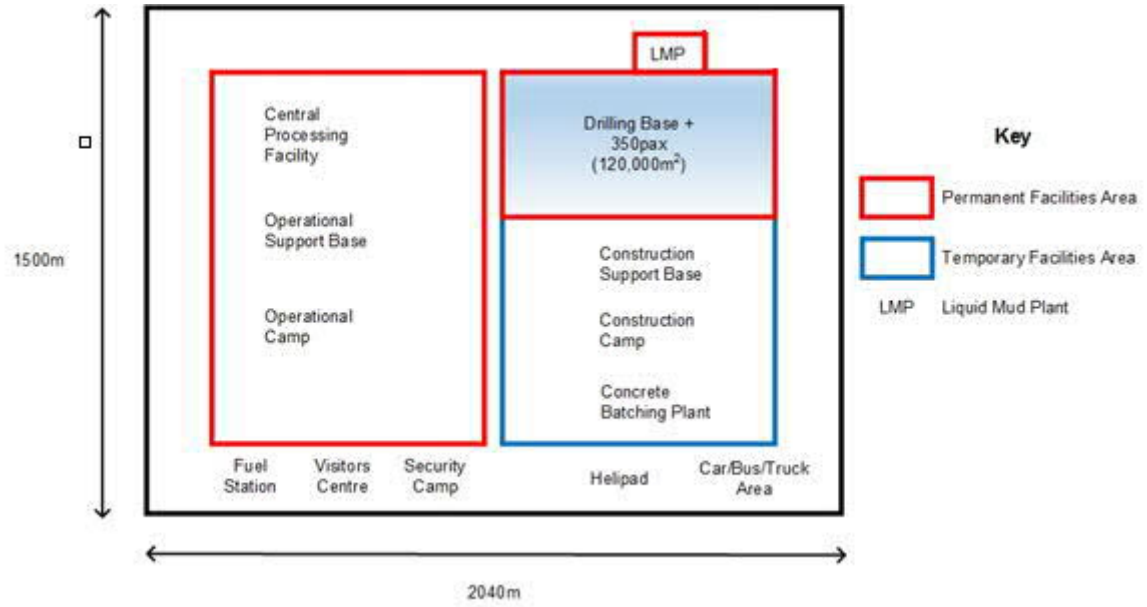


Figure 4-7: Indicative Schematic of the Industrial Area

The most visible components within the Industrial Area will be the radio mast at approximately 60 m above ground level (agl); the elevated flare at approximately 50 m agl, power generation exhaust stacks at up to 45 m agl and the heater exhaust stacks at 30 m agl. 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 (Ref. 4.1).

4.3.4.2 CPF

The CPF will include a number of facilities to produce up to 190 thousand barrels of oil per day (kbopd). The CPF will be located within the Industrial Area covering an area of approximately 52 ha. An indicative layout of the CPF is illustrated in Figure 4-8.

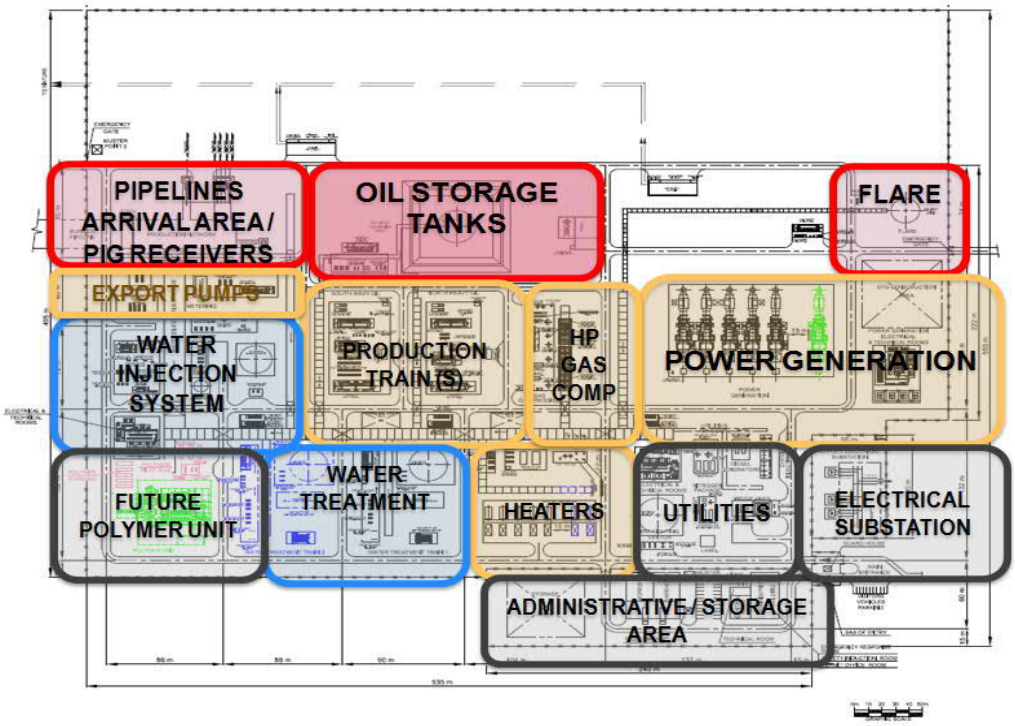


Figure 4-8: Indicative Layout of the CPF

The CPF will separate the produced oil, water and gas from the well pads, stabilise oil, treat and utilise associated gas; and treat produced water/lake water for cleaning and re-injection. The composition of the produced oil, water and gas will change as field life progresses (i.e. produced water will increase whilst produced gas will decrease). The following streams will be produced, treated and stabilised at the CPF:

- Oil stream with a quality suitable for export (true vapour pressure of 0.76 bara at 68°C and less than 0.5% residual water content);
- Produced water with less than 30 milligrams per litre (mg/l) of residual oil content for reinjection back into the oil reservoir. There will be no discharge of produced water; and
- Sludge residues coming from the oil stream or the produced water process, which will be collected, treated and disposed of at a suitable licensed facility.

In addition, water abstracted from Lake Albert will be de-oxygenated prior to being mixed with the produced water to provide sufficient volumes for reinjection. All gas associated with oil production will be fully utilised for power and heat generation.

The CFP will include flare stack which is a key safety feature that will only be used to depressurise the plant for emergency, process upsets and maintenance. There will be no routine flaring during normal operations. There are currently two options under consideration as summarised below, which will occupy a similar footprint within the CPF. Both options have been assessed with Chapters 6 to 19 of the ESIA Report:

- Option 1: The Enclosed Ground Flare (EGF) will be approximately 26 m high with a diameter of approximately 13 m. During operations there will be no visible flame, smoke and minimal noise; and
- Option 2: The Elevated Flare (EF) will be approximately 50 m high with a diameter of 1.25 m. During normal operations there will be no visible flame, noise or smoke from the stack.

A flow meter will be integrated into the flare design to monitor flow and a sample point will be integrated to monitor composition.

Figure 4-9 presents examples of EGF and EF.

Source: https://www.zeeco.com/index.php

Figure 4-9: Example of an EGF and EF

A Vapour Recovery Unit will be located at the CPF to process gases generated.

There will be two 100 kbopd crude oil storage tanks to provide dual function use as buffer and off-spec storage. These tanks will be built within a bunded area designed to provide 110% containment.

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:

- ***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 overflows 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; and
- ***Uncontaminated Drains*** will manage clean surface water from uncontaminated areas via suitably designed SuDS (network of filter drains and soakaways).

Power and heat generation facilities will be required for the Project to process the oil; heat and power will be required to operate the wells, well pads and CPF. The CPF will include a centralised and

integrated power and heat generation system. At the time the ESIA Report was prepared, two options for the power generation system were under consideration as summarised below, both of which have been assessed in Chapters 6 to 19 of this ESIA Report:

- Option 1: 4 x 25% 72 barg steam boilers with 4 x 50 megawatt (MW) steam turbines for generation of power and process heat; and
- Option 2: 6 x industrial 26 megawatts thermal (MWth) dual fuel turbines to generate power and 10 x 21 MW dual fuel industrial heaters to provide process heat.

For both options, it is assumed that during an initial period there will be excess gas associated with the oil production to produce all power and heat requirements for the Project. As there is no other method to utilise the associated gas, any surplus gas will be turned into surplus electricity for export to the Ugandan National Grid.

A metering system will be integrated into the main power generation system package to enable the continuous monitoring of flow. Sampling points will also be established to enable sampling of fuel gas and exhaust gas.

As oil production starts to decline, the associated gas volume will decline also, and the Project will become heat deficient. At this point the Base Case will be to import electrical power from the Ugandan National Grid and the heat demand will be supplemented with the utilisation of crude oil. In order to guarantee autonomous operations, the Project power and heat generation system will be designed to utilise gas, diesel and crude oil.

For the CPF, equipment will be designed to achieve occupational noise level compliance of 85dBA at 1 metre (which is an industry accepted standard). This will take into consideration standard acoustic mitigations for the main power generation package. Where it is not practicable to install acoustic mitigation e.g. around pumps, compressors etc., the area shall be designated as a Restricted Area/Mandatory Hearing Protection Zone. Further details are included within ***Chapter 7: Noise and Vibration***

4.3.4.3 Operations Camp

The Operations Camp will provide:

- Permanent accommodation buildings for up to 300 workers for the duration of the Project;
- Permanent medical facility;
- Recreational facilities such as a gym and football pitches;
- Canteen; and
- Camp utilities.

4.3.4.4 Operations Support Base

The key components of the Operations Support Base are as follows:

- Offices;
- Material warehouses and laydown areas;
- Maintenance and construction workshops;
- Permanent Integrated Waste Management Area; and
- Storage (chemicals including polymer and diesel).

4.3.4.5 Drilling Support Base

The key components of the Drilling Support Base are as follows:

- Offices;
- Material warehouses and laydown areas;

- Workshops; and
- Accommodation camp for up to 500 workers which will utilise the utilities (water, power, sewage and waste) and recreational facilities of the Industrial Area Construction Camp.

4.3.4.6 Liquid Mud Plant

The Liquid Mud Plant will be used to prepare and store the Synthetic Based Mud (SBM) and brine for the duration of the drilling programme. The same or a slightly downsized Liquid Mud Plant will be kept during the work over period for brine management.

Key components of the Liquid Mud Plant facility will be:

- Equipment required for SBM mud mixing operations;
- Warehouses and laydown areas; and
- SMB/brine liquid storage facilities, which will include covers (there will be no open top storage).

Measures will be taken to minimise dust emissions as outlined in ***Chapter 6: Air Quality and Climate***.

4.3.5 Lake Water Abstraction System

To supply water for re-injection into reservoir for maintaining the reservoir pressure a Lake Water Abstraction System will be constructed at Lake Albert as shown in Figure 4-1. It will house pumps and initial water treatment (i.e. filtration and chlorination). There are currently two options under consideration as assessed within Chapters 6 to 19 of this ESIA Report, as summarised below:

- Option 1:
  - Floating platform housing submersible pumps and coarse filter equipment with hypochlorite injection system to be located onshore[6]. Figure 4-10 presents a typical floating platform.
  - Surface laid intake pipe with a 1,200 mm diameter extending 1.5 km from the shoreline into Lake Albert. The intake structure will be located on the lakebed.
- Option 2:
  - Onshore facility to house pumps and the hypochlorite injection system which will be located at least 200 m from the lake shore.
  - Surface laid intake pipe with a 1200 mm diameter extending 1.5 km from the shoreline into Lake Albert. The intake structure, which will include a 2 mm coarse filter screen, will be located at a midpoint water depth with the aid of buoys and anchors (Figure 4-11).

[6] For the purpose of this ESIA the nearest well pad location was considered

For both Option 1 and Option 2:

- A flow meter will be installed and sample point established for ongoing monitoring purposes; and
- The onshore pipeline will be trenched and buried extending approximately 10 km from the onshore facility to the CPF.

Once operational, there will be restricted access either side of the pipeline location in Lake Albert.

Further geomorphology studies are currently being undertaken in relation to the Water Abstraction point in order to further define the design of the scheme.

Figure 4-10: Example of an Offshore Fixed Floating Platform

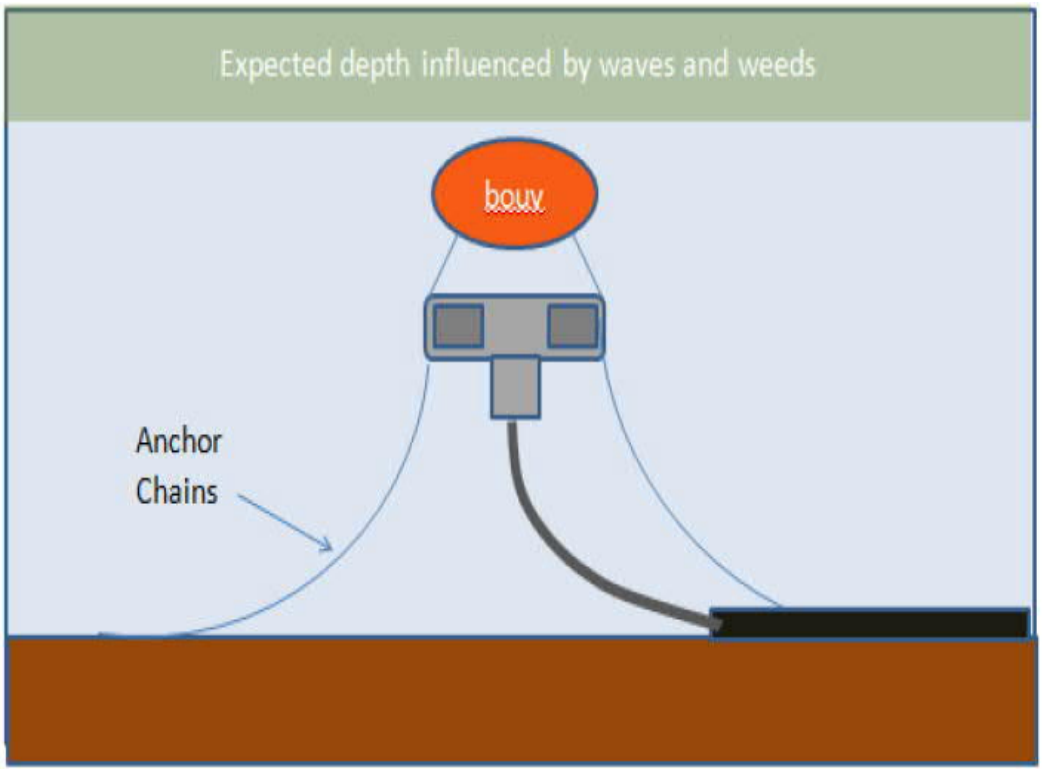


Figure 4-11: Schematic of an Anchor Mounted Midwater Intake Structure

It should be noted the Project Proponents are also considering installing the water abstraction pipeline using the HDD technique for Option 2; however, only the surface laid technique has been assessed as part of the ESIA Report.

4.3.6 Roads

The following section presents an overview of both the new roads and the upgraded roads required for the Project. With the exception of the D roads (inter field access roads), the asphalt roads will have a permanent Right of Way (RoW) of 50 m, while the gravel / murram roads will have a permanent RoW of 30 m. The D roads will have both a 15 m construction and permanent RoW.

Drainage channels will be installed along the edges of the upgraded roads to prevent excessive runoff and cross drainage culverts will be installed, as required. 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).

At the time this ESIA Report was prepared an exercise to minimise the widths of both the permanent and temporary RoW was in progress as part of the engineering undertaken by the Project Proponents.

4.3.6.1 Upgrade Roads

A number of local roads will need to be upgraded involving widening and surfacing with gravel and asphalt to provide access during construction as presented in Table 4-9 and illustrated in Figure 4-12.

Table 4-9: Summary of Roads to be Upgraded

Road	Description	Approximate Length (km)	Approximate Width (m)	Surface Material	Construction RoW	Permanent RoW
A1	Existing small roads to be upgraded to sustain two-way traffic throughout the Project period. Mainly used for infield transport from Industrial area to well pad work sites.	11.6	10 m (7 m width + 1.5 m shoulders)	Asphalt	40 m	50 m
A2		10.6		Asphalt and Gravel	40 m and 30 m	50 m and 30 m
A3		11.0		Asphalt and Gravel	40 m and 30 m	50 m and 30 m
A4		9.4		Gravel	30 m	30 m
B1	Existing small tracks to be upgraded. To be used as Project roads mainly for LA-2 well pads, personnel and materials movements to Buliisa camp and exit route off from Buliisa.	1.9		Asphalt	40 m	50 m
B2		2.4		Asphalt	40 m	50 m
M1	Existing roads to be upgraded to enable the Masindi Airstrip to be used as a vehicle check point.	1	3 m (3 m without shoulders)	Gravel	30 m	30 m

4.3.6.2 New Roads

A number of new roads will also need to be constructed as part of the Project, as summarised within Table 4-10 and shown in Figure 4-12.

Table 4-10: Summary of Proposed New Roads

Road	Description	Approximate Length (km)	Width (m)	Surface Material	Construction RoW	Permanent RoW
N1	Access road to the Industrial Area from A1 (located within the boundary of the Industrial Area)	0.1	10 m (7 m width + 1.5 m shoulders)	Asphalt	40 m	50 m
N2	Optimised route between L2 and A2, to be used for all outgoing vehicles from Industrial area and all infield transport to water abstraction and NGR well pads	3.2			40 m	50 m
C1	A Project dedicated road in MFNP from Pakuba track junction to JBR-09.	4.5	6.4 m	Murram	30 m	30 m
C3	Within Victoria Nile Ferry Crossing and associated building area	0.76			30 m	30 m

At the time the ESIA was prepared, the detailed design and construction strategy for the new roads was under development by the Project Proponents. The design will take into account the

environmental sensitivities as well as the seasonal variations, localised drainage requirements and capacity required for transportation.

4.3.6.3 Inter Field Access Roads

Inter field access roads south of the Victoria Nile to the well pads will be provided by upgrade works to existing tracks / roads and construction of new roads as shown in Figure 4-12. North of the Victoria Nile, access to JBR wellpads will be provided by C1 through JBR-09; and access to JBR-04 (pad where polymer injection pilot is proposed) will be provided using the existing tracks; all other well pads north of the Victoria Nile will be accessed using the Production and Injection Network RoW taking into consideration weight restrictions. Table 4-11 summarises the inter field access roads south of the Victoria Nile.

Table 4-11: Summary of Inter Field Access Roads to Well Pads South of the Victoria Nile

Road	Description	Length (m)	Width (m)	Surface Material	Construction RoW	Permanent RoW
D1	Access Road to Well pad NGR-01	1,839	5	murram or gravel	15 m	15 m
D2	Access Road to Well pad NGR-02	795				
D3	Access Road to Well pad NGR-03A	155				
D5	Access Road to Well pad NGR-05A	135				
D6	Access Road to Well pad NGR-06	477				
D8	Access Road to Well pad GNA-01	354				
D9	Access Road to Well pad GNA-02	185				
D10	Access Road to Well pad GNA-03	238				
D11	Access Road to Well pad GNA-04	664				
D12	Access Road to Well pad KW-01	41				
D13	Access Road to Well pad KW-02A	434				
D14	Access Road to Well pad NSO-01	913				
D15	Access Road to Well pad NSO-02	937				
D16	Access Road to Well pad NSO-03	780				
D17	Access Road to Well pad NSO-04	228				
D18	Access Road to Well pad NSO-05	665				
D19	Access Road to Well pad NSO-06	916				
D20	Access Road to Well pad KGG-01	32				
D22	Access Road to Well pad KGG-03	685				
D23	Access Road to Well pad KGG-04	76				
D24	Access Road to Well pad KGG-05	872				
D25	Access Road to Well pad KGG-06	1,679				
D26	Access Road to Well pad KGG-09	1,824				
D27	Access Road to Well pad KW-02B	65				

4.3.6.4 Water Abstraction System Access Road

An existing road from the Water Abstraction System to the nearest access road (W1 road) will be upgraded to enable vehicular access to the Water Abstraction System. The road will be approximately 1.2 km long with a width of 8.6 m covered in gravel material. Both the construction and permanent RoW will be 30 m wide; 15 m either side of the centre point of the road.

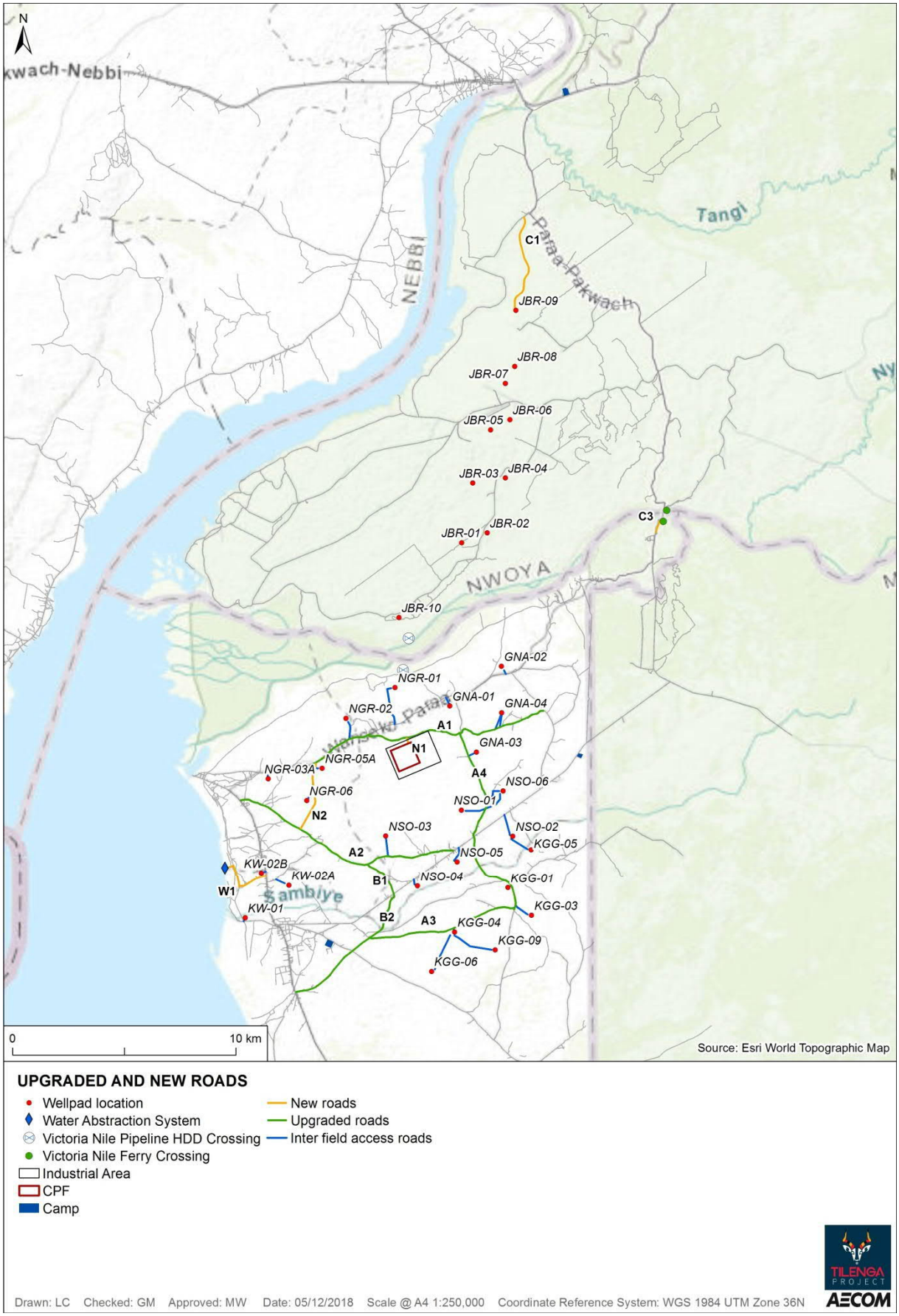


Figure 4-12: Upgraded and New Roads

4.3.7 Victoria Nile Ferry Crossing Facility

Located approximately 135 m east of the existing Paara ferry crossing, the proposed ferry will be dedicated to service Project activities on Victoria Nile during both the Construction and Pre-Commissioning Phase and the Commissioning and Operations Phase of the Project. The construction of a new ferry crossing will optimise logistics and reduce pressure on the existing ferry facility that is currently used by the community and tourists.

Infrastructure will include the ferry with payload of 50 tonnes, 1 m draft; vehicle parking, administration office and workshop; diesel storage facilities and general storage area. In addition, the installation of concrete structures will be required in order to provide safe berthing areas on the north and south banks of the Victoria Nile. The exact location and layout of the facilities will be optimised during detailed design.

The landing structures will comprise a double Roll-on / Roll-off (Ro-Ro) ramp placed not more than 60 m from the shoreline on the south side and 20 m on the northern side at a required minimum water depth of approximately -3.5m mean water level (MWL) for the ferry to berth. The Ro-Ro ramp and embankments which connect to the shoreline will consist of a mix of earthworks, rock fill, steel and piling works along with concrete casting for the ramp.

The ferry (example shown in Figure 4-13) will have capacity for either four 20 foot (ft) container trucks or two 40 ft container trucks. The proposed ferry is expected to be powered by two marine diesel engines. Crossing speed will be approximately 6 kilometres per hour (km/h) (3.2 knots) and will take approximately 4 minutes.

Figure 4-13: Example of Ferry Design

It is understood that Uganda National Roads Authority (UNRA) has plans to build a permanent bridge close to the current Paraa ferry crossing point. This is not a requirement of the Project Proponents. Should this be implemented within the timelines of this Project, the Project Proponents will reconsider the necessity of the new Victoria Nile Ferry Crossing Facility. However, for the purposes of the ESIA Report, the new ferry crossing facility has been assessed as the Base Case option.

4.3.8 Bugungu Airstrip

The existing Bugungu Airstrip, located in the MFNP, is operated by Uganda Wildlife Authority (UWA) and will be used to transport Project personnel by small aircrafts during daytime. Currently, a small hanger supports the airstrip. Upgrade works are necessary for the airstrip to cater for frequent flight trips and emergency response during the Construction and Pre-Commissioning Phase and the Commissioning and Operations Phase. The upgrade will also ensure that the airstrip meets CAA requirements, ICAO standards and international civil aviation rules.

The estimated number of Project flights will be about 4 flights per day (4 landings and 4 take-offs). As the airstrip will still be in use for tourist operations, further consideration is given for 1 flight for UWA and tourists per day (1 landing and 1 take-off).

The airstrip will be upgraded according to aerodrome class code 3B. Upgrade works include increasing the size of the airstrip from about 16Ha to 42Ha (blue perimeter in Figure 4-14). The area within the new fence line will therefore be fully cleared of trees. In addition, clearance will be required for trees above 10m within a wider area (29Ha) to comply with international safety requirements (pink perimeter in Figure 4-14).

The other facilities to be upgraded or added include the control centre, terminal building, hangar building, security fence, helipad, airfield lighting, fuelling facilities, firefighting services and access road. In addition, landside facilities such as power supply, water supply, sewer services, and perimeter drains will be introduced.

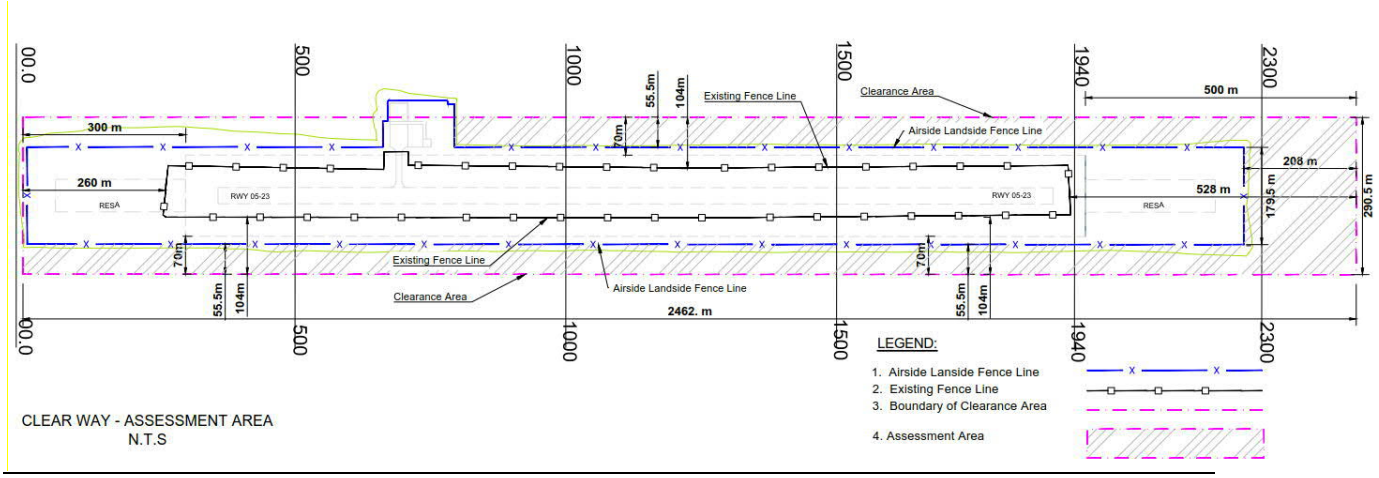


Figure 4-14: Overview of proposed airstrip upgrades

4.3.9 Tangi Support Base (Operations and Construction)

The Tangi Support Base, to be located at the site of the existing Tangi Camp, will comprise a number of permanent and temporary facilities as summarised below and illustrated in Figure 4-15. It will utilise the existing facilities and footprint (11 ha) and will be expanded by a further 11 ha to support the Project development.

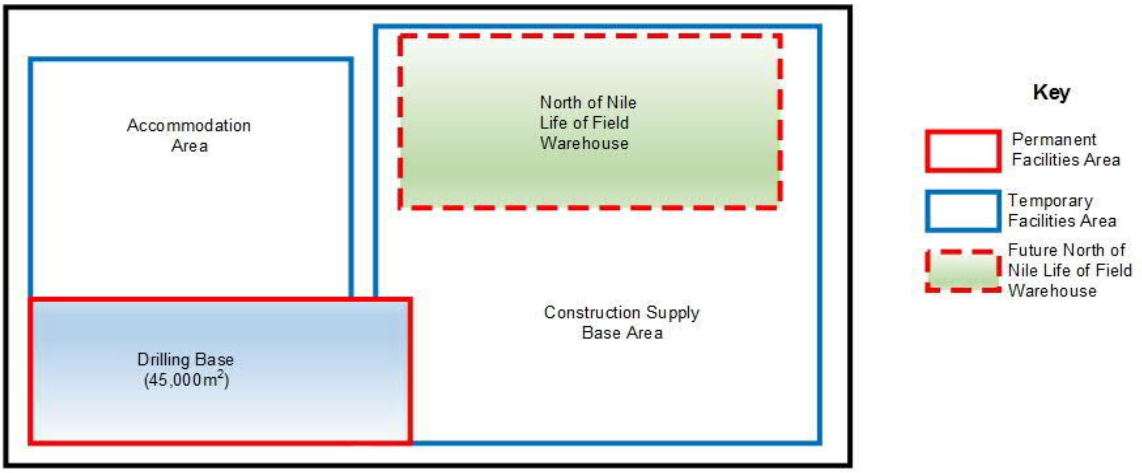


Figure 4-15: Indicative Schematic of Tangi Support Base

- Permanent Facilities (Operations Support Base) will include:
  - Operations Warehouse; and
  - Drilling Base including:
    - Offices;
    - Material warehouses and laydown areas;
    - Workshops; and
    - Accommodation camp for up to 175 workers during drilling and/or work over activities.
- Temporary Facilities (Construction Support Base) will include:
  - Construction Camp with capacity for 800 persons including catering services;
  - Temporary Waste Management Area;
  - Truck Parking Area;
  - Fuel Storage;
  - Refuelling Station;
  - Concrete Batching Plant;
  - Offices and medical facility;
  - Material warehouses and laydown areas; and
  - Construction workshops for fabrication, painting and maintenance.

4.3.10 Masindi Vehicle Check Point

Following approval from the relevant authority, it is planned to temporarily convert the disused Masindi Airstrip into a vehicle transit check point, prior to onward travel to the Project Area south of the Victoria Nile. There are no existing facilities at the Airstrip. The Masindi Vehicle Check Point will be located approximately 10 km from Masindi, 70 km from Hoima and 80 km from Buliisa as illustrated on Figure 4-1. The airstrip is positioned outside MFNP on R3 road heading to Buliisa and will be used as a stop-over and check point for vehicles.

Depending on Project requirements, the whole area of approximately 25 ha may be developed.

The Masindi Vehicle Check Point will be used throughout the Construction and Pre-Commissioning Phase of the Project following which it will be handed back to the Government of Uganda (GoU).

The Masindi Vehicle Check Point will be 2 km length by 200m wide constructed on an existing grass airstrip providing accommodation for up to 400 trucks and will enable:

- Security checks during the Construction and Pre-Commissioning Phase on vehicles, drivers and passengers to be undertaken ahead of the travelling on the R3 road entering the MFNP;
- Regulation of traffic entering and exiting MFNP and Project sites;
- Recording data for traffic management system set up and improvement, vehicle tracking and cargo;
- A point for safety briefing for all personnel to be conducted;
- Truck drivers / passengers to take breaks and use the facilities (canteen, toilet, shower, accommodation – for up to 350 people);
- Vehicle conditions to be checked; and
- Refuelling.

An indicative layout of the vehicle checkpoint is shown in Figure 4-16.

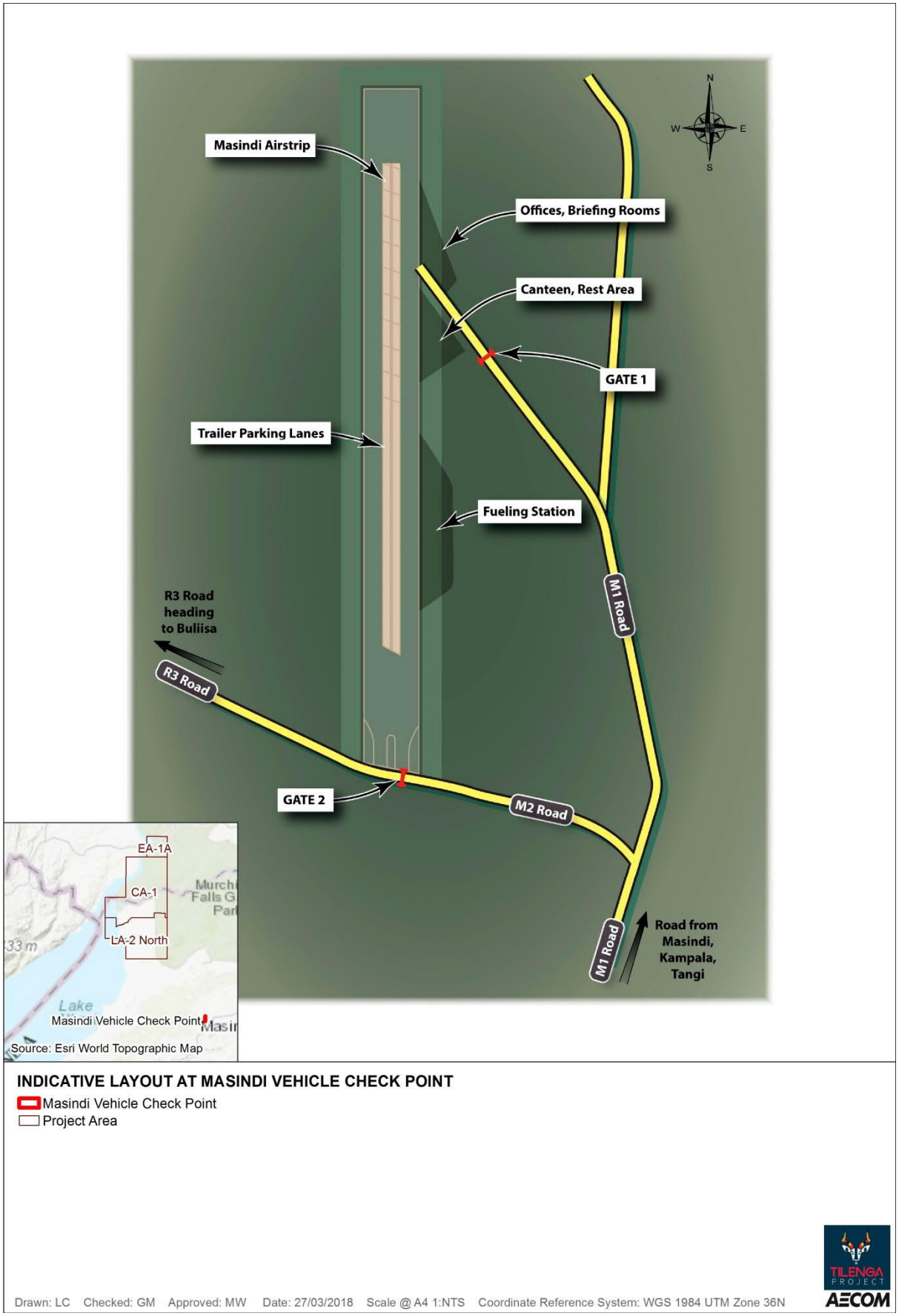


Figure 4-16: Indicative Layout at Masindi Check Point

4.4 Potential Future Field Development

The Project Proponents may further develop the existing as well as new fields within CA-1, EA-1A and LA-2 North in order to sustain the production plateau. The development would be initiated several years after the initial project. The following new fields are considered for further development: Lyec, Jobi-East, Mpyo, Ngege and Ngara (Figure 4-17).

Delayed start of these fields will allow to optimize the use of the Central Processing Facility (CPF) and common facilities capacity and to provide economy of scale. Experience gained with construction and operations of the Project would help adapting design and refining the future field development.

Details on the number of well pads and associated development is subject to further detailed studies and will be the subject of a future ESIA Report.

4.5 Associated Facilities

The Project will also involve other facilities that can be termed as Associated Facilities as defined by the International Finance Corporation (IFC) Performance Standards (PS) 'associated facilities' are: *facilities that are not funded as part of the project and that would not have been constructed or expanded if the project did not exist and without which the project would not be viable*.

The Associated Facilities are:

- **Tilenga Feeder Pipeline:** A 24-inch-diameter buried and insulated with trace heating system pipeline will transport export crude from the CPF, Buliisa District to the delivery point, in Kabaale Industrial Park, Hoima District. The length of the pipeline is approximately 95 km. The 30 m corridor for right-of-way of the feeder pipeline is being refined. The pigging station for the feeder pipeline will be located in CPF and is covered under current ESIA. A separate ESIA is being developed for the Tilenga Feeder Pipeline.
- **East Africa Crude Oil Export Pipeline (EACOP):** The produced oil not sent to the planned Kabaale Refinery would be routed for export via a connection to an export pipeline to the East African coast. This is expected to be approximately 1,445 km in length and with an export terminal on the Tanzanian coastline. A separate ESIA is being developed for this project.
- **Waste management storage and treatment facilities:** The Project Proponents are currently investigating the need for new or improved waste management facilities. The location of these facilities is not yet determined, but any development would be subject to separate ESIA(s).
- **132 Kilovolt (kV) transmission line from CPF to Kabaale:** The transmission line will provide power to the Project, Kabaale Industrial Park (KIP) and surrounding areas.
- **Critical Oil Roads:** these are road improvements that will be developed under the jurisdiction of UNRA for the purpose of supporting the oil industry. A total of 11 roads are being improved by UNRA, of which the following are associated with the Project:
    - Kisanja-Park junction (R3)
    - Wanseko-Kasenyi-Kirango-Bugungu Camp (L2)
    - Buliisa-Paraa (L1)
    - Masindi-Biiso (R2)
    - Hoima- Wanseko (through Biiso) (R1)

From the perspective of IFC definition of Associated Facilities; the Kingfisher field and Kaiso Tonya development are separate projects where Total Exploration & Production (E&P) Uganda B.V (TEP Uganda), Tullow Uganda Operations Pty Ltd (TUOP) and China National Offshore Oil Corporation (CNOOC) are working in partnership. These Projects are therefore not considered as associated facilities, but will be included within the Cumulative Impact Assessment (CIA).

Details on the Associated Facilities including their location in relation to the Project Area are presented in ***Chapter 21: Cumulative Impact Assessment***.

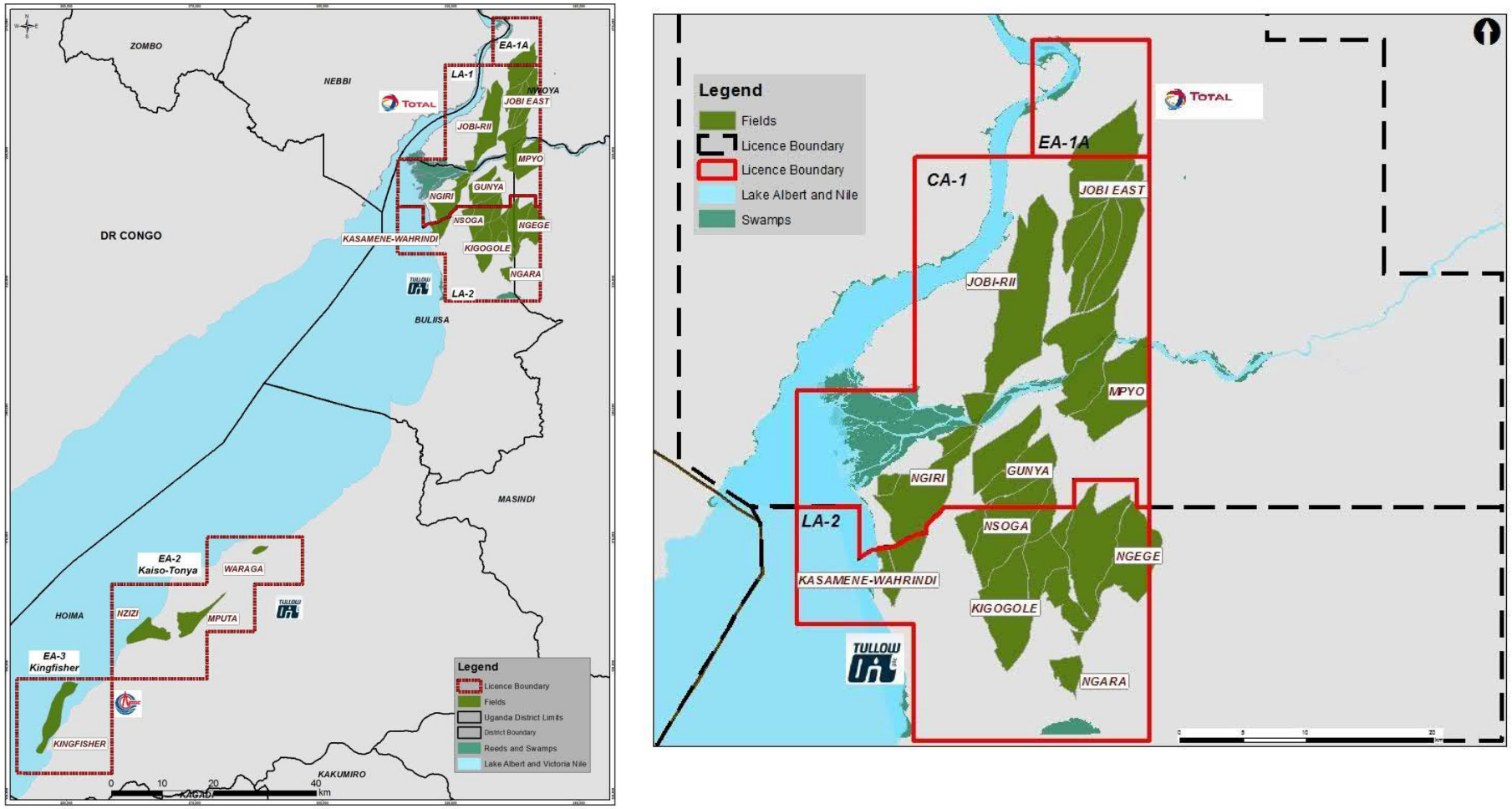


Figure 4-17: Fields Location Layout

4.6 Project Schedule

Key Project activities and milestones are shown in Figure 4-18, which shows there is an integrated approach between the different phases. In summary:

- Land acquisition and resettlement;
- Site Preparation and Enabling Works to prepare the land for construction or other activities. This will typically include bush clearing, fencing, levelling, drainage and other basic civil works;
- Drilling activities will commence some 18 months after Project sanction, and continue with three rigs for approximately four and a half years;
- The main Construction and Pre-commissioning Phase will commence once the enabling infrastructure is in place and the Industrial Area Construction Camp and Construction Support Bases at Industrial Area and Tangi Camp are established. Note that these two phases will run concurrently;
- As the Construction and Pre-commissioning Phase is completed, the facilities will be commissioned and handed over to Operations. No hydrocarbons will be introduced to facilities until plant is under operations control;
- The Commissioning and Operations Phase will start with first oil production and continue for approximately 25 years;
- Well work over and rig-less interventions will commence approximately at first oil and continue for whole field life; and
- Decommissioning is planned for the end of the 25 year operation.

The dates and timescales presented in may change, depending on local permit requirements and market conditions. Sections 4.8 to 4.11 detail the main activities that will be undertaken during each of the main Project phases.

In addition to the Project schedule the indicative schedule of the well pad development is shown in Figure 4-19. It should be noted, the sequencing presented in Figure 4-19 is preliminary and subject to change during detailed design, but has been taken into consideration during the preparation of Chapters 6 to 19 of this ESIA Report.

