



MINISTRY OF WATER AND ENVIRONMENT

DIRECTORATE OF WATER DEVELOPMENT RURAL WATER SUPPLY AND
SANITATION

INTEGRATED WATER MANAGEMENT AND DEVELOPMENT PROJECT

ENVIRONMENTAL SOCIAL IMPACT STATEMENT FOR LOBE RURAL GROWTH CENTRE WATER SUPPLY IN YUMBE DISTRICT



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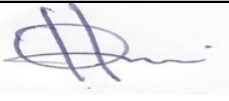


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TABLE OF CONTENTS

ESIA TEAM	ii
TABLE OF CONTENTS	iii
LIST OF FIGURES.....	xii
LIST OF TABLES	xii
LIST OF ACRONYMS	xiv
EXECUTIVE SUMMARY	xvii
1 INTRODUCTION	1
1.1 Background.....	1
1.2 Current water supply and sanitation in Yumbe District	1
Water supply	1
1.2.1 1	
1.2.2 Sanitation facilities	3
1.3 Overview of the proposed water supply systems	3
1.4 Project Location.....	3
1.4.1.1 Water Reservoir	5
1.4.1.2 Transmission and Storage Site	6
1.4.1.3 Distribution Area.....	7
1.5 The Developer Contact Details.....	7
1.6 Project Investment Cost	7
1.7 Project Need and Justification	8
1.8 The Need for Environmental Impact Assessment	8
1.9 Purpose and Specific Objectives of the Environmental Social Impact Assessment... 9	
2 STUDY APPROACH AND METHODOLOGY.....	11
2.1 Overall Approach.....	11
2.2 Field visits	11
2.3 Scoping Study.....	12
2.4 Literature Review	12
2.5 Public /Stakeholder Consultation and Participation	13
2.6 Field Survey Methods	14
2.6.1 Flora	14
2.6.2 Fauna.....	14
2.6.3 Air Quality surveys.....	15
2.6.4 Noise assessment Survey	16

2.6.5	Mapping and Photography	16
2.7	Geotechnical Site Investigations.....	16
2.7.1	General	16
2.7.2	Excavations, Logging and Dynamic Cone Penetration Tests.....	17
2.7.3	Disturbed and Undisturbed Soil Sampling.....	19
2.7.4	Ground Water Table	20
2.7.5	Laboratory Testing	20
2.8	Social economic Survey Methods.....	21
2.8.1	Sampling Methods -	21
2.8.2	Methods of data collection	21
2.8.3	Impact Assessment Criteria	23
2.9	Cumulative Impact Assessment Methodology	26
2.10	Structure of the Environment Social Impact Statement.....	30
3	PROJECT DESCRIPTION	1
3.1	Introduction	1
3.2	Project location	1
3.3	Lobe RGC Piped Water System.....	3
3.3.1	Project Area Population.....	3
3.4	Design Overview – Water Supply.....	3
3.4.1	Water abstraction system.....	4
3.4.2	Water Treatment Units	5
3.4.3	Ancillary Buildings.....	5
3.4.4	Power supply and Electrical installations	6
3.4.5	Central Water Storage Reservoir	6
3.4.6	Total Land requirements.....	6
3.5	Distribution pipe network.....	7
3.5.1	External Works	9
3.6	SANITATION SYSTEMS	11
3.6.1	Waste water disposal.....	11
3.6.2	Faecal waste management facilities.....	11
3.6.2.1	Households and institutions.....	11
3.6.2.2	Public places	11
3.6.3	Faecal sludge management.....	12
3.7	Construction Method.....	12
3.8	Earthworks.....	12

3.8.1	Concrete works	13
3.8.2	Structural Steel.....	13
3.8.3	Reinforcement Steel fixing.....	13
3.8.4	Masonry.....	13
3.8.5	Pipe laying.....	13
3.8.6	Electro-Mechanical Installations	13
3.8.7	Project Management	13
3.8.8	Labor Force	14
3.8.9	Equipment	14
	POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK	15
4	15	
4.1	Introduction	15
	National Policies Framework	15
4.2	15	
4.3	Key Multilateral Environmental Agreements.....	22
4.3.1	International Protocols and Conventions	22
4.3.2	World Bank Operational Policies	23
4.3.3	The World Bank Group Environmental, Health and Safety Guidelines for Water and Sanitation project.....	25
4.4	Institutional framework.....	26
4.4.1	Ministry of Water and Environment	27
4.4.2	National Environment Management Authority	27
4.4.3	National Forestry Authority.....	27
4.4.4	Wetlands Management Department.....	27
4.4.5	Directorate of Water Resources Management.....	27
4.4.6	Ministry of Lands, Housing and Urban Development.....	28
4.4.7	Ministry of Local Government	28
4.4.8	Ministry of Gender, Labour and Social Development.....	28
4.4.9	The Equal Opportunities Commission (EOC).....	29
4.4.10	Yumbe District Local Government.....	29
4.5	Permits and Licenses Required by Project Proponent.....	29
5	BASELINE BIOPHYSICAL ENVIRONMENT	31
5.1	Physical Environment	31
5.1.1	Climate	31
5.1.2	Topography of the Project Area.....	31

5.1.3	Drainage and water resources.....	32
5.1.4	Geology and soils.....	34
5.1.5	Seismology	36
5.1.6	Noise	37
5.1.7	Air quality.....	39
5.1.7.1	Particulate Matter	39
5.1.7.2	Gas emissions	41
5.1.8	Geotechnical Field Findings.....	43
5.1.8.1	Dynamic Cone Penetrometer results	43
5.1.8.2	Classification and Identification of Soils.....	44
5.1.8.3	Shear Strength Test Results	44
5.1.8.4	Bearing Capacity Evaluation	45
5.1.8.5	Structural Designs	47
5.1.8.6	Design loads.....	47
5.1.8.7	Design Information	48
5.1.8.8	External Works.....	48
5.2	Biological Environmental	49
5.2.1	Flora	49
5.2.2	Mammals.....	50
5.2.3	Birds.....	50
5.2.3.1	Water Quality.....	50
5.3	Social Economic Baseline Environment.....	51
5.3.1	Overview	51
5.3.2	Demographic Information	52
5.3.2.1	Sex of respondents.....	52
5.3.3	Relationship of the respondent to the household head.....	52
5.3.4	Age of respondents	53
5.3.5	Marital status of the respondents	53
5.4	Religion of respondent.....	54
5.5	Level of Education.....	54
5.6	Ethnicity	55
5.7	Population.....	55
5.8	Source of energy for lighting and cooking.....	56
5.9	Transport.....	56