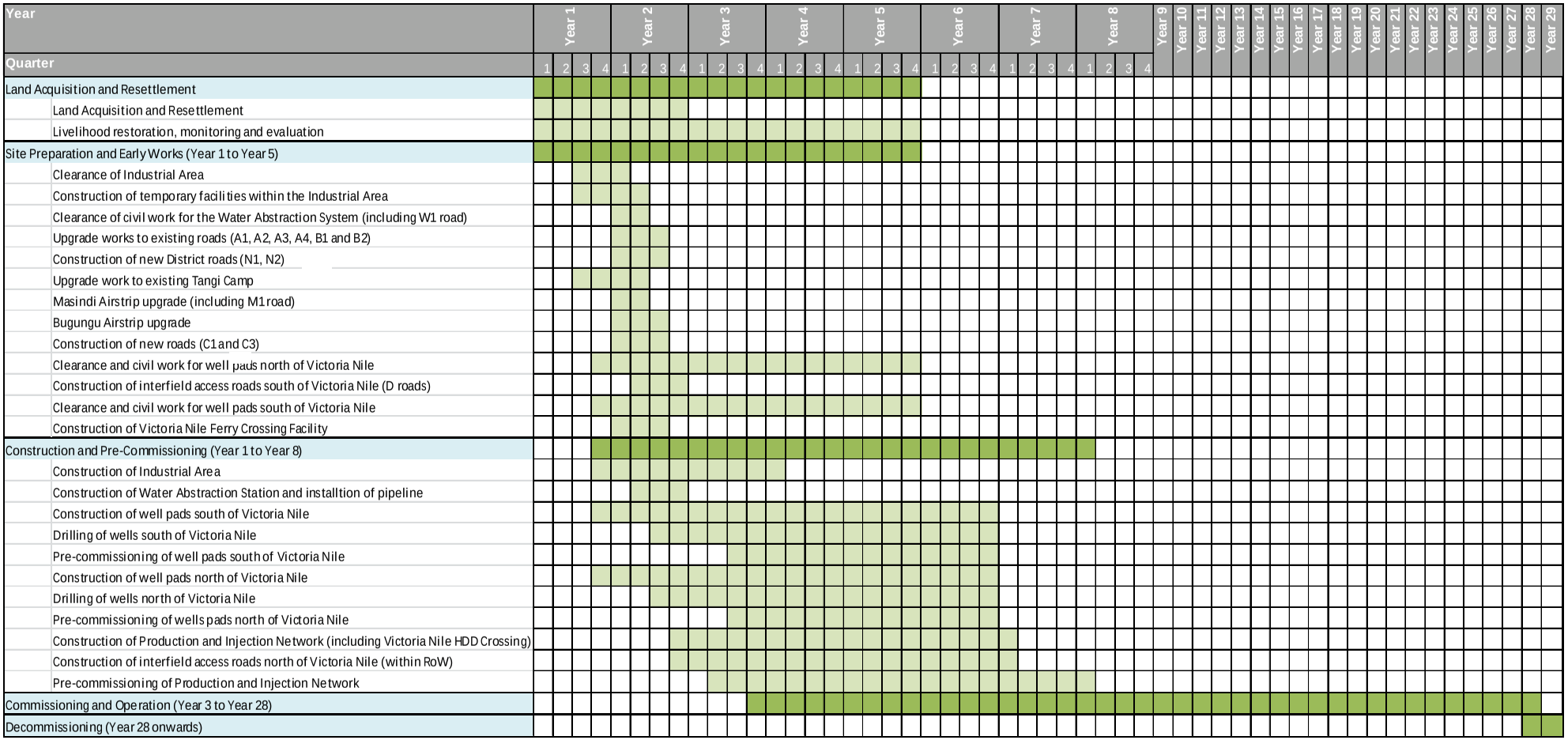


Figure 4-18: Indicative Overall Project Schedule

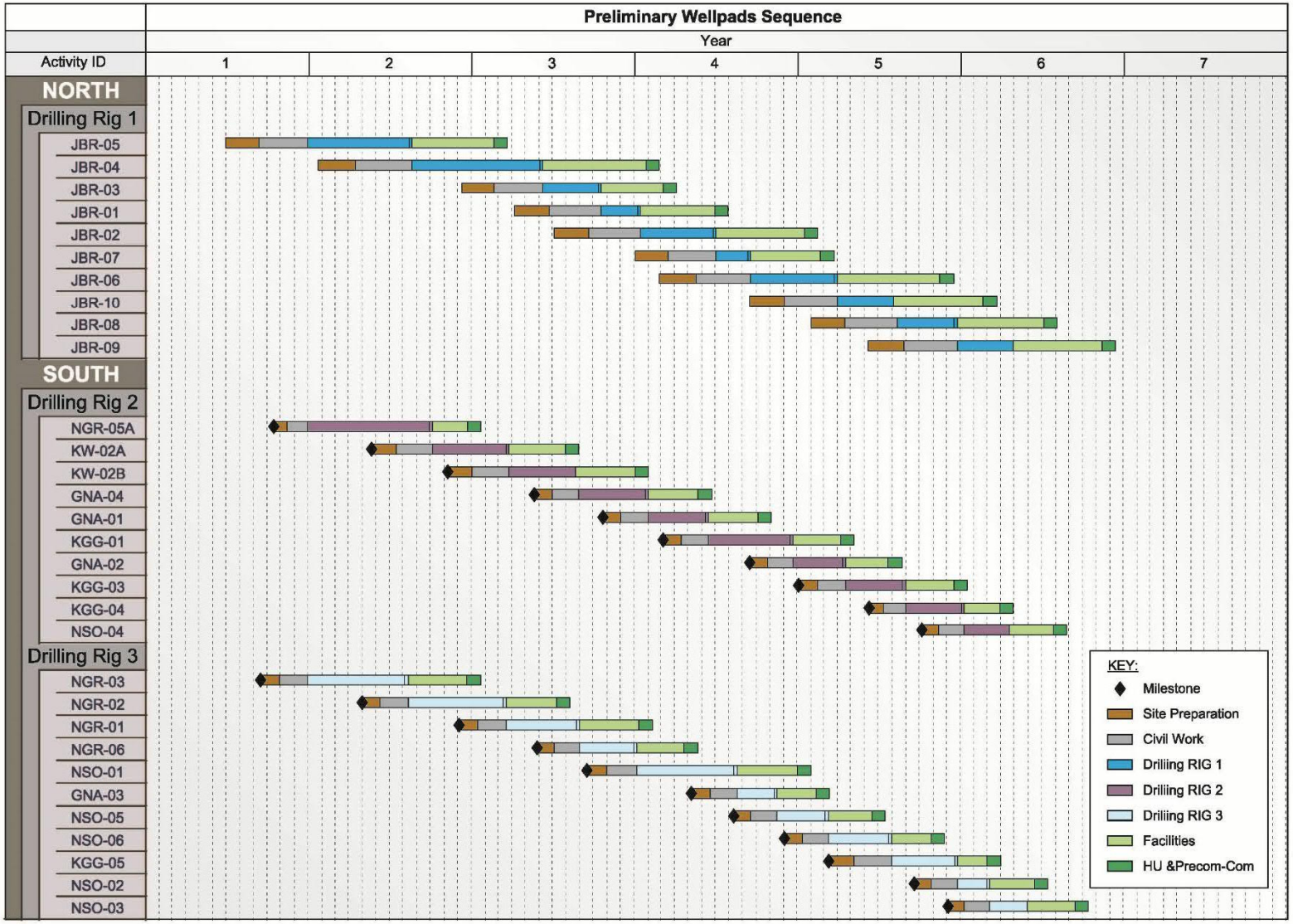


Figure 4-19: Preliminary Well Pad Sequencing Schedule

4.7 Land Acquisition and Resettlement

Land acquisition will be achieved through negotiations by the Project Proponents with landowners, with the guidance of the Chief Government Valuer. The Land Acquisition and Resettlement Framework (LARF) and the Resettlement Action Plan (RAP) will facilitate the process of transfer of ownership from the landowner to GoU.

Some Project components are located within GoU owned land including protected areas, national roads, etc. These areas are generally free from human habitation and land acquisition will be negotiated between the Project Proponents and the GoU as the registered owners of the land and potential lease holder of the land. Access to GoU land by the Proponents will be obtained through agreements and other documents as may be provided for by law with the Uganda Land Commission and other government agencies.

Table 4-12 presents a summary of the areas to be acquired; further details are presented in ***Chapter 16: Social***.

Table 4-12: Land Acquisition Required

Project Component	Location	Total Area (ha)
Industrial Area	South of Victoria Nile	307
Tangi Camp*	North of Victoria Nile	11
Well pads	North & South of Victoria Nile	228
Production and Injection Network RoW**	North & South of Victoria Nile	263
Victoria Nile Crossing using HDD Construction Area	North & South of Victoria Nile	20
Victoria Nile HDD Stringing Area	North of the Victoria Nile	8
Lake Water Abstraction System Onshore Facility (including W1)^, ^^	South of Victoria Nile	9.2
Victoria Nile Ferry Crossing Facilities	North & South of Victoria Nile	1.3
Masindi Vehicle Check Point (including M1 road)^^	Masindi	25
New roads (C1, C3)^^	North & South of Victoria Nile	15.8
District new roads (N1, N2)^^	South of Victoria Nile	17.8
Upgrade roads (A1, A2, A3, A4, B1, B2) ^^	South of Victoria Nile	189
Inter field access roads south of the Victoria Nile (D roads)^^	South of Victoria Nile	25
TOTAL		**1120.1**
With Contingency (5% to cater for unknowns)		1176.1

Notes:
* The existing footprint of the Tangi Support Base is about 11 ha. A further 11 ha will be acquired.
** A 30 m wide footprint along the length of the Production and Injection Network.
^ Footprint for Water Abstraction System is associated with the onshore facility option only.
^^ Roads N1, N2, A1, B1, B2 and sections of A2 and A3 will require a 50 m wide footprint along the lengths of the roads. A 30 m wide footprint will be required along the lengths of roads A4, W1, C1, C3, M1, sections of A2 and A3 and a 15 m wide footprint along the lengths of the D roads.

The Project will involve resettlement, and the exact location and number of structures will be identified during the preparation of the RAPs as summarised below. However, an estimation of the number of structures affected is provided in ***Chapter 16: Social***.

A LARF has been prepared by the Project Proponents in collaboration with representatives from Ministry of Energy and Mineral Development (MEMD), Ministry of Land Housing and Urban Development (MLHUD), Ministry of Local Government (MLOG) and the National Environment Management Authority (NEMA). 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. The LARF sets out the following key principles and is aimed at standardising the way in which land acquisition and resettlement planning is conducted across the Albertine Graben Basin, and to assure a consistent approach in line with the IFC PS (particularly PS 5 on Involuntary Resettlement and Land Acquisition):

- Resettlement will be avoided and minimised as much as possible;

- Resettlement will be integrated into overall Project planning;
- Compliance with laws, standards and policies;
- Active and informed stakeholder participation;
- Cultural appropriateness will be applied;
- A publicly disclosed cut-off date to be used;
- Compensation will be based on full replacement value;
- Comprehensive resettlement assistance package will be applied;
- Informal land rights to be recognised;
- Vulnerable People will be provided with targeted assistance;
- A grievance mechanism will be established; and
- Appropriate monitoring and evaluation will be undertaken.

In total it is estimated that there will be six RAPs prepared in compliance with the LARF as summarised in Table 4-13.

Table 4-13: Summary of RAPs South of the Victoria Nile

RAP	Description	Approximate Area Covered (ha)
RAP 1	Industrial Area and N1 road	320 (including orphan land^)
RAP 2	West NGR and KW well pads, new access roads, and RoW for the Production and Injection Network RoW and the Water Abstraction pipeline	150 (excluding orphan land^)
RAP 3a	North NGR, GYA well pads, new access roads and Production and Injection Network RoW	180 (excluding orphan land^)
RAP 3b	NSO and KGG well pads, new access roads and Production and Injection Network RoW	245 (excluding orphan land^)
RAP 4	Tilenga Feeder Pipeline*	475 (excluding orphan land^)
RAP 5	Buliisa road upgrades RoW	280 (excluding orphan land^)
Notes: *Outside scope of this ESIA and covered in the Tilenga Feeder ESIA ^Orphan land is described as land not directly impacted by the Project, but where restriction may limit the usefulness / economic viability.		

RAP 1 was submitted in September 2017 and approved by GoU in January 2018, where the main affected village was identified as Kasenyi (Ngwedo sub-county). In total, RAP 1 identified 632 PAPs who will be displaced by the Project.

The planning phase for RAPs 2, 3a, 4 and 5 began in 2018 and will begin in 2019 for RAP 3b. Further information on the LARF and RAPs is presented in ***Chapter 5: Stakeholder Engagement***.

4.8 Site Preparation and Enabling Works Phase

4.8.1 Overview

The Site Preparation and Enabling Works Phase will comprise the following key activities:

- Site clearance and land preparation of the Industrial Area, well pads and Water Abstraction System onshore facility (Option 2) (including W1 access road) (vegetation stripping, earthworks, drainage and some fencing);
- Civil works for well pads and Water Abstraction System (concrete, drainage, fencing/bund walls etc.);

- Upgrade works to roads and the construction of new roads:
  - Upgrade roads:
    - A1, A2, A3, A4, B1 and B2; and
    - W1 access road to Water Abstraction System.
  - New roads:
    - C1, C3, N1 and N2;
    - Inter field access roads south of the Victoria Nile (D roads); and
    - Inter field access roads north of the Victoria Nile (within the existing 30 m permanent pipeline RoW).
- Construction of the Victoria Nile Ferry Crossing Facility land structures and associated building to support ferry operation;
- Masindi Vehicle Check Point (including upgrade to M1 road); and
- Bugungu Airstrip upgrade[7].

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.

The durations of key activities of the Site Preparation and Enabling Works Phase are summarised in Figure 4-18 and are expected to last approximately five years.

The Site Preparation and Enabling Works phase will also include drilling of water boreholes in support of the Construction and Pre-Commissioning Phase water needs.

During the Site Preparation and Enabling Works Phase, the embedded mitigation measures presented in will be adopted to all components as standard practice for each Contractor.

Table 4-14: Embedded Mitigation of the Project Components during the Site Preparation and Enabling Works Phase

Aspect	Description
Storage of Hazardous Materials	As detailed in Table 4-3.
Refuelling	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). Mobile refuelling units will be positioned at the road works sites, Masindi Vehicle Check Point, Bugungu Airstrip, well pads and the Water Abstraction System site, as required. All fuel re-filling facilities will be located within bunded areas with appropriate capacity. 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.
Drainage	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 utilising the principles as outlined in Chapter 23: Environmental and Social Management Plan.

[7] The Bugungu Airstrip, operated by UWA, is currently used by tourists and will continue to be used by both tourists and the Project during the Construction and Pre-commissioning and Commissioning and Operations Phases.

Aspect	Description
Lighting	As per base case there will be no routine nightshift activities associated with the Site Preparation and Enabling Works Phase. Lighting will be reduced to the minimum and its design consider need to limit associated nuisances (e.g. light directed inwards, of warm/neutral colour) without impacting safety and security
Waste Management	To be managed in line with detail presented in Section 4.14.
Sewage	To be managed in line with detail presented in Section 4.13.
Power	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.

In addition to the measures presented in Table 14-14, Table 4-15 summarises additional key measures to be adopted by the Contractors involved in the Site Preparation and Enabling works Phase.

Table 4-15: Embedded Mitigation to be adopted by the Contractor(s) during the Site Preparation and Enabling Works Phase

Key Measures to be Adopted by the Contractor During the Site Preparation and Enabling Works Phase
During site clearance, vegetation stripping will be undertaken using a phased approach to minimise sediment pollution from runoff.
Buffer zones will be established to protect watercourses and habitats.
Barriers and fences will be used to isolate work areas.
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.
Clean surface water will be diverted away from exposed soils with use of diversion drains and bunds.
All dewatering from excavations or isolated work areas will be provided with appropriate level of treatment prior to discharge.
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. 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. Activities likely to generate dust (e.g. drilling powders use and transfer) will be enclosed and dust catchers in place when practicable. Trucks carrying potentially dusty material will be covered, to reduce fugitive dust emissions from the materials being transported. Roads used by Project vehicles will maintained, to the extent that this is possible, to reduce fugitive dust emissions associated with surface dust being disturbed by the passing of traffic. Concrete batching materials to be stored in sealed silos with the batching area regularly watered down to supress dust emissions.

Site clearance and land preparation at the Industrial Area, well pads and the onshore facilities at the Water Abstraction System (including W1 access road) will comprise the following key stages:

- Clearing (including demolition), tree/bush felling and uprooting, stripping of topsoil and sub soil;
- Excavation of drainage channels;
- Site pre-levelling;
- Compaction;

- Final levelling; and
- Fencing.

Tree felling will be undertaken to ensure buildings, neighbouring trees, plantations, crops and constructions are not damaged. 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.

The top soils will be removed to a required depth; material will be temporarily stored areas within designated areas. It is planned to reuse removed soil onsite or for borrow pit restoration. Through detailed design, the Project will ensure the generation of excess material is minimised.

As stated above, residential structures will be demolished as part of the Site Preparation and Enabling Work Phase. The majority are residential homes comprising two rooms, each covering 2.5 m x 2.5 m with a height of about 3 m built using mud and wattle and most are thatched. Alternatives to be considered for handling this volume of demolition waste generated include but might not limited to:

- Incorporate the wall rubble into landscaping;
- Reuse/recycle by the owners in various ways;
- Thatching, undamaged doors, windows and wooden poles salvaged for (re)building houses in the local communities;
- Recyclable roofing sheets sold to scrap dealers; and
- Landfill disposal.

4.8.2 Civil Works for Well Pads and Water Abstraction System

Following site clearance, civil works will be undertaken at the well pads and Water Abstraction System onshore facility (Option 2) as part of the Site Preparation and Enabling Works Phase. Works will include the following:

- Water Abstraction System onshore facilities:
  - Construction of drainage; and
  - Installation of fencing around onshore facility boundary.
- Well pads:
  - Laying concrete foundation slab for drilling rig;
  - Construction of well cellars;
  - Construction of structure to prevent wildlife ingress around well pads located north of the Victoria Nile (within the MFNP);
  - Installation of conductor pipeline;
  - Construction of internal drilling access road; and
  - Construction of drainage.

4.8.3 Upgrade Works to Roads and the Construction of New Roads

As presented in Section 4.3.6, the Project will require both new roads to be constructed and upgrades to existing roads and tracks including the construction of drainage.

The inter field access roads routes south of the Victoria Nile (D roads) will comprise both existing tracks to be upgraded with small tie in to existing roads and the development of new roads. Inter field access roads south of the Victoria Nile will be approximately 6.4 m wide to allow 2-way traffic and surfaced with murram. The proposed layout of the D roads is presented in Figure 4-12.

Inter field access roads north of the Victoria Nile will be located within the pipeline RoW with the exception of road C1 linking JBR-09 to Pakuba Lodge Junction as shown in Figure 4-12. Respectively, works are expected to involve the following activities:

- Bush clearing;
- Topsoil removal;
- Compaction;
- Fill with gravel material;
- Excavation for side drains; and
- Installation of cross drainage culverts.

Roads will be upgraded to accommodate maximum cargo sizes of 5 m wide x 4.5 m high x 25 m and 120 tonnes (t). Road construction (both upgraded roads and new roads) will be covered by 20 works areas, which will operate concurrently.

For new roads, the site will be cleared and graded before the installation of drainage infrastructure followed by the surface material (gravel or asphalt). Road furniture (i.e. road markings and traffic signals) will be installed once construction is complete. For the upgraded roads, it will be necessary to cordon off the road (while retaining pedestrian access) before widening the road.

Table 4-20 presents the expected construction vehicles, plant and equipment to be used and Table 4-16 summarises the volumes of both excavated material and required materials.

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.

4.8.4 Victoria Nile Ferry Crossing

As stated in Section 4.3.7, the Victoria Nile Ferry Crossing Facilities will comprise a number of onshore facilities and landing approaches extending from both the north and south banks of the Victoria Nile. The works will include:

- Vegetation clearing (tree/bush felling and uprooting, stripping of topsoil and sub soil);
- Earthworks (pre-levelling, compaction, final levelling);
- Erection of temporary facilities for construction (welfare, workshops, laydown & storage areas);
- Installation of structures and foundations (dependent on the jetty design); and
- Installation of permanent facilities (landing approaches, offices, workshops, parking areas, diesel storage facilities, general storage area and utilities).

The landing approaches for ferry crossing are currently under design; however a deck on piled structure is currently considered as the Base Case and was assessed in Chapters 6 to 19 of the ESIA Report.

4.8.5 Upgrade Work to the Masindi Airstrip

As stated in Section 4.3.10, the Masindi Airstrip will be adapted to provide a vehicle check point for traffic on route to the Industrial Area. The works will include:

- Upgrade to access road M1;
- Upgrade of existing Airstrip surface to gravel;
- Installation of utilities, drainage and fencing; and
- Installation of temporary buildings as described in Section 4.3.10.

Works will not involve the construction of buildings; instead containers will be positioned on site to provide the necessary facilities due to the temporary nature of the facility.

4.8.6 Upgrade Work to the Bugungu Airstrip

The existing Bugungu Airstrip, located in the MFNP, is operated by UWA, and is used to transport people by small aircrafts during daytime. The surface material is murram and it is approximately 1,550 m in length and less than 30 m wide. A small hanger supports the airstrip. Upgrade works are necessary to cater for frequent flight trips and emergency landing to cater for Project needs and meet ICAO standards. The works will include:

- Extend the runaway up to 1,540 m (with 260 m runway end safety area on each end) and widen to 30 m and surface with asphalt;
- Repair existing perimeter fencing;
- Upgrade existing hangar, office and toilets; Enlarge the entrance gate;
- Extend clearance zone by approximately 75 m from either sides the runway strip (obstacle removal inside and outside new fence line for maximum tree height of 10 m);
- Construction of a control room, new terminal building with an approximate footprint of 20m length and 30m wide;
- Airfield lighting; and
- Landside facilities such as power supply, water supply, sewer services, perimeter drains and upgrade of an existing road.

Fuelling and firefighting services will be mobile.

During the construction phase of Bugungu Airstrip, all UWA tourist traffic and general air traffic will be diverted to Pakuba Airstrip or any other airstrip within the vicinity of Bugungu Airstrip. UWA shall make the necessary communications to all the airstrip frequent users and the general public.

4.8.7 Boreholes Drilling

It is proposed that additional boreholes will be required to service the water needs of the Project during the Construction and Pre-commissioning Phase. The additional 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. 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 transferred to a licensed waste disposal facility for treatment and/or disposal.

Flow meters will be installed on all boreholes to measure flow, water level and quality.

4.8.8 Materials and Borrow Pits

Table 4-16 summarises the excavation material for each key facility and materials required as part Site Preparation and Enabling Works Phase. It should be noted that at the time the ESIA Report was prepared the volumes of material for the inter field access roads located north of the Victoria Nile (located within the Production and Injection Network) were under development and have not been included in Table 4-16.

Table 4-16: Indicative Volumes of Excavated Materials and Required Material during Site Preparation and Enabling Works Phase

Facility	Volume (m^3)								
	Topsoil	Cut	Fill	Unused Material^	Asphalt	Crushed Stone	Cement/Lime for Soil stabilisation	Concrete	Murram
	Material to Remain on Site				Introduced to Site				
Industrial Area	611,000	3,008,697	3,611,232		-	-			-
Water Abstraction System	630			3,150	-	-			3,780
Well pads	119,000	833,000	624,750	208,250			6,272	56,000	208,250
Upgraded Roads (A1, A2, A3, A4, B1 and B2)	85,605	239,908	135,199	104,709	25,480	221,688			
New Roads (N1, N2)	12,659	39,119	2,110	37,009	2,715	23,634			
New Roads (C1, C3)	32,175	64,350	64,350	64,350		32,175		3,824	64,350
Inter field Access Roads (south of Victoria Nile) (D roads)									38,800
Masindi Vehicle Check Point Road (M1)									6,098
Water Abstraction System Access Road (W1)									15,921
Masindi Vehicle Check Point	12,000	40,000	40,000			12,000			
Bugungu Airstrip	10,800	54,000	43,200	10,800	4,320	32,400			10,800
Victoria Nile Ferry Crossing facilities								3,200	120

Notes:
^ It is planned to reuse removed soil onsite or for borrow pits restoration. Through detailed design, the Project will ensure the generation of excess material is minimised

Murram will be sourced from up to 13 existing borrow pits south of the Victoria Nile and 7 borrow pits north of the Victoria Nile as summarised in Table 4-17 and shown in Figure 4-20. Within the MFNP only material sourced within the Park can be used and as such, Table 4-17 denotes the location of the borrow pits north and south of the Victoria Nile.

Borrow pits and quarries will be accessed via existing tracks and no upgrades to these tracks are planned as part of the Project. Should additional borrow pits and/or access roads be required the additional facilities will be reviewed as part of the Management of Change process (refer to Section 4.15).

Table 4-17: Murram Borrow Pits

Location	Estimated Borrow Area (m^3)	Eastings	Northings	Estimated Material Quantity (m^3)
South of the Victoria Nile				
UWA Begeri Park Borrow Pit	74,500	33.9732	2.44118	111,750
Ajigo Borrow Pit 1	32,250	33.538	2.40559	70,500
Uduku Borrow Pit 1	25,170	33.4276	2.41366	50,300
Kisomere Borrow Pit 4	6,300	33.1436	2.4474	12,600
UWA Park Borrow Pit (Alternative)	5,200	31.56385	2.2234	10,400
Kilyango Borrow Pit	4,450	33.2506	2.45121	8,900
Kisomere Borrow Pit 1	5,500	33.0996	2.44738	8,250
Avogera Borrow Pit	3,600	33.4903	2.44066	7,200
Kisomere Borrow Pit 3	5,350	33.1234	2.44849	10,700
Kisomere Borrow Pit 2	3,400	33.1094	2.44773	5,100
Kisomere Community Borrow Pit	2,650	33.1122	2.44722	3,975
Kisomere Borrow Pit 6	4,900	33.2034	2.44238	9,800
Kisomere Borrow Pit 5	1,500	33.1288	2.44384	5,100
Total for South of the Victoria Nile				**314,575**
North of the Victoria Nile				
GWOT Afowoyo Borrow Pit 2	118,755	33.9393	2.7205	179,625
Til 1 Borrow Pit	34,800	35.3542	2.62809	52,500
GWOT Afowoyo Borrow Pit 1	13,700	33.9506	2.73457	20,550
UWA Park Borrow Pit 3 and 4	15,755	33.4875	2.38587	23,636
Pakuba Airstrip Borrow Pit 2	12,820	33.1605	2.65442	32,050
Jobi 6 - 3 Borrow Pit	12,570	33.3018	0.253432	22,000
Buligi Track Borrow Pit	6,900	33.4562	2.54955	12,075
Total for North of the Victoria Nile				**342,436**

It is recognised that while the majority of murram will be sourced from the borrow pits identified in Table 4-17, additional borrow pits may need to be identified by the Project Proponents prior to commencing Site Preparation and Enabling Works Phase. All murram used for the Project will be sourced through third party licensed borrow pits or through borrow pits operated by the Project Proponents. In cases where borrow pits will be operated by the Project Proponents necessary licencing status will be obtained.

Material may also be obtained from the following identified quarry sites as shown in Figure 4-20:

- Kakiri Stone Quarry;
- Kiboga; and
- Busunju.

While a number of materials sourcing sites have been identified as summarised above, a detailed audit of the sites and available material had not been completed at the time this ESIA Report was prepared, including potential land take requirements. As such, once final details of the location of quarries has been determined, the sites and access routes will be reviewed as part of the Management of Change process (Section 4.15).

Regular audits of the borrow pits and quarries will be conducted at the aforementioned sources to ensure compliance with Ugandan law.

Material sourcing will involve the following activities:

- Bush clearing (if required);
- Stripping and stockpiling of soil for future use during restoration;
- Site drainage works;
- Excavation; and
- Transportation of material to Project sites.

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. It is recognised that some borrow pits and quarries can be used by third parties for other projects, The Project Proponents will not be responsible for restoration of those areas used by others. Wherever possible, excess material not reused within the Project Area will be transferred to borrow pits for restoration purposes.

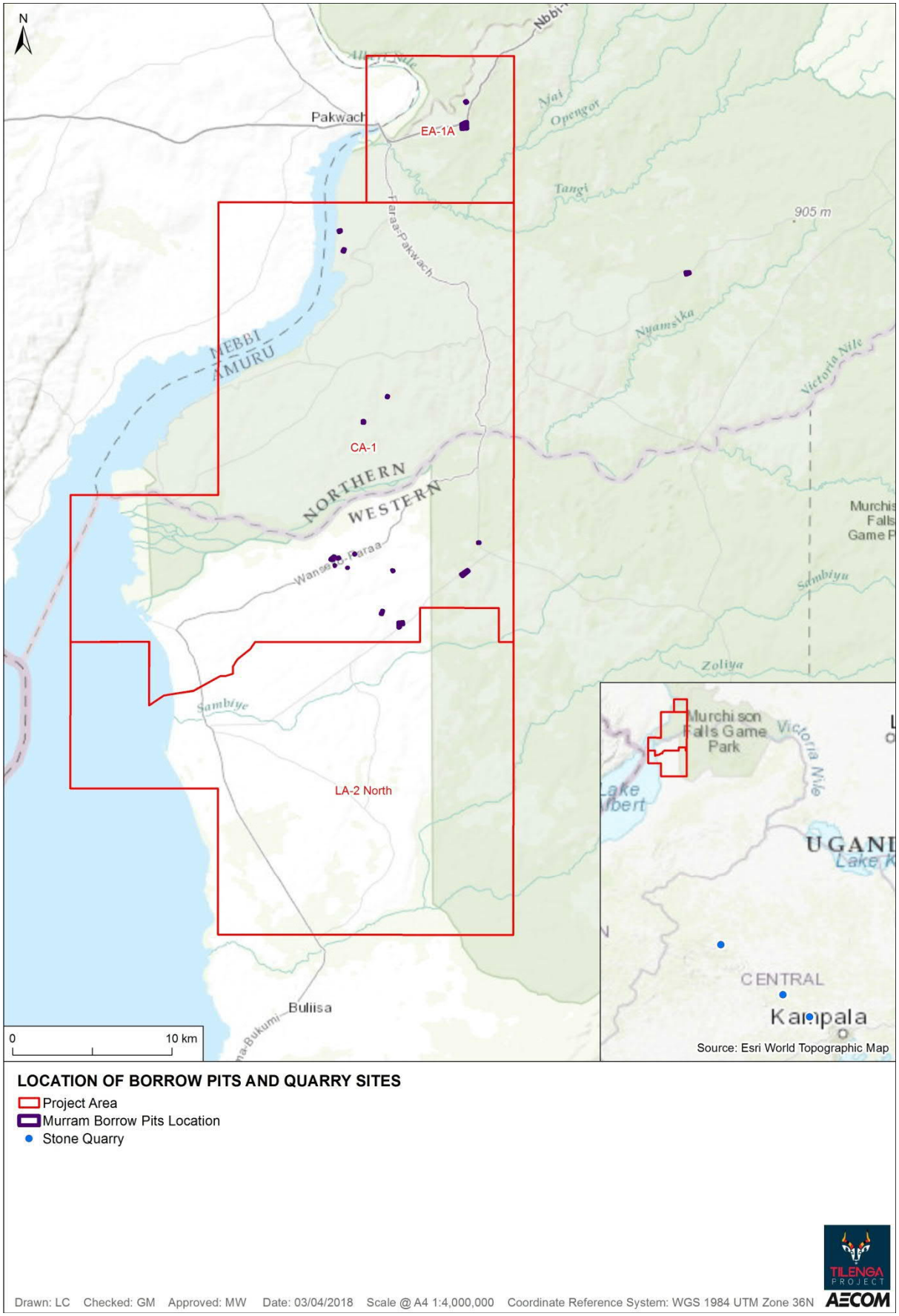


Figure 4-20: Location of Borrow Pits and Quarry Sites

4.8.9 Work Force

4.8.9.1 Work Force Required

As summarised in Table 4-18, the Site Preparation and Enabling Works Phase will require a maximum work force of up to 2,000 people. Working hours will be based on the normal work day in line with Ugandan law. As per base case there will be no routine nightshift activities associated with the Site Preparation and Enabling Works Phase.

Table 4-18: Work Force Indicative Requirements

	Workers Per Work Area	Total Number of Works
Industrial Area (4 Work Areas)		
Supervisory	4	16
Equipment Operators	19	76
Labour (local)	57	228
	80	**320**
Water Abstraction System (1 Work Area)		
Supervisory	2	2
Equipment Operators	9	9
Labour (local)	27	27
	38	**38**
Well Pads (7 Work Areas)		
Supervisory	2	14
Equipment Operators	10	70
Labour (local)	30	210
	42	**294**
Roads (8 Work Areas)		
Supervisory	3	60
Equipment Operators	14	280
Labour (local)	42	840
	59	**1180**
Victoria Nile Landing Structure and associated buildings (1 Work Area)		
Supervisory	2	2
Equipment Operators	11	11
Labour (local)	33	33
	46	**46**
Masindi Check Point (1 Work Area)		
Supervisory	2	2
Equipment Operators	9	9
Labour (local)	27	27
	38	**38**
Bugungu Airstrip (1 Work Area)		
Supervisory	2	2

	Workers Per Work Area	Total Number of Works
Equipment Operators	11	11
Labour (local)	33	33
	46	**46**

4.8.9.2 Work Force Accommodation

It is expected the majority of the casual workforce will come from nearby villages and towns with higher workers (supervisors and operators) travelling from outside the area. Buses will be provided to transport workers living in nearby villages.

Section 4.3.1 and Table 4-4 summarise the existing construction camps (Tangi - north of the Victoria Nile and Bugungu and Buliisa - south of the Victoria Nile) which may be used to accommodate workers as part of the Site Preparation and Enabling Works Phase.

4.8.10 Water Demand

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.

During the Site Preparation and Enabling Works Phase, water will be supplied from both existing boreholes and new boreholes for potable and general use (refer to Section 4.3.1 and Figure 4-4 for locations). 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. The objectives of the study are further described in ***Chapter 9: Hydrogeology***.

The proposed boreholes will be located as close as possible to the infrastructure to reduce the length of temporary piping where possible to a maximum of 500 m. The base case is for one borehole to be drilled for each well pad. Water abstracted for potable use will be tested and treated (if necessary) prior to storing in a water day tank.

A contingency measure is also under consideration as part of FEED, which involves the installation of a temporary water abstraction facility at Lake Albert. The purpose of this facility will be to service the water needs for the Site Preparation and Enabling Works; and the Construction and Pre-Commissioning phases using surface water. The temporary water abstraction facility would utilise the permanent water abstraction facility footprint (including the onshore pipeline RoW) to transport water to the Industrial Area by surface laid pipe.

Estimated volumes of water required for the Site Preparation and Early Works Phase are summarised in Table 4-19.

Table 4-19: Estimated Water Demand during the Site Preparation and Enabling Works Phase

Activity	TOTAL	Annual Water Demand (Cubic Metres)				
		Year 1	Year 2	Year 3	Year 4	Year 5
Earthworks at the Industrial Area	582,202	582,202				
Earthworks at the Water Abstraction System	0.54	0.54				
Construction of new and upgraded roads north of the Victoria Nile	34,852		17,027	17,826		
Construction of new and upgraded roads south of the Victoria Nile	56,822	11,364	39,776	5,682		
Civil works at well pads located south of the Victoria Nile	8,788	1,758	1,758	1,758	1,758	1,758
Earthworks at well pads located south of the Victoria Nile	101,960	20,392	20,392	20,392	20,392	20,392
Civil works at well pads located north of the Victoria Nile	3,495	699	699	699	699	699
Earthworks at well pads located north of the Victoria Nile	40,744	8,149	8,149	8,149	8,149	8,149
Earthworks at Masindi Airstrip and Bugungu Airstrip	16,078	11,496	4,582			
Construction of Victoria Nile Ferry Crossing Facilities	8,089		8,089			
TOTAL	**853,032**	**636,061**	**100,471**	**54,505**	**30,998**	**30,998**

Notes:
There is no discernible water demand for civils work associated with the Water Abstraction System

4.8.11 Vehicles, Equipment and Plant

Table 4-20 provides the estimated number of construction vehicles during the Site Preparation and Enabling Works Phase. All construction vehicles/equipment will be kept on site when not in use. For the preparation of the roads and depending on location, vehicles/equipment will either travel from site yard/storage to work site each work day or be stored on site when not in use (i.e. night time).

Table 4-20: Estimated Vehicle and Plant Use during Site Preparation and Enabling Works Phase (Including the Number of Work Areas per Component)

	Construction Vehicles Per Work Area	Total Number of Construction Vehicles	Movement per day / Return Trips per Work Area	Total Movement per day / Return Trips
Industrial Area (4 Work Areas)				
Excavator	2	8		
Forward Loader	2	8		
Dump truck	4	16		
Dozer	2	8		
Grader	1	4		
Water tanker	1	4	5	20
Roller compactor	2	8		
Light Duty Vehicles (LDV)	4	16	1	16
Labour Shuttle Bus	1	4	1	4
Roads (8 Work Areas)				
Forward Loader	1	20	1	20
Dump truck	3	60	6	360
Dozer	1	20	1	20
Grader	1	20	1	20
Water tanker	1	20	6	120
Roller compactor	1	20	1	20
Asphalt paver	1	5	1	5
Asphalt tip truck	2	5	4	20
LDVs	2	40	1	40
Labour Shuttle Bus	1	20	1	20
Well Pads (7 Work Areas)				
Forward Loader	1	7		
Dump truck	1	7		
Dozer	1	7		
Grader	1	7		
Water tanker	1	7	5	35
Concrete tip truck	2	14	3	42
Roller compactor	1	7		
LDVs	1	7	1	7
Labour Shuttle Bus	1	7	1	7
Victoria Nile Ferry Crossing Facilities (1 Work Area)				
Excavator	1	1		
Crawler crane	1	1		
Dump truck	2	2		

	Construction Vehicles Per Work Area	Total Number of Construction Vehicles	Movement per day / Return Trips per Work Area	Total Movement per day / Return Trips
Dozer	1	1		
Grader	1	1		
Water tanker	1	1		
Concrete tip truck	2	2	3	6
Roller compactor	1	1		
LDVs	1	1	1	1
Labour Shuttle Bus	1	1	1	1
Bugungu Airstrip (1 Work Area)				
Excavator	1	1		
Dump truck	2	2		
Dozer	1	1		
Grader	1	1		
Water tanker	1	1	5	5
Concrete tip truck	2	2	3	6
Roller compactor	1	1		
LDVs	1	1	1	1
Labour Shuttle Bus	1	1	1	1
Water Abstraction System (1 Work Area)				
Excavator	1	1		
Dump truck	2	2		
Dozer	1	1		
Grader	1	1		
Water tanker	1	1		
Roller compactor	1	1		
LDVs	1	1	1	1
Labour Shuttle Bus	1	1	1	1
Masindi Vehicle Check Point (1 Work Area)				
Excavator	1	1		
Dump truck	2	2		
Dozer	1	1		
Grader	1	1		
Water tanker	1	1	5	5
Roller compactor	1	1		
LDVs	1	1	1	1
Labour Shuttle Bus	1	1	1	1

4.8.12 Logistics and Procurement

Preference will be given to source equipment (such as plant and construction vehicles) and materials which meet the required Project specifications from Uganda wherever possible. However, where this is not possible construction vehicles, plant and equipment will be imported from overseas and will be delivered to Mombasa port for onward travel via road or rail to the Project Area. Figure 4-12 presents a detailed overview of the proposed road networks within the Project Area that will be established during the Site Preparation and Enabling Works Phase.

The Project Proponents will ensure a robust selection procedure for all supplies. Information on the following aspects will be required and reviewed by the Project Proponents prior to suppliers being permitted to tender for contracts:

- Technical: equipment, certifications, personal qualifications, work experience and facilities;
- General: legal status and financial information;
- Health: safety, security, social responsibilities and environmental management;
- National content; and
- Compliance: anti-corruption compliance program.

In line with the Petroleum (Exploration, Development and Production) (National Content) Regulations, 2016 certain goods and services are to be provided exclusively from registered entities, Ugandan companies and citizens (to the extent of the available capacity and ability).

4.9 Construction and Pre-Commissioning Phase

4.9.1 Overview

The Construction and Pre-Commissioning[8] Phase comprise the following key activities:

- Erection of temporary facilities at Industrial Area;
- Construction, installation and pre-commissioning of the plant and equipment within the Industrial Area;
- Drilling of 412 wells across 34 well pad locations;
- Construction, installation and pre-commissioning of the plant and equipment at the Lake Water Abstraction System, including associated pipelines (onshore and offshore);
- Construction, installation and pre-commissioning of plant and equipment at the well pads; and
- Construction, installation and pre-commissioning of the plant and equipment required for the pipeline network (Production and Injection Network and FOC).

During the Construction and Pre-Commissioning Phase, the embedded mitigation measures presented in Table 4-21 will be adopted to all components as standard practice for each Contractor.

Table 4-21: Embedded Mitigation Measures of the Project Components during the Construction and Pre-Commissioning Phase

Aspect	Description
Storage of Hazardous Materials	As detailed in Table 4-3.
Refuelling	As detailed in Table 4-14.
Drainage	As detailed in Table 4-14.
Lighting	Lighting will be essential for night-time working during the Construction and Pre-Commissioning Phase. As detailed in Table 4-3.
Waste Management	To be managed in line with detail presented in Section 4.14.
Sewage	To be managed in line with detail presented in Section 4.14.

[8] Pre-commissioning is defined as the process of undertaking integrity testing of equipment and the Production and Injection Network using water prior to the introduction of hydrocarbons.

Aspect	Description
Power	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 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.

In addition, the following embedded mitigation measures will also be adopted by the Contractor during the Construction and Pre-Commissioning Phase:

- With the exception of drilling and HDD construction activities there will be no permanent night time working in the MFNP;
- Options for treatment and disposal of hydrotest water will be assessed in detail during the next phase of engineering. The volume of hydrotest water to be disposed of shall be minimised by collection and reuse after each test. Emphasis will be on the use of chemicals that pose little or no risk to the environment. All options for reuse/disposal shall be in compliance with applicable regulations and be subject to detailed assessment and prior permission of the relevant authorities. For the purpose of the ESIA, it has been assumed that hydrotest water will be transferred to the CPF for treatment and used for reinjection at the well pads.
- Water will be sprayed onto the roads and work sites to supress dust generation, where necessary; and
- 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.

4.9.2 Industrial Area

The construction activities within the Industrial Area include erection of the temporary and permanent facilities as shown in Figure 4-7

The construction philosophy will be adapted taking into account the specific constraints posed by the surrounding environment. The preferred approach is to opt for modular components in order to minimise the disruption caused by on site construction activities. However, it is recognised that this approach is constrained due to the challenges faced by road transportation. The construction methodology will therefore be further developed during detailed design to take into account logistical constraints, the requirement to optimise national content, labour resources available and schedule constraints.

It is planned that the construction of the CPF will be undertaken in blocks with a key focus on delivery of the subsystems required for first oil. This will consist in (but not be limited to) ensuring that all major equipment within each modules are installed i.e. all heavy lifting has been completed before first oil and the facility is in the final stages of fit-out and completion mode.

An indicative sequence of construction activities for Industrial Area is provided as follows:

- Civil works: The civil personnel will be the first mobilised on site. Once the concrete batching plant is operational and civil construction equipment have been mobilised, civil activities will be developed in a way to complete in priority, piling activities, deepest foundations, underground services and areas where buildings are to be erected;
- Structural steel works: Focus will be given to the pipe racks erection, and then to the platforms and shelters. Pipe racks erection sequence is linked with area availability for equipment erection (lifting requirements are primary consideration);

- Equipment / Modules installation: Once foundations have been completed and surroundings accessible, equipment (and modules) will be erected in order to give piping erection workload. Lifting will be as far as possible grouped in order to reduce the mobilisation of heavy cranes;
- Piping installation: Piping erection will start with pipe racks and continue with inside units when equipment installation is completed; and
- Electrical and Instrumentation: Activities will start with the installation of main cable trays and ladders on pipe racks.

4.9.3 Construction Camps

To provide sufficient accommodation for the Project the existing Tangi Support Base will be expanded from 11 ha to 22 ha and the Industrial Area camp will be established as summarised in Table 4-22.

Table 4-22: Camp Accommodation during the Construction and Pre-Commissioning Phase

Camp	Existing Capacity	Maximum Capacity
Industrial Area Construction Camp	-	4,400
Industrial Area Drilling Camp	-	500
Buliisa	100	100
Bugungu	350	350
Tangi Camp	350	800

The entire Buliisa and Bugungu camps will be decommissioned following the completion of the Construction and Pre-Commissioning Phase. 17 ha of the Tangi Camp will also be decommissioned leaving a camp 5 ha in size for use after commissioning of the main facilities.

4.9.4 Lake Water Abstraction System

The Water Abstraction System will be installed to provide water for the Commissioning and Operations Phase of the Project, including for re-injection, potable and firewater uses. However, if required, water may be abstracted from Lake Albert for construction of the facilities. Water needs for the Construction and Pre-Commissioning phase are further defined in Section 4.9.10.

As described in Section 4.3.5, there will be a 1.5 km pipeline extending into Lake Albert which will tie into a facility (on or offshore) housing pumps and filtration systems. A 24-inch diameter buried pipeline will also be installed to transport the water from abstraction facility to the CPF, approximately 10 km in length. There are currently two design options under consideration as presented in Section 4.3.5 and a summary of the proposed construction technique is presented below:

- Option 1 (floating platform with lakebed intake structure) - The platform will be delivered to site in modular units and assembled onshore prior to towing it to the selected position in the lake using a barge. The platform will be secured in position from each corner by fixed anchors.
- Option 2 (onshore facility with midwater intake structure) - Civil work for the onshore facility will be undertaken as part of the Site Preparation and Enabling Works Phase. During the Construction and Pre-Commissioning Phase the facilities will be installed including mechanical and electrical equipment (pumps and hypochlorite injection package). The midwater intake structure will require the use of work barges for installation.

For both options, the intake pipeline, comprising high-density polyethylene (HDPE) material, will be outfitted with concrete collars to serve as ballast prior to being pulled into the lake. Following stringing, a work barge will be used to pull the pipeline out into the lake. The electrical and instrumental cabling will be subsea grade and will be bundled with the water abstraction pipeline for installation.

The onshore section of the pipeline for both options will be included within the Production and Injection Network installation scope and will follow the open trench method as described in Section 4.9.6.

4.9.5 Drilling of Wells

The wells will be constructed using three drilling rigs simultaneously. One drilling rig will be positioned north of the Victoria Nile in the MFNP to drill the JBR field wells. The other two rigs will be positioned south of the Victoria Nile to drill the remaining wells:

- Rig 1: JBR wells;
- Rig 2: NGR, GNA, NSO and then KN wells; and
- Rig 3: KW, NSO and KN wells.

An example of a typical drilling rig is presented in Figure 4-21. The rig and associated equipment will be transported to the site by low bed and flatbed trailers.

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. Further details regarding unplanned releases during the drilling activities are described in ***Chapter 20: Unplanned Events.***

Figure 4-21: Typical Drilling Rig

The total duration of the drilling phase is expected to be approximately 4.5 years, and thereafter the rigs will be demobilised and drilling activities will cease. It will be necessary to undertake well intervention during the lifetime of the Project, as further described below under the Commissioning and Operations Phase.

4.9.5.1 Well Pad Accommodation

Figure 4-5 presents the typical layout of a well pad during the Construction and Pre-Commissioning Phase. Each well pad will include a temporary mini workers camp with capacity to accommodate up to 10 personnel. Water will be provided from a borehole and transferred via pipeline to the mini camp.

4.9.5.2 Well Design

An overview of the production well design is presented in Table 4-23. Each well will take approximately 11 days to drill and will be drilled on a 24 hour / 7 day basis. The lower section of the well (reservoir wellbore interface) will be equipped with Wire Wrapped Screens (WWS) in front of open hole. The maximum well length will be 2,300 m.

The oil producer and water injection wells will have horizontal or deviated sections in the reservoir, such that the total length measured along hole of each well will be in the average range of 1,500 m. In addition, the oil producer wells will be equipped with electrically driven downhole pumps, known as ESPs, to pump the oil to the surface. To maintain the functionality of oil producer wells it will be necessary to periodically replace the ESPs. The base case for the water injection wells is that they will be drilled with simplified Christmas tree[9] and hanger design without tubing. The observation wells will be vertically drilled directly downwards beneath the well pad.

The Project trajectories can be categorised into the following:

- JBR wells will be horizontal, 3D and up to 1,000 m drain length;
- NGR and KW wells will be highly slanted (60-80°), 2D with up to 250 m drain length;
- GNA and KN wells will be highly slanted to horizontal (70-90°), 2D with up to 700 m drain length; and
- Observation wells will be vertical.

Table 4-23: Proposed Well Design

Drilling Phase	Casing String	Section TD (m)					Average Section Length (m)				
		JBR	GN	NGR	KN	KW	JBR	GN	NGR	KN	KW
18 ⅝" CP (civil works)	18 ⅝" CP	36	36	36	36	36	36	36	36	36	36
14 ¾"	10 ¾" casing	Max 205 Min 106 avg 164	Max 196 Min 130 avg 147	Max 180 Min 130 avg 164	Max 150 Min 130 avg 148	Max 194 Min 150 avg 172	128	111	128	112	136
9 ⅞"	7 ⅝" casing	Max 1955 Min 479 avg 957	Max 1295 Min 683 avg 896	Max 1790 Min 788 avg 1226	Max 1599 Min 526 avg 1035	Max 1815 Min 865 avg 1279	794	748	1062	887	1106
6 ¾"	4 ½ WWS	Max 2152 Min 495 avg 1447	Max 1993 Min 1013 avg 1530	Max 2047 Min 849 avg 1415	Max 2100 Min 604 avg 1398	Max 2294 Min 896 avg 1538	490	634	190	363	260

Notes:
TD – Target depth

Figure 4-22 and Figure 4-23 present the well design for the completed oil production and water injection wells. A down-hole safety valve (DHSV) will be fitted on all production wells crossing major fault lines. The base case for water injection wells will be without tubing, which means that water will be injected directly into the reservoir via the casing. A secondary case for the water injection well is also presented in and will be adopted in the event that a more conventional approach (i.e. using tubing) is required due to technical requirements.

[9] The Christmas tree is an assembly of valves, spools and fittings that will control the flow of produced fluids from the well and water injection to the wells.

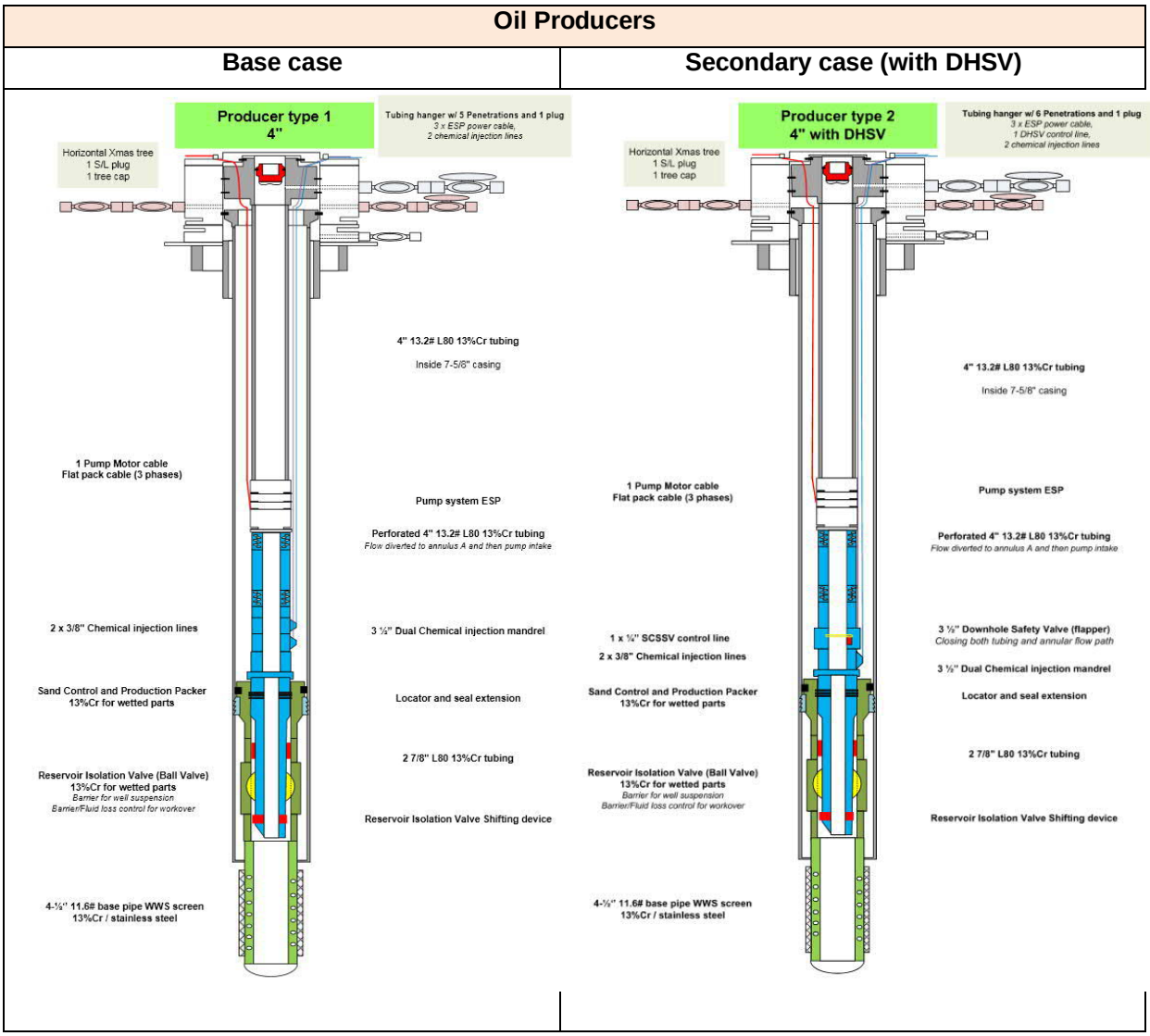


Figure 4-22: Oil Production Wells

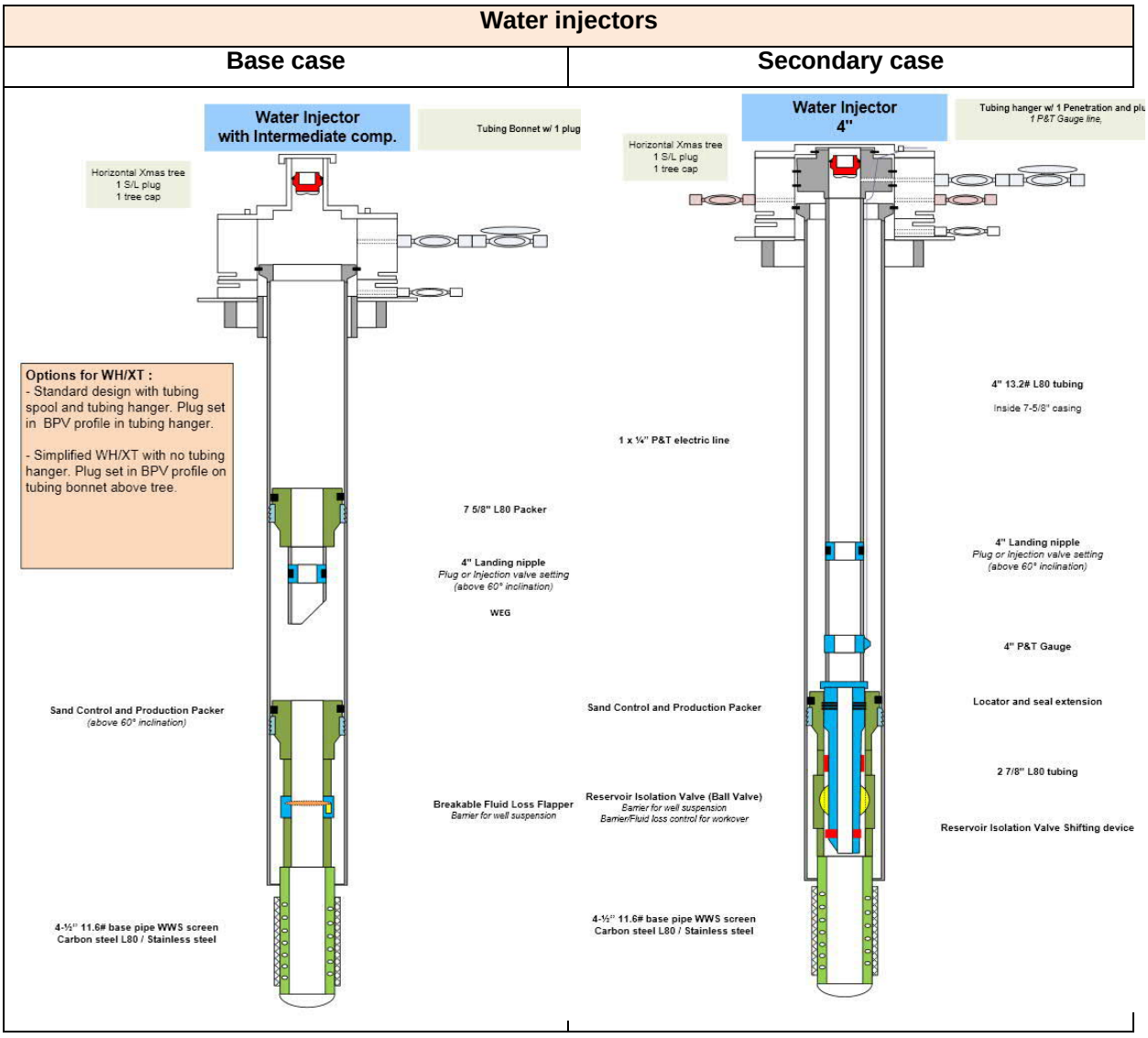


Figure 4-23: Water Injection Wells

4.9.5.3 Wellhead and Christmas Tree Design

The wells will be equipped with a horizontal Christmas tree and compact wellhead. The Christmas trees for each well will be situated below ground within individual cellars. The configuration and the dimension of the cellars will be finalised based on dimensions of the equipment. However, the current dimensions are:

- Individual cellar of 3.8 m x 3.8 m (length x width); and
- Depth of 3 m considering the air gap and the cellar hatch/cover thickness.

Figure 4-24 provides an overview of the Christmas tree design and Figure 4-25 provides a plan of the cellar design.

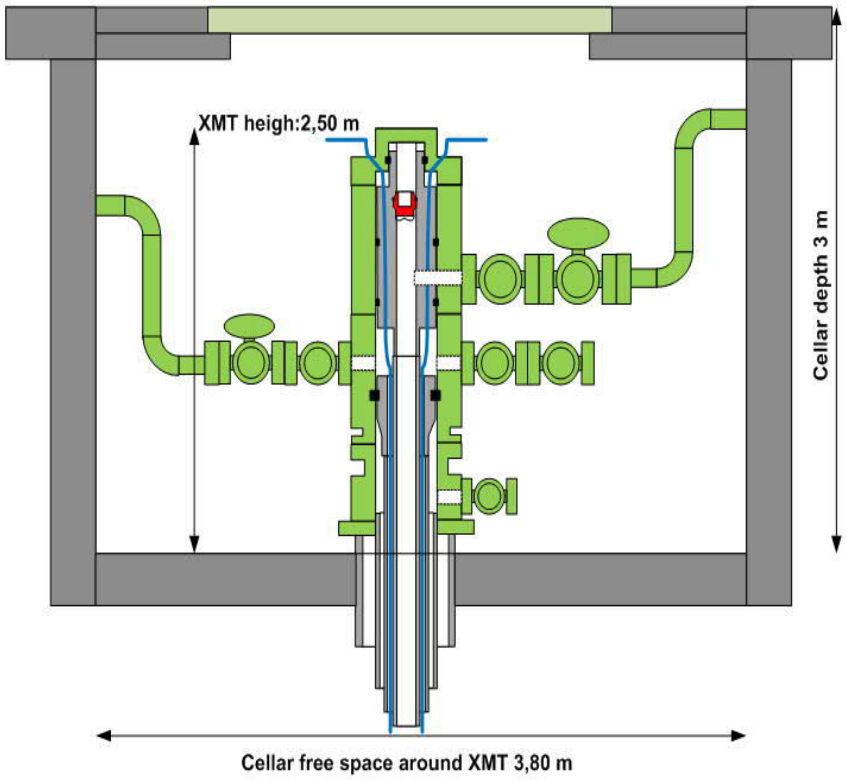


Figure 4-24: Wellhead, Christmas Tree

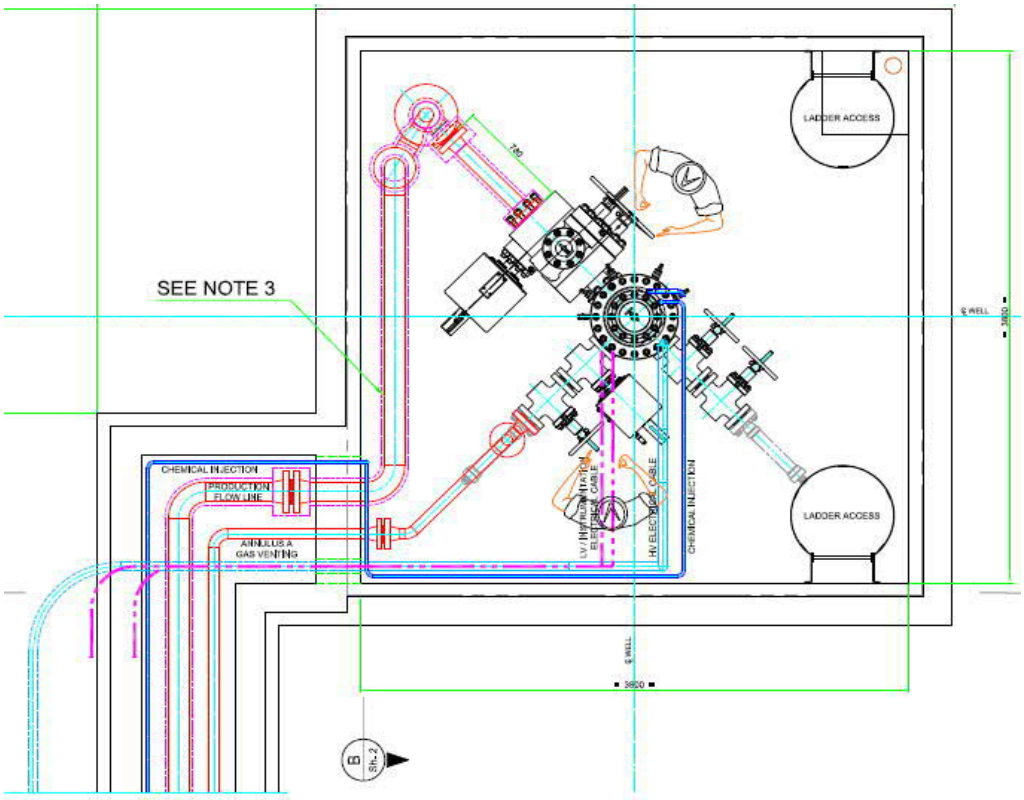


Figure 4-25: Well Cellar Design

4.9.5.4 Drilling Operational Sequence

Wells will be drilled in clusters from each well pad (Figure 4-26). A batch drilling sequence will be used which involves the drilling rig moving back and forth between the wells, progressing through the hole sections until all the wells on each pad have been drilled to target depth (TD), lower completion installed (4 ½ " WWS) and upper completion installed. The rig will then move to the next well pad once all wells will have been drilled and completed.

Phase	Fluid	Rig type	1st Well	2nd Well	3rd Well	4th Well	5th Well	Nth Well
Top Hole: 14 ¾" (Batch) – No BOP	Water Based Mud	Drilling Rig						
Intermediate: 9 ⅞"	SBM	Drilling Rig						
Drain Section: 6 ¾"	SBM + Sieved mud	Drilling Rig						
Lower Completion	Cake breaker* + Brine	Drilling Rig						
Upper Completion	Brine	Drilling Rig						

Notes:
Cake breaker refers to part of the well clean up operation and is required to preserve integrity of the WWS and to ensure high productivity of the well.

Figure 4-26: Batch Drilling Sequence

As part of the batch drilling process, two different mud systems will be used prior running completion.

The operations will be done in sequences as follows:

- 18 ⅝" well conductor pipe piled in place during the Site Preparation and Enabling Works Phase;
- Water Based Mud (WBM) Period:
  - 14 ¾" section will be drilled using WBM;
  - 10 ¾" casing run and cemented into position; and
  - Rig will skid to next well.
- Synthetic Based Mud (SBM) Period:
  - 9 ⅞" will be drilled using SBM;
  - 7 ⅝" casing will be run and cemented into position;
  - 6 ¾" section will be drilled using SBM;
  - Lower completion installed - 4 ½" WWS;
  - 4" tubing string run with completion and sub-assemblies; and
  - Rig skids to next well;

All observation wells will be fully drilled using WBM.

It is estimated that the Project will generate the following amounts of WBM and SBM on cuttings:

- WBM: 42,000 tonnes; and
- SBM: 77,000 tonnes.

SBM 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.

Details of the fluids and chemicals to be used are detailed in Sections 4.9.5.5. Drilling mud will be pumped into the drill pipe and returned to the surface on the rig via the annulus between the drill pipe and well bore. The casing in each well will provide a seal between the drilling mud and the formations to prevent fluid losses into the formation. On the surface, drilling muds will be removed from the cuttings via the use of shale shaker, centrifuge and/or cutting dryer. Drilling muds will be reused.

Up to 22 wells will be drilled per well pad. There are challenges associated with wellbore positioning and collision avoidance, both at the top hole and at the deep hole sections. A Wellbore Surveying Management Strategy will be implemented to address the main challenges related to wellbore positioning and collision avoidance aspects. It has to be specified that the survey management strategy will respect the following constraints:

- Adapted to factory drilling process that will be followed during the Project; and
- Simple to implement and execute during operations.

Further information regarding collision risk is detailed in ***Chapter 20: Unplanned Events*** of this ESIA Report.

4.9.5.5 Drilling Fluids and Chemicals

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

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

Details of the two types of mud are typically to be used for drilling are:

- *WBMs* – water mixed with bentonite and barium sulphate (barite) forms the continuous phase of the mud. Table 4-24 presents the composition of the proposed WBM; *and*
- *SBMs* – base oils synthetically derived from the continuous phase of the mud. SBMs offer better well stability, particularly when drilling through water-sensitive or unconsolidated formations. They also offer better lubricity and high temperature stability and reduce the formation of gas hydrates. Table 4-25 presents the composition of the proposed SBM.

Table 4-24: Proposed WBM Composition

Type of Product	Brand Name	Hazard Category*
Water	-	E
Caustic soda	-	E
Bentonite clay	-	E
Xanthan gum Polymer, viscosifier	KELZAN XCD	E
Polyannionic cellulose polymer, fluid loss reducer	DRISPAC	E
$CaCO_3$, calcium carbonate	-	PLONOR

*Brand name and associated chemical composition are subject to change following the call for tender exercise
**Two methods of hazard assessment are used in accordance with internationally recognised practice - Chemical Hazard and Risk Management (CHARM) and Non CHARM. The CHARM Model is used to calculate the ratio of predicted exposure concentration against no effect concentration (PEC:NEC) and is expressed as a Hazard Quotient. Hazard Quotients are assigned to 1 of 6 categories and "GOLD" is the least hazardous category. Those chemicals that cannot be modelled by CHARM are assigned to a category (A to E) based on toxicity assessment, biodegradation and bioaccumulation potential. Category E is the least harmful category. Source: CEFAS, Offshore Chemical Notification Scheme - Ranked Lists of Notified Chemicals, Updated October 2013.

The Oslo Paris Commission (OSPAR) List of Substances and Preparations Used and Discharged Offshore which are considered to Pose Little or No Risk to the Environment (PLONOR).

Table 4-25: Proposed SBM Composition

Type of Product	Brand Name	Hazard Category*
Synthetic base fluid (50%)	Total EDC 95/11	D
Emulsifier (2%)	EZ-MUL NT	D
Viscosifier (1%)	GELTONE II	E
Fluid loss reducer (0.3%)	ADAPTA	E
Fresh water (33%)	Water	E
Dispersion inhibitor (4%)	Sodium Formate	E
Alkalinity (0.3%)	Calcium Hydroxide	E
Weighting agent (9.4%)	BARACARB	E

*Brand name and associated chemical composition are subject to change following the call for tender exercise
**Two methods of hazard assessment are used in accordance with internationally recognised practice - CHARM and Non CHARM. The CHARM Model is used to calculate the PEC:NEC ratio and is expressed as a Hazard Quotient. Hazard Quotients are assigned to 1 of 6 categories and "GOLD" is the least hazardous category. Those chemicals that cannot be modelled by CHARM are assigned to a category (A to E) based on toxicity assessment, biodegradation and bioaccumulation potential. Category E is the least harmful category. Source: CEFAS, Offshore Chemical Notification Scheme - Ranked Lists of Notified Chemicals, Updated October 2013.

After each section has been drilled and the casing installed, cement will be pumped up to surface into the well to hold the casing in place and to prevent any fluid migration between subsurface formations. The two principal functions of the cementing process are:

- To restrict fluid movement between the formation; and
- To bond and support the casing.

All casings for the wells will be cemented to ensure proper isolation from the reservoir. The cement slurry /spacers formulation, displacement parameters and casing centralization will be undertaken to ensure the cementing operation is robust. Casing will also be rotated on more critical wells (crossing the gas cap) to limit risk of a poor cement bond. The composition of cement to be used will be Class G with 40% silica flour.

The completion fluid planned to be used will be filtered inhibited 1.06 specific gravity (sg) sodium formate brine and/or for 50% of the wells it will be filtered inhibited drill water. The following criteria will be applied to all fluids and chemicals used on Project:

- 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.

Weighting agent is required to maintain formation pressure. A minimum use of barite is forecasted, which will be used in case of emergency. The drilling fluid weighting agent will be based on calcium carbonate and ground marble (at different grade) to avoid heavy metals (in the upper limit of 100 ppm by weight) linked with barite ores.

A number of example Material Safety Data Sheets (MSDS) for a selection of chemicals which may be used are included within Appendix E (the actual products names and suppliers may change depending on drilling and operational requirements).

4.9.5.6 Cuttings and Fluids Management

The total amount of cuttings and fluids to be generated is estimated to be approximately 230,000 tonnes. As stated previously, drilling muds will be reused on the well pad and a dedicated spread of equipment will be mobilised including two shakers and a cuttings dryer (or equivalent) to separate mud from cuttings. Spent muds will be temporarily 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.

Conventional treatment of cuttings and fluids, whereby cuttings and fluids would be transported offsite for treatment and disposal in a dedicated facility, is the preferred option. Further information on the various options assessed is provided in ***Chapter 12: Waste***.

SBM cuttings will be transferred to a licensed facility equipped with a thermal desorption unit. The cuttings will be heated to evaporate and recover the SBM fluid and water (Note that the use, or not, of the thermal desorption unit is linked to the efficiency of the cutting dryer on site). Recovered base fluid from thermal treatment will be recycled into drilling fluid, while water (generally briny) will be either recycled or treated via a waste water treatment plant and disposed of.

The resultant solid fraction will then be stabilised and disposed of via an engineered landfill. Figure 4-27 illustrates the process.

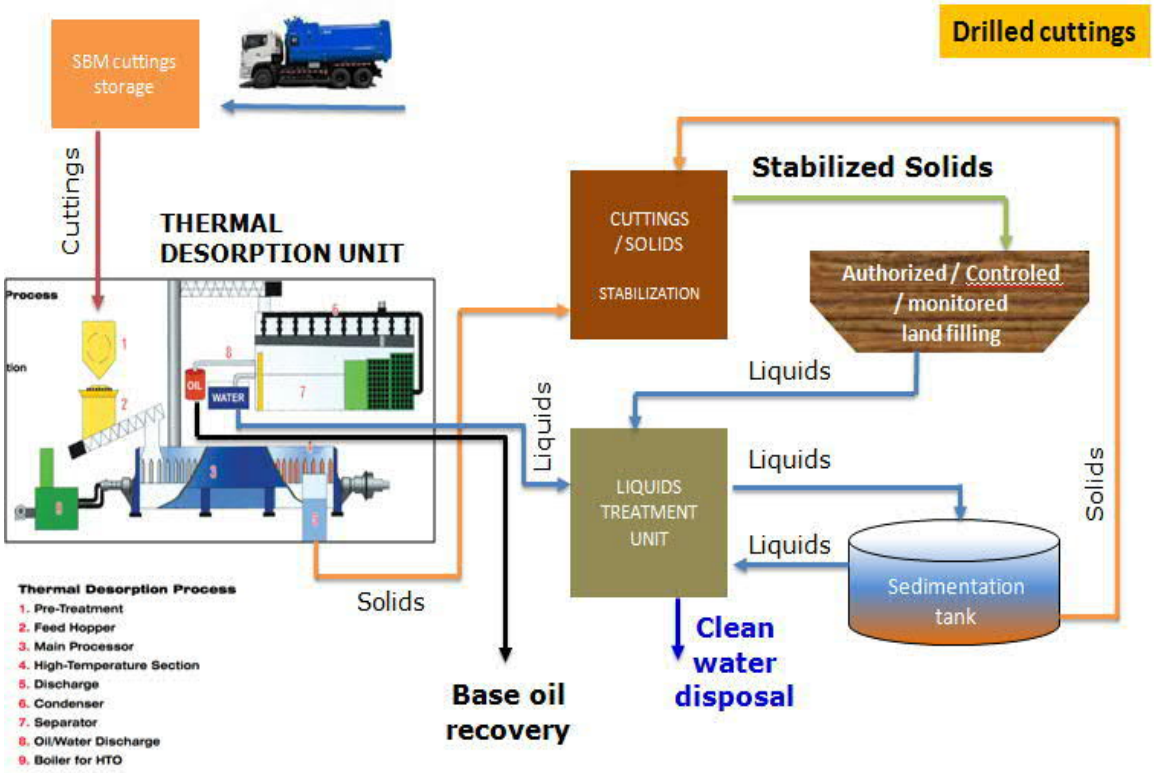


Figure 4-27: Diagram of Thermal Desorption Approach

The WBM cuttings will not be subject to thermal desorption treatment and would instead be subject stabilisation and disposal as shown in Figure 4-28 (similar treatment for remaining solids and fluids from thermal desorption process).

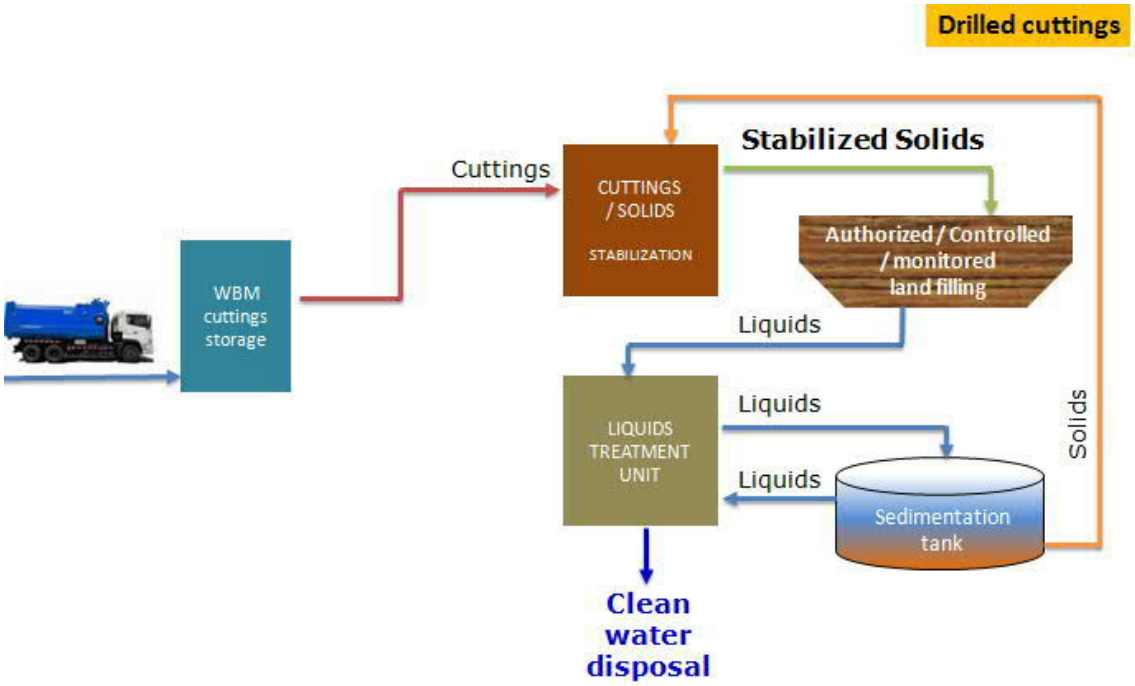


Figure 4-28: Diagram of WBM Cuttings Stabilisation and Disposal

4.9.5.7 Well Flow Back and Well Test

There will be no routine well testing after wells are completed. This means the residual drilling and completion fluids will be produced directly through the flowline to CPF when the well is put into production (this may be up to 18 months after completion of the drilling campaign).

4.9.5.8 Well pad Construction

Upon completion of the drilling activities, the main facilities installation and pre-commissioning activities will commence at the well pads. The main activities are summarised as follows:

- Erection of temporary facilities (power, utilities, workshops, laydown and storage areas etc.);
- Excavation and civil works (opening of trenches for installation of equipment, storage of excess subsoil/topsoil; installation of underground facilities; inspection pits; on site foundations; and backfill/compacting activities);
- Installation of main equipment including Pre-Assembled Units, skids and crossovers;
- Installation of culvert piping;
- Electrical and Instrumentation works;
- Installation of interconnecting piping including tie-ins (wells and pipeline);
- Mechanical completion;
- Pre-commissioning; and
- Installation of culvert lids.

4.9.6 Production and Injection Network

The Production and Injection Network outside of the Industrial Area will be trenched and buried. The pipelines will be installed using open-cut trench methods, using excavators, welding units, side-booms and dozers. The general process for open-cut technique is shown in Figure 4-30. The depth of the trenches will be between 0.8 m and 2 m, in line with International Standards Organisation (ISO) 13623.

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). The amount of vegetation to be stripped will be minimised within the Production and Injection Network RoW. Where multiple pipelines follow the same route they will be grouped together in the same trench, with a separation distance of at least 0.4 m (or one diameter of the largest pipeline, if greater). Where there are 4 pipes or more, and depending on the installation contractor and type of side boom to be used, certain sections may require two separate trenches within the same construction corridor.

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 (refer to Section 4.10.8).

The measures outlined in Table 4-15 will be adopted during the Construction of the Production and Injection Network.

4.9.6.1 Pipeline Fabrication, Welding, Joint Coating and Insulation

The onsite fabrication area will be located within the Industrial Area Construction Support Base (refer to Figure 4.7) and will house all of the site fabrication and support services related to piping and structural steel modifications. It will have the capability for pipe fabrication, welding, blasting / painting pipes, relief valve calibration, and valve repair.

There will be pipeline welding workshops located at both the Industrial Area and Tangi Construction Support Base.

Sections of pipeline 12 m in length will be delivered by truck to the Industrial Area and the Tangi Construction Support Base. The pipe welding is planned to be executed in two phases as outlined below:

- Phase 1 – pre-assembly of standard 12 m lengths into 24 m lengths in a pipe welding facility located within the Industrial Area and Tangi Support Base. Joint coating and insulation will also be completed within the facility; and
- Phase 2 – Transportation of 24 m lengths of pipe by truck for in-situ welding on the Production and Injection Network RoW. Joint coating and insulation will also be completed on the RoW.

The intent of the phased approach is to minimise the man hours on the Production and Injection Network RoW, reduce exposure to wildlife and local community and improve installation productivity.

4.9.6.2 Trenching and Bedding

The Production and Injection Network trenches are planned to be excavated with dedicated pipeline trenching machines, as shown in Figure 4-29, to minimise the trench and RoW width.

The pipelines will be buried with at least 0.8 m covering on the top. The FOC will be installed along the full length of the pipeline to detect abnormal movement around the pipeline and will monitor pipeline integrity. Information regarding potential unplanned events and the methodology for development of the Oil Spill Contingency Plan is covered in ***Chapter 20: Unplanned Events.***

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. This is a key consideration for the works within MFNP. The use of human and animal crossing structures such as bridges, culverts, and over crossings, along pipeline and access road RoW will be considered. At special points such as crossings, deep excavations and tie-in bell holes, safety fences will be installed to prevent human or animal ingress.

Ditch plugs will be installed on all trenches to prevent the pooling of water in the trenches. Water management will ensure that the water flow regime remain as per pre-construction conditions.

Figure 4-30 summarises a typical open-cut pipeline construction.

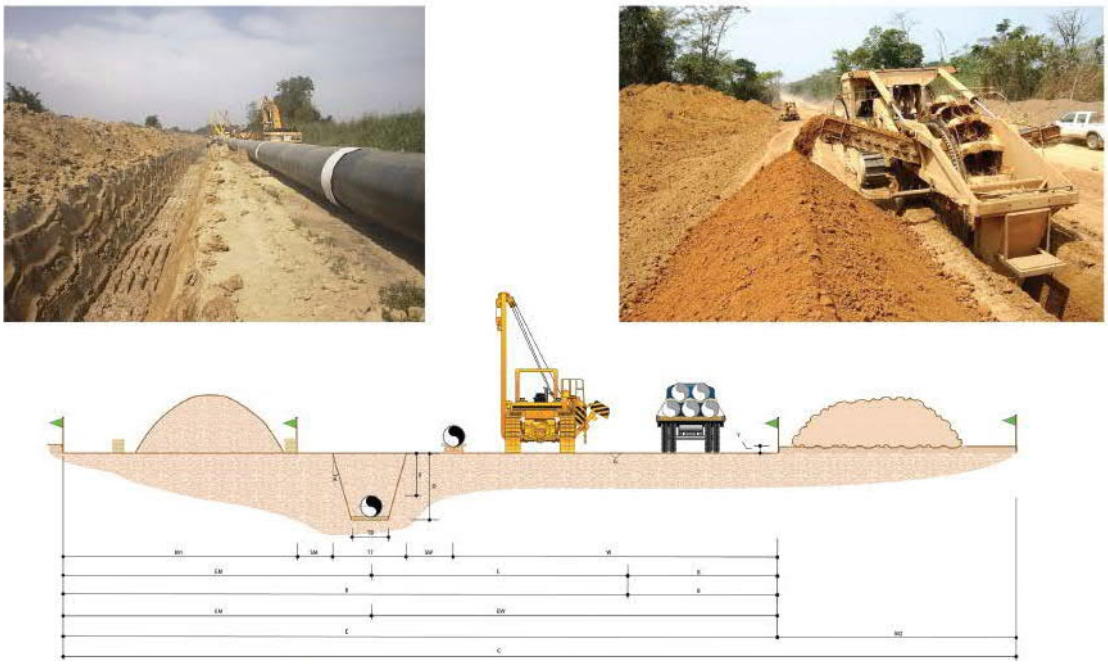
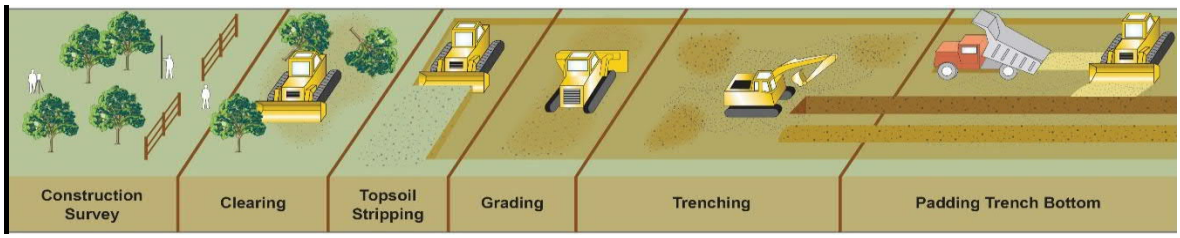


Figure 4-29: Typical Trench Alignment

Part 1



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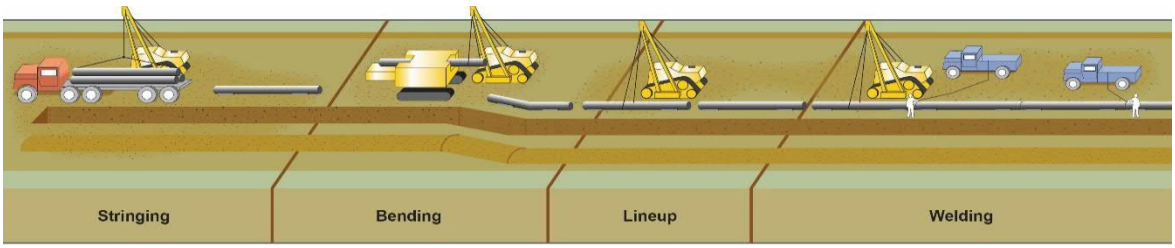


Part 3

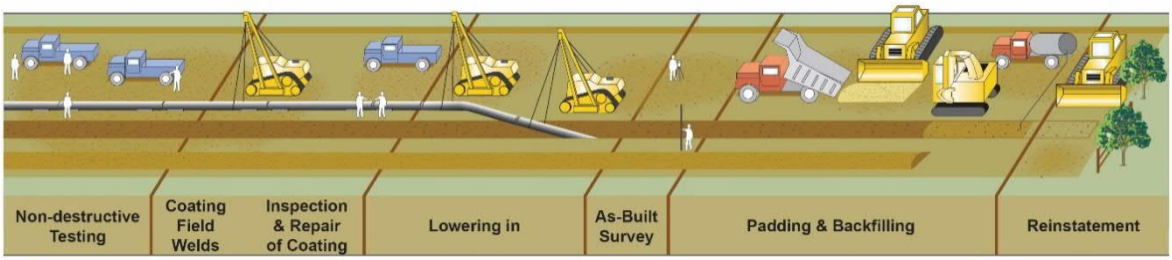


Figure 4-30: Typical Open-cut Pipeline Construction Technique

The Production and Injection Network will be constructed concurrently on an estimated five work fronts consisting of four pipeline installation crews and one HDD crew for the Victoria Nile crossing.

Material from trenching activities will be stored within the pipeline RoW and used as backfill. Excess material will be reused on site or for borrow pits restoration. Options for the reuse of uncontaminated excess subsoil material will be assessed during detailed engineering.

Open cut trenching will be used in areas of ephemeral rivers/tributaries, which are dry. However, for flowing rivers, the pipeline will be laid by either:

- *Fluming Method* – the flow will be redirected out of the river channel via a number of flume pipes designed to accommodate the highest anticipated flow during construction. This isolates the flow from the construction area. The pipeline trench will be excavated below the flume pipeline and the river bed reinstated; or
- *Dam-and-Pump Crossing Method* – upstream and downstream of the pipeline trench will be dammed and a pump system will be used to move water upstream of the dam to the downstream side of the dam. The riverbed will be reinstated following the installation of the pipeline.

4.9.6.3 Pipe Stringing

Known commonly as ‘stringing’, the pipe sections will be placed end to end alongside the trench in preparation for welding and then lowered into the trench in a continuous operation. 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. Site preparation details are provided in 4.9.6.6.

Once in place, hydrotesting of the pipelines will be undertaken, as described in Section 4.9.7. The pipeline trench will then be backfilled with the stored material (subsoil and topsoil).

4.9.6.4 Production and Injection Network RoW Restoration

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. The aim is to minimise the exposure of open trenches to wildlife and the local community.

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. North of the Victoria Nile, a permanent inter field access road will be maintained in driveable conditions to allow surveillance and access to the well pads; the track will be surfaced with either gravel or murram. Induced access management controls will be left in place along the pipeline land easement.

4.9.6.5 Electrical and Fibre Optic Cable Installation

An electric cable up to 66 Kilovolt-Ampere (kVA) and fibre optics communication cable will be laid in the trench to supply the well pads North of Victoria Nile and up to 66 kVA will be laid to supply the well pads to the South of Victoria Nile. Fibre optic cable installation will be undertaken by a tracked dozer with the specific cable laying attachments. This method of work is intended to minimise installation time and the time that the cable is exposed. Locations where cable jointing and testing will be completed will be fenced and secured to allow safe access.

4.9.6.6 Victoria Nile HDD Crossing

To connect the fields in MFNP to the CPF, there will be pipeline crossing under the Victoria Nile. The Victoria Nile crossing will include three HDD pipelines, two with a minimum 30" diameter to house the production pipeline, water injection pipeline and, one of 9" diameter for electrical and FOC.

During HDD pressure is maintained by mud pressure. In addition to holding the hole open during construction the mud is used to transport the cuttings back to the drill site for clean-up and removal. In total, HDD activities are expected to generate the following volumes of wastes:

- Total Cuttings Volume (Semi-dry): 2,000m^3; and
- Waste Drilling Fluid: 3,000m^3.

A 15-20 m burial depth below the river bed is currently planned, which has taken into the account the risk of frack out[10] which would result in the loss of drilling muds through fracks which could potentially enter the aquatic environment. This drilling technique is illustrated in Figure 4-31. Prior to starting HDD activities a risk assessment will be undertaken to identify the necessary design of the HDD tunnels including appropriate tunnelling and slurry management practice to control groundwater ingress and minimise slurry loss from the tunnel into surrounding aquifers/surface waters.

[10] Frack out occurs when the mud pressure exceeds the value that the local ground conditions can resist causing the loss of drilling mud through fracks into the aquatic environment.