5.10	Communication channels	58
5.11	Land use	59
5.12	Utility lines	60
5.13	Economic status	61
5.13.1	Household's Main Source of Income	61
5.13.2	Household monthly income	61
5.13.3	Household expenditure patterns	62
5.14	Household production	62
5.14.1	Crop farming	62
5.14.2	Challenges Affecting Crop Production	63
5.14.3	Domestic animals kept by Households	63
5.15	Water and sanitation-related diseases	64
5.15.1	Access to water	66
5.15.2	Distance from Homes to Main Water Source	66
5.15.3	Role of women and girls in water collection	67
5.15.4	Challenges associated with water Collection	68
5.15.5	Amount of Water Used by Households	68
5.15.6	Households' payment towards maintenance of water sources	69
5.15.7	Women's Involvement in the Management of Water Sources	69
5.16	Sanitation and hygiene	70
5.16.1	Availability of toilet facilities	70
5.16.2	Challenges with toilet facilities	70
5.16.3	Public toilets	71
5.16.4	Waste disposal	71
5.16.5	Waterborne diseases	72
5.17	Health service delivery	72
5.18	Educational Institutions	73
5.19	Settlement patterns & housing	77
5.19.1	Housing Typology	77
5.20	Poverty	79
5.20.1	Land and Property Ownership	80
5.21	Physical Cultural Resources (PCR)	80
6	STAKEHOLDER CONSULTATION AND DISCLOSURE	81
6.1	Introduction	81
6.2	Public participation objectives	81

6.3	Stakeholder identification.....	82
6.4	Stakeholder mobilization.....	82
6.5	Methods of engagement	84
6.6	Stakeholder consultation findings.....	84
7	ANALYSIS OF ALTERNATIVES	89
7.1	Introduction	89
7.2	The No Project Alternative.....	89
7.3	Alternative Sources of Water.....	89
7.3.1	The surface water source (Stream)	89
7.3.2	Groundwater Sources.....	90
7.3.2.1	Borehole alternatives.....	90
7.3.3	Adequacy of the Ground Water Sources.....	91
7.3.4	Roof Catchment:.....	92
7.3.5	Alternatives Pipeline Material.....	93
7.3.6	Alternative Access to Water Sources.	93
7.3.7	Power supply options.....	96
7.4	Sanitation Options.....	97
7.4.1	Central Sewerage System.....	98
7.4.2	On-Site Sanitation Systems	98
8	POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION MEASURES	99
8.1	Introduction	99
8.2	Impact Evaluation and Analysis	99
8.3	POSITIVE IMPACTS.....	104
8.3.1	Creation of local employment opportunities.....	104
8.3.2	Increased market for agricultural produce and local goods	105
8.3.3	Income to Material/ Equipment Suppliers and Contractors.....	105
8.3.4	Improved Skills for Local Communities.....	106
8.3.5	Improving the growth of the economy.....	106
8.3.6	Employment opportunities	106
8.3.7	Improved Site Aesthetics.....	107
8.3.8	Market for Construction Materials	107
8.4	NEGATIVE CONSTRUCTION PHASE ENVIRONMENTAL AND SOCIAL IMPACTS.....	107
8.4.1	Flora (vegetation clearance and destruction of crops).....	107

8.4.2	Land take	110
8.4.3	Soil erosion and siltation of water resources.....	112
8.4.4	Disturbance of Fauna (Loss of wildlife, invertebrates, birds, etc.).....	113
8.4.5	Visual Alteration (Aesthetics pollution).....	115
8.4.6	Impact on temporal structures	116
8.4.7	Noise generation	117
8.4.8	Pollution of soil, surface and groundwater.....	119
8.4.9	Soil compaction and loss of soil functions.....	121
8.4.10	Alteration of air quality due to the generation of dust and emissions	122
8.4.11	Increased traffic and associated risks.....	125
8.4.12	Poor sanitation around the project site.....	126
8.4.13	Introduction of alien and invasive species	127
8.4.14	Increased spread of HIV/AIDS and communicable diseases due to population influx	129
8.4.15	Theft and vandalism of property.....	131
8.4.16	Social ills or Influx of construction labour.....	131
8.4.17	Occupational health and safety of workers	134
8.4.18	Physical Cultural Resources impacts	137
8.4.19	Gender and vulnerable groups.....	138
8.4.19.1	Gender Impacts	138
8.4.19.2	Impacts on vulnerable groups	140
8.4.19.3	Potential abuse to women and girls	142
8.4.19.4	Potential child abuse.....	143
8.5	NEGATIVE OPERATIONAL PHASE ENVIRONMENTAL AND SOCIAL IMPACTS.....	144
8.5.1	Visual Alteration (Aesthetics pollution).....	144
8.5.2	Noise generation	144
8.5.3	Pollution of soil, surface and groundwater.....	146
8.5.4	Soil compaction and loss of soil functions.....	147
8.5.5	Dust generation.....	147
8.5.6	Traffic-Related Risks	147
8.5.7	Waste Management.....	147
8.5.8	Theft and vandalism of property.....	148
8.6	NEGATIVE DECOMMISSIONING PHASE ENVIRONMENTAL AND SOCIAL IMPACTS.....	149