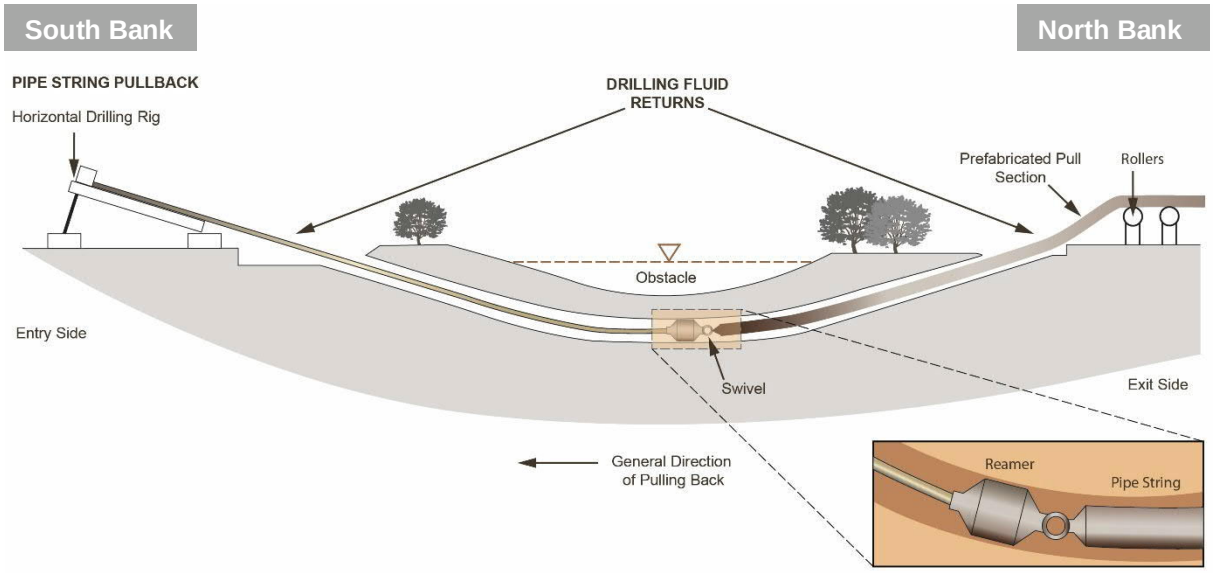
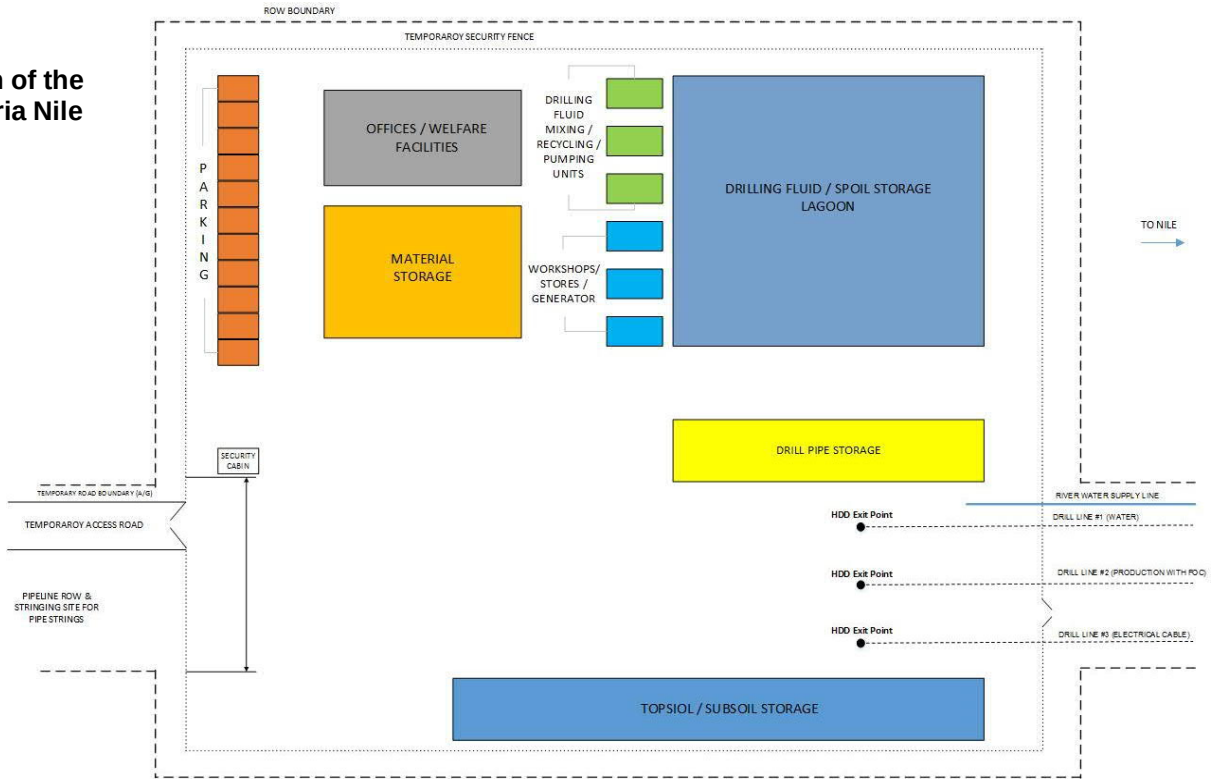


Figure 4-31: Victoria Nile HDD Crossing Construction Technique

As shown in Figure 4-32 the Victoria Nile crossing will require two HDD Construction Areas of approximately 100 m x 100 m north of the Victoria Nile and 100 m x 100 m to the south for laydown, machine, oil tanks, drilling mud storage (in mud tanks or a lined lagoon), pipe extension and welding. The HDD Construction Areas will be located within the boundary of the Ramsar site. HDD activities will be undertaken on a 24 hour / 7 days basis. The estimated duration is 3 months, subject to further refinement following analysis of geotechnical information.

South of the Victoria Nile



North of the Victoria Nile

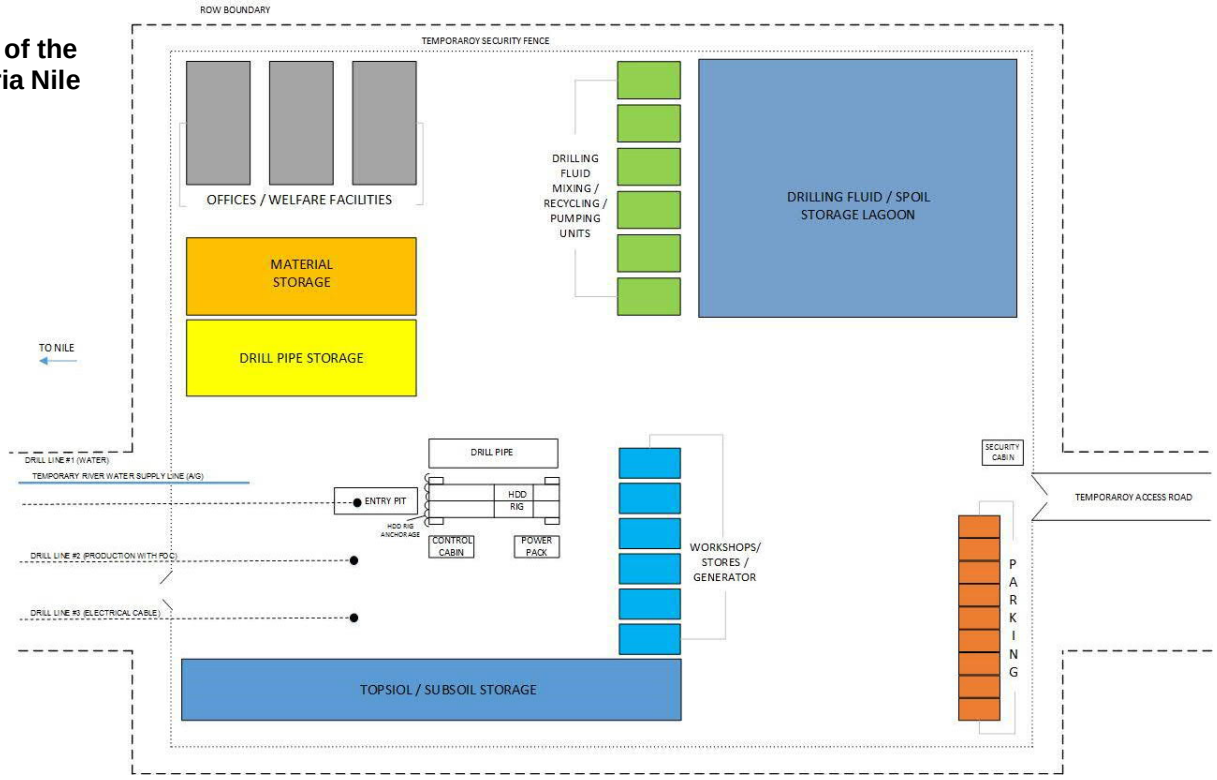


Figure 4-32: Indicative Layout of HDD Construction Area North and South of the Victoria Nile

The temporary land required for the HDD Construction Areas will be restored following construction in line with the Site Restoration Plan as developed by the Contractor. Pipe stringing will require a 50 m wide area approximately 1.6 km in length as shown in Figure 4-33 and Figure 4-34. Where possible the HDD Construction Area and the Production and Injection RoW will be utilised.

The stringing area is required to be in direct alignment with the HDD river crossing. The stringing area will be used temporarily for activities such as pipe joining, welding, and hydro-testing, therefore the level of site preparation required is less than that for permanent facilities. The pipe stringing area will be stripped of vegetation and topsoil. The stripped ground will not require much improvement because most of the area is in either fluvial terrace or uplands, except some localised marshy sections where filling, levelling and compaction might be required. It is anticipated that the rollers for the pipe pull-in will be placed directly onto the stripped ground (subject to confirmation from the geotechnical investigation studies). Specific transport trailers and frames will be required for the delivery of the preassembled 24 m length pipes from the onsite pipe welding facility.

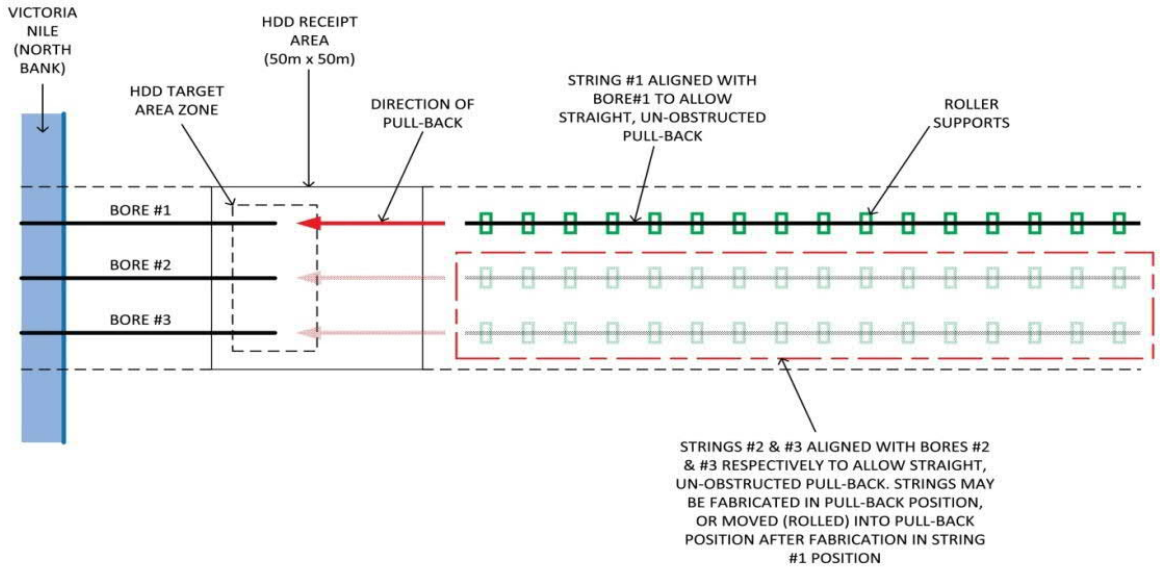


Figure 4-33: Indicative Layout of Stringing Area for Victoria Nile Crossing

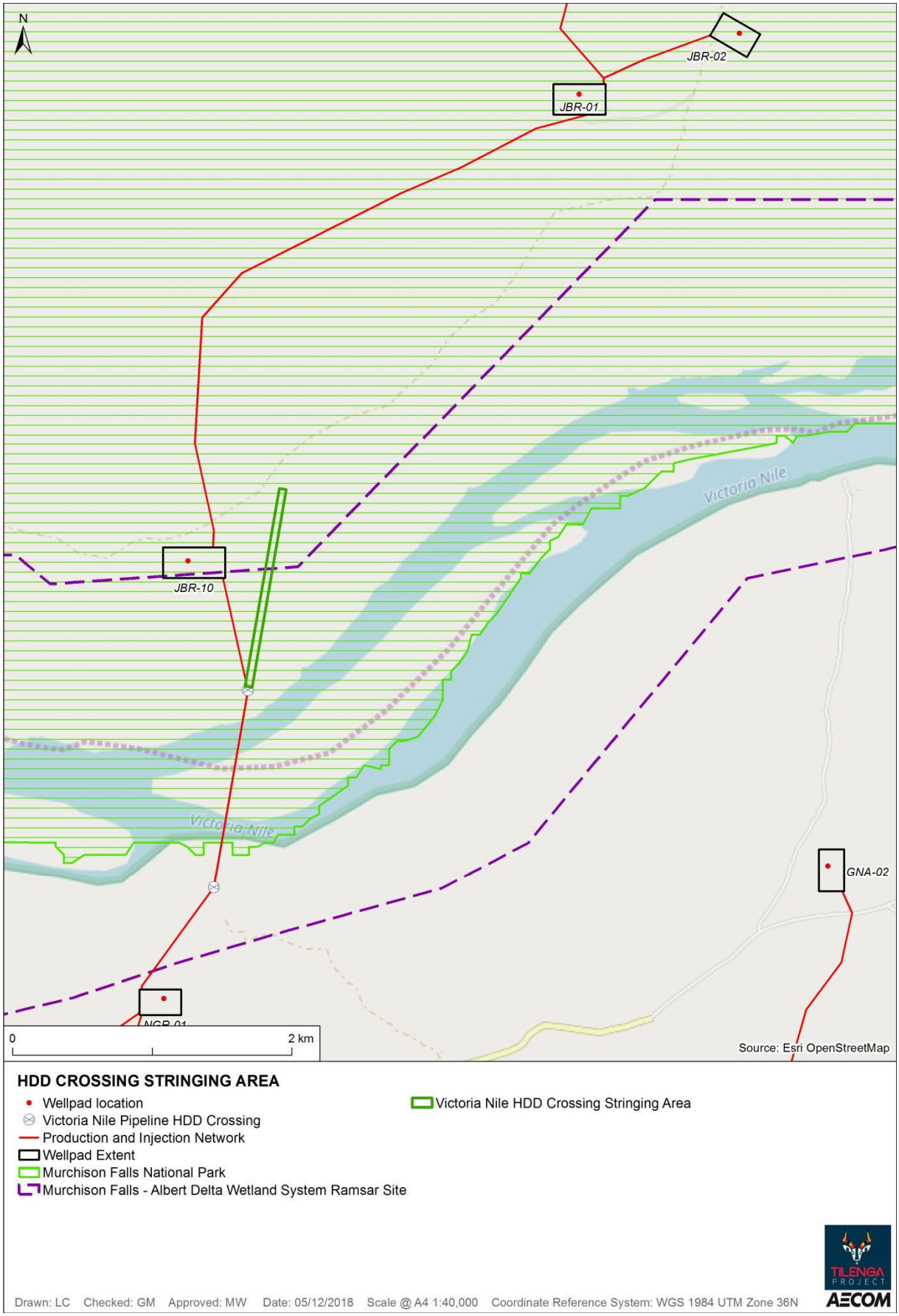


Figure 4-34: HDD Stringing Area

4.9.7 Pre-Commissioning Testing

Pre-commissioning activities will involve extensive leak testing of the Production and Injection Network, valves at the well pads, Water Abstraction System and CPF to ensure that the pipelines and equipment meet operational requirements. For the production and injection network the primary objective of these activities will be to verify that the pipeline has been laid without defects, and that it is in a suitable condition.

Any residues and wastes generated from pre-commissioning activities will be managed in accordance with the site Waste Management Plan.

During the installation of the pipelines a temporary test head will have been welded to the ends of the pipelines to enable pre-commissioning tests to be undertaken. The temporary test head will be designed to contain and launch flooding, cleaning and gauging. The section below presents the activities associated with pipeline pre-commissioning:

- ***Pre-cleaning / Swabbing*** of welded joints will be undertaken to remove larger material than fines/sand. Pipe strings will also be pre-cleaned by passing foam pigs drive compressed by air immediately prior to lowering into pre-cut trench. As far as possible, pre-cleaning will be done at Industrial Area and Tangi Support Base to minimise the requirement for in field pre-cleaning activities. Solid residues will be collected and disposed of appropriately;

- ***Pipeline Cleaning*** will be undertaken to remove sand and other construction debris from the pipeline using treated water. This will involve cycling of water or pigging with air / water using temporary pig traps and pumps. The use of intermediate storage tanks for feeding the pumps is compulsory to ensure minimum flow requirements. The minimum volume of treated water will be pumped into the pipeline ahead of the first pig, the number of pigs and volume of treated water between the pigs will be minimised and tailored to the length of pipeline to be tested. Treated water will be recovered from the pipelines and reused, wherever possible prior to disposal. Options for disposal will be in accordance with regulatory requirements and subject to permission by the relevant authorities.

- ***Pigging / Gauging*** of internal pipelines will be undertaken to ensure the pipeline has not been buckled, dented or otherwise damaged during construction activities and requires passage of a gauging tool through the pipeline. Gauging tools can be launched from temporary pig trap if the above ground facility with permanent trap is not yet complete. Gauging will be done in several stages with increasing tool size to minimise the risk of the equipment becoming stuck;

- ***Hydrostatic / Leak / Integrity Testing*** of all pipelines will be undertaken to ensure pressure containment and determine if leaks are present prior to operating fluid entering the system as outlined below:

    - *Strength Test:* this hydrostatic pressure test is used to demonstrate the integrity of welds and establish the operating pressure limit of a pipeline segment or component. The values of pressure and minimum duration will be based on the design code requirements.

    - *Leak Test:* this pressure test is used to determine the tightness of a pipeline system. The leak test is performed on the complete pipeline system, from the pig launcher to pig receiver, after each of its components has been strength tested and assembled, with special attention paid to tie-in flanges, fittings, valves, etc.

  The pipeline will be filled with treated water and pressurised. Pipeline test pressure is typically above the design pressure and will be held for a period in accordance with regulations using calibrated instrumentation recording both pressure and temperature (if required) throughout the test period; and

- ***Pipeline Preservation*** will be undertaken to protect the pipeline after successful pre-commissioning lines by filling them with a fluid for preservation likely to be inhibited / deoxygenated water. These preservation methods are used to avoid internal corrosion due to rust or pitting before commissioning the pipeline. Inhibited water will be held at a positive pressure (minimum 1.5 bars) and regularly monitored.

The pre-commissioning of each pipeline will be undertaken individually as each pipeline is completed and typically takes approximately a few days to a few weeks to complete.

The majority of pre-commissioning activities will be powered using localised generators and pumps. With regard to pipeline pre-commissioning activities it will be necessary to utilise mobile drilling spreads. At the time this ESIA Report was prepared the required equipment and size/capacity was under development.

The maximum volumes of water required for hydrotesting forecasted is presented in Table 4-26 and totals an estimated 23,825 m^3.

Table 4-26: Indicative Volumes of Water Required for Hydrotesting Activities

Facility	Volume (m^3)
CPF	1,437
Well pads	1,549
Production and Injection Network	20,839

Pre-commissioning water will be treated as required. For any chemical usage, a thorough Chemical Risk Assessment will be undertaken and lowest toxicity chemicals will be used wherever possible; treated water will be filtered to 50 microns mesh screen to keep solids content below 20mg/l. Any biocide and corrosion inhibitors/scale inhibitors used will be similar to those used during the production operational process.

Pre-commissioning water (used for pipeline cleaning and hydrostatic tests) will be reused. 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 the 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. Pre-commissioning 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.

Smaller pipework at the yards will be hydrotested during fabrication and pneumatic tested on site to minimise requirement for inhibited water management.

4.9.8 Materials and Borrow Pits

During the Construction and Pre-Commissioning Phase the Project will require a number of different materials, including but not limited to steel, concrete, weld material and backfill material (for pipeline trenches). Table 4-27 presents the approximate volumes required for the construction of the Production and Injection Network. Material quantities for other components were still in development at the time this ESIA Report was prepared. Section 4.8.8 presents the potential quarries, which may be used to source material and as stated will be subject to detailed audits of the quarries and available material.

Table 4-27: Approximate Volumes of Materials Required for the Construction of the Production and Injection Network

Volume (m^3)							Volume (tonnes)
Topsoil	Cut	Fill	Unused Material^	Cement	Gravel	Sand	Steel
Material to Remain on Site				Introduced to Site			
2,500,000	1,000,000	800,000	200,000 + 150,000 (spoil material)	200	400,000	30,000	25,000
Notes: ^ Unused material, defined as cut and spoil minus fill, will be reused within the Project footprint or used to restore the borrow pits. No excess material will be transferred off site for disposal.							

4.9.9 Work Force

There will be a gradual build-up of workers during construction as well as an eventual reduction and stabilisation of these numbers for the remaining production cycle. At the peak of construction the Project will employ approximately 4,400 workers. 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.

4.9.10 Water Demand

It is anticipated that the water will be sourced from:

- Groundwater aquifers via a series of boreholes;
- Lake Albert following the installation of the Water Abstraction System, when available;
- Lake Albert at the same location until the Water Abstraction System is functional using temporary pumps and tankers; and
- Victoria Nile (north of the Victoria Nile).

Table 4-28 presents a summary of the water demands during the Construction and Pre-Commissioning Phase. There will be no requirement for water for cooling purposes for any of the Project components.

Table 4-28: Approximate Water Demand during the Construction and Pre-Commissioning Phase

Activity	Total	Annual Water Demand (Cubic Metres)							
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Water Sourced from Groundwater									
Construction activities	49,932	6,990	14,979	14,979	5,992	2,996	1,997	1,997	0
Operation of Industrial Area Construction Camp (max capacity 4,400 people)	953,694	49,932	264,637	264,637	149,795	89,877	69,904	64,911	0
Operation of Tangi Camp (including equipment and vehicle washing)	621,241	43,871	92,473	95,429	95,429	95,429	95,429	58,929	44,251
Dust suppression north of the Victoria Nile	306,600	21,900	43,800	43,800	43,800	43,800	43,800	43,800	21,900
Operation of Bugungu Camp (including equipment and vehicle washing)	353,194	23,340	51,410	54,367	54,367	54,367	54,367	36,117	24,860
Operation of Buliisa camp	47,450	3,650	7,300	7,300	7,300	7,300	7,300	3,650	3,650
Operation of the Industrial Area Camp (including equipment and vehicle washing)	604,588	42,502	89,735	92,692	92,692	92,692	92,692	59,842	41,741
Dust suppression south of the Victoria Nile	715,400	51,100	102,200	102,200	102,200	102,200	102,200	102,200	51,100
Operation of Masindi Vehicle Check Point	131,400	3,285	32,850	32,850	32,850	29,565			
Drilling activities north of the Victoria Nile (including domestic use)	52,560	-	17,155	17,155	3,650	3,650	3,650	3,650	3,650
Drilling Activities south of the Victoria Nile (including domestic use)	266,450	-	48,910	48,910	48,910	48,910	48,910	21,900	-
Operation of the Liquid Mud Plant (WBM, SBM and brine)	499,320	83,220	83,220	83,220	83,220	83,220	83,220	-	-
Pre-commissioning activities	9,986	-	-	2,996	3,995	999	999	999	-
Groundwater Demand TOTAL	4,611,814	**329,791**	**848,670**	**860,536**	**724,199**	**655,004**	**604,468**	**397,995**	**191,152**
Water Sourced from Surface Water									
Construction activities		707,772	707,772	707,772	707,772	707,772	707,772	707,772	707,772
Surface water Demand TOTAL	**5,662,177**	**707,772**	**707,772**	**707,772**	**707,772**	**707,772**	**707,772**	**707,772**	**707,772**

4.9.11 Vehicles, Equipment and Traffic Flow

Table 4-29 provides the estimated number of construction vehicles and plant during the Construction and Pre-Commissioning Phase. With the exception of road construction all construction vehicles/equipment will be kept on site when not in use. For the preparation of the roads, all vehicles/equipment will travel from the site yard/storage to work site each work day.

In addition to the vehicles and plant listed in Table 4-29 the Project will also require a number of cranes to support the construction of the Industrial Area and well pads as summarised below:

- Industrial Area: up to 40 x 600t cranes; and
- Well pads: up to 21 x 80t cranes.

Table 4-29: Estimated Vehicle and Plant Use during Construction and Pre-Commissioning Site Phase

	Construction Plant Per Work Area	Total Number of Construction Plant	Movement per day / Return Trips per Work Area	Total Movement per day / Return Trips
Industrial Area (considered as one area due to single geographical location)				
Excavator		5		1
Forward Loader		2		1
Dump truck		6		64
Dozer		2		1
Grader		4		1
Water tanker		4		10
Truck for deliveries		8		20
Roller compactor		4		1
LDVs		60		190
Labour shuttle bus		1		24
Transport bus		0		0
Well Pads (approx. 3 Work Areas in parallel) - quantities below are per work area				
Excavator		2		1
Forward Loader		0		0
Dump truck		1		1
Dozer		1		1
Grader		1		1
Water tanker	1	1	1	3
Concrete tip truck	4	4	4	4
Truck for deliveries	2	4	3	6
Roller compactor		2		0
LDVs	6	13	13	36
Labour shuttle bus	2	2	16	16
Transport bus	17	32	17	32
Transport bus	14	28	14	28
Pipeline (approximately 3 Work Areas in parallel) - quantities below are for the sum of all work areas				
10,000 litre Bowser (fuel)	4	8	4	8

	Construction Plant Per Work Area	Total Number of Construction Plant	Movement per day / Return Trips per Work Area	Total Movement per day / Return Trips
14G Grader	7	14	0	0
20' Flat with Hiab	10	20	6	12
20' Flat bed truck	5	10	6	12
Crane	7	14	0	0
Compressor	16	32	0	0
Generator	17	34	0	0
4x4 Flat With Hiab	4	8	6	12
4X4 Pick up	160	320	2	4
4X4 Tipper	6	12	1	2
6"-26" Mandrills	2	4	0	0
6-20in Bender	2	4	0	0
Excavator	27	54	0	0
Sideboom	32	64	0	0
Cat 966 Loader	1	2	0	0
Choker Belt	7	14	0	0
D6 Dozer	12	24	0	0
D6 Dozer and Winch	5	10	0	0
D7 Mole Plow Drain Layer	1	2	0	0
D8 Dozer	2	4	0	0
Dump trucks	4	8	6	12
Dumper	7	14	6	12
Tractor and trailer	17	34	4	8
JCB	6	12	0	0
Link Belt 300	2	4	0	0
Low Loader	2	4	6	12
Mini Bus	44	88	1	2
Tree Grubber	1	2	0	0
Vibratory Roller	4	8	0	0
Vibrating Compactor	5	10	0	0
Water Bowser	2	4	4	8

Preliminary estimates indicate that a peak of approximately 2,000 truck deliveries per month will be required to the CPF and well pads during the peak Construction and Pre-Commissioning Phase (Table 4-30). Approximately 130,000 m^3 of fuel (of which 100% is assumed to be diesel) is to be imported, approximately 250 kilo tonnes (kt) of equipment and 1,000,000 t of cement, sand and concrete will be provided locally .The truck movement calculation is based on an average 20 t cargo per truck.

A Road Safety and Transport Management Plan will be developed prior to commencing the Construction and Pre-Commissioning Phase.

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. A permanent tracking system will be in place for all vehicles operating inside Project Area.

All construction vehicles/equipment will be kept on site when not in use.

Table 4-30: Indicative Construction Traffic Movements

Sites	Description	Estimated Tonnage (T)	Duration (years)	Common Truck Types To Be Used	Estimated Trips Per Month
North of the Victoria Nile	Construction Equipment (Steel, Machineries etc.)	12,500	2	20T trailer / 28T trailer / 50T low-loader	18
	Construction Materials (Cement, Gravel, Sands)	420,000	3	20-30 T soil truck	400
	Drilling Equipment and Materials	33,000	4	20T trailer / 28T trailer / 50T low-loader	35
	Fuel, Water, Food, Generals	220,000	5	28T trailer / tanker	130
South of the Victoria Nile	Construction Equipment	13,500	2	20T trailer / 28T trailer / 50T low-loader	25
	Construction Materials (Cement, Gravel, Sands)	780,000	4	20-30T soil trucks	815
	Drilling Equipment and Materials	66,000	4	20T trailer / 28T trailer / 50T low-loader	70
	Fuel, Water, Food, Generals	490,000	5	28T trailer / tanker	300
CPF	Construction Equipment (Steel, Machineries etc.)	50,000	3	28T trailer	49
			2	50T low-loader	3
			1	120T low-loader	2
	Materials (Cement, Gravel, Sands)	1,852,000	3	28T soil trucks	1,850
TOTAL		**3,937,000**			**3,697**

Table 4-31 presents the number of movements for each of the inter field access roads.

Table 4-31: Inter Field Access Road Traffic Movements

Roads	Description	Estimated Monthly Trips
South of the Victoria Nile		
D1	Access Road to Well pad NGR-01	2400
D2	Access Road to Well pad NGR-02	
D3	Access Road to Well pad NGR-03A	
D5	Access Road to Well pad NGR-05A	
D6	Access Road to Well pad NGR-06	
D8	Access Road to Well pad GNA-01	
D9	Access Road to Well pad GNA-02	
D10	Access Road to Well pad GNA-03	
D11	Access Road to Well pad GNA-04	
D12	Access Road to Well pad KW-01	
D13	Access Road to Well pad KW-02A	
D14	Access Road to Well pad NSO-01	
D15	Access Road to Well pad NSO-02	
D16	Access Road to Well pad NSO-03	
D17	Access Road to Well pad NSO-04	

Roads	Description	Estimated Monthly Trips
D18	Access Road to Well pad NSO-05	
D19	Access Road to Well pad NSO-06	
D20	Access Road to Well pad KGG-01	
D22	Access Road to Well pad KGG-03	
D23	Access Road to Well pad KGG-04	
D24	Access Road to Well pad KGG-05	
D25	Access Road to Well pad KGG-06	
D26	Access Road to Well pad KGG-09	
D27	Access Road to Well pad KW-02B	
North of the Victoria Nile (within Production and Injection Network RoW)		
JBR-01 to Victoria Nile ferry crossing		1400
JBR-01 to JBR-02		2800
JBR-02 to JBR-04		1400
JBR-01 to JBR-03		5600
JBR-03 to JBR-05		7000
JBR-05 to JBR-06		8400
JBR-06 to JBR-07		9800
JBR-07 to JBR-08		11200
JBR-08 to JBR-09		12600
JBR-01 to JBR-10		1400

To support drilling activities, a number of vehicles and equipment will be sourced from overseas and will be transported via sea and road to the Project Area. It is planned that all equipment coming from abroad will be delivered to the Industrial Area Drilling Support Base for inspection and preparation before being sent to the rigs on well pads north and south of the Victoria Nile.

4.9.12 Logistics and Procurement

4.9.12.1 Procurement

As stated in Section 4.8.12 preference will be given to source equipment (such as plant and construction vehicles) and materials which meet the required Project specifications from Uganda wherever possible. However, where this is not possible construction vehicles, plant and equipment will be imported from overseas.

4.9.12.2 Routing To and From Project Work Sites

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. These two biggest ports are at distance of approximately 1,400 km and 1,900 km from the Project respectively.

Road transport will be the preferred transportation option, however rail will be used as well, but will be limited given that goods transported by rails will be required to go to an Inland Container Depot (ICD) in Mukono (30 km from Kampala) for subsequent transfer to trucks.

As shown in Figure 4-35 materials will be transported from Mombasa to the Ugandan borders (either Busia and/or Malaba) and will continue to their final destinations either in Buliisa (south of the Victoria Nile) or Tangi (north of the Victoria Nile).

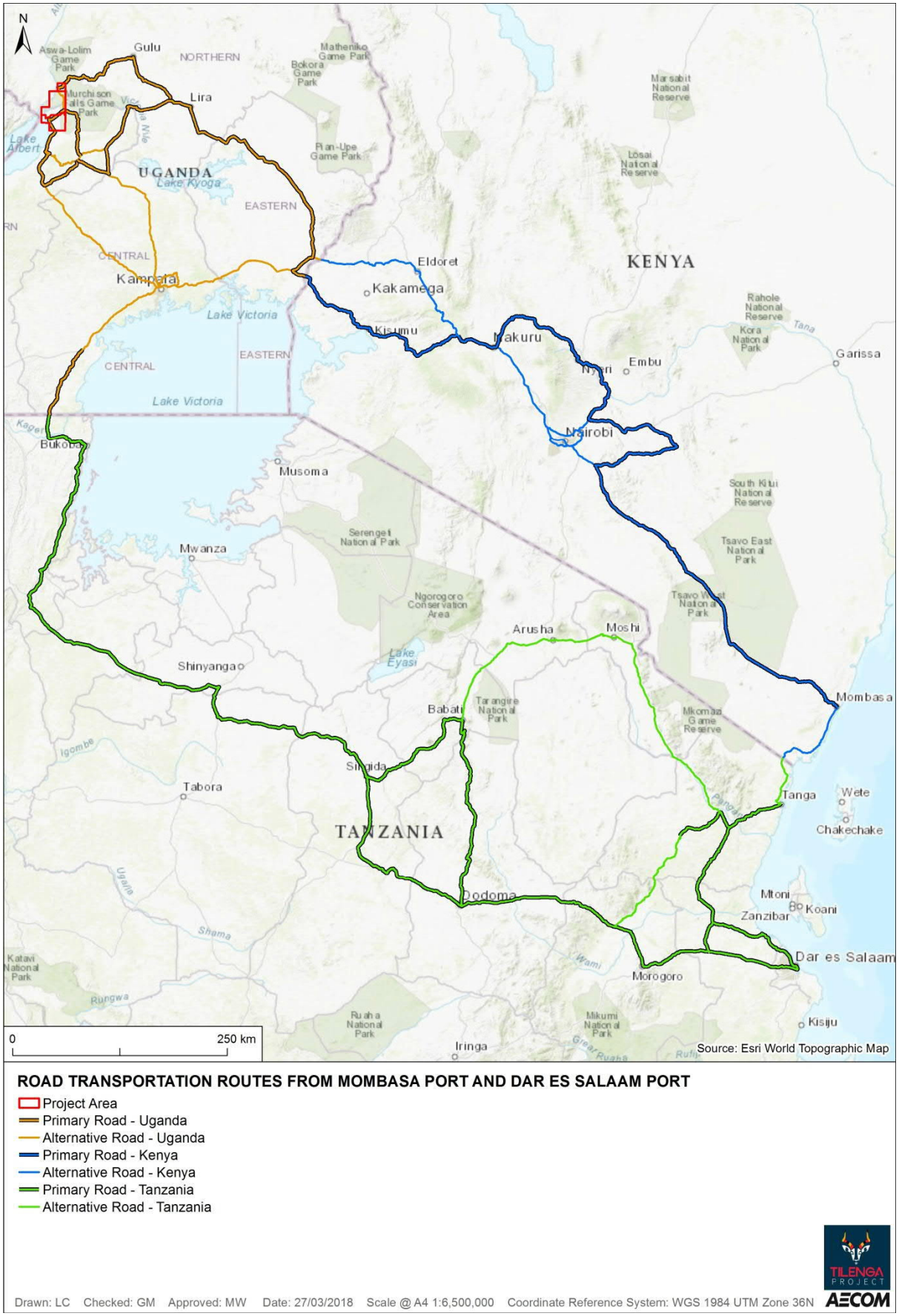


Figure 4-35: Road Transportation Routes from Mombasa Port and Dar es Salaam

The proposed routes are summarised below, with the preferred route being via Mombasa:

- **Kenya:** Mombasa – Machakos – Kitui – Nakuru – Kericho – Kisumu – Busia
  - *Uganda (north of the Nile):* Busia – Tororo – Soroti – Lira – Karuma – Tangi (Pakwach)
  - *Uganda (south of the Nile):* Busia - Tororo – Soroti – Lira – Kigumba – Kibangya – Masindi
- **Tanzania:** Dar es Salam – Dodoma – Singida – Mutukula
  - *Uganda (north of the Nile):* Mutukula - Kyotera - Mbirizi – Sembabule - Mubende - Kibuye - Hoima - Masindi - Karuma - Tangi
  - *Uganda (south of the Nile):* Mutukula - Kyotera - Mbirizi – Sembabule - Mubende - Kibuye - Hoima - Masindi - Bugungu

As shown above, all vehicles travelling to the Project Area south of the Victoria Nile will travel via the Masindi Vehicle Check Point. Truck movements from Mombasa to Tangi will not go via the Masindi Vehicle Check Point given that Project activities are not as busy in this area.

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 safety and practicable to do so. Drivers will be required to have a break during their journeys (every 2 hours for light vehicles, and every 4 hours 30 minutes for heavy vehicles).

4.9.12.3 Routing to Masindi

As shown in Figure 4-36 a 'one-way' traffic flow is proposed for safety reasons, with the R3 road being the main entry into the Project work site and the R1 road being the main exit from the site.

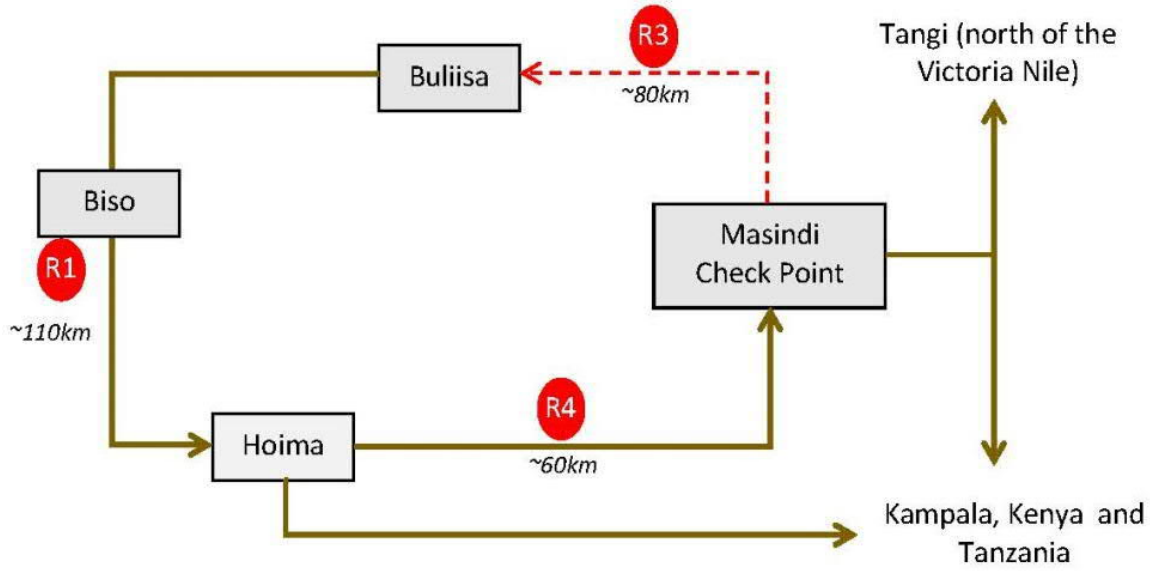


Figure 4-36: One-Way Traffic Flow In and Out of Buliisa

Kisanja-Park junction (R3 Road): R3 is part of the UNRA Oil Critical Road program for upgrade. The R3 road from Masindi Airstrip to Bugungu gate is currently a murram road of less than 4 m width used as an entry point to MFNP South Nile (Kichumbanyobo gate), 60km of which are located within the MFNP; with about 20 km across the Budongo Forest.

Upon completion, the road will be a bituminous Class II standard road of 7 m width, two-lane carriageway and shoulder width of 2 m (UNRA ESIA, 2017 Ref. 4-3).

Project traffic on this road is estimated at 80 daily movements on average (trucks, buses, and light vehicles).

Hoima-Wanseko through Biiso (R1 Road): R1 is also part of the UNRA oil critical road program for upgrade. The 110 km road from Hoima-Biiso-Buliisa-Wanseko is currently a murram road with less than 5 m width, and lacks shoulders and drainage.

Upon completion, the road will be a bituminous Class II standard road of 7 m width, two-lane carriageway and shoulder width of 2 m, with 50 m Right of Way (UNRA ESIA, 2017 Ref. 4-4).

Project traffic on this road is estimated at 80 daily movements on average (trucks, buses, and light vehicles).

4.9.12.4 Routing during the Construction and Pre-Commissioning Phase

The Industrial Area and the Tangi Operational Base will operate as hubs for the south and north areas, respectively. As summarised in Section 4.3.6 and shown in Figure 4-12, a number of inter field tracks will provide access to the well pads throughout the Construction and Pre-Commissioning Phase of the Project.

The Tangi camp is located by the main road between Pakwach and Karuma, and accessible by good tarmac road from Mombasa / Kampala. Well pads within MFNP will be accessed from Tangi Construction Support Base by road (refer to Section 4.3.6). In addition, the well pads located in the MFNP will also be accessed from the south of the Victoria Nile.

4.9.12.5 Personnel Transportation

80% of crew changes (3,500 people) will be made by road and 20% (900 people) will be transported by air from Entebbe Airport to either Bugungu or Pakuba airstrips every 4 weeks. Crew changes are planned to be undertaken 6 days a week.

4.9.12.5.1 By Road

To complete crew changes of 3,500 people by road in a month, five 30-seater bus trips will be required to transport an average of 150 personnel per day. The main mobilisation points will be to and from the Industrial Area, Bugungu Camp, Buliisa Camp and Tangi Camp.

4.9.12.5.2 By Air

Crew changes for approximately 480 people per week will be undertaken by air on small aircraft (for example B1900D). One flight will move 30 people (15 people per flight in, and 15 people per flight out), with an average of 16 flights per week.

It is assumed that 82% of the flights will go to Bugungu and 18% will go to Pakuba. Movements in Buliisa and Pakuba airstrips will require 64 mini-bus trips per month between camp and airstrip.

4.9.13 Decommissioning Masindi Vehicle Check Point

Decommissioning work at the Masindi Vehicle Check Point will be undertaken at the end of the Construction and Pre-Commissioning Phase. It will involve up to 38 workers and will require the removal of temporary containers. The Base Case is that all facilities will be removed and the site will be made safe and remediated in accordance with regulatory requirements.

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.

4.9.14 Decommissioning of Buliisa Camp, Bugungu Camp and 17 ha of Tangi Camp

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.

The boreholes within the Buliisa and Bugungu camps will be plugged and abandoned following completion of the Construction and Pre-Commissioning Phase. However, the possibility to transfer ownership of the camp boreholes to the community will be explored.

4.10 Commissioning and Operations Phase

4.10.1 Overview

The operating philosophy will be based on low-impact and minimum intervention, e.g. to be achieved by multi-well pads usually operated as un-manned facilities, with inherent fail-safe design and capability for remote monitoring and control of the wells, etc. The fluids will be subsequently combined at the CPF, to be treated to achieve the required product specification prior to storage and export.

The Operating Philosophy will be based on the following key operating principles (KOP) as follows:

- The development will include well pads linked to the CPF via the Production and Injection Network;
- Water will be injected using produced water and abstracted water from Lake Albert in the following fields: GNA, NGR, JBR, KWA and NSO. There will be no produced water disposal;
- Well pads will be not normally manned facilities. Only daytime operations and maintenance activities are undertaken. Night working by field operations will not normally be permitted except for drilling/completion and well interventions activities;
- The CPF will be permanently manned and the monitoring and control of the overall facilities will be managed from the CPF Central Control Room;
- The CPF export facilities (storage tanks, export pumps) will be controlled from the CPF Central Control Room via the CPF Integrated control and safety system (ICSS);
- A collaborative Centre for both upstream and pipe export and facilities will be established in Kampala for monitoring, optimisation and efficient site support;
- All the operations support for the well pads will be located in the CPF;
- The Project design will ensure remote monitoring and operations is maximised as much as practicable;
- The installation of FOC will ensure reliable connectivity with the pipeline leak detection system built into the fibre optic technology;
- Equipment at the well pads has been minimised as far as practicable;
- The Project Proponents will develop and implement a robust recruitment, training and development program for Ugandan nationals for life of Project; and
- Integrity of the installations will be safeguarded by having a robust maintenance and inspection program in place for life of field.

Operations support for the entire Project Area will be provided from the Industrial Area Operations Support Base located within the boundary of the Industrial Area.

Table 4-3 in Section 4.3 presents the operational aspects of all permanent components of the Project.

4.10.2 Organisation

The CPF and well pads located south of the Victoria Nile will be under the responsibility of the Plant Manager based at the CPF. The Plant Manager will assume the overall responsibility for operations and safety (Health, Safety and Environment (HSE) Responsibilities) of the Project. For well pads located north of the Victoria Nile, the Plant Manager (RSES) will delegate the responsibilities (HSE and Operations) to the Operations Team undertaking monitoring for the well pads located to the north of the Victoria Nile.

The following principles are expected to be applied:

- Production teams will work on a 2-shift basis (day shift: 06h00-18h00 / night shift: 18h00-06h00) with regular cumulative breaks (days off) in compliance with Ugandan law. During night shift, the

activity will be limited to the surveillance of the facilities to ensure that all equipment is running in safe condition and follow-up well intervention/ well drilling and completion activities;

- Maintenance team will be organised as 'day staff', nevertheless, every day the maintenance coordinator will identify one 'on call' duty specialist for mechanical, electrical, instrumentation and ICSS. The Plant Manager will mobilise the 'on call' specialist as required;
- In the event of shutdown of all or part of the installations, the day staff, which will be present on site, could be called-out during the night if needed; and
- Production and maintenance teams working outside will maintain permanent radio communication with staff in the Central Control Room (Ultra high frequency (UHF) radios).

4.10.3 Commissioning

Commissioning activities will be limited to checking the equipment and plant prior to first oil to ensure it operates correctly and addressing any issues identified. The testing of equipment and plant will be undertaken twice. Commissioning activities will comprise the following key activities, which will be managed by a dedicated Commissioning Team:

- Verification of safety systems to ensure they have been properly installed;
- Energising of electrical systems and electrical driven equipment;
- Emergency Shutdown system checking;
- Undertake initial visual review of plant/equipment and document (punch list) any deficiencies following by a second review to ensure close out of all punch list items;
- Start-up of utility systems and start transfer to a 24/7 shift system;
- Visual inspections of all systems and sub-systems; and
- 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.

As part of the commissioning activity, equipment/ plant and system will be subject to an operational test, which consists of bringing into service, as close as possible to normal operating condition and for a significant period of time, the equipment, using inert or process fluids as necessary. The objective of the operational test is to:

- Test all situations and configurations that might lead to problems during normal operation; and
- Prove that the safety key performance standards, the integrity, the operating range, design parameters, the readiness are suitable in the site final configuration.

It is essential that all systems will be fully commissioned and must be RFSU (Ready for Start-Up) before final hand-over to Operations. All systems will be fully transferred from construction to commissioning to start-up with hand-over dossiers. Commissioning will be considered complete once all testing activities have been carried out successfully.

4.10.4 Start up

Once commissioning is completed, and the plant is handed over to the Operations Team, a dedicated start-up procedure is initiated and implemented. The initial start-up sequence for the main support systems are identified in Table 4-32.

Table 4-32: Start-up Sequence

Sequence	System	Function	Comments
1	Utilities>Diesel	Provide fuel to power generators	Initial inventories of diesel to be sufficient to sustain Commissioning activities and Operational Test Plan (OTP) and able to keep up with the ramp up of power until sufficient gas is available and fuel switch is possible
	Utilities>Air System	Provide air to instruments and services	Modularity of the system to start zones is important for staged approach
	Water>Lake Water Abstraction System	Provide water for services and production	First main operational area to start after utilities. Will support OTPs before commissioning and will fill Fire Water System (FWS) and potable water
	Water>Potable Water	Sustain camp requirements	Proper treatment of water in terms of quality
2	Power> generators	Supply power	Emergency Diesel Generator (EDG) will start sustaining services needed for black start and will be followed with the first genset at low load and power bar transfer
	Water>FWS	Fire protection	This system could be started in level 1 if possible, inventories should be toped up and subsequent testing of areas
	Control>SCADA	Remote control of facilities	Temporary console will be available to allow early testing and transition
	Power>Heat Trace	Enable heat to maintain crude above WAT	As a critical system for ensuring safe operations will have to be readily available

4.10.5 Operations

Figure 4-37 presents a schematic of the operational process for the Project. 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.