9	ENVIRONMENTAL SOCIAL MANAGEMENT AND MONITORING PLAN	151
9.1	General Considerations	151
9.2	Scope and Objectives of the ESMP	151
9.3	Environmental and Social Monitoring Programme	166
9.3.1	Purpose of Monitoring	166
9.3.2	Scope Of Environmental And Social Monitoring.....	166
9.3.3	Monitoring Activities and Processes.....	166
9.3.3.1	Weather Forecasts	166
9.3.3.2	Site Inspection	166
9.3.3.3	Meetings.....	166
9.3.3.4	Record keeping	167
9.3.3.5	Monthly and Quarterly Environmental and Social Report.....	167
9.3.3.6	Accident and Incident Reporting	168
9.3.3.7	Environmental compliance audit.....	168
9.3.3.8	Approval of the ESMP activities.....	168
9.3.3.9	Enforcement Of Compliance	168
9.4	E&S Action Plans and Method Statements	168
9.5	Institutional Implementation Arrangements.....	175
9.5.1	Role of NEMA.....	175
9.5.2	Role of Yumbe District Local Government.....	175
9.5.3	The Role of MWE.....	176
9.5.4	The Role of the Contractor	177
9.5.5	Role of Supervising Consultant.....	178
9.5.6	Role of the Umbrella Organisation.....	178
9.5.7	The Water User Committee (WUC).....	178
9.5.8	The role of the Scheme Operator (SO)	179
9.6	Grievance Redress Mechanism	179
9.6.1	Village and District Grievances Redress Committees	180
9.6.2	Roles and Responsibilities of Community GMC	181
9.6.3	Project Workers Grievances Redress Committees.....	181
9.6.4	Roles of Workers Grievance Redress Committees	182
9.6.5	MWE'S Internal Grievance Redress Committee.....	183
9.6.6	MC at Sub County Level.....	183
9.6.7	GMC at Town Council/ Municipal Level	184

9.6.8	GMC at the District Level.....	184
9.6.9	Contractor/workers GRM.....	184
9.6.10	Process of Handling Grievances.....	185
9.6.11	Flow Chart of the Grievance Management Process.....	187
9.6.12	Complaints Handling Flow Chart for Workers.....	189
9.6.13	Publicity of the GRM and GRCs.....	190
9.6.14	Monitoring and Evaluation of the Grievance Handling System	190
9.6.15	Training of the GRCs.....	191
9.6.16	Facilitation of the GRCs.....	192
9.6.17	Reporting Requirements.....	192
10	CONCLUSION.....	193
APPENDICES.....		194
	Appendix A: Approved Terms Of Reference.....	194
	Appendix B: Water Quality Test Certificate	197
	Appendix C: Consultation Minutes and Attendance Lists.....	200
	Appendix C (1): Minutes with Yumbe district officials.....	200
	Appendix C (2): Minutes with District Water Officials.....	204
	Appendix C (3): Minutes with Office of the Prime Minister (OPM)	207
	Appendix C (4): Minutes with Yumbe district officials Consultations with Lobe Town Council officials.....	209
	Appendix C (5): Minutes with Community at Lobe Trading Center.....	213
	Appendix E: Bill Of Quantities.....	220
	Appendix F: Social Tools.....	221

LIST OF FIGURES

Figure 1-1: Water distribution supply system.....	3
Figure 1-2: Lobe TC Google Map	4
Figure 1-3: Yumbe District Location Map	5
Figure 1-4: Borehole drilled for Lobe RGC in Drachia village.....	6
Figure 2-1: ESIA Process in Uganda	11
Figure 2-2: Trial Pit No.1 Log (Soil Profile): Borehole site	18
Figure 2-3: Trial Pit No.2 Log (Soil Profile): Reservoir Site	19
Figure 3-1: Location of Project sites in Yumbe District.....	1
Figure 3-2: Layout of Lobe RGC.....	2
Figure 3-3: Lobe RGC Water Supply System Schematic Diagram	3
Figure 3-4: EPANET Hydraulic model	8
Figure 3-5: Lobe RGC Water Supply System Schematic Diagram	10
Figure 5-1: Topographic formation of Lobe RGC.....	32
Figure 5-2: Lobe drainage system.....	33
Figure 5-3: Soil types in Lobe Town Council.....	35
Figure 5-4: Seismic zoning map of Uganda and Project Location (US 319).....	36
Figure 5-5: Sampled Noise measurements.....	38
Figure 5-6: Sampled Air Quality Receptor points	43
Figure 5-7: Source of energy for lighting and cooking.....	56
Figure 5-8: Land use pattern in Lobe.....	59
Figure 5-9: Existing Land Use Map.....	60
Figure 5-10: Percentage of household expenditure on different items. <i>Source: Baseline survey, 2023</i>	62
Figure 5-11: Crops grown by households.....	63
Figure 5-12: Livestock production. <i>Source: Baseline survey, 2023</i>	64
Figure 5-13: Main and alternative water sources. <i>Source: Baseline survey, 2023</i>	66
Figure 5-14: Average distance to the main water source and time taken to collect water. <i>Source: Baseline survey, 2023</i>	67
Figure 5-15: HIV/AIDS risky groups	76
Figure 5-16 Key features within Lobe Town Council	79
Figure 7-1: Alternative Borehole Sites	90
Figure 7-2: Average Demand in relation to the available water resources from Drachia BH	92
Figure 7-3: Alternative footpath to the water source	95

LIST OF TABLES

Table 1-1: Current Water Supply Coverage by sub-County.....	2
Table 1-2: Villages in the proposed project area.	4
Table 1-3: Abstraction Water Pumps and Transmission Mains.....	6
Table 1-4: Water Storage Tank.....	7
Table 1-5: Contact details of the project developer	7
Table 2-1: Test pits Locations.....	17
Table 2-2: Soil samples.....	17
Table 2-3: Standard Test Methods.....	20
Table 2-4: Summary of study participants and sampling method used	22
Table 2-5: Sensitivity Criteria.....	Error! Bookmark not defined.
Table 2-6: Impact Magnitude Criteria	Error! Bookmark not defined.
Table 2-7: Likelihood of occurrence classification.....	24
Table 2-8: Criteria for rating overall impact severity (environment parameters).....	24
Table 2-9: Criteria for rating overall impact severity (Social and economic parameters).....	26
Table 2-10.....	30
Table 3-1: Borehole Sources with Potential for Development to Production Wells in Lobe	4
Table 3-2: Pumping Mains Details	5
Table 3-3: Solar power system components	6
Table 3-4: Land requirements for the proposed project.....	7

Table 3-5: Summary of distribution pipes	8
Table 3-6: Components of the Sanitation Facilities	12
Table 4-1: National Policy Framework.....	15
Table 4-2:International Protocols and Conventions.....	22
Table 4-3: World Bank Operational Policies.....	23
<i>Table 4-4: Permits and Licenses.....</i>	<i>29</i>
Table 5-1: Seismic Zone Factor, Z	36
Table 5-2: Noise Measurements	38
Table 5-3: Readings for Particulate matter (particles/m3) measured.....	40
Table 5-4: Details of the Gas Emissions Assessments.....	42
Table 5-5: Summary of DCP Test Results and Consistency.....	43
Table 5-6: Index Properties and USCS Classification for Retrieved Soil Sample.....	44
Table 5-7: Summary of Soil Shear strength parameters	44
Table 5-8: Evaluated Bearing Capacities of Sub Soils Based on N- Values	46
Table 5-9: Summary of Evaluation for Bearing Capacity based on Local Strength Parameters	47
Table 5-10: Design Information.....	48
Table 5-11: Water Quality Data for the Boreholes	51
Table 5-12: Percentage of respondents by sex.....	52
Table 5-13: Relationship to household head.....	53
Table 5-14: Age category of respondents	53
Table 5-15: Marital status of the respondent	53
Table 5-16: Religion of respondent	54
Table 5-17: Education level of respondent	54
Table 5-18: Population distribution by ward and sex	55
Table 5-19: Road Infrastructure in Yumbe District.....	57
Table 5-20: Main source of income for the household head.....	61
Table 5-21: Household monthly income.....	62
Table 5-22: Current Water Supply Coverage by sub-County	64
Table 5-23: Available water sources by technology and functionality status in the Host Community	65
Table 5-24: Responsibility of fetching water at the household level.....	67
Table 5-25: Challenges with water collection.....	68
Table 5-26: amount of water used at the household level.....	69
Table 5-27: Payment for domestic and maintenance of water sources	69
Table 5-28: Women's involvement in water management.....	69
Table 5-29: Availability and type of toilet facility	70
Table 5-30: Latrine construction challenges.....	71
Table 5-31: Presence and need for public toilets	71
Table 5-32: Water and solid waste management	72
Table 5-33: Common waterborne diseases	72
Table 5-34: Enrolment and school facilities for Lobe TC	74
Table 5-35: Prevalence of gender-based violence in the community	77
Table 5-36: Type of the main house	78
Table 6-1: Summary of stakeholders identified and consulted during the ESIA process.....	84
Table 6-2: Summary of key issues from consultation meetings	84
Table 7-1: Borehole Data.....	90
Table 7-2: Water Demand.....	91
Table 7-3: Solar power system components	96
Table 7-4: Comparison between solar power and diesel power generator	96
Table 8-1: Environmental and Social Impact Matrix.....	100
Table 8-2: Maximum permissible noise levels for construction sites and accelerating vehicles.....	117
Table 9-1: Environmental Social Management and Monitoring Plan Matrix.....	153

LIST OF ACRONYMS

AIDS	Acquired Immune-Deficiency Syndrome
AOI	Area of Influence
CAO	Chief Administrative officer
CBD	Convention on Biological Diversity
CBOs	Community-Based Organisations
CDO	Community Development Officer
CITES	Convention on International Trade in Endangered Species
dBA	Decibel Amperes
DDP	District Development Plan
DEA	Directorate of Environmental Affairs
DLGs	District Local Governments
E	Easting
EA	Environmental Assessments
EHS	Environment Health and Safety
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EI	Environmental Inspector
EMMP	Environmental Mitigation and Monitoring Plan
EMP	Environmental Management Plan
EMP	Environmental Management Plan
ENR	Environment and Natural Resources
EO	Environmental Officer
EOC	Equal Opportunities Commission

ERP	Emergency Response Plan
ESIA	Environmental and Social Impact Assessments
ESIS	Environmental and Social Impact Statement
ESMF	Environment and Social Management Framework
ESMP	Environmental and Social Management Plan
GBV	Gender-Based Violence
GOU	Government of Uganda
GPS	Global Positioning System
HS&E	Health, Safety and Environment
HH	Household
HSMP	Health and Safety Management Plan
IWMDP	Integrated Water Management and Development Project
IWRM	Integrated Water Resource Management
MoGLSD	Ministry of Gender, Labour and Social Development
MWE/MoWE	Ministry of Water and Environment
N	Northing
NEA	National Environment Act
NEMA	National Environment Management Authority
NHPC	National Housing and Population Census
NPHC	National Population and Housing Census
OP	World Bank Operation Policy
OS	Operational Safeguard
OSH	Occupational Safety and Health
OSHA	Occupational Safety and Health Administration

PAP	Project Affected Person
PDO	Project Development Objective
RA	Risk Assessment
RGC	Rural Growth Centre
SEA	Sexual Exploitation and Abuse
SPP	Source Protection Plans
SEAP	Social and Environment Action Plan
TOR	Terms of Reference
UBOS	Uganda Bureau of Standards
VAT	Value Added Tax
WB	World Bank
WBG	World Bank Group
WHO	World Health Organisation
WSS	Water Supply System
WSP	Water Source Protection
UNHCR	United Nations High Commissioner for Refugees

EXECUTIVE SUMMARY

The Government of Uganda (GoU) through the Ministry of Water and Environment (MWE), with financial support from the World Bank, under the Integrated Water Management and Development Project (IWMDP) is undertaking Water and Sanitation sub-projects in small towns and rural growth centres. The Project Development Objective (PDO) is to improve access to water supply and sanitation services, capacity for integrated water resources management and the operational performance of service providers in project areas.