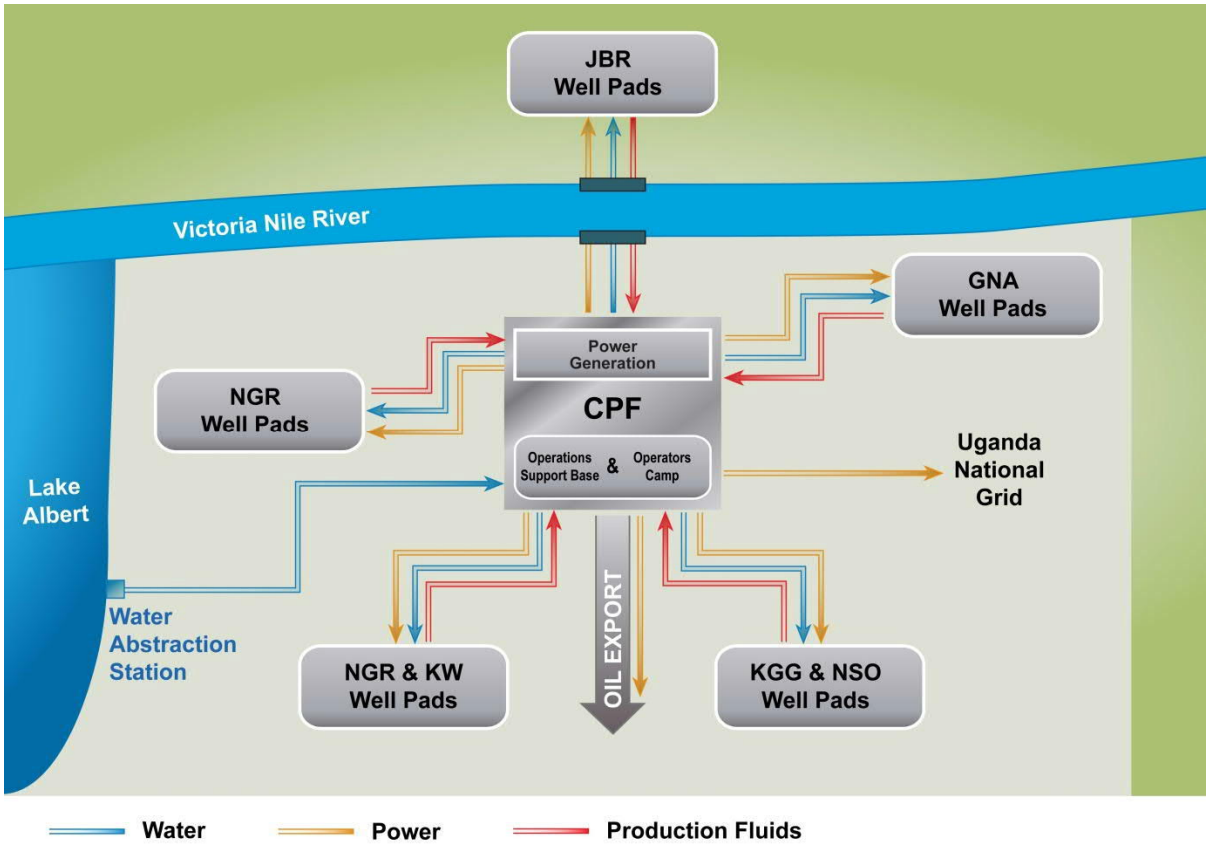


Figure 4-37: Schematic of Operational Process of the Project

4.10.5.1 Polymer Injection

The JBR-04 well pad will be used as a pilot to test for the effectiveness of the introduction of polymer to increase production, which is expected to last up to 18 months. As such, the JBR-04 well pad will also include a polymer plant preparation and pumping system for the duration of the pilot which will require regular visits to ensure its effective operation.

Polymers increase the viscosity of the water injected in the reservoir, therefore enhancing oil recovery. A pilot de-risking phase will start up to evaluate the potential benefit of future full-field polymer injection and its feasibility. The polymer solution is prepared on the JBR-04 well pad using the water coming from the single trunkline and diluted directly at the well head through a static mixer. The pilot operations are divided into two phases:

- Phase 1 with preferential use of water abstracted from Lake Albert (duration: 12 months or longer); and
- Phase 2 with preferential use of Produced Water (duration: around 6 months or longer).

Workers will be present at the JBR-04 well pad during the day only to operate the polymer unit for the duration of the pilot. The pilot polymer will include:

- A polymer preparation unit on the well-pad JBR-04, sized to prepare 2,000m^3/day polymerized water;
- Two injectors wells equipped with low shear rate chokes at first oil;
- Two producer wells: one normal and the other specific well for pilot; and
- A pilot test manifold connected to the two producer wells and a test separator.

Polymer consumption will be circa 1.5 tons/day and delivered to the JBR-04 well pad for polymer preparation by truck (one truck per week).

Polymer will be delivered in 750 kg bags from the chemical provider plant to the warehouse within the Industrial Area Operation Support Base. In the warehouse, polymer bags will be unloaded and stored. The warehouse will have capacity to store up to 35 days' worth of polymer.

It is currently planned to use HPAM 3630S product produced by Floeger. While the product is considered non-toxic, it does not biodegrade. During the pilot two types of chemicals will be used:

- Polymer (anionic polyacrylamide) 3630S; and
- Ammonium bisulfite (O_2 Scavenger).

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.

The quantity of polymer required for the pilot and the expected back produced volume is presented in Table 4-33.

Table 4-33: Expected Quantities of Polymer Required for Pilot Project

Month	Consumption Volume (t/day)	Back Produced (t/day)
1	1.73	1.04
2	1.54	0.92
3	1.54	0.87
4	1.40	0.84
5	1.37	0.82
6	1.33.	0.80
7	1.31	0.78
8	1.28	0.76
9	1.25	0.75
10	1.22	0.73
11	1.21	0.73
12	1.20	0.72
13	1.19	0.72
14	1.18	0.71
15	1.17	0.70
16	1.17	0.70
17	1.16	0.70

The rate of back-produced polymer will be highly dependent on the reservoir characteristics. This has an impact on the quantities and timing of the detection of back produced polymer in the surface facilities. For the purpose of preliminary estimation, an average of 60% is taken as the rate of back produced polymer.

Due to the high dilution factor with the liquid rates at the CPF, it is estimated that the concentration of polymer in the water re-injected into the reservoir will not exceed 50ppm during the pilot. By virtue of the closed nature of the oil/water separation process, the back produced polymer will remain in circulation with the re-injected produced water.

4.10.5.2 Process Chemicals

Production chemicals will be used during the Operations phase. They can be used for various applications including but not limited to:

- Equipment protection (such as corrosion inhibition, reduction of deposit formation, oxygen or fouling formation); and
- Hydrocarbon Process Separation (oil/water separation including control of foam, emulsion, wax, coagulation).

For any chemical usage, a thorough Chemical Risk Assessment will be undertaken and lowest toxicity chemicals will be used wherever possible. Table 4-34 provides an overview of some of the production chemicals which are likely to be used in the production process. A number of example Material Safety Data Sheets (MSDS) for a selection of these chemicals are included within Appendix E (the actual products names and suppliers may change depending on drilling and operational requirements).

Table 4-34: Example Production chemicals

Type of Product	Brand Name	Usage
Acetic Acid	-	Continuous
Corrosion Inhibitor	-	Continuous
Biocide	-	Continuous
Napthenates dispersant	-	Continuous
Oil anti-foam	-	Continuous
Demulsifier	-	Continuous
Scale inhibitor	-	Continuous
Oxygen Scavanger	-	Continuous

4.10.6 Operational Maintenance

4.10.6.1 Workover Activities

A capacity to intervene in wells (for example for ESP maintenance) will be maintained by the retention of two light workover rigs and several rigless intervention means. During the full field life (25 years), it will represent an estimated 50 to 80 workovers per year will be required. A typical set up for a light workover rig set up is shown in Figure 4-38.

Well intervention can range from light intervention (lowering tools or sensors into a live well) or heavy interventions where production is ceased and equipment replaced (i.e. wellhead). The following have been identified as potential non-routine well interventions:

- Change of valves on Christmas tree or wellhead;
- Pressure measurement: static pressure, flowing or injecting pressure, build up or fall off pressure;
- Well treatment such as acid, scale squeeze, water shut off;
- Well clean out for fine/sand and deposit (wax, scale); and
- Cavity pump replacement.

Each well pad will be equipped with the following utilities to enable workover rigs to operate:

- One high voltage (HV) electrical feeder to supply to enable rigs to run on electrical mode (around 1MW); and
- Hot water supply stations at the manifold including one isolation valve and one manual control valve to supply around 200m^3 for each workover operation.

Workover activities may be undertaken at any time during the year and are expected to be a 24hr/day activity based on a 12hr/day shift pattern of the workers.

During workover activities, the majority of workers will be accommodated within the mini camps at each well pad and the nearest Operational Camp (Industrial Area or Tangi). It is expected that workover activities will require a workforce of up to 30 workers.

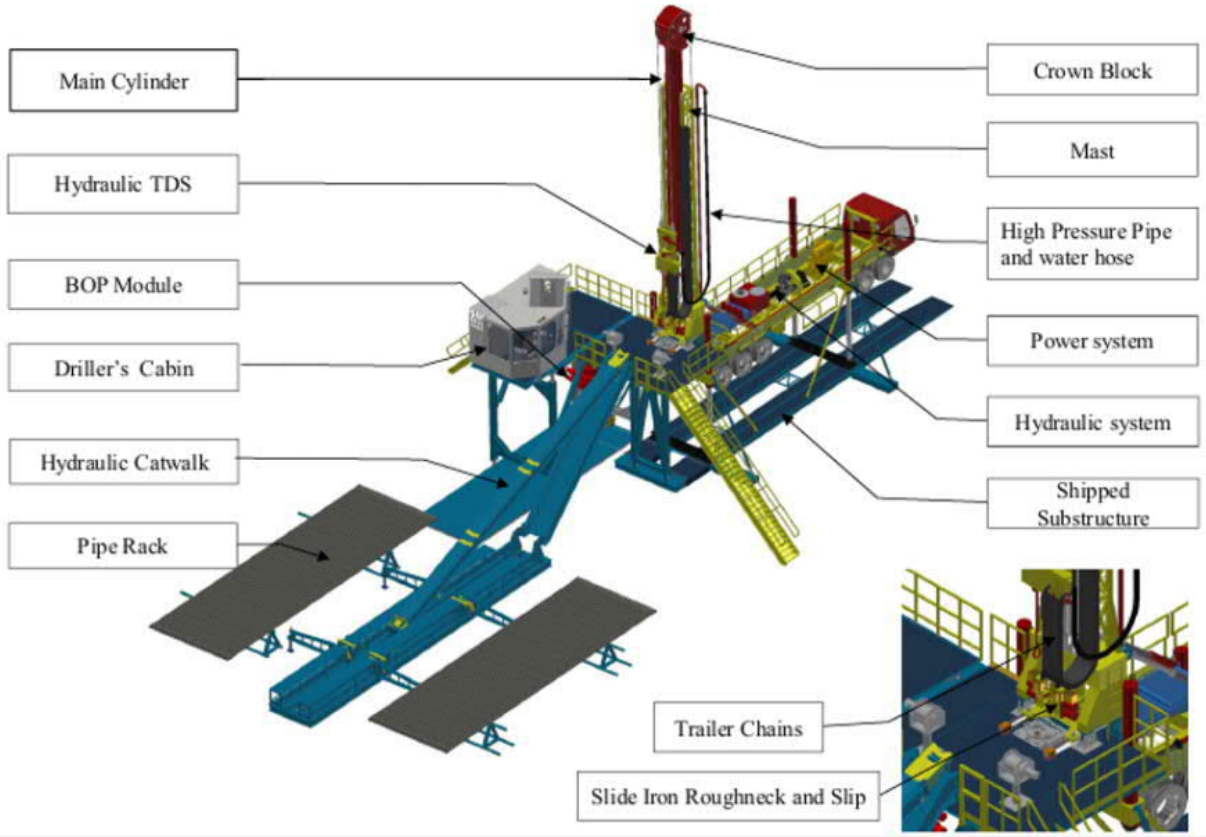


Figure 4-38: Example Light workover Rig Typical Set Up

4.10.6.2 Operational Pigging

Periodic pigging will be required throughout the Commissioning and Operations Phase, for the following purposes:

- Wax removal;
- Sand management;
- Batched application of chemicals, e.g. biocide; and
- In-line inspection.

The wax and sand management requirements apply only to the oil production pipelines. The frequency of pigging will vary both from field to field and with time, but will typically be of the order of once every two weeks. Pigging waste will be collected and transferred offsite at a licensed facility for disposal.

4.10.6.3 Venting and Annulus Management

Localised, low volume and low frequency gas venting will be required at the well pads for maintenance activities and for annulus gas venting purposes. This will be done locally via manually operated valves vented to a safe height at the production manifold (approximately 5 m high). In some cases, continuous annulus venting may be necessary due to the well architecture. For such cases, dedicated facilities will be installed to route any vented gas back into the production network. This will be done with dedicated piping and mobile compression units. The requirements for annulus management activities at the well pads will be reviewed during the Commissioning and Operations Phase.

4.10.6.4 Seismicity Monitoring

Given that the Project Area is located within the EARS, the Project Proponents will establish a Passive Seismic Network of seismograph stations in the area to enable detection of naturally occurring seismic events. The programme will involve geohazard monitoring, from which the results

will be used to establish a baseline and provide data throughout the Commissioning and Operations Phase.

4.10.6.5 Subsidence and Ground Movement Monitoring

The Project Proponents will undertake analysis of archive images from Interferometric Synthetic Aperture Radar (InSAR) for ground movement data in the Project Area. Based on the results, the following ground subsidence evaluation will be undertaken:

- Weekly monitoring of the reservoir pressure (on a weekly basis – real-time pressure gauges) will allow to quickly detect any issue and compensate by re-distributing water injection accordingly; and
- Periodic purchase and analysis of Radarsat-2 imagery to assess ground motion evolution.

4.10.6.6 Flaring at CPF

As described in Section 4.3.4.2, there will be no routine flaring associated with production activities at the CPF. Although the majority of flaring will be limited to unplanned events, some flaring is also expected during start up, plant stabilisation and maintenance (one gas compression train non-operational for two six hour periods per month). Such flaring events are expected to be limited to maximum of 48 hours in duration. Reducing the frequency of flaring events will require a high plant reliability (>93%) and is therefore a main design focus.

Both flare options (EGF and EF) have been considered in Chapters 6 to 22 of this ESIA. The flare design will be subject to further investigation during detailed design to demonstrate its suitability in terms of safety, environmental and operability aspects through further studies.

4.10.7 Victoria Nile Ferry Crossing Facilities

A ferry, located at Paraa will provide an alternative route connecting the South and North of the Project either side of the Victoria Nile, to that of road transport. At the location of the proposed Victoria Nile ferry crossing point the river is approximately 400 m wide. 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. Between six and eight ferry movements are anticipated per day.

4.10.8 Production and Injection RoW

The Production and Injection Network will have a 30 m RoW (15 m either side of the centreline of the pipeline). Ongoing access will be required to the pipeline route throughout the Operations Phase of the Project and for well pads located north of the Victoria Nile the permanent RoW will be used for inter field access. 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.

There will be no permanent access restrictions to the pipeline RoW.

4.10.9 Road

Roads N1, N2, B1, B2, A1, section of A2 and section of A3 will have a permanent 50 m wide RoW. With the exception of the D roads, for all other roads the permanent RoW will be 30m wide from the centre point of the road. For the D roads a 15m RoW will be maintained.

4.10.10 Work Force

During the Commissioning and Operations Phase of the Project it is envisaged that operations will employ approximately 200 workers. The workers will be based at either the Industrial Area Operational Base or the Tangi Operational Base. Workers will be transported to the Project during the Commissioning and Operations Phase via road and air as summarised in Section 4.9.12.5.

4.10.11 Water Demand

During the Commissioning and Operations Phase it is anticipated that the water will be sourced from:

- Aquifers via a series of boreholes; and
- Lake Albert (following the installation of the Lake Water Abstraction System).

Table 4-35 presents a summary of the water demands during the Commissioning and Operations Phase.

4.10.12 Vehicles, Equipment and Plant

Truck movements associated with the Commissioning and Operations Phase will be limited to the delivery of materials (i.e. polymer) and workforce. Preliminary estimates indicate that movements are expected to be less than 20 movements per month.

4.11 Decommissioning

The expected service lifetime of the Project is 25 years. The decommissioning program will be developed during the Commissioning and Operations Phase of the Project. It is likely that the technological options and preferred methods for decommissioning of such systems will be different in 25 years' time. The status of the Project at the time of decommissioning will also impact on the chosen decommissioning methods. An overview of the currently envisaged decommissioning plan is provided below.

It is envisaged that the process of developing detailed decommissioning management plans may be staged, initially outlining potential options and studies required for discussion with the regulatory authorities, and finally leading to agreed plans prior to the commencement of decommissioning. 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 reuse strategy for Project components and wastes. Completion criteria will be detailed in the management plans. These completion criteria will be determined in consultation with the respective national and local authorities.

Documentation or processes addressing the issues outlined below will be developed to further support the implementation of detailed decommissioning management documentation:

- Incident reporting, recording and investigation;
- Chemical and hazardous substance management;
- Waste management;
- Dust management;
- Traffic management;
- Soils management;
- Health, safety and environmental site induction; and
- Spill contingency.

Under all circumstances, decommissioning activities to be undertaken in accordance with the international and national legislation and regulations prevailing at that time, and in liaison with the relevant regulatory authorities.

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. The review will outline management controls and demonstrate that the decommissioning activities will not cause significant environmental and social impacts. The Project Proponents will obtain all relevant approvals and authorisations for all decommissioning activities from the GoU departments responsible at the time.

Table 4-35: Approximate Water Demand during the Commissioning and Operations Phase

Activity	Total	Annual Water Demand from Groundwater and Surface Water Sources (Cubic Metres)																									
		Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28
Water Sourced from Groundwater																											
Operation of Tangi Camp (including equipment and vehicle washing and dust suppression)	677,594		-	-	-	-	-	66,151	66,151	63,870	45,620	33,487	31,639	31,639	31,639	31,639	25,069	25,069	25,069	25,069	25,069	25,069	25,069	25,069	25,069	25,069	25,069
Operation of the Industrial Area Camp (including equipment and vehicle washing)	447,370	-	-	-	-	-	-	41,741	41,741	38,320	21,895	20,712	18,864	18,864	18,864	18,864	18,864	18,864	18,864	18,864	18,864	18,864	18,864	18,864	18,864	18,864	18,864
Work over activities north of the Victoria Nile (including domestic use)	164,250		3,650	3,650	3,650	3,650	3,650	7,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300
Work over activities south of the Victoria Nile (including domestic use)	379,600	-	-	3,650	3,650	3,650	3,650	18,250	18,250	18,250	18,250	18,250	18,250	18,250	18,250	18,250	18,250	18,250	18,250	18,250	18,250	18,250	18,250	18,250	18,250	18,250	18,250
Operation of the Liquid Mud Plant (brine) and CRI	1,073,100	-	-	-	-	-	51,100	51,100	51,100	51,100	51,100	51,100	51,100	51,100	51,100	51,100	51,100	51,100	51,100	51,100	51,100	51,100	51,100	51,100	51,100	51,100	51,100
Groundwater Demand TOTAL	2,741,915	**-**	**3,650**	**7,300**	**7,300**	**7,300**	**58,400**	**184,542**	**184,542**	**178,839**	**144,164**	**130,849**	**127,153**	**127,153**	**127,153**	**127,153**	**120,583**	**120,583**	**120,583**	**120,583**	**120,583**	**120,583**	**120,583**	**120,583**	**120,583**	**120,583**	**120,583**
Water Sourced from Surface Water																											
Re-injection Activities	142,939,995		8,973,094	11,213,711	11,621,383	12,517,756	12,069,757	11,125,300	9,049,844	7,573,580	6,419,405	5,730,245	5,136,575	4,661,960	4,327,275	3,884,474	3,590,087	3,300,564	2,908,965	2,866,229	2,735,654	2,477,332	2,397,672	2,280,169	2,083,302	2,012,446	1,983,214
Construction Activities	14,155,442							707,772	707,772	707,772	707,772	707,772	707,772	707,772	707,772	707,772	707,772	707,772	707,772	707,772	707,772	707,772	707,772	707,772	707,772	707,772	707,772
Surface Water Demand TOTAL	**157,095,437**	**-**	**8,973,094**	**11,213,711**	**11,621,383**	**12,517,756**	**12,069,757**	**11,833,072**	**9,757,616**	**8,281,352**	**7,127,177**	**6,438,017**	**5,844,347**	**5,369,732**	**5,035,047**	**4,592,246**	**4,297,859**	**4,008,336**	**3,616,737**	**3,574,002**	**3,443,426**	**3,185,104**	**3,105,444**	**2,987,941**	**2,791,074**	**2,720,218**	**2,690,986**

During the Decommissioning Phase, activities on site associated with the removal of infrastructure will increase in intensity relative to those occurring during the Commissioning and Operations Phase of the Project. Of particular note are the potential environmental and social impacts associated with the following activities:

- The demolition of facilities and infrastructure;
- Equipment and vehicle movements; and
- Earthworks.

An ESIA may be required before decommissioning commences in order to confirm that the planned activities are the most appropriate to the prevailing circumstances; this will be agreed with GoU departments responsible at the time and future land use. The decommissioning assessment will aim to demonstrate that the decommissioning activities would not cause unacceptable environmental and social impacts and would lead to the development of specific management controls.

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 assessment identifies it is acceptable, in some locations pipeline sections may be cleaned, reclaimed and reused.

During the Decommissioning Phase the following assumptions are applicable regarding supporting facilities:

- 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;
- Drainage systems will remain until sites are free of contamination. SuDS will also manage flood risk during this phase of work;
- No discharge of water used for decommissioning activities will be discharged to the environment;
- 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;
- Lighting will be reduced to the minimum and its design consider need to limit associated nuisances (e.g. light directed inwards, of warm/neutral colour) without impacting safety and security. As per base case there will be no routine nightshift activities associated with this Phase;
- A Construction Support Base will be constructed within the Industrial Area for use during the Decommissioning Phase;
- 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; and

- Waste will be segregated and managed in accordance with a Waste Management Plan.

Prior to undertaking decommissioning activities, the Project Proponents will undertake a review of historical monitoring data and incidents on site that might have caused contamination.

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.

Completion criteria will include vegetation community composition, extent of weed infestation, erosion control and visual amenity of the site. These completion criteria will be determined in consultation with the local and national authorities.

4.12 Stakeholder Engagement

A Stakeholder Engagement Plan is already in place; this will ensure the community are informed and consulted both prior to the commencement of work on site, during the works on a regular basis and after. As stated above a Grievance Mechanism will be established for the local community to raise complaint and concerns relating to Project activities (i.e. dust, noise etc.). More details are presented in ***Chapter 5: Stakeholder Engagement.***

4.13 National Content

The Project Proponents are committed to promoting economic development through implementation of their industrial development which requires training, capital investment and maintaining a steady level of activity.

The Project will take an integrated approach to National Content development as shown in Figure 4-39. This approach aims to capitalize on the development phase to build the capacity of the companies that will work on the upcoming operations needs and that will drive the growth of the Ugandan oil and gas industry and general economy farther down the road.

The national content strategy aims at enhancing the performance/capacity of Ugandan companies, Ugandan manpower and registered entities in petroleum activities so as to encourage local investment and participation; in full consideration of the Project's Quality, Health, Safety and Environmental standards. More details are presented in ***Chapter 23: Environmental and Social Management Plan***.

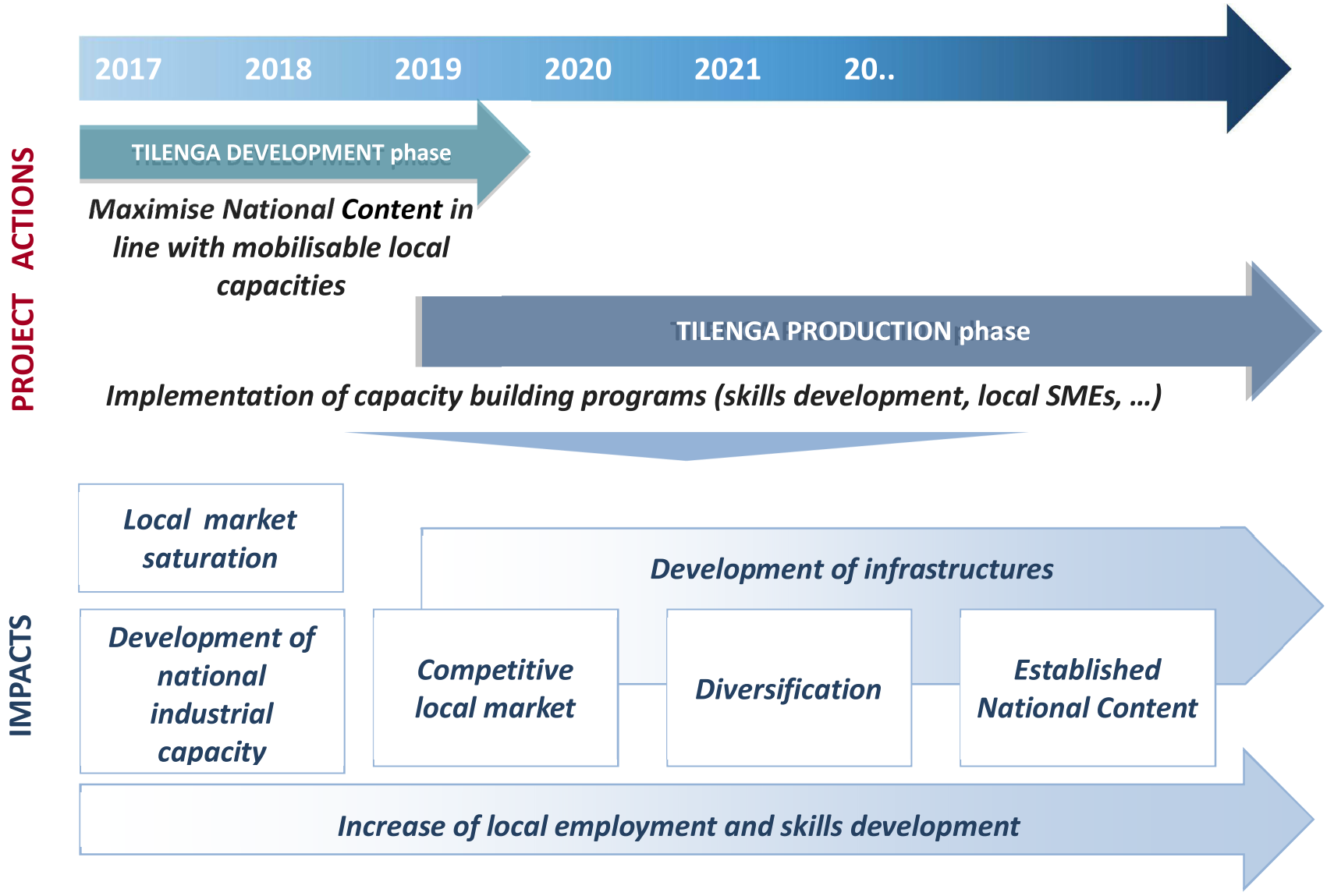


Figure 4-39: National Content Development

4.14 Waste

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.

Chapter 12: Waste provides a summarised waste map through the phases of the Project, including quantities/volumes of waste expected to be generated, the types and the proposed treatment/disposal routes. The Section below provides a summary of the waste management facilities that will be deployed within the Project Area.

4.14.1 Site Preparation and Enabling Works Phase

During the Site Preparation and Enabling Works Phase, at least two waste storage areas will be established, one at the Industrial Area and one at the existing Tangi Camp. Waste will be transferred from the construction worksites to these waste storage areas where waste materials will be segregated into hazardous, non-hazardous and recyclables. Prior to transfer offsite to a licensed waste treatment facility, waste materials will be segregated and stored in appropriate containers to prevent:

- 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.

Suitable containers and bins will be provided for medical wastes generated at the clinics, which will be managed directly by the Project Proponents' selected Waste Management Contractors including transfer for disposal to a licensed facility.

The existing camps have operating 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.

A flow meter will be integrated at the discharge point of the WWTPs to record all discharges and a sample point will be established to collect spot samples for analysis.

4.14.2 Construction and Pre-Commissioning Phase

All solid waste materials, hazardous and non-hazardous (excluding cuttings and fluids from drilling activities) will be transported to the centralised Integrated Waste Management Areas (IWMAs) for pre-treatment activities. The location of the IWMAs is still under consideration as part of the Waste Management competitive call for tender process and was not defined at the time the ESIA Report was prepared. Waste materials will be segregated and stored in line with criteria presented in Section 4.14.1.

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.

Sewage produced from the camps and other Project Areas will be treated at the WWTPs located at the camps in compliance with regulatory requirements (refer to ***Chapter 10: Surface Water***). Wastewater from the well pads will be collected and transferred by tanker to the nearest WWTPs.

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 presented in ***Chapter***

10: Surface Water or transferred to the Masindi sewage treatment plant for processing (depending on capacity and approval).

4.14.3 Commissioning and Operations Phase

During the Commissioning and Operations Phase waste will be stored and processed at the IWMA located south of Victoria Nile. There will be no waste management facility located north of the Victoria Nile within the MFNP.

Wastewater generated during the Commissioning and Operations Phase will be processed by a dedicated WWTP at the Industrial Area and Tangi Camp Operation Support Base in line with the description provided in 4.14.1. 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.

4.14.4 Decommissioning

During the Decommissioning Phase, it is envisaged that additional waste storage areas will be established at key locations to manage specific waste streams (fluids and solids from the cleaning and flushing of equipment), demolition wastes from the dismantling operation and wastes generated from the workforce. Wastes will be segregated and stored in line with the criteria established in Section 4.14.1. A dedicated Waste Management Plan will also be developed for the Decommissioning Phase as stated in Section 4.11.

4.15 Management of Change

The information detailed within this chapter has been prepared based on the information provided by the Project Proponents as of January 2018, and has been used for the purposes of the impact assessment process provided within this ESIA. However, during the detailed design development of the Project, there may be a requirement to amend design elements or processes which could result in a deviation from the information that is presented in this chapter. This will apply in particular to the Site Preparation and Enabling Works, Construction and Pre-Commissioning, and Commissioning and Operations phases of the Project. In order to keep track of any key design changes, the Project has implemented a management of change process to manage any such amendments to the Project design, and which will also:

- Assess the potential consequences of the design changes with respect to environmental and social impact; and
- In cases where a significant impact is considered likely as a consequence of the amendment or change, to inform and consult with relevant parties on the nature of the impact and on proposed mitigation measures, where practical and appropriate.

A detailed summary of the Management of Change process is presented in ***Chapter 23: Environmental and Social Management Plan***.

4.16 Impact mitigation hierarchy and Embedded Mitigation

4.16.1 Introduction

The facilities design has been developed in line with Ugandan regulatory requirements and has incorporated Best Available Techniques (BAT) (as per European Union (EU) BAT Reference Document (BREF)), IFC EHS guidelines and GIIP requirements (as detailed in ***Chapter 2: Policy, Regulatory and Administrative Framework***) as far as possible. Furthermore, the Project will further consider the BAT during the detailed design of the Project. In line with both IFC PS1 and GIIP, the engineering and design development of the Project has incorporated a number of embedded mitigation measures into the Project design and construction activities as described below.

The Project Proponents have achieved this by following the Mitigation Hierarchy as presented in ***Chapter 3: ESIA Methodology***, where the preference is to avoid and then to minimise before restoring and finally offsetting.

4.16.1.1 Avoidance

As demonstrated and detailed in Section 4.17, the siting options considered for key facilities took into account both environmental and social sensitivities. The Project Proponents initiated their own avoidance protocol which was used by the FEED Engineers in the development of the Project's design.

4.16.1.2 Footprint Minimisation

As described above, in line with the Mitigation Hierarchy, the early development of Project sought to avoid key sensitive areas and following this the Project was subject to further refinement during the FEED phase to minimise the footprint of the key components and in particular the well pads. The process was both environmental and socially driven as well as based on cost and operational productivity. Minimisation consisted of both reducing the number of individual components required for the Project as well as reducing the individual footprint for each Project component. These two processes further helped the Project to avoid potential negative impacts that otherwise may have occurred. The applied minimisation process is further detailed in Section 4.17.

4.16.2 Embedded Mitigation Measures

In addition to avoiding key environmentally and sensitive areas where possible and minimising the footprint, the Enabling Infrastructure and FEED design teams have incorporated embedded mitigation measures as part of the design. These measures also include mitigations to be implemented during the construction phase of the Project to further reduce the anticipated potential impacts. It should be noted that for the purposes of the impact assessment, it is assumed that all the embedded mitigation measures will be implemented.

Appendix E presents a summary of the key embedded mitigation measures (however this should not be considered as an exhaustive list).

4.16.3 Environmental and Social Requirements in Design

Prior to commencement of the FEED phase, the Project Proponents developed the Environmental Optimum Requirements document. The purpose of the document was to supply the environmental standards to be adopted for all phases.

The document has been developed in line with the requirements of the Uganda National Regulatory Framework and associated guidance; World Bank/IFC Performance Standards and the Environmental Health and Safety Guidelines and GIIP. In addition, the following commitments are explicit within the document:

- Reduce the potential environmental and social impacts at every stage of the Project (throughout the project lifecycle from design, construction work, operation through to field abandonment);
- Follow the mitigation hierarchy approach i.e. avoid, minimise, restore and offset in line with the Project Proponents' commitment to achieve no net loss/net gain to biodiversity;
- Identify potential environmental impacts and minimise the potential risk associated with those impacts and ensure prompt and effective response in case of any environmental incidents; and
- To reduce any potentially significant impact of the activities on the natural and human environment, mitigation measures shall be identified and selected according to Best Available Technique (BAT).

The Environmental Optimum Requirements have been embedded into the design documentation and construction methodologies development by Enabling Infrastructure, FEED and Drilling teams. In addition, ENVID (ENVironmental issues IDentification) studies have been undertaken under the direction of the Project Proponents. The purpose of the ENVID studies was to identify the environmental and social aspects specific for each phase (using a list of dedicated guidewords), determine the potential impact significance associated with each aspect and define the required mitigation measures to reduce potential impacts to as low as reasonably practicable (ALARP). The studies included routine, downgraded and accidental situations as part of the scope.

The results of each study were reviewed and documented. The ENVID reports summarise the results of these studies and presents the basis for the embedded mitigation measures for each Project phase as described in the Project Description.

In addition, a systematic assessment of Best Available Technique has been undertaken during FEED for the permanent facilities. The purpose of the review was to assess the proposed design against BAT criteria as defined with the associated BREF documents and demonstrate that the technology minimizes as much as possible its future potential impact on the environment and implements the most technically feasible and cost efficient technologies on the available market and has considered maintenance and operability issues as a key component. The study also summarizes the opportunities and recommendations to be taken forward to the Detailed Engineering to ensure the required environmental performance of the selected design option is progressed, focusing on the main emissions to air, water and land.

4.17 Alternatives

4.17.1 Introduction

This section examines the technically and financially feasible alternatives to develop the Project. These alternatives were considered during the development of Project and have led to the validation of the Project as it is described within this Chapter.

The objective of this section is to outline how the Project represents an optimised design that is technically and financially feasible whilst minimising overall potential environmental and social impacts.

This section also presents an overview of the optimisation of the locations selected for the key components of the Project demonstrating how the Project considered avoidance as a key measure to reduce the overall potential impact of the Project. This chapter also presents the refinement of the design of the key components which included minimising the footprints and reducing the interaction with the environment.

4.17.2 Regulatory Requirements

The Project must be developed according to the requirements for the EIA process in Uganda (The Environmental Impact Assessment Regulation 13/1998). These require for the EIA to provide:

- *"A description of the proposed site and reasons for rejecting alternative sites,*
- *The technology and processes that shall be used, and a description of alternative technologies and processes, and the reasons for not selecting them,*
- *The environmental effects of the project including the direct, indirect, cumulative, short-term and long-term effects and possible alternatives,*
- *An indication of whether the environment of any other State is likely to be affected and the available alternatives and mitigating measures"*

In addition, IFC PSs standards include specific requirements for the assessment of feasible alternative configurations for a project. The Guidance Note to IFC PS 1 stipulates that:

- *"For greenfield developments or large expansions with specifically identified physical elements, aspects, and facilities that are likely to generate potential significant environmental or social impacts, the client will conduct a comprehensive Environmental and Social Impact Assessment, including an examination of alternatives, where appropriate."*
- *"For greenfield developments, the ESIA includes an examination of technically and financially feasible alternatives to the source of such impacts, and documentation of the rationale for selecting the particular course of action proposed. The purpose of the alternatives analysis is to improve decisions on project design, construction, and operation based on feasible alternatives to the proposed project. The alternatives analysis should be conducted as early as possible in the process and examine feasible alternatives; alternative project locations, designs, or operational processes; or alternative ways of dealing with environmental and social impacts".*

The Project Proponents also considered the following IFC PSs: (5) Land Acquisition and Involuntary Resettlement, (6) Biodiversity Conservation and Sustainable Management of Living Natural Resource, and (8) Cultural Heritage which set specific requirements for avoidance, mainly defined based on the sensitivity of the Project Area.

4.17.3 Approach to Alternative Analysis

4.17.3.1 Overview

This section describes the approach to site selection, and the approach to design development introduced by the Project Proponents in response to the environmental and social characteristics of the area. The Project Proponents recognise the importance of the Mitigation Hierarchy as presented in ***Chapter 3: ESIA Methodology***. Avoidance is acknowledged as both the first and the most important component of the Mitigation Hierarchy, which has the greatest potential to reduce the environmental and social impacts and/or their significance.

The Project Proponents have therefore considered potential environmental and social impacts as a key factor of the decision making process as the design of the Project has evolved. The design of the Project has developed with the impact mitigation hierarchy being prominent in the decision making process of the FEED engineers, and avoidance of potentially negative environmental and social impacts has always been the preferred option.

This process has benefited the overall layout of the Project facilities whilst ensuring that the potential environmental and social impacts are reduced to as low as reasonably practicable, particularly with regard to reducing the requirements both for land take associated with the permanent facilities and temporary disturbance associated with the construction phases of the Project.

4.17.3.2 Avoidance Protocol

A Project specific Avoidance Protocol has been developed by the Project Proponents, and implemented by the Enabling Infrastructure and FEED engineers. The development of the Avoidance Protocol incorporated both the requirements of the Ugandan national regulations and IFC PSs with respect to the location, footprint extent and design of the Project components.

The framework presented in the Avoidance Protocol provides guidance to be applied during the assessment of the alternatives. It is based on a staggered approach favouring macro-avoidance of sensitive environmental and social features in the first instance (e.g. avoidance of urban centres and highly sensitive ecosystems) followed by micro-avoidance. The protocol defines a list of environmental and social features with an associated ranking (based on the sensitivity of the feature and its ability to recover after disturbance). Table 4-36 and Table 4-37 below show examples of macro and micro-avoidance features and their associated priority ranking (1 = most severe constraint).

Table 4-36: Example of Macro Avoidance for Social Features

Feature	Constraint Level / Ranking
Urban centre land-use	1
Semi-rural land use	2
Crop farming land use	1
Grazing land use	1

Table 4-37: Example of Macro Avoidance for Environmental Features

Feature	Constraint Level / Ranking
Kobleks	1
Hyena Dens (active)*	2
Marsh/ponds/other swamp	3
NFA reserved tree species	4
Streams (small rivers) and Wetlands	5
Vulture nests[11]	6
Significant Animal routes to the Victoria Nile	7
Wallow	1
Mature tree	2
Termites mounds (major aggregates)	3
Hyena Dens (inactive)	4
Burrow	1

The protocol also defines features associated with cultural heritage and on seasonal sensitivities.

4.17.3.3 Avoidance Protocol Implementation

The adherence to the Protocol was particularly relevant during the FEED Phase when the footprint of Project components was defined and options for avoidance were considered. The Protocol implementation is based on an iterative process requiring input from environmental, social and technical specialists to identify the most appropriate alternative in consideration of multiple constraints. When environment and social features were identified with limited technical alternatives

[11] Presence of critical habitat trigger species vulture nests in our area of operations has not been confirmed hence the proposed ranking. In case it gets confirmed then priority moves up to number 2

that could avoid both, the most appropriate option was defined upon discussion between Environment and Social experts.

The implementation of the Avoidance Protocol was supported by baseline data and mapping compiled from literature and previous environmental and social surveys within the Project Area. Geographic Information System (GIS) survey data were used to identify opportunities for avoidance and footprint minimisation in conjunction with the framework presented in the Protocol. This was supported by dedicated site visits to confirm the adequacy of proposed alternatives and/or identify alternative options.

As an example, an overview of all the inputs considered for well pad locations and overall footprint and the Production and Injection Network routing and extent of the RoW is presented in Figure 4-40. It should be noted that cost and operational productivity were also integrated into the decision process.

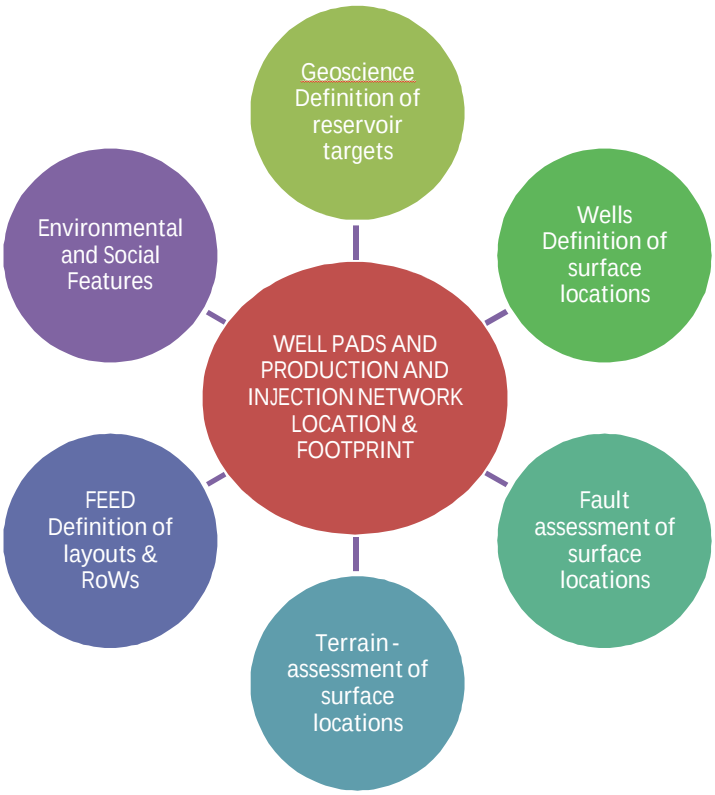


Figure 4-40: Overview of Inputs Considered in Defining the Location and Footprint of the Well Pads and the Routing and extent of the RoW of the Production and Injection Network

4.17.4 Project Zero Alternative

The zero alternative for the purposes of this document is the situation where the Project does not proceed. Under the zero alternative for the Project, there are no negative environmental or social impacts associated with Project development in Uganda as there are no construction or operation activities. However, this would need to be balanced against the fact that there would also be no beneficial impacts associated with the Project not being implemented. The Government of Uganda has made the decision to explore the possibility of extracting oil resources from the Albertine Graben since commercially viable oil reserves were discovered in 2006.

In fact, the GoU has taken significant strides to ensure that the appropriate policies, institutions and legal framework exist to harness the projected benefits of the Albertine Graben's oil resources and concurrently to ensure that the environment is managed sustainably. The country already has a national Oil and Gas policy, and a number of laws meant to guide the management of oil resources have already been passed by in Parliament, including the 2013 Petroleum Exploration, Development and Production Bill. This fact, coupled with public support (e.g. 70% were in favour of oil exploration in

a survey conducted in 2015 (Ref. 4-1) mean that the opportunity to enhance the national income of Uganda as a whole is considered in the national interest and the option of not developing the Project was therefore discounted. However, there is a clear commitment that all activities would be undertaken in an environmentally sustainable manner, in line with all applicable Ugandan regulations. In addition, due to the sensitive environmental and social context, the Project Proponents have expressed their commitment to the highest environmental and social standards and have chosen to follow the IFC PSs.

4.17.5 Project Alternatives

The following sections present the alternative options considered during the development of the Project both during the early stages and within the FEED phase. The information presented explains the assessment process and the drivers for final selection, in terms of Project component location and proposed footprint and layout. Details of the proposed Project components are presented in the previous sections of this chapter and are not repeated in this section.

In addition to what is presented in the section below, the following philosophy is being applied for the Project, overall reducing the associated footprint:

- The reuse of temporary facilities for life of field permanent facilities whenever it is possible; and
- The optimisation of overall footprint by applying synergies for all shared services as waste handling, water supply, power supply, medical services etc.

4.17.5.1 Well Pads

As described in Section 4.3 each well pad will have a number of wells including producers, injectors and observation wells. The Production and Injection Network will connect the well pads with the CPF where production fluids will be processed.

4.17.5.1.1 Location and Footprint

Both the layout and footprint of the well pads have been considered in parallel with the initial locations driven by technical; environment and social constraints. For the Project to remain viable however, it is necessary to develop fields located both North and South of the Victoria Nile.

The number of well pads has been optimised and reduced to as low as practicable including by use of directional drilling to concentrate more wells onto a well pad. Detailed surveys to identify and map social and ecological features were undertaken during the FEED phase within a 500 m radius around each proposed well pad centre. This has enabled the further refinement of the well pads including minimisation of the footprint, which has been a key driver with the benefit of both minimising environment and social impacts (including effects on land use and visual amenity).

The wells have been gathered in well pads and deviated wells architecture considered to reduce the overall number of pads required (75 well pads at pre-project phase). For the fields subject to current development, 36 well pads were originally planned during the early stages of the FEED phase. However, this number was rationalised also taking into consideration the need for maximising the number of production and injection wells located within each well pad (subject to productivity).

The number of well pads required to ensure Project feasibility was reduced to 43 (Table 4-38), as presented in the ESIA Scoping Report Out of these 43 pads, 7 were associated with potential future field development (as indicated in section 4.4 “Potential Future Field Development”). For the remaining fields, as the FEED phase has progressed, the number of well pads required to ensure Project feasibility has been reduced from 36 to 34 as described in Section 4.1, thus reducing the required permanent footprint of the overall Project by approximately 24 ha (considering a 12 ha maximum per pad; and excluding additional footprint that would have been required for access roads and the Production and Injection Network). As shown in Table 4-38, the refinement in the number of wells pads has been driven by environmental, social and technical feasibility.

Table 4-38: Refinement of Well Pads number and location

Well Pad	Number of Location Options Considered	Driver(s) Triggering to Consider Revised Location	Main driver(s) towards final proposal[12]
NGR01	1	n/a	n/a
NGR02	3	Environment	Technical - geohazards
NGR03a	1	n/a	Decrease number of well pads (previously NGR03, NGR04, NGR05)
NGR05a	1	n/a	Decrease number of well pads (previously NGR03, NGR04, NGR05)
NGR06	4	Social	Technical – drilling & Social (settlement)
GNA01	3	Social	Technical – drilling
GNA02	2	Social & Environment	Technical – drilling
GNA03	1	n/a	n/a
GNA04	2	Technical	Technical - geohazards
KGG01	2	Social	Social (settlement)
KGG03	2	Social	Social (settlement)
KGG04	2	Social	Social (settlement)
KGG05	1	n/a	n/a
KGG06	2	Social	Social (livestock pond)
KGG09	2	Technical	Technical - geohazards
NSO01	1	n/a	n/a
NSO02	1	n/a	n/a
NSO03	1	n/a	n/a
NSO04	1	n/a	n/a
NSO05	1	n/a	n/a
NSO06	3	Social	Social (settlement)
KW01	1	n/a	Optimise number and location of wellpads (previously KW01, KW02,)
KW02A	1	n/a	Optimise number and location of wellpads (previously KW02, NGR07) given geohazard issue
KW02B	1	n/a	Optimise number and location of wellpads (previously KW02, NGR07) given geohazard issue
JBR-01	5	Environment	Technical – geohazards and drilling
JBR-02	3	Environment	Technical – geohazards and drilling
JBR-03	1	n/a	n/a
JBR-04	2	Social & Environment	Technical – drilling
JBR-05	1	n/a	n/a
JBR-06	1	n/a	n/a
JBR-07	5	Environment & Technical (geohazards and drilling)	Environment (wallow) & Technical - drilling
JBR-08	5	Environment & Technical (geohazards and drilling)	Technical – drilling & Environment (wallow)
JBR-09	5	Environment & Technical – drilling	Technical - drilling
JBR-10	7	Environment & Technical – drilling	Technical – drilling & Environment (Ramsar)

[12] It should be noted that the driver was to avoid features as much as practicable and in case where complete avoidance was not possible, decrease number of features impacted as much as practicable.

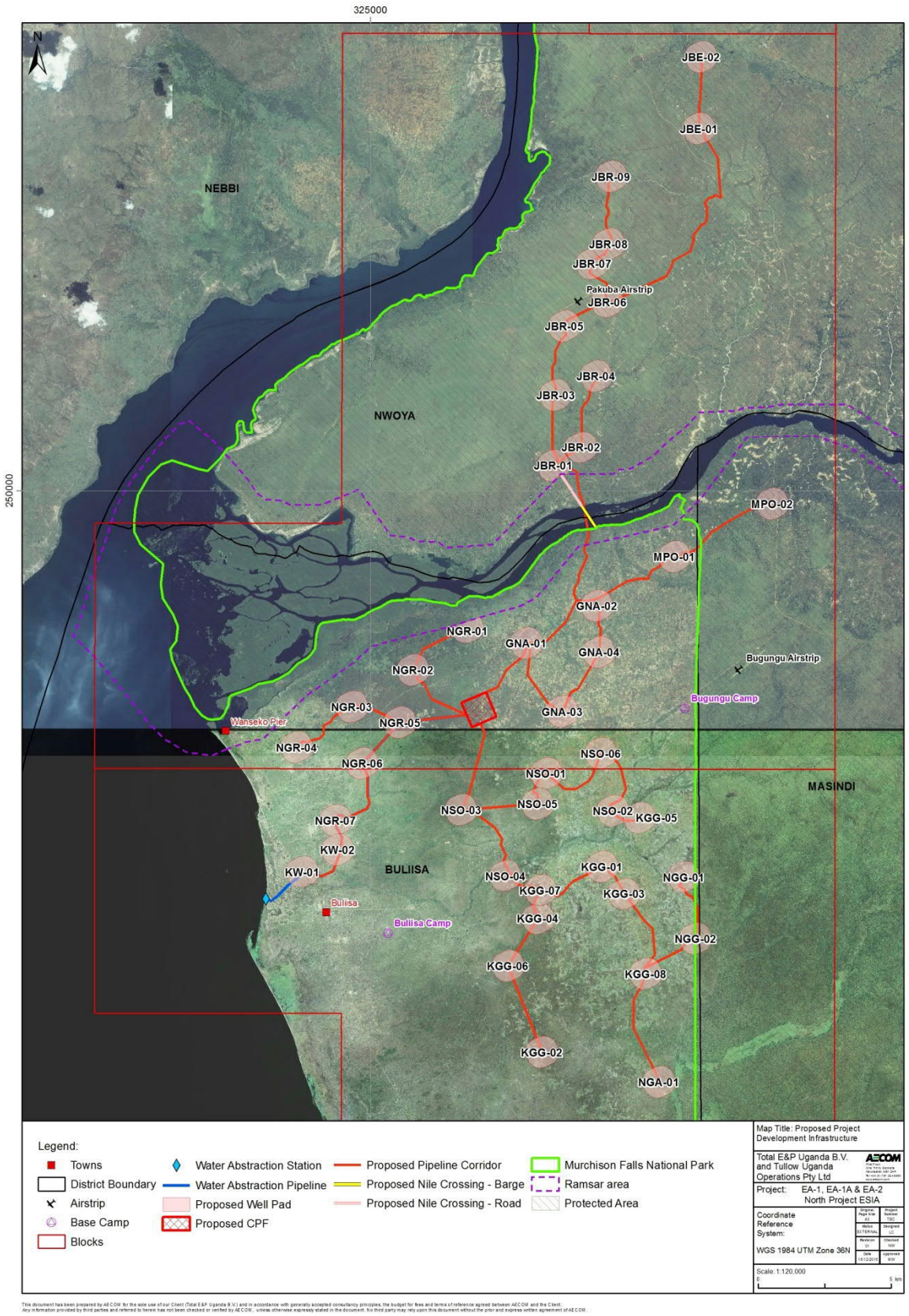


Figure 4-41: Locations of 43 Well Pads Presented in the Scoping Report (2015)

4.17.5.1.2 Layout and Footprint

In addition to minimising the number of well pads the FEED phase has also considered the layout of the facilities within the well pads and their configuration. This has enabled the area of the well pads to be optimised with measures including:

- Rationalising the surface facilities equipment to limit impact on footprint and visibility: removal of surface multi-phase pumps (MPP) by using subsurface electronic submersible pumps for production boosting, minimising the number of open drain pits and basins on the well pad, minimising the number of pigging facilities;
- The early design of the well pads included an 11 m vent stack for the purposes of well management. Refinement of the design has enabled this component to be removed, which has reduced the visual impact associated with the well pads;
- Cluster of the multi-phase flow meter (MPFM), chemical/polymer skid and annular gas compression skid within the same fire zone as the wells, production and test headers, forming one main well pad fire zone[13]; and
- The drainage system for the well pads, as presented in Section 4.3, has been optimised. Contaminated fluids will be collected locally and removed by vacuum truck for disposal. Surface water generation will be minimised with the adoption of localised containment, use of shelters and removing the requirement for surface water drainage treatment (i.e. concrete basin with oily water separator).

Taking into consideration well pad layout refinement, the footprint required for each well pad was reduced significantly from original plans of approximately 400 m by 400 m to between 150-230 m wide and 260-360 m long (i.e. overall reduction of between 262 ha and 411 ha for the entire Project).

4.17.5.1.3 Design - Well Architecture and Drilling Mud Selection

The early design of the Project considered drilling wells based on standard architecture dimensions (Figure 4-42); however this was subject to detailed review and consideration during the FEED phase. The Project Proponents have subsequently changed the well architecture to a slim design based on a reduction in both cost and the volume of waste material generated as follows:

- Well costs reduced by 16% compared to standard architecture;
- A 30% reduction in consumables (drilling muds, water and cement); and
- A 30% reduction in drill cuttings.

Based on the two previous points, there would also be a reduction in the required number of transportation movements.

[13] This was a derogation against the Proponents' standards, but a request was made on the grounds that it would reduce the footprint. The request was approved.

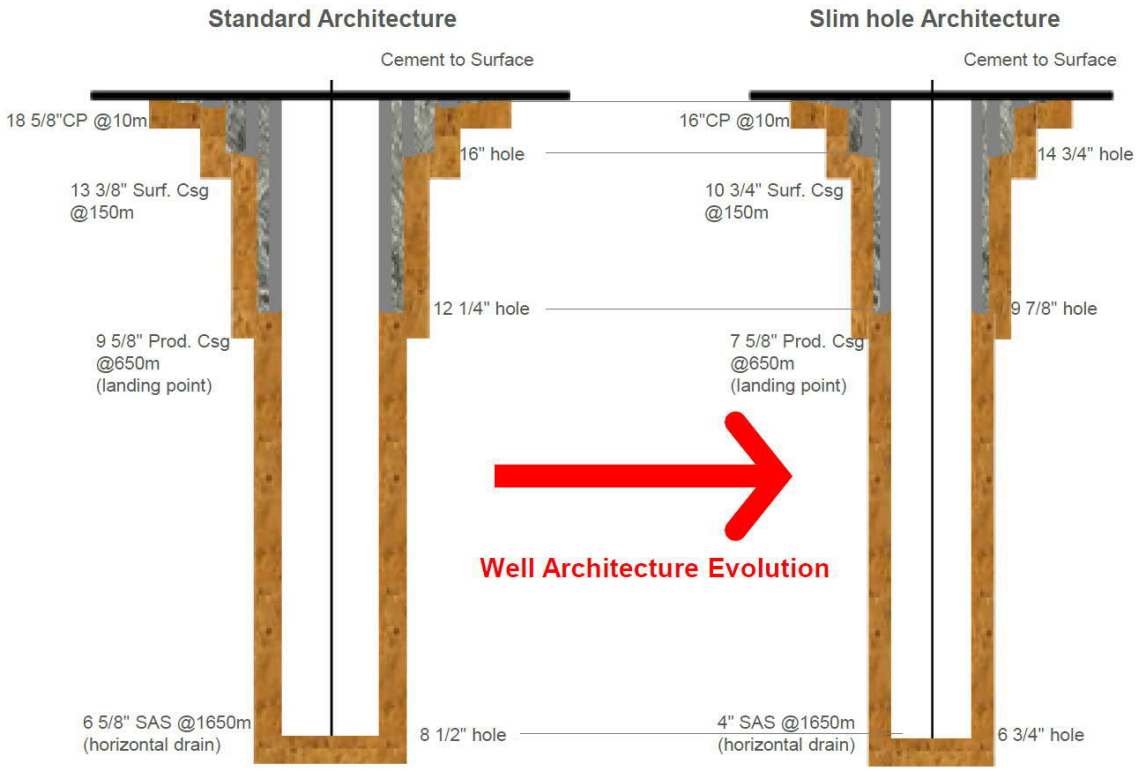


Figure 4-42: Comparison of a Standard Dimension Well Design and a Slim Line Design

In addition to the type of well selected, consideration was given to the type of mud to be used for drilling. It was recognised that a WBM should be used to drill the upper hole sections of the well (average 150-200 m from surface) due to the potential presence of aquifers. However, consideration was given for the lower hole sections (involving horizontal drilling) as summarised in Table 4-39 and as such it was concluded that SBM would be the most appropriate mud with the advantage that the drilling schedule would be shorter than using WBM.

Table 4-39: Comparison of a WBM and SBM

Comparison	WBM	SBM
Aquifer comparability	Yes	No
Drilling Fluid reuse / recycle	Up to 2 wells	At least 5 wells
Shale inhibitors	Required separately	Not required
Lubricity	Required separately	Not required
Drill cuttings from oil reserve	Heavy oil to be treated	
Transportation	Using vacuum sealed containers	

4.17.5.2 Production and Injection Network

The Production and Injection Network is required to transfer production fluids and gas from the well pads to the CPF for processing prior to export. The network will also transport water and produced water back to the well pads for reinjection to the reservoir required for enhanced oil recovery purposes.

4.17.5.2.1 Location

The location and routing of the Production and Injection Network has been primarily dictated by the locations of the well pads; however the refinement of the routing has taken into consideration social and ecological sensitivities as per the Avoidance Protocol. Baseline surveys to confirm sensitive features within the proposed routing corridor were conducted in 2017 and covered a 50 m buffer zone

around the initial routing. This has enabled the precise routing as presented in Section 4.3.3 to take into consideration, where practicable, any sensitive locations; however, a key driver was technical and safety requirements such as minimisation of geohazard risks on facilities in a very faulted area.

In consideration of the above, for example the proposed routing between JBR-01 and JBR-10 is not a straight line mainly driven by considering the need to minimise crossing through preferred habitat for giraffe, lions and elephants so that disturbance to these areas could be minimised.

4.17.5.2.2 Design and Footprint - RoW

The design of the Production and Injection Network has grouped together the three elements (production flowline, water injection flowline and electrical and FOC) to minimise the overall footprint of the Production and Injection Network and ensure there is a single output from each well pad. An additional pipeline for polymer has been removed from design. Should the polymer pilot (as described in Section 4.5.10.1) be successful, the water injection line will be used for polymer injection. This resulted in optimisation of the pipelines footprint, use of fewer materials and one fewer crossing underneath the Victoria Nile. Also, removal of insulation on pipelines in north of the Victoria Nile resulted in a significant reduction in material requirements and subsequently waste volumes during construction.

Where practicable, straight lines have been used to minimise the physical footprint.

The permanent RoW will be 30 m wide (15 m either side of the centre line), which is optimum in consideration of technical requirements. The construction RoW will be contained within this area to eliminate the need to impact additional land (refer to Section 4.9.6).

4.17.5.3 Victoria Nile River Production and Injection Network Crossing

A suitable approach for the Production and Injection Network is required to cross the Victoria Nile and construction areas are required either side of the Victoria Nile to support the construction.

4.17.5.3.1 Location

Two alternative locations were considered for the Victoria Nile River Production and Injection Network Crossing (Figure 4.43):

Option 1: connecting JBR-01 and GNA-01

Option 2: connecting JBR-10 and NGR-01

A number of criteria, including social, environmental and technical (e.g. geology and faults) were assessed for both options. Option 2 was preferred as overall it exhibits a smaller permanent footprint.

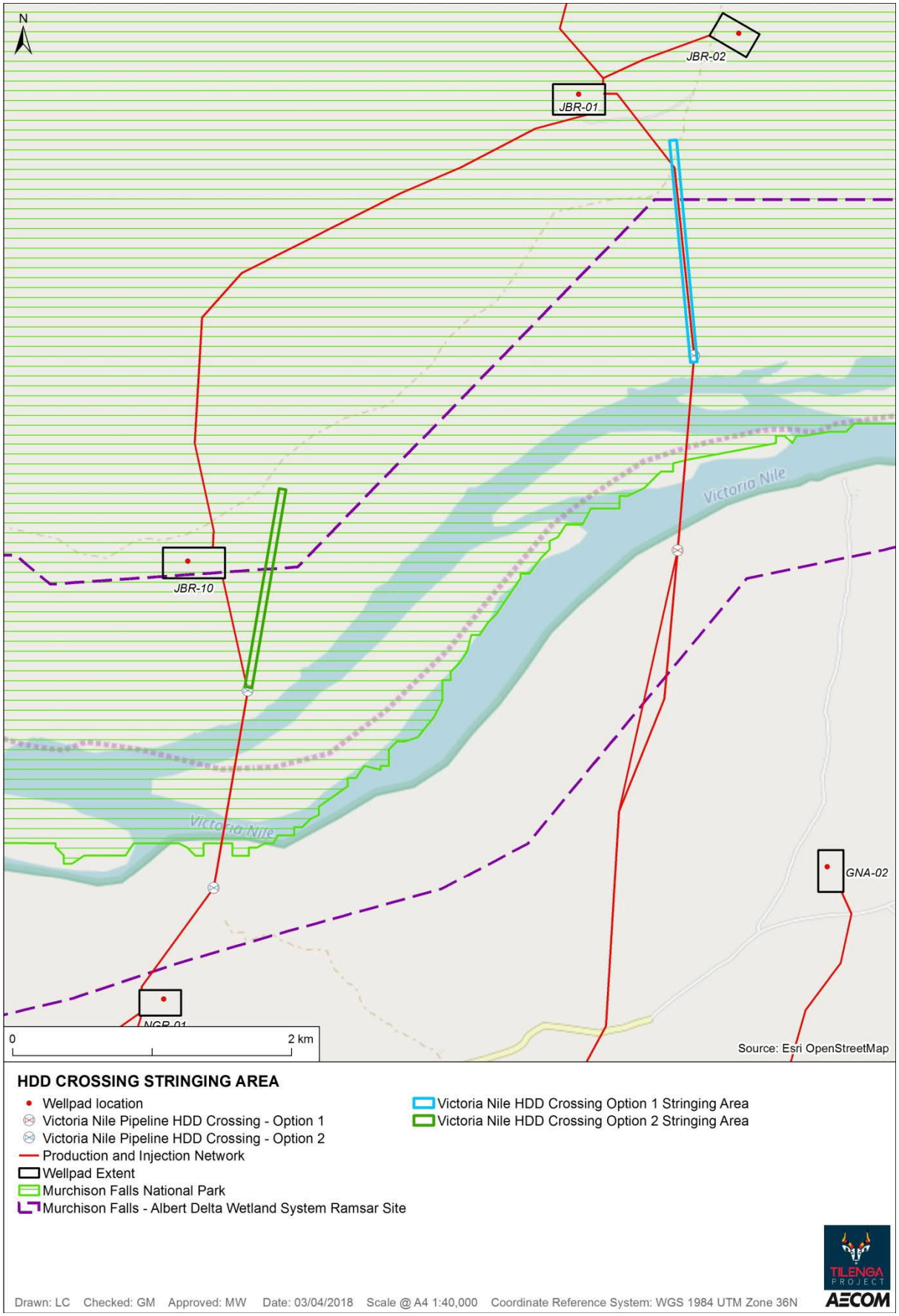


Figure 4-43: HDD stringing Area for Options 1 and 2

4.17.5.3.2 Design

Taking into consideration the sensitivity of the Victoria Nile and the Ramsar status of the Murchison Falls-Albert Delta Wetland System, the Project Proponents committed to minimising the impact by ensuring that permanent above ground footprint is minimised. As such a trenchless solution for the pipeline installation underneath the Victoria Nile has been selected. Three options have been considered as follows:

- HDD;
- Microtunnel; and
- Direct Pipe.

A summary of the trenchless techniques is presented in Table 4-40.

Based on the review of the available techniques, the HDD option was considered preferable despite HDD and Direct Pipe being comparable. Based on preliminary information on ground conditions and the length of time required to complete crossing activities, HDD has been selected as the most suitable method for the Project.

Table 4-40: Comparison of Trenchless Victoria Nile Crossing Options

Technique	HDD	Microtunnel	Direct Pipe
Summary	HDD involves the drilling of a hole, along a pre-determined alignment, by pulling/pushing a drill string (drill pipe with drilling tools attached) and installing the pipeline in the drilled hole. The hole is constantly supported by drilling fluid, which also serves as a medium for providing excavating power, as well as transportation of excavated spoil out of the drilled hole as the drilling operation progresses. The HDD drilling rig and associated HDD equipment is set up on the Entry Point Site (proposed location South of Nile) with the pipeline string to be installed in the drilled hole fabricated on the other side of the obstacle set up at the Exit Point Site (proposed location North of Nile). The pipeline string is the same length as the drilled hole and, assuming sufficient space is available on the exit side of the crossing it is fully welded and tested in advance of the completion of HDD activities.	Microtunnelling involves circular precast concrete pipe sections being pushed (jacked) through the ground along a predetermined alignment. A remotely controlled MTBM (Micro Tunnel Boring Machine) at the front of the concrete pipe sections provides the method of excavation and steering, with excavated spoil being transported from the MTBM back through the tunnel to the surface. The pipeline is later installed in the completed tunnel by pulling/pushing the pipeline into the tunnel in short or long lengths depending on space availability. The installed precast concrete jacking pipe provides the permanent ground support for the installed pipeline. The technique requires that launch and reception shafts or pits are installed, which can be in the form of steel sheet piled cofferdams, precast concrete segment-lined shafts, secant piled shafts.	Direct Pipe combines the technologies of the HDD and microtunnelling. The Direct Pipe technique is traditionally applied as a trenchless crossing method where the product pipe is driven directly into the shield driven tunnel. The shield driven tunnel is created by a tunnel boring machine (TBM), which is welded directly on the product pipe. The pipe mounted TBM is propelled by pipe thruster(s) which grip the pipe and are capable of delivering a thrust force of more than 500 tonnes.
Approximate Crossing Length	1.4 km		
Number of Entries	Each of the 3 pipelines will be drilled separately	All 3 pipelines will be contained within a 1.8 m concrete tunnel	All 3 pipelines will be contained within a 1.4 m steel pipe
In Country Expertise	A specialists operation, for which there is no in-country experienced contractor. Work will be undertaken by an out of country specialist, with support provided by an in-country contractor.		
Cost	Low (comparable with Direct Pipe)	Highest (expected to be 50% more than HDD and Direct Pipe)	Low (comparable with HDD)
Logistics	Simplest logistically requiring the lowest number of equipment and plant	Highest logistically challenging based on required plant, equipment and personnel.	Mid logistically challenging
Environment	Risk of hydrofracture* Lowest material required and spoil generated Mid effort in MFNP requiring stringing in MFNP	Risk of hydrofracture Highest spoil generated Highest effort in MFNP requiring bunding for the shaft	Risk of hydrofracture Mid spoil generated Minimum effort in MFNP with the majority of operations and bunding location south of the Victoria Nile
Note: *Elevated risk of hydrofracture during HDD can be addressed through the design by taking in account trajectory, depth/length of bores, geotechnical conditions and by constant monitoring during HDD operations			

4.17.5.4 Industrial Area (including CPF)

The Industrial Area comprises a number of facilities, both temporary to support the Construction and Pre-Commissioning Phase of the Project and permanent to support the Commissioning and Operations Phase. A key component of the Industrial Area is the CPF which will process approximately 190 kbopd involving the separation of production fluids and the generation of power from gas extracted.

4.17.5.4.1 Location

Despite the physical barrier that the Victoria Nile represents for the Project, it was decided to establish one CPF for the Project, which would be located south of the Victoria Nile to ensure the physical footprint within both the MFNP and Ramsar area were minimised as far as practicable. Furthermore, it was decided that grouping the CPF and the other facilities located with the Industrial Area would have a positive impact enabling the majority of supplies to be delivered to one location south of the Victoria Nile.

Two site options (Figure 4-44) were considered for the location of the Industrial Area South Nile (and specifically the CPF) given the importance of the component to ensure optimum connection with the well pads network. The assessment was done very early during the pre-project phase:

- Location Option 1: near Bugungu camp; and
- Location Option 2: occupying land predominately located within Kasinyi village.

Proposed locations were evaluated according to three main screening criteria:

1. Exposure (physical proximity to Project facilities),
2. Sensitivity (the degree to which receiving /host environments are likely to experience social impacts, looking at population /demographics, infrastructure and access to social services, land tenure and use, conflict and security, and cultural resources), and
3. Coping capacity (ability of a receiving environment to accommodate or cope with impacts).

The screening found that Option 1 featured a relatively high population density, with settlements located both along the main transportation axes and in the interior of villages. Lands in the area of Option 1 were individually owned and dedicated primarily to crop cultivation. This makes land acquisition and livelihood loss compensation straight forward for individuals, but regional reliance on the area for its food basket creates high sensitivity for livelihood and food security. Numerous schools, health centres, and other social infrastructure that serve more than one village were located in Option 1, further affecting regional inter-dependency.

In contrast, Option 2 was found to be sparsely populated, with the population located primarily along the main road. Land in the area was mostly dedicated to grazing activities with a few agricultural plots in the Eastern part. Therefore, livelihood and food security sensitivity was lower for Option 2 than Option 1. The area also featured very limited social services infrastructure compared to Option 1. Perceived communal land ownership structures in the area of Option 2 were considered to make acquisition and compensation more complicated.

Ultimately, the screening concluded that Option 2 was the more favourable location for the following key reasons:

- Less physical displacement compared to Industrial Area Location Option 1;
- Economic displacement was mostly reduced to pastureland (as opposed to cultivated land) at the time[14];
- Less inter-dependency on land in this area, limiting the impact for the whole region, especially in terms of food security; and
- While land acquisition might be more complex (due to communal ownership/clan structure compared to individual ownership) for Industrial Area Location Option 2, the potential long-term

[14] The evidence from recent surveys confirms that the amount of cultivated land in the Industrial Area has increased.

impacts for livelihood and resettlement were expected to be lower than Industrial Area Location Option 1.

Refinement of the Industrial Area Location Option 2 took into consideration the following points:

- Avoidance of high socio-economic value land (e.g. cultivated land), where possible;
- Avoidance of fragmentation of residential areas (avoidance of isolating a village from others or isolating a few households from a village);
- Reduction in the number of administrative units (villages and parishes) directly affected by the footprint of the Industrial Area;
- Avoidance of major road/tracks intersections and reduction of the number of community access roads lost; and
- Avoidance of cultural sites.

Furthermore, in coordination with national and local land management entities, a land conflict assessment (at the village, community, clan, household and individual levels) was conducted and the results taken into consideration.

As stated above, the Industrial Area comprises a number of facilities and the Project Proponents made the decision to concentrate these in one location to both minimise and concentrate the footprint of these facilities. The Industrial Area will occupy approximately 307 ha. In addition to the permanent facilities, temporary facilities such as the Industrial Area Construction Camp will be located within the footprint of the Industrial Area. This will enable the majority of supplies to be delivered to one location south of the Victoria Nile.

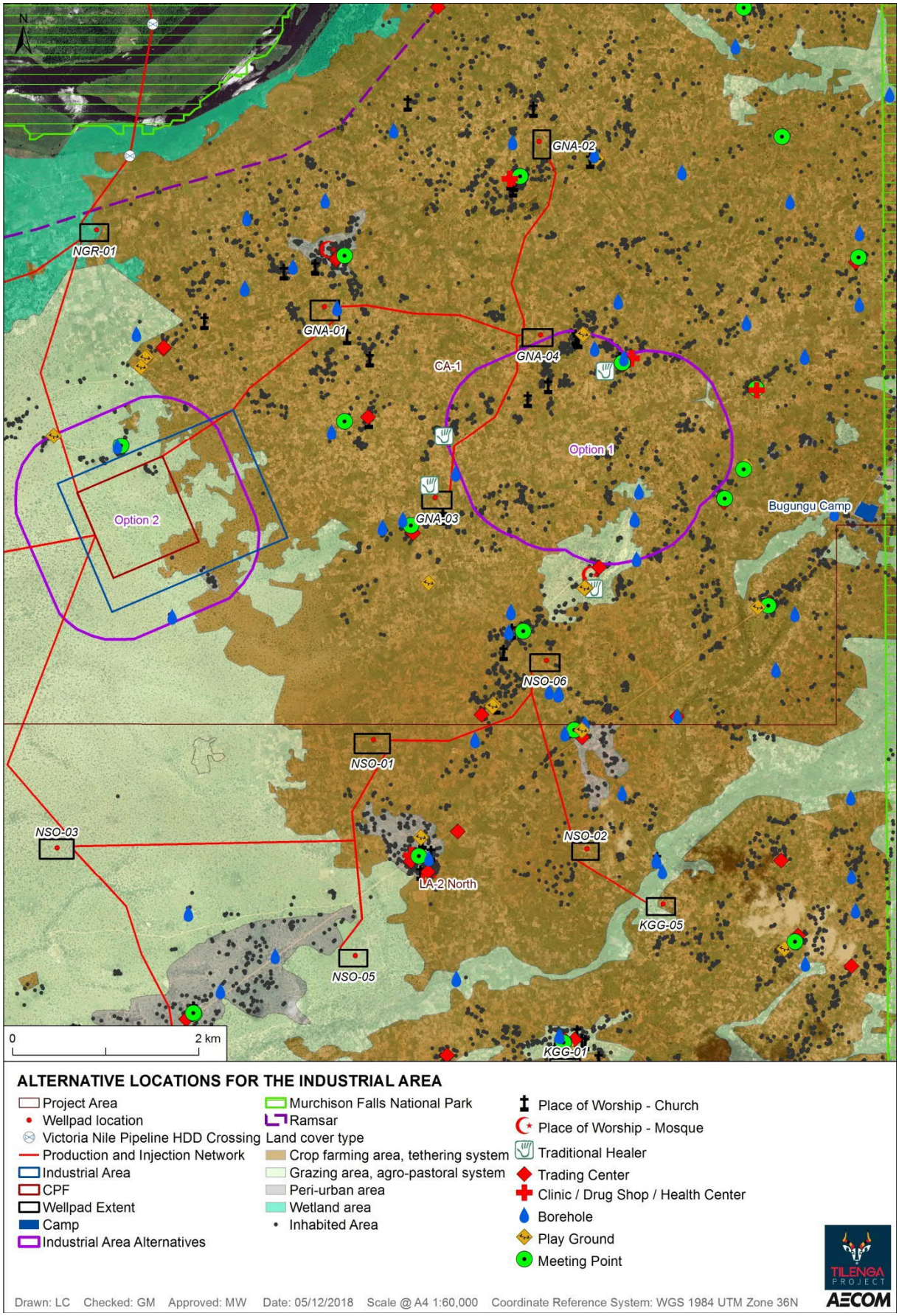


Figure 4-44: Alternative locations for the Industrial Area (and Specifically the CPF)

4.17.5.4.2 Layout and Footprint

The overall layout of the Industrial Area and in particular the CPF has been refined to optimise the footprint. This has been considered in combination with the design of specific facilities, which has enabled the optimisation of the layout as follows:

- For all facilities, reduction of safety and environmental impacts to ALARP are the primary drivers in defining process plant layout. The selection of areas for particular processes has taken into account the type of hazard and potential risks involved. Additionally, the site layout aims to contain an accident at source to prevent escalation. The CPF plant layout optimisation is constrained by the need to maintain minimum safe separation distances. The main principles applied during FEED for layout has ensured the following:
  - Prevention of escalations
  - Efficient operation and maintenance
  - Cater for vehicle and personnel traffic, security, safe working conditions
  - Access for operation and maintenance, low impact to others (noise, toxicity, pollution, risk, etc.)
  - Protection of the environment
- Removal of permanent chemical storage when practicable and replaced with pre-filled tanks which will be independently certified and of robust construction. The tanks will be removed offsite once the content has been used and replaced with a new unit. This removes the requirement for bunded areas and reduces the potential risk of spillages; and
- The requirement for crude oil storage has been revised, based on an assessment of the operational scenarios and considering the requirement to simplify the design, which enabled the removal of one crude export tank.

The underlying concept applied is that distance is considered as the most efficient protection measure against the outcomes of escalated hazardous scenarios.

The Industrial Area is therefore divided into a general services area and a restricted area.

The general services area is where the support facilities are to be located i.e. Construction Support Base, Construction Camp, Security facilities, Drilling Support Base, Liquid Mud Plant Facility. The area will also house the Operations Support Base and Operations Camp during the Commissioning and Operations Phase. These support areas will be closed to public for security reasons. Workshops and warehouses can be permanently manned. Therefore they constitute premises where, or around which, various uncontrolled hazardous activities may take place (e.g. traffic, hot work). They will be located in the General Services Area.

The restricted area will comprise the CPF i.e. equipment and activities that are capable of causing major accidents i.e. hydrocarbon or other chemical ignition hazards, or releases (process units, hydrocarbon storage, machinery and power generation).

The general services area comprises activities that cannot cause process hazards, such as parking lots, workshops, warehouses, control room, administrative buildings. Offices are to be located away from sources of hazards at sufficient distances to ensure that consequences of major accidents do not put the integrity of the building nor its occupants at risk. The Central Control Room will also to be located in the general services area to ensure sufficient distance from the Restricted Area so that consequences of a major failure do not put their integrity at risk or impair the emergency response function.

4.17.5.5 Water Abstraction System

As stated in Section 4.3, the Project will include a Water Abstraction System at Lake Albert, which will abstract and transfer water via a buried pipeline to the CPF. This is required in order to predominately provide water for reinjection purposes. There are currently two options presented and assessed as part of the Project as detailed in Section 4.3.5.

4.17.5.5.1 Location

Initially, three locations were identified (Figure 4-45), which were comparatively assessed to define the most appropriate location for water abstraction. The results of the comparative assessment are presented in Table 4-41.

Location 3 was selected as the preferred option based on the following points:

- No wetland vegetation; and
- No neighbouring communities.

Table 4-41: Comparison of Three Water Abstraction System Locations

Criteria	Location 1	Location 2	Location 3
Sensitive Receptors	Lake wetland and associated vegetation	Neighbouring communities	None on land
Protected Areas	Located within the Lake Protection Zone designated by GoU		
Wetland	Within lake wetland vegetation	No lake wetland vegetation (removed by communities)	No lake wetland vegetation
Biodiversity	Various birds and other wetland species observed on land Potential for critical habitat trigger species in the lake	Potential for critical habitat trigger species in the Lake Albert	
Flood Risk	Prone to flooding		
Land Cover /Land Use	Area used by communities for harvesting snail shells	Area used as landing site	Neighbouring landing site
Population /Social Activity	Harvesting and crushing of shells	High density communities and landing site	No community settlements

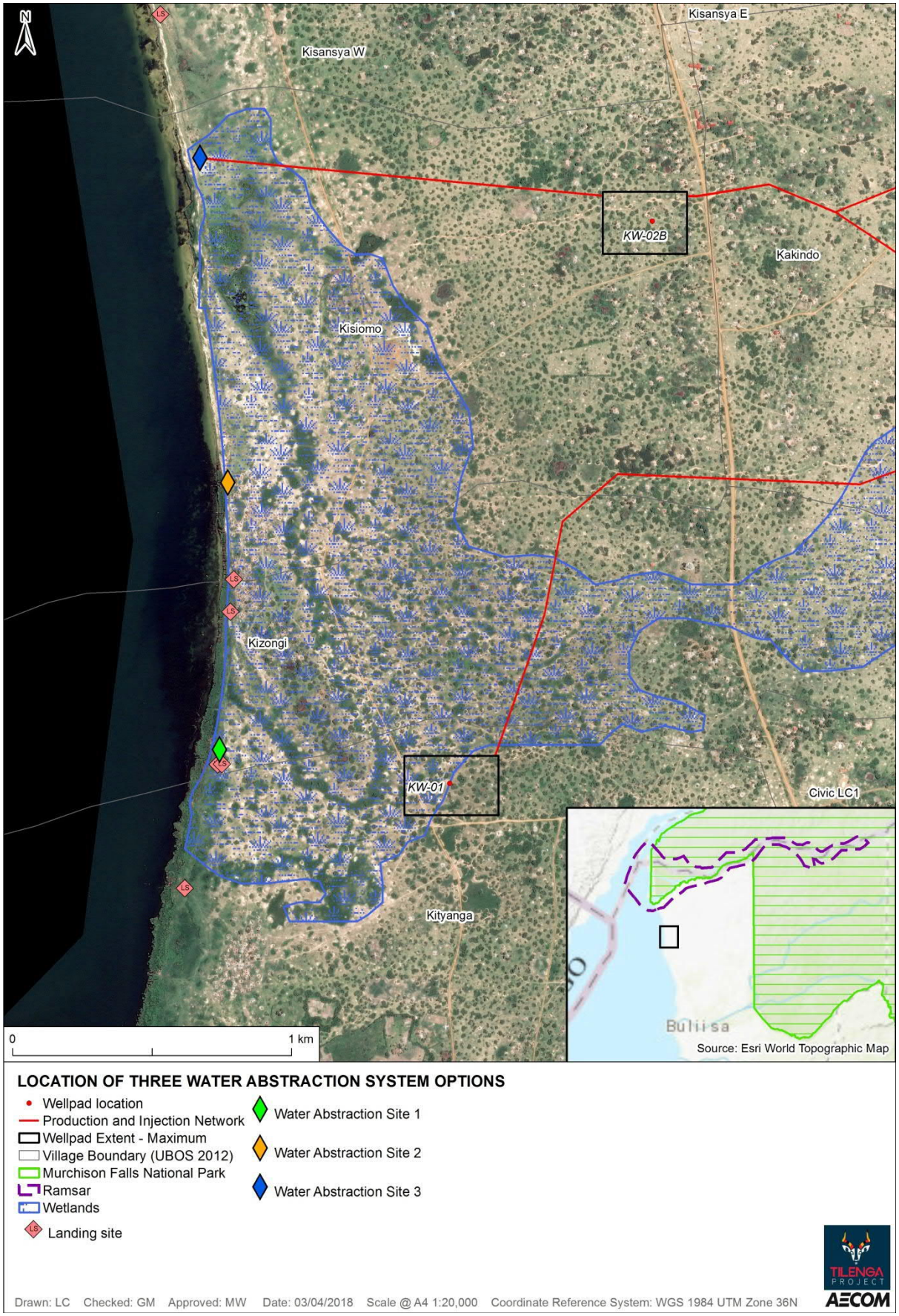


Figure 4-45: Location of Three Water Abstraction System Options

4.17.5.5.2 Layout and Footprint

The footprint of the pipeline transferring water from the Water Abstraction System to the CPF has been designed to utilise the existing Production and Injection Network RoW from the nearest well pad.

4.17.5.6 Victoria Nile Ferry Crossing

As presented in Section 4.3.7 a ferry crossing is required across the Victoria Nile for the Project for use during the Construction and Pre-Commissioning Phase and Commissioning and Operations Phase to transport personnel and equipment from the CPF to the well pads located north of the Victoria Nile.

4.17.5.6.1 Location

A Feasibility Study was undertaken to establish the most appropriate crossing location based on environmental, social, technical and cost related issues. Four locations were considered (Figure 4-46):

- Location A – Located approximately 250 m at north and 550 m at the south of the proposed HDD Victoria Nile crossing ;
- Location B – Located approximately 200 m west of the existing Paraa ferry crossing;
- Location C – Located approximately 125 m east of existing Paraa crossing; and
- Location D – Located at the existing Paraa ferry crossing.

All location options require infrastructure to be constructed within the MFNP and as such the exact location within the MFNP was a key consideration. Whilst Location A could have brought the benefit of splitting oil from tourism activities; it was rejected from a technical (bathymetry) and environmental (sensitive habitats including papyrus islands) perspective. Location D was also rejected due to existing activity at that location. Location B was rejected due to a higher environmental sensitivity (both banks pristine with sensitive habitats) and safety (downstream of existing traffic) concerns.

Based on evaluation of all environmental and social, technical and safety issues for the different crossing locations, the result was that Location C was the most preferred option.

Establishing a crossing at Location C has among others the following benefits:

- There will be a low risk of collision with existing Paara ferry, which in turns means the highest operational safety; and
- It avoids pristine and sensitive habitats such as those found at Location B including important habitats for hippopotamus, Nile crocodile, roosting areas and watering holes for elephants.

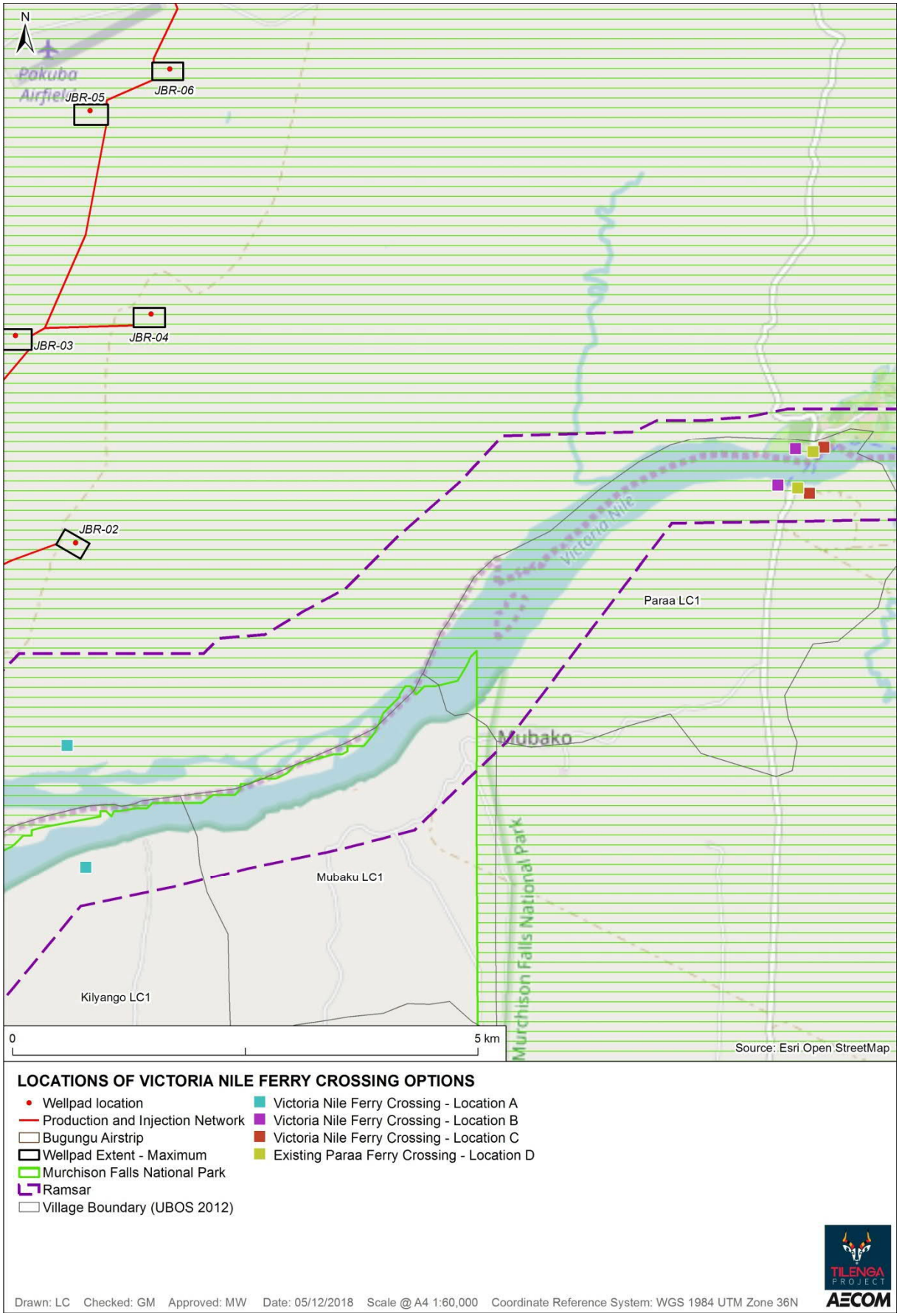


Figure 4-46: Locations of Victoria Nile Ferry Crossing Options A, B, C and D

4.17.5.6.2 Design

Bridge Vs Ferry

A Feasibility Study was completed to consider both a bridge and a ferry crossing as potential options to cross the Victoria Nile providing vehicle access from the south to the north.

The weighting criteria included a number of environmental and social considerations including; ecological sensitivity, impact on species of conservation importance, condition of flora, resilience to anticipated Project impacts, impacts on soils, crops and structures, and impacts on the local tourism industry.

The ferry option was considered more favourable across a number of the criteria and a summary of the environmental and social findings are presented in Table 4-42.

Table 4-42: Environmental and Social Impacts Associated with River Crossing Options

Ferry	Bridge
Short-term	
Fewer workers required during the Construction and Pre-Commissioning Phase resulting in less visual intrusion on wildlife and tourists.	More workers required during construction and more visual intrusion on wildlife and tourists.
Shorter construction duration resulting in reduced exposure to noise, vibrations and gaseous emissions from construction traffic.	Longer duration of construction phase and hence greater exposure time to noise, vibrations and gaseous emissions from construction traffic.
Lower risk of accidents because most of the parts are assembled offsite during the construction.	Higher risks of accidents from working at heights and falls from height into the river.
Long-term	
Daily/continuous noise and vibrations during operation of the ferry.	Noise only generated from Project vehicles using the bridge.
Reduced visual impact due to the introduction of a feature into the landscape that already occurs in the locality (existing Paraa ferry crossing).	Greater visual impact due to the introduction of a new feature to the landscape.
Does not require lighting.	May cause disturbance to animal vision in case lighting is installed along the access.
	Permanent connection (high potential to compromise protection of the park) where MFNP now is a destination (mainly for tourism) – an end-destination in the sense of traffic – the bridge would change that character by also turning it into a throughway.

Ferry Landing Structure

The concept design of the ferry landing approach on both the northern and southern banks of the Victoria Nile were reviewed during the FEED phase to find the optimal solution. Landing approaches considered for the southern embankment include:

- A sand filled embankment; and
- Deck on piled structure.

The deck on piled structure is identified as a most appropriate option as it decreases potential environment impacts associated with its construction / use by limiting:

- Siltation during construction in comparison to sand filled embankment (associated with loss of the sand material used due to currents); and
- Impacts on the hydraulic conditions of the river due to the open nature of the deck on piled structure.

4.17.5.7 Construction Camps

Construction camps will be required to accommodate the workforce required during the Site Preparation and Enabling Works Phase, Construction and Pre-Commissioning Phase and during the Commissioning and Operations Phase. The existing Buliisa, Bugungu and Tangi camps will provide accommodation during the initial phases of the project. A new camp will be constructed within the Industrial Area and the Tangi Camp will be expanded to meet the demand for accommodation during the Construction and Pre-Commissioning Phase.