The proposed interventions in the IWMDP will contribute to the achievement of National Development Plan III objectives, Vision 2040 and achievement of the Sustainable Development Goals, SDG#3 - ensuring healthy lives and promoting well-being for all at all ages, SDG#4 - ensuring availability and sustainable management of water and sanitation for all and SDG#10 - reducing inequalities within and among countries.

The Project focuses on three strategic areas: (i) delivering necessary Water and Sanitation Services (WSS) infrastructure and catchment management measures in targeted areas; (ii) supporting water-related institutions (MWE, local government, and service providers) to establish and consolidate operational efficiency and service quality in small towns and rural areas; and (iii) strengthening national and regional capacity to improve Integrated Water Resource Management (IWRM). The Project comprises four components: Component 1– WSS in Small Town and rural Growth Centers which covers Support to Small Town and rural Growth Centres and Support to Refugee and host Communities; Component 2–WSS in Urban Large Towns; Component 3–Water Resource Management and, Component 4–Project Implementation & Sector Support. Sub-components.

Component 1: provides support activities designed to improve the sustainable provision of water supply and sanitation services to refugee settlements and host communities. The sub-component will target the districts of Yumbe, Arua, Moyo (including Obongi district newly created from Moyo), Adjumani in West Nile, Lamwo in Northern and Kiryandongo in Central Uganda, where about 70 per cent of the refugees in Uganda are being hosted.

To address the water supply gap in Yumbe, 6 solar-powered piped water supply systems and 22 toilets have been proposed. These water supply and sanitation infrastructure will be implemented as part of the strategy to improve access to clean water, improved sanitation and hygiene in the refugee host communities. Under the IWMDP, funds have been reserved for the preparation of the Environmental Social Impact Assessment (ESIA), Water Source Protection (WSP) and Resettlement Action Plan (RAP) feasibility study, engineering design under consultancy services, construction works as well as the implementation of full-scale source protection measures.

Project Location

The proposed Lobe Rural growth Centre will be located in Lobe Town Council, Yumbe District. The catchment villages for the project include Noki, Taparago, Urungu, Amabala, Kanabu south, Burongo, Turu Central, Ogutin, Gobu, Illisia, Urungo Central, Dukulia, Giro, Akaya, Awunana, Juba, Illumani, Uringu East, Lobe, Okuba, Noki Triangle, Odrubi, Ibaku,

Lodua, Kina, Kobua, Yakata, Adu, Drachia, Nanguleje, Labe, Kalulua, Lele, Tendele and Majaka

Proposed project infrastructure

The proposed project infrastructure and facilities include the following components:

- 1 No production borehole in Drachia village (DWD 89612) with submersible pump powered by solar system and grid power
- The distribution pipe network of total length 20,020 m.
- Pressed steel storage tank of 150 m³ capacity
- Pumping main from the ground tank to the central water storage tank of 5,005 m (DN 200 HDPE PN20)
- Electric submersible pump set; 30 m³/hr and 110 m head
- Transmission pipeline length 5,005 m
- Daily power requirement of 280.29 KWhr
- Water transmission pipeline Size (mm) and Material DN 200 PN 20 HDPE
- The pump station situated on a 1500m² site enclosed with 2.1m high concrete post and chain link fence
- Access by 3m wide gravel access road.
- 60 m² pump house at the borehole station.
- Chemical dosing house (3.0 x 6.0m) building at the water reservoir site to house the chlorine dosing equipment and chemical storage.
- Staff house (96 m²) residential building to house two staff
- Office and laboratory building (110 m² office building, laboratory and tools store.
- Site works, Attendants Quarters + Guardhouse

The following equipments will be used during the construction of a piped water and sanitation project:

- Excavator - for digging trenches for pipelines and reservoirs.
- Backhoe loader - for excavating and loading materials.
- Dump truck - for transporting materials like sand, gravel, and pipes.
- Bulldozer - for clearing land and levelling the ground.
- Wheel loader - for moving materials around the construction site.
- Compactor - for compacting soil and materials.
- Concrete mixer - for mixing concrete for foundations and structures.
- Crane - for lifting heavy materials and equipment.
- Welding machine - for welding pipes and structures.
- Pump - for dewatering trenches and pumping water during construction.
- Generator - for providing power to construction equipment and tools.
- Surveying equipment (theodolite, level, GPS) - for surveying and layout of the project.

- Pipe cutting and threading machine - for cutting and threading pipes to size.
- Jackhammer - for breaking concrete and rocks.

Shoring equipment - for supporting trenches and excavations.

Approximately 145 persons shall be employed with contractors staff approximated at 120 personnel for the Lobe RGC piped water supply and sanitation project, 70% of whom must be local. The project will abide by World Bank safeguarding standards, Ugandan labour laws, and environmental, health, and safety guidelines.

Environmental and Social Assessment Requirements

The proposed construction of a water piped system in Lobe RGC falls within the ambit of Schedule 5 of the National Environment Act No.5 of 2019, mandating mandatory Environmental and Social Impact Assessments (ESIAs). Specifically falling under the Utilization of water resources and water supply (No. 4), abstraction or utilization of ground water (b), and support facilities (k) categories, which includes ground water resources and water abstraction. As per the National Environment Act (NEA), projects in this category necessitate the submission of a mandatory ESIA to the National Environment Management Authority (NEMA) for thorough review and clearance before construction commences. The Scoping/Terms of Reference (ToR) were meticulously prepared and submitted to NEMA for consideration, paving the way for the comprehensive ESIA for the project. Approval from NEMA, as indicated in Annex 1, further underscores the compliance with regulatory requirements.

In adherence to the EIA Regulations of 2020, this ESIA meticulously addresses the stipulated issues, presenting vital information crucial for safeguarding the environment and the well-being of affected communities throughout the project's design, construction, and operational phases. The objective is to empower NEMA and other lead agencies to make informed decisions regarding the project's progression in light of the identified environmental and social impacts. Special emphasis has been placed on incorporating insights from the Environmental Impact Assessment Guidelines and the specific EIA guidelines for the water sector in Uganda.