4.17.5.7.1 Location

South of the Victoria Nile it was deemed that there was sufficient capacity within the existing camps (Bugungu and Buliisa) and within the Industrial Area Construction Camp which will be established during the Construction and Pre-Commissioning Phase to support the Project.

Strategically located North of the Victoria Nile, the Tangi Camp and Support Base will provide accommodation to workers who will be involved in the drilling and construction activities for JBR, however it was not considered to have sufficient capacity to meet the requirements of the Project Construction and Pre-Commissioning Phase. The camp will therefore require an expansion as indicated in Section 4.3.1. A number of possible locations for expansion of Tangi Camp and Support Base were considered.

For each proposed location, the technical, environmental and social constraints were assessed. The technical constraints included the slope gradient of the site, size, and site access to ensure ease of logistics. Environmental constraints included proximity to the water sources which are used by animals (e.g. hippos, elephants, antelopes, buffaloes), as well as animal migratory corridor. Social constraints included consideration of land ownership and land disputes. The most optimum location identified at the time of ESIA submission is presented in Section 4.3.1

4.17.5.7.2 Footprint

This decision to use existing infrastructure as much as practicable was deemed to be the most technically and economically feasible solution. It will require less land take and limited construction activities; resulting in fewer potential environmental and social impacts than establishing camps at new locations.

4.17.5.8 Logistics and Roads (New and Upgraded)

The one-way traffic proposed within the Project Area (Section 4.9.12.3) is driven by technical and safety considerations associated with anticipated traffic and heavy loads. The escarpment at Biiso in particular provides a safety and technical challenge for heavy loads hence why it will be used when leaving the area.

Due to traffic anticipated, it is necessary to set up Project dedicated roads connecting key Project locations to minimise interference and impact to local communities whilst regulating and controlling traffic movements. Both the construction of new roads and upgrade of existing roads north and south of the Victoria Nile are proposed as presented in Section 4.3.6.

New roads include C1, C3, N1 and N2; and Upgraded roads include A1, A2, A3, A4, B1, B2, M1 and W3. Inter field access roads (D roads) south of the Victoria Nile to the well pads will be provided by upgrade works to existing tracks / roads and construction of new roads.

4.17.5.8.1 Layout and Footprint

New proposed roads within the MFNP include C1, and C3 and outside the MFNP N1 (within the Industrial Area), and N2. The proposed routing was selected taking consideration of technical, environmental and social constraints as identified in the Avoidance Protocol and dedicated site surveys undertaken in order to map the sensitive features along the proposed alternatives when necessary. Examples of road routing optimisations are provided below; optimisation is still ongoing.

Roads C1, C3

The new road C1 is proposed in order to access the JBR pads from the North. The new road C3 is proposed to provide access to the Project ferry crossing.

Main features considered for avoidance by the proposed C1 routing are wallows.

Road N2

The new road N2 is proposed in order to mitigate the potential impacts that construction traffic could have on surrounding communities (in particular during peak traffic at Construction and Pre-commissioning Phase). N2 provides linkage between existing roads A1 and A2 and will allow avoiding the busy town of Wanseko.

Inter field Access Roads North of the Victoria Nile

In addition to the route modification of the roads above, the development of the Project design has also removed roads not considered essential to reduce the overall footprint of the Project. The inter field access roads north of the Victoria Nile (within the MFNP) have been removed from the overall design. Instead the inter field access roads will be constructed within the Production and Injection Network RoW.

Inter field Access Roads South of the Victoria Nile (D roads)

As much as practicable, definition of access roads south of the Victoria Nile has favoured existing roads over creation of new ones.

Surface Material

The definition of material will be subject to national road requirements, considering surrounding environment as much as practicable (visual impact). Excavated material is planned to be reused wherever possible (subject to suitability) and additional material sourced from existing borrow pits.

Permanent RoW

Table 4-43 presents the permanent RoW for the roads (minimum required as currently defined) and the required RoW as required in accordance with Ugandan regulations. The roads optimisation is still being studied and definition of permanent RoW subject to further discussion and agreement with Ugandan Authorities. All temporary land required associated with the construction of the road will be restored.

Table 4-43: Surface Material Options Considered for Road Upgrades and New Roads

Road	Permanent RoW (minimum needed)	Regulatory Permanent RoW Requirement ^
Upgraded Roads		
A1	30m	50m
B1	30m	50m
B2	30m	50m
A2	30m	50m (asphalt) / 30m (gravel)
A3	30m	50m (asphalt) / 30m (gravel)
A4	30m	30m
M1	30m	50m
New Roads		
N1	30m	50m
N2	30m	50m
C1	20m	30m
C3	20m	30m
W1	30m	30m
D Roads	15m	30m

4.17.5.9 Bugungu Airstrip Upgrade

An airstrip close to the Project is required to transport workers to and from the Site.

Given the close proximity of the Bugungu Airstrip to the Project, no alternatives were considered as it was preferable to upgrade the existing facilities rather than identify a new location for the construction of a new Project dedicated airstrip.

4.17.5.10 Masindi Vehicle Check Point

The Masindi Vehicle Check Point was selected based on its strategic positon between the Project and Dar es Salaam and Mombasa Ports; and the fact that this is an existing facility (hence limiting Project footprint). Based on this, no alternative location has currently been considered.

4.18 References

Ref. 4-1 EPRC, Natural Resource Management in the Albertine Graben Region of Uganda: Baseline Survey Report" Research Report No 12 February 2015

Ref. 4-2 Uganda Ministry of Works and Transport - Road and Bridge Works Design Manual for Drainage (January 2010)

Ref. 4-3 Environmental and Social Impact Statement for the upgrade of; Kisanja-Park junction; Sambiya-Murchison Falls; Buliisa-Paraa; Paraa-Pakwach; Wanseko-Kasenyi-Kirango-Bugungu Cam roads and associated bridges (169 km), UNRA, 2017

Ref. 4-4 Environmental and Social Impact Statement for the upgrade of Masindi-Biiso Road, UNRA, 2017

05 – Stakeholder Engagement

Table of Contents

Table of Figures

List of Tables

5 Stakeholder Engagement

5.1 Overview

This section outlines the approach that has been taken for stakeholder engagement during the Environmental and Social Impact Assessment (ESIA) process including a summary of stakeholder engagement activities undertaken. Consultation with stakeholders is a key aspect of the ESIA process and essential to building a longer term 'social licence to operate'. Undertaking effective stakeholder engagement is a key requirement of national regulations and international standards and guidelines. The Project ESIA consultation process was designed to comply with the requirements for public participation as prescribed in Uganda's Environmental Impact Assessment Regulations, No. 13 (1998) (Ref. 5-1) and the International Finance Corporation (IFC) Performance Standard (PS) 1 (Ref. 5-2) and guidelines for stakeholder engagement. Stakeholder engagement activities were also guided by the International Petroleum Industry Environment and Conservation Association (IPIECA), the global oil and gas industry association for environmental and social issues, guidance documents on managing and dealing with stakeholders throughout the Project lifecycle and the Project Proponents' internal corporate standards and guidelines. The basic principles of the consultation process have been to undertake a process that was inclusive, culturally sensitive and transparent.

The consultation process aimed to give stakeholders an opportunity to comment on the proposed Project and share their apprehensions, grievances and concerns. Stakeholder feedback was an essential part of the process of identifying real and perceived impacts and suitable mitigation and enhancement measures. Local communities, formal and traditional leaders, representatives of the communities, and potential vulnerable groups such as women and youth have all been consulted throughout the ESIA to understand their specific issues and concerns. This has ensured a meaningful participation of the affected sub-sections of the communities in the studies.

Stakeholder engagement is a continuous process and with the help of Total Exploration & Production (E&P) Uganda B.V (TEP Uganda) and Tullow Uganda Operations Pty Ltd (TUOP) 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. Grievances are managed though a Grievance Mechanism.

Over the years several stakeholder related activities have been conducted for the Project such as:

- Socio-economic Baseline Assessment, 2013 (Worley Parsons) Ref. 5-3;
- Social and Health Baseline Studies, 2013 - 2015 (Artelia Eau et Environnement) Ref. 5-4;
- Land surveys, 2015 (Intersocial Consult and New Plan) Ref. 5-5;
- Land acquisition and resettlement related consultations for RAP 1: Priority Areas, 2017 (Atacama Consulting, Synergy Global Consulting, Nomad Consulting) Ref. 5-7;
- Hosting of quarterly stakeholder meetings in partnership with Petroleum Exploration and Production Department (PEPD) and Ministry of Energy and Mineral Development (MEMD) at national, regional and district levels.
- Project Briefs for Geophysical and Geotechnical surveys, 2012-2014, 2017; and
- Project Brief for Early Works, 2017.

The ESIA consultation process has built on the activities described above. More details about consultation activities undertaken for the Project in relation to the Resettlement Action Plan (RAP) 1: Priority Areas and the Early Works Project Brief (PB) are provided in Section 0 of this chapter.

5.2 Stakeholder Engagement Methodology

5.2.1 Stakeholder Engagement Plan

A Stakeholder Engagement Plan (SEP) was developed as part of the ESIA process, and in line with Ugandan Standards US ISO 26000:2010 which promote identifying and engaging with stakeholders;

and communicating commitments, performance and other information related to social responsibility . The SEP provides the overarching framework and methodology for all engagement relating to the ESIA. It is a live document that has been regularly updated throughout the ESIA process. A copy of the latest version of the SEP is included in Appendix G. Throughout the Project lifecycle, the Project Proponents and their contractors will continue to implement, maintain and update a SEP as part of the Project's overall Environmental and Social Management Plan (ESMP). The continuous stakeholder engagement will be used to help mitigate social impacts and address any grievances as described in ***Chapter 16: Social*** and ***Chapter 23: Environmental and Social Management Plan*** of this ESIA.

5.2.2 Stakeholder Engagement Principles

The approach to stakeholder engagement during the ESIA process has been guided by the following good practice principles:

- ***Free, Prior and Informed Consultation***:
    - *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 risks, impacts and opportunities of the Project.*
- ***Consultation***: affected communities were provided with opportunities to express their views on project risks, impacts and mitigation measures. These were considered and responded to throughout the engagement process;
- ***Inclusive and iterative process:*** efforts were made to identify all those affected by or interested in the Project to allow them to participate in the engagement process, including women and vulnerable groups. The engagement process provided a mechanism for receiving, documenting and addressing comments from stakeholders and allowing their feedback to inform the environmental and social baselines, impact assessment and development of mitigation and enhancement measures;
- ***Use of appropriate platforms and methods of communication:*** in order to engage effectively, stakeholder groups were identified as well as the use of appropriate communication channels and approaches. Stakeholder engagement materials were translated into relevant local languages and translators were available during meetings with local communities to translate. Different meeting formats were used to suit the preferences of the stakeholder individuals and groups being met;
- ***Grievances recorded and tracked:*** the Project Proponents use the MOST system (an e-database) to record information about grievances raised during stakeholder engagement and tracks efforts to resolve these; and
- ***Documented:*** attendance and meeting minutes, as well as pictures were taken for all stakeholder meetings. The people attending were informed that we would take photographs that could be reused in the ESIA documentation and confirmed acceptance of this by signing attendance sheets.

5.2.3 Stakeholder Identification

A stakeholder is defined as any individual or group that is potentially affected by the Project (directly or indirectly), or who has an interest in or influence on the Project and its impacts, either positive or negative (Ref. 5-8). In order to develop an effective approach to engagement, it is necessary to undertake a process of stakeholder identification and analysis. Stakeholder analysis considers how a stakeholder or stakeholder group may be affected by the Project and what influence they may have on Project outcomes in order to understand their needs and expectations for engagement. For this Project, a list of key stakeholders was identified and assessed through stakeholder mapping, as detailed in Appendix G.

Stakeholder analysis considered:

- Who is affected by the Project and how;
- Each stakeholders' key interests and concerns in relation to the Project; and
- How different stakeholders can influence the Project and what risks or opportunities this presents to the Project.

A list of stakeholders identified to date in the Project is presented in Table 5-1.

Stakeholders' interests in the Project were also analysed, these included (non-exhaustive list):

- Permitting and authorisations;
- Development control and coordination of planning and implementation activities, ensuring consistency in the application of agreed policy frameworks and procedures across the development blocks in the Albertine region;
- Understanding potential adverse and beneficial impacts on local communities including:
    - *Impacts on health and safety;*
    - *Impacts on amenities, services and public infrastructure;*
    - *Impacts on users of natural resources, livelihoods and businesses;*
    - *Impacts on tourism;*
    - *Potential disturbance from noise, vibration, dust, light pollution;*
    - *Impacts on cultural heritage; and*
    - *Impacts on social cohesion.*
- Planning and managing economic and physical displacement;
- Understanding potential benefits deriving from the Project including employment and procurement opportunities;
- Environmental protection and safeguard of protected areas and wildlife; and
- Transparency, openness and access to information.

Table 5-1: Tilenga Project - Stakeholder List

STAKEHOLDER GROUP	STAKEHOLDERS
National government	Ministry of Water and Environment (MWE) • National Environmental Management Authority (NEMA) • National Forestry Authority (NFA) • Directorate of Water Resource Management (DWRM) • Wetlands Management Department (WMD) Ministry of Energy and Mineral Development (MEMD) • Petroleum Authority of Uganda (PAU) • Petroleum Exploration and Production Department (PEPD) Ministry of Tourism, Wildlife and Antiquities (MTWA) • Uganda Wildlife Authority (UWA) • Department of Museums and Monuments (DMM) • Uganda Tourism Board (UTB) Ministry of Lands, Housing, and Urban Development (MLHUD) • Directorate of Physical Planning and Urban Development (DPPUD)

STAKEHOLDER GROUP	STAKEHOLDERS
	o Department of Physical Planning o Department of Human Settlement • Directorate of Land Management (DLM) o Department of Land Registration o Department of Land Administration ▪ Office of the Chief Government Valuers (CGV) o Department of Surveys and Mapping Ministry of Gender, Labour and Social Development (MGLSD) • Directorate of Gender and Community Development • Directorate of Social Protection • Directorate of Labour, Employment, Occupational Safety and Health Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) • Directorate of Fisheries Resources • Department of Crop Production • National Agricultural Research Organisation • National Agricultural Advisory Services • National Fisheries Resources Research Institute (NaFIRRI) Ministry of Health (MoH) • Community Health Department • Uganda Sanitation Fund Program • Uganda Acquired Immunodeficiency Syndrome (AIDS) Control Program • Uganda Tuberculosis (TB) Control Program Uganda National Bureau of Statistics (UNBS) Uganda Human Rights Commission (UHRC) National Planning Authority (NPA) Office of the Prime Minister (OPM) • Department for Disaster Preparedness and Response • Operation Wealth Creation Ugandan Police Force (UPF) • Directorate for Oil and Gas Ministry of Works and Transport (MoWT) • Uganda National Roads Authority (UNRA) Ministry of Defence (MoD) Ministry of Education and Sports (MoES) Ministry of Internal Affairs (MoIA) • Directorate in charge of Citizenship & Migration

STAKEHOLDER GROUP	STAKEHOLDERS
Project Proponents	TEP Uganda TUOP
Project Proponents of Associated Facilities, Supporting Infrastructure and stakeholders relevant to projects considered in Cumulative Impact Assessment	UNRA Uganda Electricity Transmission Company Ltd (UETCL) Uganda Electricity Generation Company Ltd (UEGCL) East Africa Crude Oil Pipeline (EACOP) project proponents Karuma Dam project proponents Ayago Dam project proponents Kabaale Industrial Park project proponents Civil Aviation Authority (CAA) Kabaale Refinery project proponents Kabaale Airport project proponents Nile Basin Initiative (NBI) Secretariat
Local Government	Buliisa District Local Government • Ngwedo Sub-County • Kigwera sub-country • Buliisa Sub-county • Buliisa Town Council • Kisyabi-Sub County • Biiso Sub County • Butiaba Sub-county • Kihungya Sub County Nwoya District Local Government • Got Apwoyo Sub County • Purongo Sub-county • Anaka Town Council Nebbi District Local Government Pakwach District Local Government • Pakwach Town Council Hoima District Local Government • Hoima Municipality Masindi District Local Government • Masindi Municipality

STAKEHOLDER GROUP	STAKEHOLDERS
Project Affected Communities – communities whose boundaries fall within Project Area (i.e. EA-1A, CA-1 and LA-2). [1]	**Buliisa District** • Ngwedo Sub-County: - Villages: Avogera, Kamandindi, Muvule Nunda, Kibambura, Ngwedo TC, Uduk I, Karatum, Mubako, Paraa, Ajigo, Muvule I, Nwwgedo Farm, Uduk II, Kasinyi, Kilyango, Kisomere • Kigwera sub-country: - Villages: Kigwera NW, Kigwera SE, Kigwera SW, Kigwera NE, Kirama, Kiyere, Bikongoro, Kisansya E, Kisansya W, Katodio, Ndandamire, Kichoke, Katanga, Masaka, Wanseko TC • Buliisa Sub-county: - Villages: Pandiga, Gotlyech, Beroya, Kakoora, Uribo, Kijumbya, Bugana Kataleba, Bugana Kichoke, Waiga, Kigoya, Kijangi • Buliisa Town Council - Villages: Civic cell, Kizongi, Nyapeya, Kizikya, Kakindo, Kisimo Cell, Kityanga, Kitahura **Nwoya District** • Got Apwoyo Sub County - Villages: Te Ogot, Pajengo • Purongo Sub-county
Project Affected Communities – communities outside Project Area but who are likely to be indirectly affected by the Project. [2]	**Buliisa District** - Kisyabi-Sub County - Biiso Sub County - Butiaba Sub-county **Pakwach District** - Pakwach Town Council **Hoima District** - Hoima Municipality **Masindi District** - Masindi Municipality
Traditional and religious authorities	• Council of Elders, Bunyoro Kingdom • Acholi Chiefdom • Alur Kingdom • Bunyoro inter-religious committee
Local businesses and tourism operators	• Association of Uganda Tour Operators (AUTO) • Tourism Operators situated inside the Murchison Falls National Park (MFNP), concessionaires situated outside MFNP (including tourism lodges) • Business and Traders (Kasinyi) • Business and Traders (Uduk II)

[1] *Referred to as the Primary Study Area in the Social Baseline – see* ***Chapter 16 – Social.***
[2] *Referred to as the Secondary Study Area in the Social Baseline – see* ***Chapter 16 – Social.***

STAKEHOLDER GROUP	STAKEHOLDERS
	• Masindi District Livestock Association • Buliisa District Chamber of Commerce
NGOs and Civil society	Local community based organisations representing vulnerable groups including: • welfare of children, elderly, disabled or chronically ill • low income and female-headed households (with incomes below the subsistence level) • minority ethnic groups and tribes, immigrants and refugees • Balaalo (Herdsmen) **Local level**: • Buliisa Initiative for Rural Development Organisation (BIRUDO) • Lake Albert Children and Women's Development (LACWADO) • Kakindo Orphans Care • Build Africa • MUNGU MIYO Functional Adult Literacy Group • Bunyoro Local Oil and Gas Advocacy Group (BULOGA) • Bugungu Community Association • Buliisa Non-Governmental Organisation (NGO) Forum • Buliisa Oil & Gas Task Force • Albertine Graben Oil and Gas Districts Association (AGODA) **National level:** • Civil Society Coalition on Oil and Gas (CSCO) • Civic Response on Environment and Development (CRED) • World Wildlife Fund (WWF) • International Union for Conservation of Nature (IUCN) • Minority Rights Group International • Cross Cultural Foundation of Uganda (CCFU) • Uganda Kings and Cultural Leaders Forum • International Alert • International Organisation for Migration • African Institute for Energy Governance (AFIEGO) • The AIDS Support Organisation • World Vision Uganda • Soft Power Uganda • Living Earth Uganda • Link Community Development • Global Rights Alert • Action Aid • Labour Rights Alert • National Association of Environmental Practitioners (NAPE)
Intergovernmental Organisations	• NBI

STAKEHOLDER GROUP	STAKEHOLDERS
Academic and research organisations	• Makerere University • Kyambogo University • Gulu University • West Nile University • Uganda Petroleum Institute • NaFIRRI
Media	• New Vision • Monitor • Rupiny • Radio Biiso FM • King FM • Radio Pakwach • Key Bunyoro FM Stations with regional coverage, e.g. Spice FM

5.2.3.1 Vulnerable Groups

In accordance with Good International Industry Practice (GIIP), particular consideration was given to identification of vulnerable or disadvantaged stakeholders who could be disproportionately affected by the Project or who found it difficult to participate in standard engagement activities. Vulnerable groups were identified in consultation with local stakeholders including local authorities, health service providers, NGO/ Community Based Organisation (CBOs), government agencies and community members themselves. Diverse measures were developed to allow the effective participation of vulnerable groups in the stakeholder engagement process.

This included, for example, ensuring that targeted efforts were made to invite women and youth and people with disabilities to participate in community meetings during the mobilisation process, as well as directly asking them for their questions or comments during the meetings. Smaller group meetings with particular groups, or organisations representing vulnerable groups were also organised during the baseline studies. The general population within the Primary Study Area was considered vulnerable due to their precarious livelihoods, high levels of poverty, low levels of education, poor access to basic social infrastructure and services, and low prevalence of formal land rights. Those living far from health centres and poorer households (in relation to others) were considered particularly vulnerable. Certain groups within the population were considered relatively more vulnerable due to factors that place them more at risk of discrimination, poverty or abuse (such as age, gender, ethnicity, disability).

The vulnerable groups identified in the Project Area are listed below. ***Chapter 16: Social*** provides more details explaining the nature of their vulnerability. Within the groups described below there may be overlapping vulnerabilities (e.g. women from ethnic minority groups, elderly and disabled).

Vulnerable groups identified in the Project Area:

- women, and especially widows and female headed households;
- women in the workplace;
- children, including orphans;
- unmarried youth;
- elderly;
- persons with disabilities or chronically ill;
- migrants and refugees;

- minority ethnic groups;
- fishing communities;
- sex workers;
- cattle herders (Balaalo); and
- people living with Human Immunodeficiency Virus (HIV)/AIDS.

5.2.4 Disclosure and Consultation Methods

5.2.4.1 Information Disclosure

Disclosure of general information about the Project and the ESIA process was done in a variety of ways. Table 5-2 presents methods that were used to disclose information.

Table 5-2: Information Disclosure Methods

INFORMATION DISCLOSED	*METHOD*
Date, time, venue and purpose of upcoming meetings	• Meeting invitations sent to national level stakeholders, district authorities and Local Council (LC) 1s at least two weeks prior to meetings as far as possible. • Mobilisation of villages by CTLOs and LC1. • Event posters posted in public places.
Information on the Project and ESIA process	• Information leaflets distributed at consultation meetings and made available in key public places. • Question & Answer sheets available in CTLO offices or on request from Project Proponents and as a guide during stakeholder meetings. • Presentations given during meetings tailored to the audience in terms of technical detail and language. • Posters displayed during meetings and left in public places.
Report Publication including Scoping Report/Terms of Reference (ToR); ESIA Non-Technical Summary (NTS); and SEP	• TEP Uganda webpage. • Copies of Scoping Report/ ToR (Ref. 5-6), and ESIA distributed directly to a defined list of stakeholders by hand, post and email.

5.2.4.2 Informed Consultation and Participation

For projects with potentially significant adverse impacts on affected communities, international standards require “informed” consultation and participation, where this can be understood to mean:

- an in-depth exchange of views and information;
- an organised and iterative consultation leading to the incorporation of affected community views into the Project decision making process;
- capturing both men’s and women’s views, if necessary through separate forums or engagements; and
- reflecting men and women’s different concerns and priorities about impacts, mitigation mechanisms, and benefits, where appropriate.

Stakeholder engagement activities comprised both ‘active’ and ‘receptive’ consultation. Active engagement included meetings, and structured comment periods to support report disclosure where feedback about the Project was actively solicited. Complementary to these active periods of

disclosure and consultation the Project Proponents were always receptive to feedback, whereby stakeholders could contact the Project at any time (e.g. by email, post, toll free telephone, or in person) to provide their views and ask questions. Feedback could be submitted by any individual or group (e.g. companies, organisations, societies, collectives), either verbally or in writing.

Table 5-3 outlines the methods that were used to allow for an effective process of informed consultation and participation during the ESIA process. Further information about activities that were undertaken for each phase of the ESIA is provided in Section 5.5.

Table 5-3: Methods for Informed Consultation and Participation

METHOD	DESCRIPTION	TARGETED STAKEHOLDERS	PHASE
Village Meetings	Forum for providing Project information and hosting question and answer session with a large audience. Meetings held at community venues easily accessed by the Project's stakeholders and at convenient times, as agreed in consultation with the MEMD and the leaders of local councils.	Local communities within the Project Area including villages located within Buliisa Town Council, Buliisa, Ngwedo, Kigwera, Got Apwoyo Sub Counties and Pakwach Town Council	Scoping Phase and ToR Disclosure Impact Assessment Phase
Focus Group Discussions (FGD)	Exchange of information with more targeted groups of stakeholders focused on, for example, age, gender or livelihood.	Local communities within the Project Area including villages located within the sub counties of Buliisa Town Council, Buliisa, Ngwedo, Kigwera, and Got Apwoyo. Representative groups within the wider Project Area of Influence including in Hoima Municipality, Masindi Municipality Pakwach Town Council and Gulu.	Baseline Phase
One-on-one interviews or small group meetings[3]	Meetings with influential stakeholders and those with access to important baseline information. Meetings were generally more technical and information collected was used for decision making and planning.	Government stakeholders (including departments/ committees at national and district level [in wider Project Area of Influence (AoI)] such as NEMA, PEPD, PAU, DWRM, Occupational Health and Safety (OHS) Department, WMD, MEMD, UWA NGOs and Civil Society Organisations (CSOs) (e.g. BIRUDO, LACWADO, CRED) MFNP and tourism operators within the Park Technical experts e.g. the NaFIRRI Cultural Institutions	Scoping Phase and ToR Disclosure Baseline Phase Impact Assessment Phase
Comment boxes installed in centrally located community buildings in affected communities,	Gives local communities the opportunity to provide confidential feedback on Project activities	Local communities within the Project Area including villages located within the sub counties of Buliisa Town Council, Buliisa, Ngwedo, Kigwera, and Got Apwoyo.	All phases

[3] Small group meetings have on average between two and ten participants.

METHOD	DESCRIPTION	TARGETED STAKEHOLDERS	PHASE
such as CTLO office			
Post/ phone (toll-free)/ email	Opportunity to ask questions or raise concerns about the Project and ESIA process in a timely manner.	All Stakeholders	All phases

5.3 Grievance Mechanism

A grievance is a complaint (i.e. an expression of dissatisfaction) stemming from an incident or impact (real or perceived) related to the Project. Complaints may stem from commonly occurring and relatively minor problems, or more serious one-off events, or entrenched or repeated problems that may lead to resentment, discontent or unrest.

GIIP recommends the establishment and communication of an effective and adequate Grievance Mechanism. A Grievance Mechanism is the process by which a grievance is received, recorded and managed so that it can be tracked from its original submission through to a resolution. The process must be fair, accessible, transparent and properly documented. Effective implementation of a grievance mechanism is crucial to the management of grievances from the local community and other stakeholders. It is an integral part of the engagement process and should be reflective of the scale of impacts and expected risks of the Project.

The Project Proponents have established a grievance process to ensure that grievances associated with the Project are addressed through a transparent and impartial process. In line with GIIP, early in the Project lifecycle, the grievance procedure has been and will continue to be disclosed to the public via individual or group meetings and via printed material.

The Procedure is designed based on International Best practice such as International Petroleum Industry Environmental Conservation Association (IPIECA), International Finance Corporation (IFC) and United Nations Human Rights Council (UNHRC) principals to handle grievances with a provision for the Uganda legal framework to be used as a potential remedy to a resolution.

There are 4 steps and 4 levels in the grievance management mechanism. The steps are Step 1: Receipt and Acknowledgement, Step 2: Record Assess and Assigning, Step 3: Investigation response and resolution, and Step 4: Close out.

The escalation levels are Level 1: where an immediate solution can be given; Level 2: whereby the grievance is escalated to key site operations; Level 3: whereby third parties such as the district and central government or even civil society can be involved; and Level 4: where it is escalated for the Uganda Legal Framework to take its course.

A copy of the Grievance Mechanism is provided in Appendix G.

5.4 ESIA Stakeholder Engagement Programme

Figure 5-1 depicts the ESIA process and when stakeholder consultations should take place during this process as required under Ugandan Environmental Impact Assessment (EIA) regulations and IFC Standards. This process was applied to the Tilenga Project ESIA consultation.

A summary of the specific objectives and approach for stakeholder engagement during the ESIA process is presented in Table 5-4.

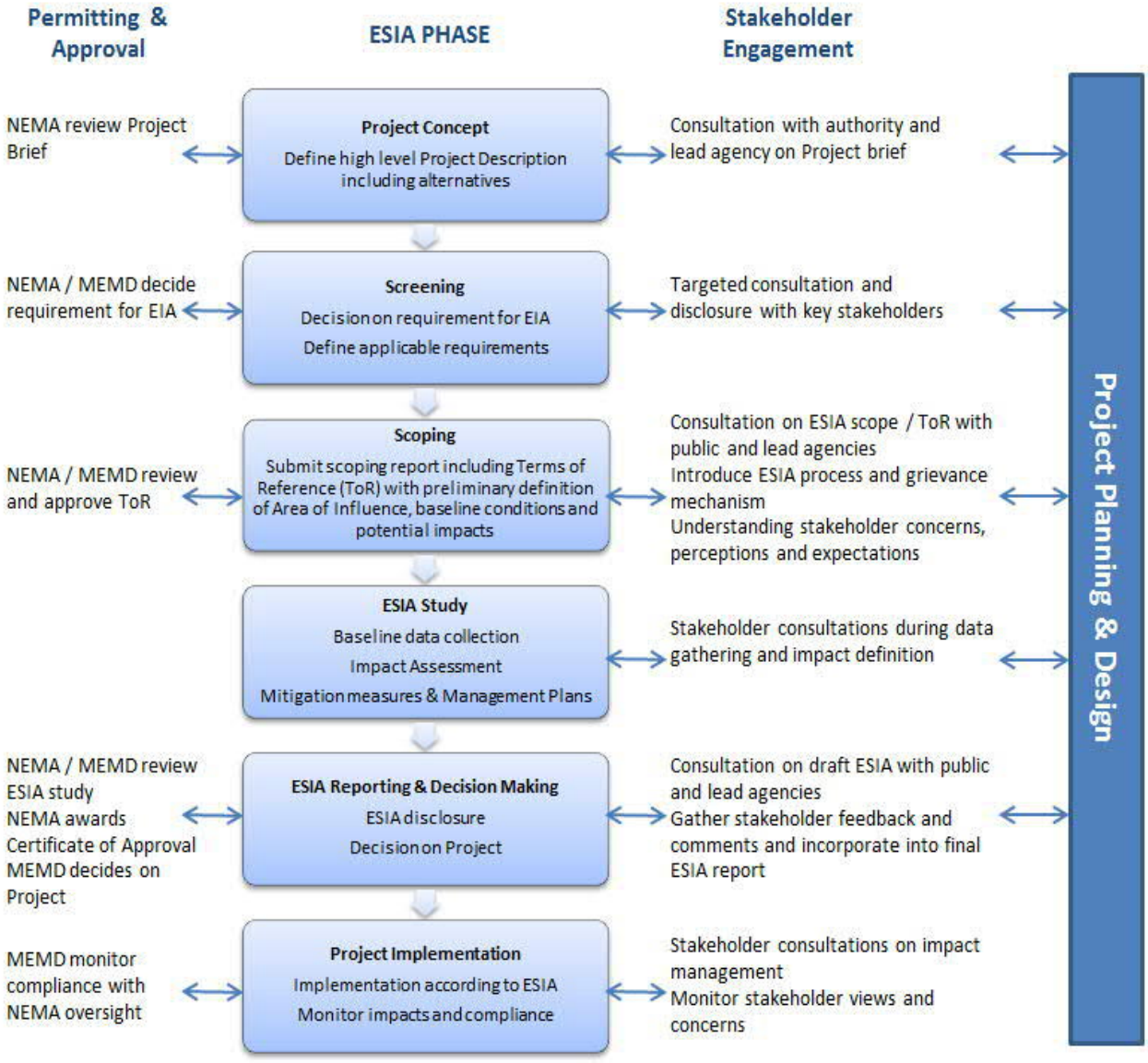


Figure 5-1: Stakeholder Engagement during the ESIA Process

Table 5-4: Objectives and Approach for Stakeholder Engagement during ESIA Phases

ESIA PHASE	OBJECTIVES	APPROACH
Scoping Phase and ToR Disclosure	• Introduce Project and ESIA process to stakeholders. • Explain Grievance Mechanism to affected communities and how to access it. • Receive stakeholder comments and feedback on the scope and content of the ESIA	• National and Community stakeholders invited to scoping consultation meetings. • Information disclosure through distribution of printed materials at all meetings. • NEMA disclosed ToR to selected stakeholders for review/comment.
Baseline Studies	• Collect social, health and environmental baseline data for the ESIA. • Continue to provide Project information to affected people and other stakeholders. • Continue the dialogue opened during scoping engagement to build trust. • Develop better understanding of affected stakeholders to inform the ESIA, rating of impacts and development of appropriate mitigation. • Make stakeholders aware of the grievance mechanism and who to contact if they have questions or concerns.	• Issue focused consultations using key informant interviews and focus group discussions with national and local stakeholders. • Briefing to ESIA specialists undertaking baseline surveys about protocols for engagement with local communities.
Impact Assessment	• Provide stakeholders with an update on the ESIA status, potential impacts and potential benefits. • Provide stakeholders with details of proposed mitigation and enhancement measures. • Solicit stakeholder interests and concerns so that it can be incorporated into the final ESIA Report and inform the design process.	• Undertake a program of public meetings in Project affected communities supported by communication materials including posters, flipchart presentation and leaflets. • Group meetings with stakeholders with a particular interest in the Project (e.g. NGOs, tour operators, or research institutes) assisted by PowerPoint Presentation and leaflets. • Group meetings with national, regional and district authorities assisted by PowerPoint Presentation and leaflets.
ESIA Reporting	• Public Disclosure of ESIA Report. • Receive and respond to comments on the impacts and mitigation.	• NEMA publicises ESIA contents and decides on public disclosure process. • Copies or summaries of the ESIA made available in key locations or on request. • Project Proponents/ ESIA consultant will assist this process as required and will also publish the ESIA on company webpage, a mechanism to receive public comments and recommendations on the impacts and mitigation measures in person, via post/ email or online and their redirection to NEMA will be set up.

5.5 Summary of ESIA Stakeholder Engagement Activities

5.5.1 Engagement during Scoping Phase

5.5.1.1 Consultations Undertaken

Consultations were undertaken with local leaders and communities over a two week period in August 2015 and with national stakeholders over a one week period in September 2015. A summary of the consultations undertaken during scoping is provided in Table 5-5.

Table 5-5: Scoping Phase Consultations

STAKEHOLDER GROUP	STAKEHOLDER	MEETING FORMAT
District Government (Technical committees and political leadership)	Buliisa District Nwoya District	Small group meeting
Sub county Government (Technical committees and Political leadership)	Buliisa Sub County Kigwera Sub County Ngwedo Sub County Buliisa Town Council Purongo Sub County Pakwach Town Council	Small group meeting with each Sub County
Villages[4]	Gotlyech Kizongi Kigwera SE Kisimo Kasinyi Village Kisomere Village Kilyango Wanseko (cancelled)[5]	Public meeting in each village
Tourism Stakeholders	Nile Safari Lodge Wild Frontiers Paraa Lodge Murchison Falls National Park Association of Ugandan Tourism Operators	One-on-one and small group meeting
Civil Society & NGOs	CRED BIRUDO LACWADO CSCO Advocates Coalition for Development and Environment (ACODE)	One-on-one and Small group meeting

[4] *Due to time constraints it was not possible to hold meetings in every village, therefore a representative sample of villages was selected based on their proximity to Project infrastructure, level of involvement in previous engagements (with the aim of avoiding stakeholder fatigue) and with consideration for inclusion of different ethnic groups and geographic representation across the Project Area.*

[5] *The Wanseko meeting could not proceed due to unrest in the community. Key stakeholders from Wanseko were subsequently engaged during the impact assessment phase of the ESIA*

STAKEHOLDER GROUP	STAKEHOLDER	MEETING FORMAT
Government Agencies and Departments	NEMA UWA PEPD DWRM OHS Department WMD Department of Physical Planning Department of Human Settlement Department Urban Development Land Registration Department DMM Directorate of Fisheries Resources NFA	Small group meeting
Research Bodies	NaFIRRI	Small group meeting

Community meetings were well attended with an average of over 100 attendees at each of the meetings (see Figure 5-2 and Figure 5-3). In total over 900 stakeholders participated in the consultations at the district, sub county and community level. Attendance and meeting minutes were recorded for all meetings.

Figure 5-2: Meeting in Gotlyech

Figure 5-3: Meeting in Kigwera South East

Copies of the Scoping Phase consultation materials are depicted in Figure 5-4, Figure 5-5 and Figure 5-6.

Figure 5-4: Event Poster

Figure 5-5: Recording of questions and comments

Figure 5-6: Information Booklets

5.5.1.2 Key Issues Raised During Scoping Phase Stakeholder Engagement

A summary of the key issues raised during the scoping phase is presented in Table 5-6.

Where possible, all stakeholder comments were addressed during meetings. A record of questions and comments was recorded and logged in a Project Issue and Response Register, which has been appended to the SEP (see Appendix G). This enabled stakeholder perceptions and concerns about the Project and the ESIA process to be fed back into the ESIA and Project design process where relevant.

Table 5-6: Key Stakeholder Issues During Scoping Consultations

CONCERN	DESCRIPTION	RESPONSE
Legacy land acquisition issues	During the scoping phase in 2015 there were still many legacy grievances related to the land acquisition process during exploration. Many stakeholders said they had not yet received compensation for land related impacts and were not happy with the compensation they received. There was also mistrust and misunderstanding in the way compensation rates had been set.	Some of the legacy cases were handled already and a new Valuer was on board to complete the process. Others were court cases which were still being handled. The process of compensation was long due to the involvement of a legal mediator. As an alternative, to make the process simpler complainants should avoid their case reaching a legal stage e.g. could use clan head as a mediator instead. Project Proponents learned from past circumstances and would try to handle resettlement and other impacts based on these lessons for the next phases to minimise a repeat of the same impacts. The Project Proponents follow laws and best practices that stipulate how compensation is set and managed. The district land boards (DLB) are responsible for determining the rates which these companies follow. It is the land boards led by the CGV that come up with rates therefore it is up to the sub counties to influence the council.
Disruptions to livelihoods	There were concerns about how livelihoods including fishing, farming (crops and livestock) and tourism will be affected by land acquisition and general oil and gas related activities.	A Livelihood Restoration Plan (LRP) will be developed as part of the RAPs. The ESIA will assess impacts on livelihoods, including fishing. Measures will be in place to mitigate impacts.

CONCERN	DESCRIPTION	RESPONSE
Employment expectations	There are high expectations around local employment and local stakeholders highlight that they will not be happy if they see workers coming from other parts of the country to do jobs that they could do, in particular unskilled jobs. There is also a request for skills training and capacity building to increase prospects of local employment on the Project.	Priority will be given to national and local employment. A ballot system will be used to select unskilled workers. The Project Proponents understand the need for capacity building and have some educational programmes in place. Unskilled work will be given to local communities as a priority – this message will also be given to contractors.
Local procurement	Local producers request capacity building and training to enable them to meet the standards required to sell to the Project.	Consideration for training activities will be given by the Project Proponents to encourage local content participation in the Project.
Health, safety and environmental concerns	Concerns about the impact of the proposed Project, particularly waste transfer and the pipeline, on the health and safety of the local population and the environment were frequently raised as well as questions about how such impacts would be managed.	Getting to the oil underneath produces waste (drill mud cuttings and drilling fluids (rocks/ soil)). The government cannot allow the Project Proponents to pump the oil from the ground without a drilling permit. The best options for drilling waste management were considered in discussion with NEMA. Three alternatives came up: Reinjection in the formation, Landfilling and Recycling. Considering recycling there were no valuable materials in the waste apart from making of construction materials. Construction materials made from waste are a problem in this country. For such construction materials from waste, they need to be declassified from waste to be usable. Uganda has no mechanism for this. All wastes generated will be addressed including hazardous, non-hazardous and sanitary wastes from all facilities both permanent and temporary. The Project Proponents take the prospect of environmental incidents very seriously, especially relating to the prospect of an oil spill. Consequently, there are a whole series of ongoing engineering protocols and designs being built into the Project to minimise the risk. Additionally, specialist consultants will be employed to undertake and produce an Oil Spill Contingency Plan (OSCP) and Emergency Response Plan (ERP). A summary will be provided within the ESIA. The proposed Project is expected to withdraw water from Lake Albert for injection in the reservoir and there will be no discharges back into the lake.
Access to information	There were concerns that access to information was inadequate leading to misinformation and consequently distrust by some members of the community in the Joint Venture Partners (JVPs) and Government. There are rumours, for example, that oil is already being transported from the area in waste trucks.	The companies will have a Community Liaison Officer (CLO) who will be available for people who want direct dialogue. Information disclosure will also take place during the ESIA to inform communities of activities and potential impacts. The district leaders will be kept informed of important developments as knowledge about the Project is clarified.

CONCERN	DESCRIPTION	RESPONSE
Communication and engagement	District, sub county and local stakeholders each requested that the right protocols were followed when undertaking surveys or consultations in the villages. In particular, stakeholders requested that those who are directly affected by Project activities or surveys (e.g. owners of land that is being surveyed) are directly engaged. It was suggested that in some cases information that was given to the sub county or LC1 chairpersons did not transcend to the village level or the relevant individual. Requests were made for greater government representation during consultations and more efforts by the district government (through the district environmental officers (DEO)) to sensitise communities about the Project and its potential impacts.	Stakeholder engagement will take place at different points. It is important to keep the district and sub counties aware of what the oil companies are doing and to notify them before going into local communities – that is the normal protocol. Buliisa villages were met during the scoping stage. In future stages community level engagement will also happen in Nwoya District.
Project Information	Requests were made for information about Project location, schedule and details of infrastructure design.	The Front End Engineering Design (FEED) will refine the exact locations of the proposed infrastructure and as such cannot be presented at this stage. More detailed information will be shared with stakeholders when appropriate. The final schedule for the Project will be addressed in the ESIA. At the time of scoping, the proposed design was still being refined including defining the exact measures that will be used to manage the safety of the pipeline. Routing studies were being undertaken to determine the best path for the pipeline, minimising displacements and impacts. Maintenance will be carried out to make sure pipelines are still working (a 10 metre (m) corridor will be required during this phase).
Sociocultural change	Concerns were raised about how the Project could change the local culture due to the resettlement process and interactions between the Project workforce and local communities.	The ESIA will consider the impacts from interaction between the workforce and community. Companies have diversity classes. When new workers come as part of their induction they are taught about culture in Uganda. A comprehensive management program will be put in place to deal with social and cultural considerations. A social baseline study was undertaken to inform the ESIA.
Corporate Social Responsibility (CSR) requests	Requests were made for various types of CSR investments such as assistance with healthcare centres, road improvements, and education and training programmes.	Any requests of this nature need to be formally submitted because decisions are made by general management – therefore stakeholders are asked to put the request in writing.

CONCERN	DESCRIPTION	RESPONSE
Subcontractor management	Questions were raised about how subcontractors would be managed to ensure they behave correctly in the communities; respect the Project's requirements for local content/ local procurement targets; and perform their work in an environmentally and socially responsible way.	The Project Proponents have in place guidelines for managing societal issues by contractors. These will be adhered to by contractors and subcontractors. The Project Proponents are aware of the importance of local recruitment. Contractors are also required to maximise local recruitment. The ballot system of recruitment is used for local unskilled labour. There was an HIV/AIDS program during exploration. During construction there will be a large workforce so HIV/AIDS will be on top of the health agenda. The social and health impact assessment will help to understand the problem and an appropriate program will be designed based on the findings.

Comments received during the course of scoping meetings were analysed and categorised into 14 categories. The distribution of comments across these categories is shown in Figure 5-7.

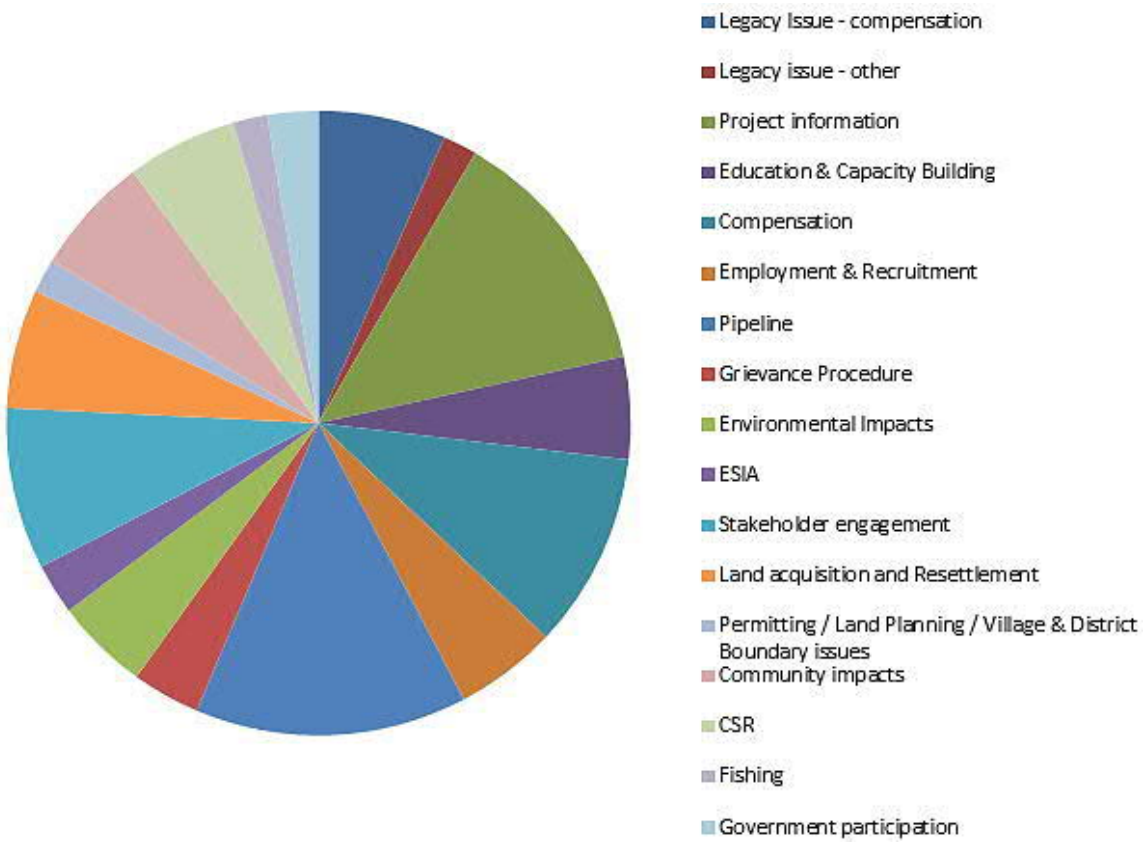


Figure 5-7: Distribution of Comments Received during Scoping Phase Community Consultations

5.5.2 Stakeholder Engagement during Baseline Phase

5.5.2.1 Consultations Undertaken

Individuals, groups and entities that were engaged as part of the baseline survey are outlined in Table 5-7. The social baseline survey was undertaken with local communities between November and December 2016. Baseline meetings with national stakeholders were undertaken over a one week period in November 2016 and January-February 2017[6]. The primary purpose of these meetings was to gather baseline data, however, during meetings the opportunity was also taken to update stakeholders on the Project and ESIA process and to note their feedback and concerns about potential impacts (positive and negative) and mitigation options.