Moreover, in accordance with the World Bank's Operational Policy 4.01 on Environmental Assessment, an Environmental and Social Impact Assessment (ESIA/ESMP) is mandated for projects that are identified to have potential adverse environmental and social effects. Given that the planned project activities are anticipated to present site-specific environmental and social risks and impacts, conducting an ESIA aligns with the policy requirements outlined in OP 4.01.

It's also essential to consider the World Bank project categorization, which may further guide the assessment process and associated mitigation measures. This categorization helps determine the level of scrutiny and attention required based on the potential environmental and social impacts of the project.

Study approach and Methodology

The ESIA study followed the process as outlined in the National Environment Management Authority (NEMA) Guidelines for Environmental Impact Assessment in Uganda, 1997 (NEMA 1997)

The study was preceded by the internalization of the Terms of Reference and formulation of appropriate data collection tools. It assessed each of the activities of the project covering physical, biological, socio-economic (including occupation health and safety); and socio-cultural environment as detailed herein. It determined and listed potential direct and indirect environmental impacts for each of the planned activities; evaluated and recommended mitigation measures for negative/adverse impacts.

The methodology used included; a scoping study, Literature review, Stakeholder consultations, key stakeholders' investigations/engagements, a survey of social economic activities, Water resources assessment, Biodiversity studies on flora and fauna, Baseline noise assessment, Mapping and photography, Visual observations, Impact screening, Impact assessment, evaluation and analysis.

The ESIA study was based on data collected along the proposed project route (project sites) as well as review of documents provided by the Developer and those from other sources such as Feasibility study reports, Environmental and Social Management Plan (ESMP), World Bank Safeguards policies, IFC Environmental Health and Safety Guidelines for Water and Sanitation Projects, and other documents provided by district staff on project location such as District Development Plans, district state of environment and health reports, among others. Other documents reviewed include relevant National Household survey reports, regulations and legal frameworks impacting the water and sanitation sector. Consultations with stakeholders constituted a major part of the ESIA methodology together with information. Stakeholder perceptions, views and concerns were collected through focus group discussions, meetings and personal interviews with Yumbe District Local Government officials, Lobe Town Council officials, UNHCR, Office of the Prime Minister and local community members.

Institutional, Legal and Policy Framework

Reference was made to the Feasibility and Preliminary Design Report for Lobe Rural Growth Center, July 2023, several national policies and legislation e.g. the National Environment Policy (1994), Water Policy (1999), National HIV/AIDS Policy (2007), Policy on Conservation and Management of Wetland Resources (1995), The constitution of the Republic of Uganda (1995), National Environment Act No.5, 2019, Water Act (Cap 152), Occupational Health and Safety Act (2006), Local Government Act (1997), Physical Planning Act (2010) as amended 2020 etc. World Bank Safeguard policies such as OP/BP 4.01 - Environmental Assessment, OP/BP 4.04 - Natural, OP/BP 4.11 - Physical Cultural Resources, OP/BP 4.10 - Indigenous Peoples, OP/BP 4.12 - Involuntary Resettlement were also reviewed

Relevant National environmental regulations were also reviewed including some international protocols that Uganda is a signatory to.

Environmental setting around the proposed project

There are different segments of vegetation along the project from the source to the reservoir. These include savanna mosaic of bushlands and thickets graduating into extensive woodlands at the water source. Lobe natural vegetation is characterized by open lands with savannah grasslands of equatorial types with small pockets of natural forests on hills and along the South Sudan border, northern parts of the district. The vegetation cover of Lobe is mainly savannah woodland and therefore rich in biodiversity. Savannah grassland is by far the predominant vegetation in the Lobe project area comprising *Combretum adenogonium*, *Combretum collinum*, *Combretum molle*, *Eucalyptus grandis*, *Ficus species*, *Flueggea virosa*, *Gmelina arborea*, *Grewia mollis*, *Grewia trichocarpa*, *Hyparrhenia rufa*, *Penisetum Perpurium*, *Eleusine indica*, *Typha ssp*, *Commelina ssp*, *Khaya anthotheca*, *Lonchocarpus capassa*, *Lophira alata*, *Maytenus senegalensis*, *Morus lacteal*, *Piliostigma thonningii*, *Psidium guajava*, *Rhus natalensis*, *Sarcocephalus latifolius*, *Schefflera volkensii*, *Senna siamea*, *Tamarindus indica*, *Vitellaria paradoxa*, *Tectona grandis*, *Mangifera indica*, and *Borassus aethiopum*.

Based on the IUCN Red List of Threatened Species 2018 none of the recorded species are of conservation concern, they are all recorded as of least concern (LC).

The project area is generally a modified environment. The sites sampled were near settlements, woodlots/tree plantations, riverine areas, grasslands, and cultivated areas. Rodent, shrew species, Bats and mongoose are the wild mammals identified in the area. Domesticated animals including cattle, goats and sheep also found in the project were the only mammals observed during the survey

The most common bird species occurring in the project area include the African Palm Swift, Northern Red Bishop, Black-Headed Weaver, Common Bulbul, Piapiac, African Mourning Dove, Red-eyed Dove, Laughing Dove and Vinaceous Dove. The area supports a high proportion of species associated with open habitats and grassland.

Yumbe has loamy soils that are generally fruitful, particularly in the valley bottoms. On the lower parts of the slopes, there are some comparatively more fertile alluvial deposits. Sand bags are the most extensively dispersed type of soil, spanning vast areas, while ferralitic soils make up the majority of soils. These finely textured soils have quickly leached, erodible loose structures. Acidic soils predominate. Vertisol soils can be found in the Yumbe district's northwest, which includes a portion of Kei Subcounty and Lobe Town Council. These easily become wet because of their inadequate drainage. Most soils have a lateritic layer that lowers the moisture content and rooting depth at the surface, making it harder to develop the land. All minerals in the subsoil are used for construction.

Yumbe District experiences a tropical climate characterized by moderate rainfall and temperatures. The annual average rainfall is 1250mm, with two distinct seasons. Light rains occur between April and October, while the wettest months are typically July to November, receiving over 120mm/month. December to February constitutes a long dry period with less

than 60mm/month. Rainfall is influenced by the northerly and southerly movements of the inter-tropical front.

Seasonal changes are seen in temperatures, with lower nighttime lows and higher daytime highs during the dry season (December to March). The average maximum temperature during the rainy seasons is 28–29°C. Most months in the region have over 80% humidity, although during the dry seasons—especially from December to March—it drops to less than 50%. Yumbe District's climate is often defined by a distinct rainy and dry season, as well as year-round changes in temperature and humidity.

The topography of the project area lies between 1327m to 953m above sea level. Drachia borehole is at the lower end around 1014 m above sea level and Urungu reservoir higher at 1157m above sea level.

Social Economic baseline

The following were the socioeconomic baseline conditions of project area. The average household size in the district is 7.6, and the average fertility rate per woman is 6.7. The district's adult population is made up of 70.3% married people and 26.1% widowed women who are 50 years of age or older. This suggests that the project region has a comparatively large household size, which is linked to lower wealth and higher levels of poverty, per the National Household survey data from 2015 (UBOS, 2015). There are 10,269 people living in Lobe Town Council as of this writing, of which women make up 58% of the population and men make up 42%. With 1,912 residents, Kanabu ward has the largest population, while Urungu has the smallest, with 862 residents.

The majority of the land in the project area is owned and managed by the community.

Project Impacts

Potential positive impacts during construction

The following positive benefits are expected to accrue from this project during construction;

- Creation of local employment opportunities
- Increased market for agricultural produce and local goods
- Increased income to Material/ Equipment Suppliers and Contractors
- Improved Skills for Local Communities
- Economic growth
- Increased Revenue to the government

Potential negative impacts during construction

The major negative risks and impacts associated with the proposed Lobe RGC Water and sanitation project are summarised in the Impact/risk mitigation (Chapter 8) and the Social and

Environmental Management and Monitoring Plan section (Chapter 9). The most significant environmental and social impacts, rated as of medium significance and higher, are:

- Pollution of water and soil resources
- Construction activities like excavations and vehicle movements during construction are likely to generate noise levels beyond the current levels. Exposure of communities and workers to high noise levels can be a health concern.
- The influx of people and the increase in social disruption and human health issues, related specifically to GBV Child abuse, the influx of people and HIV/AIDS, with which specific management is required to guide social interaction during the construction period
- Excavations, construction activities, and transportation of workers and equipment may pose occupational and community safety risks
- Soil erosion and siltation of river.
- Poor sanitation around project sites
- Spread of invasive species
- Land take for the borehole sites, pumphouse water treatment site access routes and water reservoir tank

The mitigation measures for the above-listed potential impacts include: Proper containment and re-use of cut and spoil/excavated soils for backfilling the excavated pits, hoarding off of key construction sites like intake sites, water storage sites, provision and enforcement of adequate and appropriate personal protective wear, The affected property and crops/trees shall be compensated in line with the approved RAP, Communities in the project area should be engaged and sensitized about all the components and requirements of the project. After construction, there should be landscaping and then grass left to recolonize the disturbed area naturally. MWE in collaboration with the local authorities shall undertake catchment management activities to support local environmental protection programs including support of afforestation initiatives to enhance tree cover areas as a way of reducing project footprint. Movement of equipment (vehicles, contractors, and the entire construction crew) must follow designated pathways or agreed-upon access roads to avoid unintended damages to fauna. The affected sites should be restored to almost their original position. Trenching, pipework laying and backfilling will be done concurrently. For open pits, the contractor shall ensure that every evening, they are covered while being secured with warning tape.

Following construction, rehabilitation of all areas disturbed during the construction phase and that are not required for regular maintenance operations shall be undertaken to desired ecological conditions and all exposed areas shall be re-vegetated using indigenous species. To minimize interference with traffic, digging trenches and piping across roads shall be conducted in hours with less traffic preferably on weekends, and the contractor shall develop and implement a traffic management plan. To mitigate social impacts, workers shall as much

as possible be recruited from the project area, and develop and implement a comprehensive stakeholder management and engagement plan, Structures like shrines and graves should be avoided as much as possible, and all public institutions like schools and health centres in the project footprint should be connected to the water supply and requirements for vulnerable groups (like child protection and prevention of GBV) should be mainstreamed and integrated into project activities.

Environmental and Social Management and Monitoring Plan (ESMMP)

Institutional Structure and Responsibilities: The following parties shall be involved in the ESMP during the pre-construction, construction and operation phases:

The Ministry of Water and Environment (MWE) will be responsible for ensuring environmental and social performance for the water supply and sanitation project. The Supervising Engineer will be responsible for overseeing construction, monitoring contractors, and employing specialists. The Project Manager will implement the ESMP, ensuring resources are provided, and personnel are trained. MWE will guarantee compliance with social and environmental safety measures.

The Resident Engineer will review and approve the ESMP before work commencement. Yumbe District Environmental Officer will monitor, regulate environmental protection and monitoring the project area. During site preparation and construction, the contractor will be responsible for ensuring compliance with all relevant legislation and standards, as well as adherence to all environmental and socio-economic mitigation measures specified in the Environment and Social Management Plan. The contractor is also responsible for managing the potential environmental, socio-economic, safety and health impacts of all contract activities whether these are undertaken by themselves or by their subcontractors.

Environmental monitoring will be undertaken at different levels as described below

Surveillance: Undertaken by the Supervision Engineer on behalf of MWE.

Quarterly Monitoring: Joint by all relevant stakeholders at various levels.

Audit activities: To be done by a NEMA registered Environmental Auditor.

Spot checks: By Supervising Engineer, MWE, Contractor, District Leadership, NEMA.

Routine inspections will cover environmental and social management on the site, with daily, weekly, monthly, and quarterly inspections to identify issues and ensure maintenance. Contractors must prepare monthly and quarterly reports, verifying activities in line with Ugandan laws, regulations and World Bank Safeguard policies. Critical incidents will be reported to MWE within 24 hours and to the World Bank within 48 hours.