As part of the social baseline survey a total of 67 semi-structured interviews were held with national, regional and local government authorities, traditional leadership, NGOs and CBOs, and service providers. A total of 51 FGDs were held within a sample of Project Affected Communities (PACs). Further details of all social and health baseline survey activities are provided in ***Chapter 16: Social*** and ***Chapter 18: Health and Safety***. (Table 16-4).

Table 5-7: Baseline Phase Consultations

STAKEHOLDER GROUP	*STAKEHOLDER*	*ESIA DISCIPLINE*	*MEETING FORMAT*
Government Agencies	MGLSD • Directorate of Gender and Community Development • Directorate of Social Protection • Directorate of Labour, Employment and Occupational Safety Uganda Bureau of Statistics (UBOS) MoH • Community Health Department (Environmental Health) • Uganda AIDS Control Program • Uganda TB Control Program UHRC) – headquarters and Hoima regional office. OPM, Department for Disaster Preparedness and Management UPF, Directorate for Oil and Gas Police MoIA, Directorate in charge of Citizenship DoMM, Uganda National Museum NEMA MoES	Social Health Cultural Heritage Cumulative Impact Assessment	One-on-one and small group meeting
District Government (Technical committees and political leadership)	Buliisa District Nwoya District Nebbi District Hoima District Masindi District	All disciplines	Small group meeting One-on-one meeting

[6] A comprehensive Social and Health Baseline Survey was also undertaken in 2015 by Artelia Eau et Environnement, which was used to inform the ESIA. The survey undertaken by Tilenga ESIA team in 2016-2017 built on the previous baseline work done by Artelia Eau et Environnement.

STAKEHOLDER GROUP	STAKEHOLDER	ESIA DISCIPLINE	MEETING FORMAT
Subcounty Government and Municipal Authorities (Technical committees and Political leadership)	Buliisa Sub County Kigwera Sub County Ngwedo Sub County Buliisa Town Council Purongo Sub County Got Apwoyo Sub County Masindi Municipality Hoima Municipality Pakwach Town Council Biso Town Council	Social Health Cultural Heritage Ecosystem Services	Small group meeting
Villages and towns[7]	*Villages* Kirama Kibambura Ngwedo Farm Wanseko Bikongoro Bugana Kataleba Uribo Kizongi Kakindo Kityanga Kisimo Te Ogot *Towns* Hoima Municipality Biso Town Council Pakwach Town Council Masindi Municipality	Social Health Cultural Heritage Ecosystem Services	FGDs Community Mapping
Tourism Stakeholders	Paraa Safari Lodge Kabalega Lodge Wild Frontiers	Ecosystem services Cumulative Impact Assessment	One-on-one and small group meeting
Civil Society & NGOs	BIRUDO LACWADO Kakindo Orphans Care Minority Rights Group International International Alert International Organisation for Migration AFIEGO CCFU	Social Health Cultural Heritage	One-on-one and Small group meeting
Traditional Authorities and Religious Leaders	Bunyoro Kitara Kingdom Acholi Chiefdom Bunyoro Inter-Religious Committee	Social Health Cultural Heritage Ecosystem Services	Small group meeting
Social service	District police headquarters –	Social	One-on-one meeting

[7] *These villages were selected based on the data needs identified for the baseline assessment.*

STAKEHOLDER GROUP	STAKEHOLDER	ESIA DISCIPLINE	MEETING FORMAT
providers	Hoima, Buliisa, Pakwach TC, Nebbi Health centres – Hoima Regional Referral Hospital, Biso Health Centre III, Buliisa General Hospital, Buliisa Health Centre IV, Kigwera Health Centre II, Purongo Health Centre III, Masindi General Hospital	Health	

Photos of some of the baseline phase consultation activities are provided in Figure 5-8 to Figure 5-11.

Figure 5-8: Women's FGD Kibambura

Figure 5-9: Youth FGD Ngwedo Farm

Figure 5-10: FGD Elders Kirama

Figure 5-11: Meeting Got Apwoyo Sub County

5.5.2.2 Key Issues Raised During Baseline Phase Consultations

A summary of the issues that arose most frequently during baseline consultations (at both local and national level) are summarised in Table 5-8.

Table 5-8: Key Issues Raised during Baseline Phase Consultations

ISSUE	DESCRIPTION	RESPONSE
Top Five Issues		
Employment opportunities	Questions about employment opportunities on the Project and indirect business opportunities particularly regarding agriculture and particularly for youth.	Priority will be given to national and local employment. A ballot system will be used to select unskilled workers. The Project Proponents understand the need for capacity building and have some educational programmes in place. Unskilled work will be given to local communities as a priority – this message will also be given to contractors. There will be more opportunities for indirect employment than for direct employment. The Project Proponents noted that in the forthcoming phases of the Project they will be working hand in hand with the district on recruitment of local employees. A National and Community Content Programme (NCCP) will also be developed to maximise participation of local and national businesses in the Project supply chain. It was noted that the government has a local content plan and they are going to do skills development for local companies and they are creating a database of all local companies. It was suggested that companies/ suppliers from the area could look at partnership opportunities with bigger companies.
Land issues and tensions	Land issues and tensions resulting from competing claims to land and/ or conflicts with customary land use and resulting negative impacts on social cohesion were frequently raised in discussion.	The ESIA considers the impacts on the community's way of life and residents' relationship with land. The issues of competing land claims and speculation was noted. The Project Proponents will be working with government and traditional authorities to stop speculation.
Health concerns	Concerns were frequently raised about potential health impacts of the Project particularly related to increased rates of HIV/AIDS, Sexually Transmitted Infections (STIs) and Hepatitis B in the Project Area, which are predicted to occur as a result of presence of construction workers and an increase in sex workers coming into the area seeking economic opportunities.	The ESIA has an ESMP that comprises of plans to mitigate project risks and impacts including, for example, a plan to manage HIV/AIDS and other potential health issues. The Project Proponents have been carrying out several social investment projects in different areas including health. For example, at the time of the consultations it was noted that a new awareness project was being planned for 2018. Other health related programmes being considered included hygiene and sanitation programmes.
Resettlement	Several comments and questions were raised regarding resettlement and who will be affected. Feedback was also given about negative experiences during previous compensation processes, particularly the lack of compensation for certain crops and resources and delays in payment.	The Land Acquisition and Resettlement Framework (LARF) was developed in consultation with government to provide guidance on resettlement. Resettlement will be undertaken to meet good international practice. The Project will work with authorities to identify the rightful owners of affected land. In most cases they only lease land although in the next phase there will be some permanent acquisition of land. Reassurance was provided that there would be a thorough consultation process for future resettlement amongst those affected. RAPs will be developed to manage resettlement and information on the timing of displacement and who will be affected will all be

ISSUE	DESCRIPTION	RESPONSE
		provided in those reports. The legal mediator was working through the previous compensations issues. Delayed compensation is due to the fact that amounts have to be approved by the CGV and then MEMD and this sometimes delays the approval process. In terms of setting compensation rates, it was noted that a lot of work was being done with the District Land Board (DLB) to set fair compensation rates. The Market and Asset Valuation Assessment (MAVA) was also completed in 2016 to inform the setting of compensation rates.
Increase in crime and anti-social behaviour	Stakeholders expressed perceptions that there had already been an increase in crime and anti-social behaviour (such as prostitution and increased alcohol consumption), due to an increase in economic migrants, oil and gas workers, and rise in sex workers; there were concerns that this will result in an increase in social conflict.	It was noted that the ESIA includes an analysis of impacts on the potential rise of crime and other anti-social behaviours. Management measures will also be identified to mitigate the impact.
Other Key Issues and Concerns		
Potential impacts on trees and wetlands	Concerns about pressure on trees and wetlands due to influx of opportunistic migrants to the area and due to Project related land clearance.	It was noted that Project impacts on trees and other natural resources will be assessed as part of the ESIA. Mitigation measures will be identified to minimise the impact, which will be outlined in the ESMP Mitigation Checklist (Appendix T). One of the measures includes a tree nursery to be developed. The ESIA also considers the potential impacts related to influx and an Influx Management Strategy (IMS) will be developed to try and address such impacts.
Domestic violence and family conflict	Concerns that resettlement and compensation and influx of workers would lead to a rise in domestic violence and family conflict due to misspending of increased disposable incomes and unequal distribution within families of compensation payments.	The ESIA takes into consideration the impact resettlement, influx, etc. will have on the way of life of the local community. As part of the resettlement, a LRP will be developed which will include financial literacy training to people who will receive cash compensation to avoid and minimise misuse of the received compensation payments.
Potential Impacts on cultural norms	Concerns about how the Project could indirectly affect cultural norms and values due to changes in traditional land management structures, influx and changing livelihood patterns.	Potential Project impacts on cultural norms are considered in the ESIA.
Infrastructure and services benefits	Several stakeholders expressed expectations that the Project would be an opportunity for improvement in infrastructure and services in the Project Area, particularly its potential to improve access to education and healthcare facilities.	The Project Proponents have social investment programmes for education, access to water and health, renewable energy – so far most activities have been done on a small scale and only in directly affected communities.

ISSUE	DESCRIPTION	RESPONSE
Consultation and access to information	Emphasis on the need to maintain good communication and access to information for local communities in a timely manner.	The Project Proponents have CTLOs located in the Project Area and a toll free line (since 2015) that are used to allow issues/ concerns raised by the community to be addressed immediately. Residents can contact CTLOs with any concern or questions. Project Proponents will also work with local authorities to pass information to members of the community. Noted that the companies have a commitment to engage communities fully in the next phase of the Project especially those who are directly impacted.

Comments received during the course of baseline phase meetings were analysed and categorised. The distribution of comments across these categories is shown in Figure 5-12.

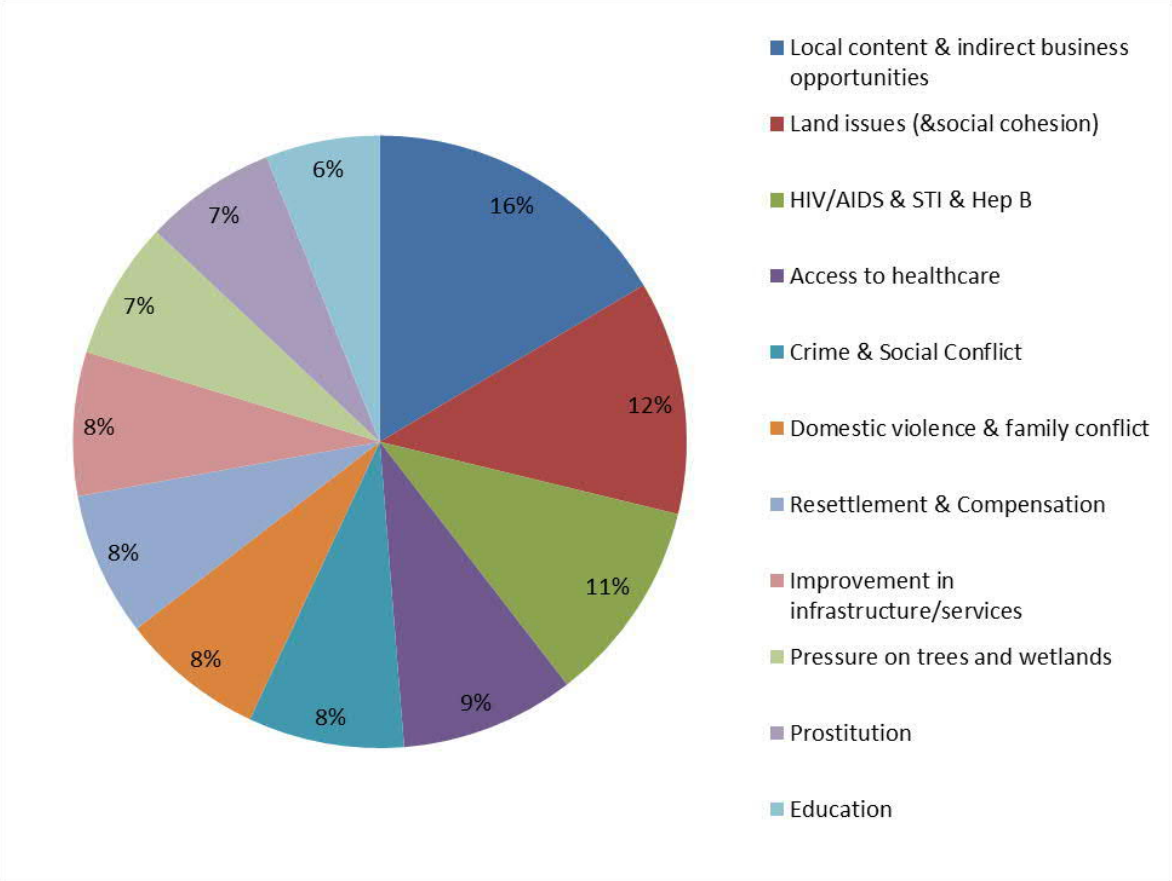


Figure 5-12: Distribution of Comments Received during Baseline Data Collection[8]

[8] Figure 5-12 shows a wider range of comments received; issues that were less than 5% of total comments received have not been included here.

5.5.3 Stakeholder Engagement during Impact Assessment Phase

5.5.3.1 Consultations Undertaken

Impact Assessment phase consultations were undertaken at national and community levels over a two week period in January 2018. During the Impact Assessment Phase, stakeholders had the opportunity to comment on the preliminary findings from the ESIA process and proposed mitigation measures. The stakeholder engagement team presented updates from the Project and explained key findings from the draft ESIA report through a PowerPoint presentation and posters (see Appendix G). Each meeting included a Question & Answer session in which stakeholders were encouraged to contribute to the discussion. Figure 5-13 to Figure 5-16 are samples of the meetings that took place during the Impact Assessment phase.

A summary of the activities undertaken for ESIA consultation is given in Table 5-9.

Table 5-9: Impact Assessment Phase Consultation Activities

STAKEHOLDER GROUP	*STAKEHOLDER*	*MEETING FORMAT*
District Government (Technical committees and political leadership)	Buliisa District Nwoya District Hoima District Masindi District Pakwach District	Small (under ten participants) to large (twenty to thirty participants) group meeting in combination with sub county and municipality government
Sub county and Municipality Governments and Parish Chiefs (Technical committees and Political leadership)	Buliisa Sub County Kigwera Sub County Ngwedo Sub County Buliisa Town Council Butiaba Sub County Biiso Sub County Kihungya Sub County Purongo Sub County Pakwach Town Council Masindi Municipality Hoima Municipality	Large group meeting in combination with sub county and municipality government (twenty to thirty participants)
	Pakwach TC Parish Chiefs Got Apwoyo Parish Chiefs	Large group meeting in combination with LC1 meeting
Villages[9]	LC1 Chairpersons from Buliisa Sub County, Ngwedo Sub County, Kigwera Sub County, Buliisa Town Council, Purongo Sub County (Lagaji only), Got Apwoyo Sub County, and Pakwach Town Council.	Large group meeting (between 30 and 60 participants)
	Kakoora Kitahura Masaka Kakindo Waiga Kijangi Kigwera SW	Public meeting in each village (between approximately 60 and 80 participants at each meeting)

[9] *Due to time constraints it was not possible to hold meetings in every village therefore a representative sample of villages was selected. The key factor for selection for these engagements was the level of involvement in previous engagements (with the aim of avoiding stakeholder fatigue) and with consideration for inclusion of different ethnic groups and geographic representation across the Project Area.*

STAKEHOLDER GROUP	STAKEHOLDER	MEETING FORMAT
	Paraa Bugana Kichoke Katanga Kisansya West Mvule Nunda Kamandindi Wanseko Kichoke Kiyere Ndandamire Uduk I Karatum Beroya	
Tourism Stakeholders[10]	Kabalega Wilderness Camp Murchison River Lodge Nile Safari Lodge Heritage Lodge Bwana Tembo Fort Murchison Parkside Lodge Murchison Falls Conservation Area (UWA, Paraa Office) Murchison Falls National Park	Small group meeting (less than ten participants)
Civil Society & NGOs	CSCO members BIRUDO LACWADO Buliisa Women's Development Organisation (BUWODA) Bugungu Heritage and Information Centre Kakindo Orphans Care CRED Community Integrated Development Initiatives (CIDI) Buliisa Livestock Farmers Cooperative Society (BLFCS) CSCO CCFU Uganda Kings and Cultural Leaders Forum	Large group meetings (average 30 participants) – CSCO members were met in Kampala and local NGOs and CSOs were invited to participate in the meeting with district government.
Government Agencies and Departments	NFA UWA DWRM NEMA PAU MEMD MGLSD MoH – Community Health Department	Small to medium group meeting (up to twenty participants)

[10] The stakeholders listed here are those that attended meetings but it should be noted that a larger number of stakeholders were invited to participate in ESIA consultations but were not able to attend meetings.

STAKEHOLDER GROUP	STAKEHOLDER	MEETING FORMAT
	Uganda Sanitation Fund Program Uganda Aids Control Program MTWA UTB Association of Uganda Tourism Operators MLHUD Department of Physical Planning Department of Human Settlement Department of Land Administration National Planning Authority Directorate of Development Planning OPM – Department for Disaster Preparedness and Response MoWT UNRA UETCL Rural Electrification Authority (REA) MoD UPF – Oil and Gas Police Ministry of Local Government (MoLG) UHRC	
Research Bodies	NaFIRRI	One-on-one meeting
Cultural Institutions	Bunyoro Kingdom Alur Chiefdom Acholi Chiefdom	Small group meeting (less than ten participants)
Intergovernmental Organisations	NBI	Small group meeting (less than ten participants)

Figure 5-13: Meeting in Kitahura village

Figure 5-14: Meeting in Waiga village

Figure 5-15: Meeting in Kakoora village

Figure 5-16: Meeting in Bugana-Kichoke village

5.5.3.2 Key Issues Raised during Impact Assessment Phase Consultations

A summary of the issues that arose most frequently during Impact Assessment Phase consultations is provided in Table 5-10.

Table 5-10: Key Issues Raised during the Impact Assessment Phase Consultations

ISSUE	DESCRIPTION	RESPONSE
Top Six Issues		
Environmental impacts	Stakeholder concerns focused on : • Crop damage and tree felling caused by site clearing; • Project impacts on biodiversity and habitat restoration especially in MFNP; • The impact of the Water Abstraction System on the water level and quality of Lake Albert; • The impacts of the Project on the tourism industry; and • Waste management and use of chemicals in the drilling operation.	There will be clearance of some trees during the site preparation and enabling works phase, but there will also be programmes for revegetation. A pilot experimental nursery was set up to understand the dynamics of propagating the native species. A seedling nursery will be developed to facilitate restoration of degraded areas. Feasibility of community based forestry programmes are also an option being considered as part of livelihood support programmes. Biodiversity specialists have conducted various studies to understand the Project area baseline. These studies have been used to understand how potential impacts such as noise and dust pollution can affect the wildlife in the Park and have proposed appropriate measures. The Production and Injection Network will have a 30 m Right of Way (RoW). No trees or structures/homes will be allowed within the RoW, save for some light agriculture (i.e. crops with short roots that cannot affect the pipeline and flowline integrity). Studies have shown that only between 0.02-0.04% of the lake's volume will be abstracted, which is an insignificant amount and is not expected to disrupt the current lake water users. Additionally, the water requirements from the lake will reduce after the first 5 years of the Project. This is because the primary use of the lake water will be to maintain reservoir pressure and over time as oil is displaced there will be minimal/no need for water. For other Project activities, the plan is to use groundwater. Studies are being undertaken to ascertain that the groundwater available in the area would be sufficient to meet the Project needs. If other sources of water are required, the due process will be followed in consultation with DWRM.

ISSUE	DESCRIPTION	RESPONSE
		The Project Proponents are aware that tourism is an important industry in the area and for the country. For this reason the company is in discussion with UWA, and tourist operators on how to best manage any adverse impact. A Tourism Management Plan will also be developed to guide implementation of the mitigation measures. Waste management is another one of the critical areas that the Project is carefully considering options for, and details are included in the ESIA. Among the facilities to be developed are waste management facilities. The waste management plan will be developed and implemented by the Project Proponents to ensure that all the different waste streams are appropriately handled and disposed of, in line with national reguirements and GIIP.
Land ownership, resettlement and compensation	Residents were concerned about land ownership and resettlement issues. Most questions centred on whether land could be leased rather than acquired and returned to people at the end of the Project lifetime. People wanted further clarification on the resettlement process: where people will be resettled, levels of compensation and what would happen to graves in the Project affected area.	Due to the nature of the Project, land will be acquired by the Government. All land acquisition matters will be handled in line with national laws and international standards for resettlement as indicated in the LARF. When the Project design is refined and more accurate information is available about Project locations, RAP studies similar to those conducted at the Industrial Area will be conducted. Due to the long term nature of the Project, it would be difficult to lease land, hence the preference for outright purchase for the permanent Project components. The RAPs will include a Cultural Heritage Management Plan (CHMP) that set out the procedures to follow where cultural resources such as religious sites or graves are affected by the Project. The Project will discuss and provide support to families affected in carrying out ceremonies according to their custom and religious beliefs.
Improvement and access to social Infrastructures	Communities made requests to the Project Proponents for improvements to existing social services such as healthcare and schools. They asked for the reinstatement of healthcare and sanitation programmes (e.g. HIV/AIDS prevention programmes). Residents also raised concerns about the potential increase in the level of traffic in the local area.	A Community Impact Management Strategy and the Community Health Sanitation Safety and Security Plan will look at the feasibility of different options to address the most critical needs in areas impacted by the Project in line with the respective district development plans. This is considered to be a more sustainable approach compared to building schools or health centres where the plan for who will maintain them is not clear. The TOTAL Scholarship scheme running in the Project area was explained, as well as the application process. The ESIA provides mitigation measures to address potential traffic related impacts such as use of speed limit, vehicle specifications, driver training, journey management planning, use of safety signage etc. In addition, the ESIA includes a commitment that the Project Proponents will look at options for supporting local police to try and improve the enforcement of road safety standards in the Project Area and there will also be efforts to sensitise local populations about road safety.

ISSUE	DESCRIPTION	RESPONSE
Employment and Procurement	Residents raised questions on employment and business opportunities linked to the Project and related training. In particular, local stakeholders asked about employment opportunities for unskilled workers. Women often asked questions about whether there would also be jobs for women on the Project.	There are different categories of jobs in the Project; from unskilled (casual labour) and semi-skilled to skilled. The Ballot process for recruiting casual labour was explained in detail, as well as the application process for semi-skilled and skilled labour. It was further emphasised that some job positions could have some restrictions such as having a good command of the English language to communicate effectively. Women were also encouraged to apply for available jobs when advertised. It was also explained that financial literacy trainings and supplier trainings would be conducted in the area to equip people with knowledge to take advantage of the opportunities presented by the Project.
Access to natural resources	People raised questions on the continued access to natural resources, loss of grazing land and limitation to the movement of people and cattle around Project components.	It was explained that for health and safety reasons, access to natural resourses through the normal routes may be restricted in some areas during site preparation and construction phases, for example water abstraction system, flowline and pipeline installation, access road construction, etc. However, the Project will provide alternative routes, as much as practicable. It was also emphasised that for the flowlines and access roads, works would be undertaken in sections and therefore not completely cut off access to community areas. It was noted that grazing land is important for the cattle herders. For future RAPs, more Resettlement Planning Committees (RPCs) will be setup for affected persons. The LRP and the Community Impact Management Strategy will also look at support for alternative livelihood options for those who lose access to natural resources.
Communication	Issues of communication included: • Translation of documents; and • Information dissemination and ongoing stakeholder engagement.	The importance of paying careful attention to translation of documents into the respective local languages was noted. It was also noted, that for example, the Acholi have an “Acholi Language Board” whose responsibility is to ensure the integrity of the Acholi language, and that this Board could be used to translate Project-related materials. Sensitisation and consultations will be carried out regularly and CTLOs will also be available in the area to keep the communities informed on the Project status.
Other Key Issues and Concerns		
Governance and trust	Local residents stated that they would like representatives from the district government present at meetings. Questions were raised about the role of local and national government and agencies in the monitoring of the Project to ensure the Project meets environmental and social commitments. Issues of 5-33corruption were also raised.	The risk of corruption is noted in the ESIA report and, measures will be taken to improve governance through institutional capacity building. 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

ISSUE	DESCRIPTION	RESPONSE
		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.
Cultural Heritage	Concerns regarding the preservation of sacred sites.	As far as possible sacred sites have been avoided through application of the Avoidance Protocol. An exercise to map cultural sites was done in consultation with local communities and cultural leaders. Where applicable, rituals will be done as part of the process to relocate any affected sites (or the spirits/ancestors from the site) where impacts are unavoidable and support will be provided for such processes.
Impacts of in-migration	Understanding of in-migration and the impact on the local communities.	The ESIA considers potential impacts related to influx and provides for the development of an Influx Management Strategy to manage those issues. Management of influx will require collaboration with national and district governments. Community Content, Economic Development and Livelihood Plan and the Community Health Sanitation, Safety and Security Plan will provide measures to mitigate and monitor impacts of population growth. Management of influx will be a cross-cutting issue that will depend on implementation of various actions across multiple plans and programs. For example, communication will be very important in trying to deter opportunistic migrants from coming to the area (e.g. by informing people that there will be no recruitment 'at the gate'); institutional capacity building programmes will provide support to governments to plan for population growth; and other programmes will be needed to address the impacts of influx such as potential increase in HIV/AIDS. The Project's strategy is to recruit local people in the Project Area, with the involvement of local leaders, as much as possible. The Project will have workers' camps to accommodate semi-skilled and skilled workers on the Project from outside of the Project Area. The accommodation camps will cater for all the occupants' needs and thus avoid increase in demand for existing services as a result of the Project.
Project schedule and location of components	Request for information on the schedule of Project activities, location of well pads and other Project components.	The actual locations will be established during the respective RAP studies and schedules of Project activities will be communicated during the quarterly stakeholder engagements undertaken by the Project Proponents.
Complaints and grievances	People wanted information on how complaints can be submitted	CTLOs explained how to raise a concern or submit a complaint and the Project grievance mechanism.

Comments received during the course of the impact assessment phase meetings were analysed and categorised. The distribution of comments across these categories is shown in Figure 5-17.

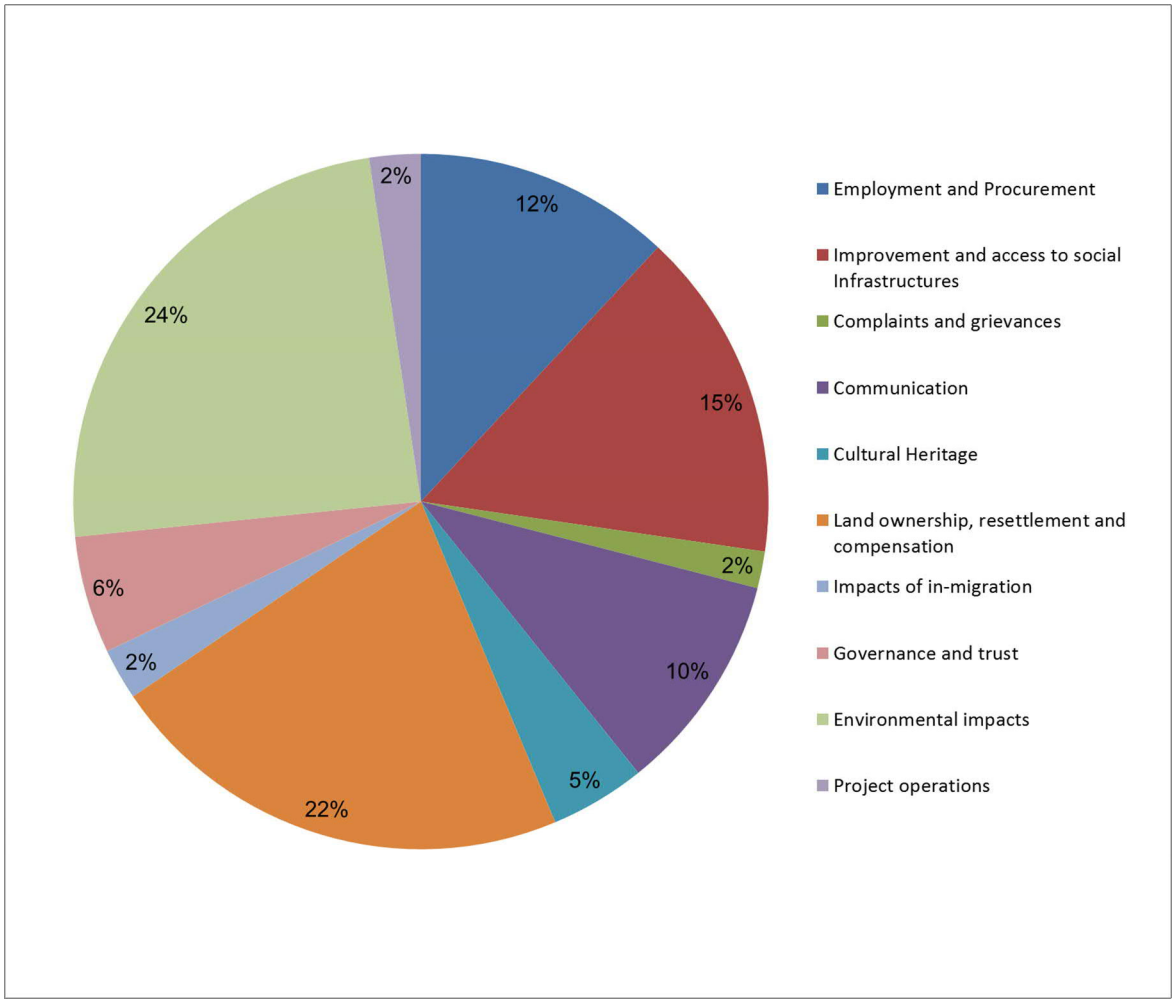


Figure 5-17: Distribution of Comments Received during Impact Assessment Consultations

5.5.4 ESIA Disclosure

Once the ESIA has been submitted to NEMA it will be disclosed for stakeholder comment. Any feedback received from stakeholders on the impacts, mitigation and monitoring plans will be used by NEMA to make their final decision on approval of the ESIA and the approval conditions on the certificate.

NEMA will lead the ESIA disclosure process with support from the Project Proponents, as required, to align the disclosure process with national and international requirements. This may include input into the preparation of disclosure presentation materials; and general guidance on conducting a process that is free, fair, inclusive, prior and informed.

Activities to be undertaken as part of ESIA disclosure will be developed in consultation with the Project Proponents and NEMA but recommended approaches include:

- Announcement using national and local media (radio and newspaper) to announce publication of ESIA Report, public comment period, and details of the public hearings;
- Copies of ESIA Report and Non Technical Summary to be made available;
- Public announcement in local newspapers;
- Publication of the ESIA Report on the Project Proponents' websites; and
- Comment boxes installed in centrally located community buildings in PACs where the ESIA Report is available for review.

5.6 Engagement Activities Undertaken in Parallel to ESIA Consultations

As detailed in ***Chapter 4: Project Description and Alternatives***, this Project will be implemented in a number of phases. The first phase of Site Preparation and Enabling Works is scheduled to start in 2018. Some preparatory works have already been undertaken for this phase, such as the RAP for Priority Areas and Early Works PB. The engagement activities for these two studies are directly related to this ESIA, and a brief on these is therefore provided below.

5.6.1 Consultation for Land Acquisition and Resettlement Activities

The land acquisition and resettlement process is led by Atacama Consulting in collaboration with Synergy Global Consulting Ltd and NOMAD Consulting. The RAP 1 Report submitted in September 2017 focuses on the Priority Areas, which occupy an area of around 785 Acres (317 hectares) and consist of the following components:

- Industrial Area (comprised of the Central Processing Facility (CPF), Operational Camps and Yards and Contractor Camps and Yards): 770 Acres (312 hectares); and
- Industrial Area Access Road N1: 13.6 Acres (5.5 hectares).

In order to guide the design and schedule of activities, the Tilenga Resettlement Team developed the *Social & Resettlement Services for Contract Area 1 & Licensed Area 2 (North) Development Project Stakeholder Engagement Plan ("RAP 1 SEP")* (Ref-5-7). This document set out the overarching RAP engagement principles and approach alongside 'live' detailed action plans for engagement between TEP Uganda, TUOP, and national, regional and local stakeholders. Figure 5-18 shows the overall structure for management of the Tilenga RAPs and ESIA and Figure 5-19 shows how this SEP relates to the overarching Project SEP and the Tilenga ESIA SEP.

The RAP 1 SEP guided the team and relevant TEP Uganda and TUOP staff members in the stakeholder engagement activities. The RAP 1 engagement process has been and will continue to be used for:

- Identifying and prioritising stakeholders affected by and interested in the RAP 1; and
- Establishing and managing relationships with those stakeholders throughout the resettlement process.

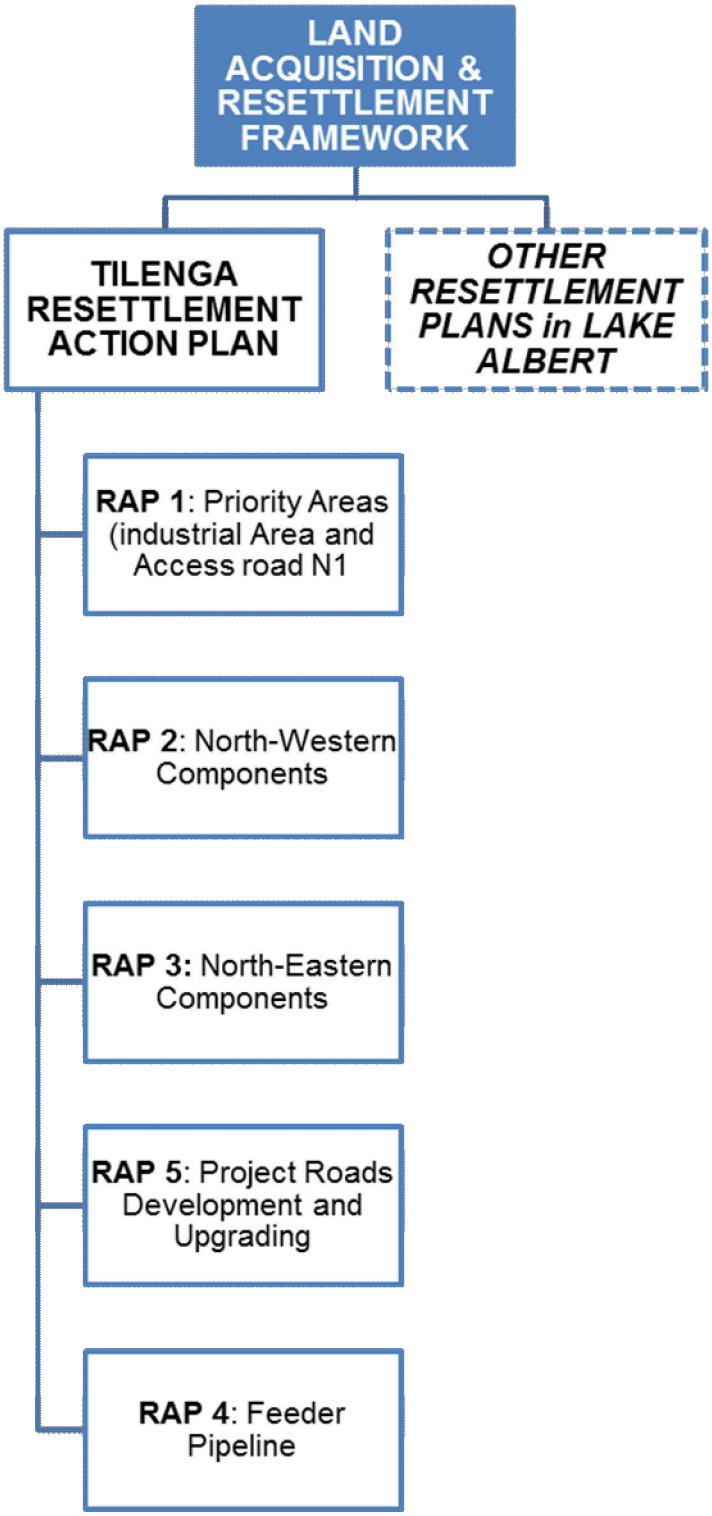


Figure 5-18: Tilenga Resettlement Action Plans and ESIA

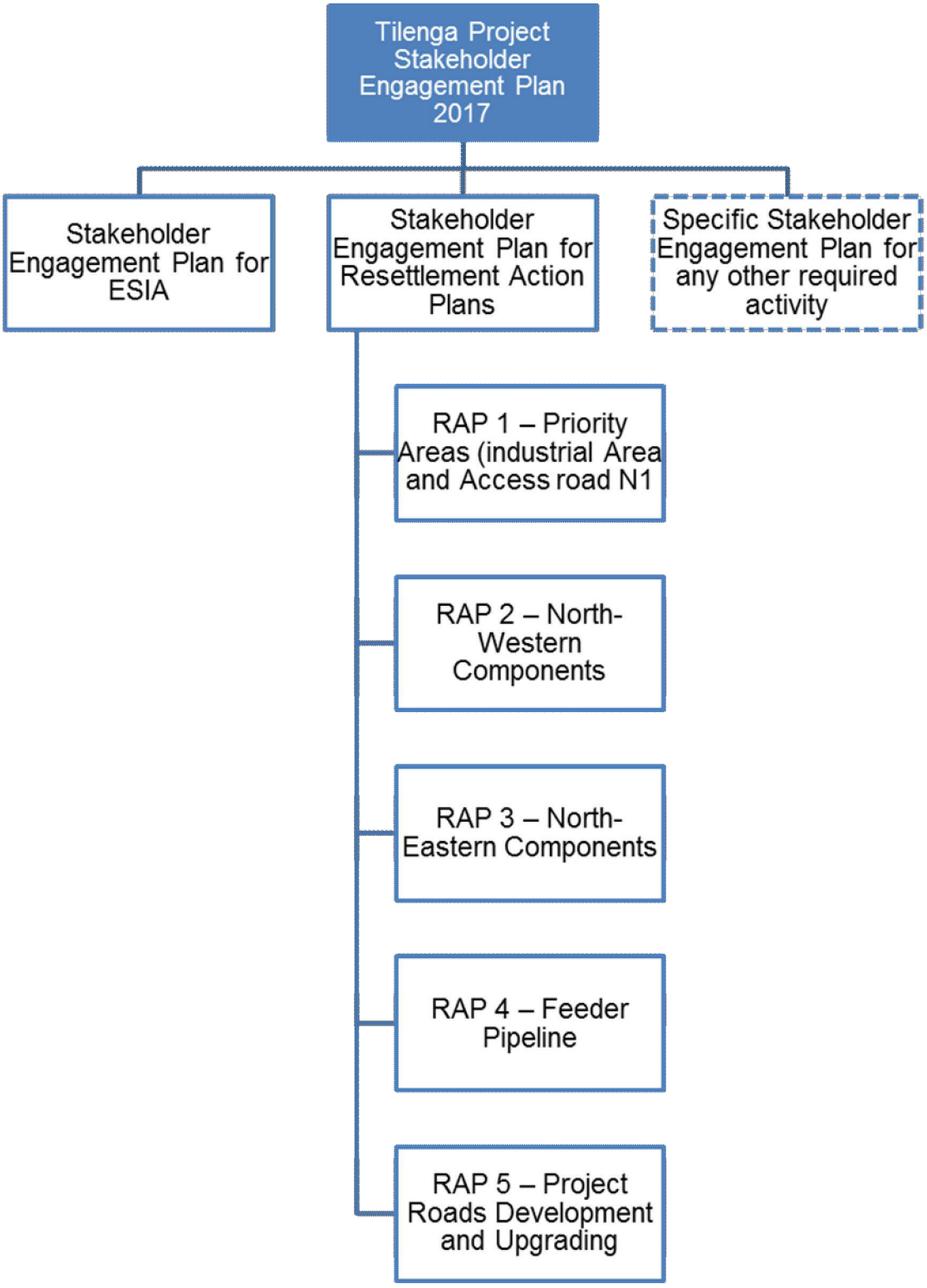


Figure 5-19: Tilenga ESIA and RAP Stakeholder Engagement Planning Documents

The RAP consultant Stakeholder Engagement Team carried out several activities throughout the resettlement process in collaboration with TEP Uganda and TUOP internal staff and representatives from the MEMD and MLHUD. The engagement activities were carried with the wider affected communities, individual Project Affected Persons (PAPs) and, through Resettlement Committees (District Resettlement Committee (DIRCO) and RPC).

Activities undertaken for the RAP comprised:

- Initial disclosure of RAP;
- Cut-off date announcement;
- Engagement during asset and cadastral surveys, legal due diligence and socio-economic surveys;
- Oversight of survey activities and site reconnaissance;
- Specialist studies interview programmes;
- Strip map disclosure and PAPs verification; and
- Presentation of entitlement matrix, resettlement options, livelihood restoration and house design options.

5.6.2 Early Works Project Brief Consultation

An Early Works PB was prepared by Air Water Earth (AWE) Ltd. (Ref. 5-9) to cover the following Project activities:

- Boundary marking and fencing (Industrial area and airstrip upgrade);
- Earthworks including vegetation clearing, top soil removal, levelling, compaction (all components);
- Drainage works (Industrial Area, airstrip and roads);
- Transportation of materials (e.g. murram); and
- Waste management (all components).

The Early Works PB was submitted to NEMA in September 2017 and a copy of the Executive Summary is included in Appendix C.

Stakeholder engagement undertaken to inform the Early Works PB comprised of consultations with local leaders in Buliisa District (district council, sub county councils, and village chiefs) as well as key national government agencies and the CSCO. The main issues and concerns raised during consultations were the same as those raised during ESIA consultations and related mainly to land acquisition and resettlement impacts; employment and economic impacts; environmental impacts; stakeholder engagement; and security concerns. The Early Works PB provides a summary of key stakeholder concerns and details of stakeholder engagement activities are provided in Annex 8.

5.7 Conclusions

Stakeholder engagement has been an integral part of the ESIA process. Feedback from local (including community members in the Project Area), regional and national regulatory and non-regulatory stakeholders was used to inform the scope of the ESIA, identify and assess impacts and develop appropriate mitigation and enhancement measures. Efforts were made to keep stakeholders informed of the ESIA and Project progress at each phase of the ESIA. The ESIA stakeholder engagement process made efforts to complement consultations being undertaken in parallel to the ESIA both as part of ongoing community management by the Project Proponents and for other studies such as the RAP and Early Works PB.

Stakeholder engagement is a continuous process. Ongoing engagement activities will be managed by the Project Proponents and their contractors as the Project moves into the Site Preparation and Enabling Works and subsequent phases. The Project SEP and Grievance Mechanism will be regularly updated to guide and plan the ongoing programme of stakeholder engagement.

5.8 References

Ref. 5-1 Government of Uganda (1998), Uganda Environmental Impact Assessment Regulations No. 13

Ref. 5-2 International Finance Corporation (IFC) (2012) IFC Performance Standard 1

Ref. 5-3 Worley Parsons (2013) Abridged Socioeconomic Baseline Assessment

Ref. 5-4 Artelia Eau et Environnement (2015) Social and Health Baseline Survey

Ref. 5-5 Intersocial Consult and Newplan (2015), Preliminary Resettlement Action Plan – Resettlement Impact Scoping

Ref. 5-6 TEP Uganda/TUOP (2015) EA-1/EA-1A and EA-2 North Development Project ESIA Scoping Report / Terms of Reference

Ref. 5-7 Atacama Consulting, Synergy Global Consulting Ltd, and NOMAD Consulting (2017) Social & Resettlement Services for Contract Area 1 & Licensed Area 2 (North) Development Project Stakeholder Engagement Plan ("RAP 1 SEP")

Ref. 5-8 IFC (2007) Stakeholder Engagement: A Good Practice Handbook for Companies Doing Business in Emerging Markets

Ref. 5-9 AWE, 2017. Tilenga Early Works Project Brief Report, 2017.

Ref. 5-10 IPIECA (2015) Manual on Community Grievance Mechanism in the Oil and Gas Industry

Ref. 5-11 IPIECA (2004) Guide to Social Impact Assessment in the Oil and Gas Industry

Ref. 5-12 IPIECA (2013) Practical Guide 'Integrating Human Rights into Environmental, Social and Health Impact Assessments – A practical guide for the oil and gas industry