To fulfil the Contractor's contractual reporting requirements, either a stand-alone Monthly Environment and Social report shall be generated, or the Contractor's Monthly Progress Report shall adequately cover safeguards. The report will outline various actions made to manage the project's environmental and social components following the terms of the contract, Ugandan laws, norms, plans, and policies, as well as World Bank Safeguard

policies. The supervising consultant will also need to confirm and approve this report. Planning is usually done continuously for the management of environmental aspects. To that end, each month's success report ought to include a plan for the upcoming month's social and environmental events.

The estimated ESMP total cost during construction phase amounts to 3.16% of the total project cost, which is 269,000,000 Uganda Shillings.

Conclusions and Recommendations

The proposed Lobe RGC water supply and sanitation system has undergone a thorough assessment and mitigation planning process; thus it is not anticipated to have an irreversible negative environmental impact. To provide an environmentally sustainable water supply and sanitation system, mitigation strategies have been developed for every stage of the project, including the construction, operation and decommissioning phases. The project is recommended for approval by the National Environment Management Authority.

1 INTRODUCTION

1.1 Background

The Government of Uganda received credit from the World Bank towards the implementation of the Integrated Water Management and Development Project (IWMDP). The Project Development Objective (PDO) is to improve access to water supply and sanitation services, capacity for integrated water resources management and the operational performance of service providers in project areas. The project will also contribute to the achievement of National Development Plan III objectives, Vision 2040 and Sustainable Development Goals.

The Project focuses on three strategic areas: (i) delivering necessary Water and Sanitation Services (WSS) infrastructure and catchment management measures in targeted areas; (ii) supporting water-related institutions (MWE, local government, and service providers) to establish and consolidate operational efficiency and service quality in small towns and rural areas; and (iii) strengthening national and regional capacity to improve Integrated Water Resource Management (IWRM). The Project comprises four components: Component 1–WSS in Small Town and rural Growth Centers which covers Support to Small Town and rural Growth Centres and Support to Refugee and host Communities; Component 2–WSS in Urban Large Towns; Component 3–Water Resource Management and, Component 4–Project Implementation & Sector Support. Sub-components.

Component 1.2 Support to Refugee and Host Communities, this sub-component will, with financing from the IDA 18 Refugees Sub-Window, support activities designed to improve the sustainable provision of water supply and sanitation services to refugee settlements and host communities. The sub-component targets districts of Yumbe, Arua, Moyo (including Obongi district newly created from Moyo), Adjumani in West Nile, Lamwo in Northern and Kiryandongo in Central Uganda, where about 70 percent of the refugees in Uganda are being hosted.

To address the water supply gap in Yumbe, 6 solar-powered piped water supply systems and 22 toilets have been proposed. These water supply and sanitation infrastructure will be implemented as part of the strategy to improve access to clean water, improved sanitation and hygiene in the refugee host communities. Under the IWMDP, funds have been reserved for the preparation of the Environmental Social Impact Assessment (ESIA), Water Source Protection (WSP) and Resettlement Action Plan (RAP) feasibility study, engineering design under consultancy services, construction works as well as the implementation of full-scale source protection measures.

The ESIA is prepared to provide relevant information to the authority and seek guidance and approval for the proposed water supply and sanitation project within Lobe RGC.

1.2 Current water supply and sanitation in Yumbe District

1.2.1 Water supply

According to Yumbe District Development Plan (2021-2025), The district entirely relies on the exploitation of underground water to provide fresh water supply to the communities. The

safe water situational analysis for the district indicates safe water coverage of 48% (based on a source man ratio of 300 people served by 1 deep borehole, 300 people served by 1 shallow well, 200 people served by 1 protected spring, and 150 people served by 1 Tap stance).

The feasibility study pointed out that, Yumbe District's access to safe water in rural and urban areas was 45% and 63% respectively. The least served Sub-Counties are Kerwa (30%), Midigo (31%), Kuru (40%), Kei (43%), Kululu (44%), and Ariwa (45%). Nearly 285,691 people in rural areas in Yumbe alone have no access to safe water.

In areas where the safe water sources are insufficient, the majority of the people in the district have to look for alternative water sources most of which are unprotected (wells, streams and rivers) and hence unsafe for human consumption. In normal situations where communities have a protected source close to them, they have to pay a flat fee of up to 1,000 Uganda Shillings per month per household for water; but where there is no protected water source nearby, people pay water vendors between 1000 -5000 Uganda shillings for a 20-litre jerry can of water.

Table 1-1: Current Water Supply Coverage by sub-County

<i>/N</i>	<i>SUB COUNTY</i>	<i>PROJECTED POPULATION 2020</i>	<i>PEOPLE SERVED</i>	<i>SAFE WATER COVERAGE</i>
1	Apo	54,958	28,200	51.3
2	Drajini	42,719	28,300	66.2
3	Lodonga	44,484	23,500	52.8
4	Kei	62,490	25,300	40.5
5	Kululu	50,486	21,600	42.8
6	Kuru	55,782	20,300	36.4
7	Midigo	50,016	21,050	42.1
8	Kerwa	44,131	21,000	47.6
9	Odravu	57,783	31,050	53.7
10	Ariwa	32,834	14,400	43.9
11	Romogi	62,372	28,500	45.7
12	Kochi	56,488	29,100	51.5
13	Yumbe town council	47,544	26,850	56.5
	Aringa	662,087	319,150	48.2
	Rural water	614,543	292,300	47.6
	District	662,087	319,150	48.2

Source: DWO-Annual Report 2019

1.2.2 Sanitation facilities

As per the Yumbe District Development Plan (2021-2025), the latrine coverage has experienced a slight decline, currently standing at 78.1%, compared to the over 80% recorded in 2019/2020. Conversely, there has been a notable improvement in handwashing coverage across the entire district, now reaching 72.9%, a significant increase from the approximately 50% reported in previous years.

1.3 Overview of the proposed water supply systems

The main components of the Large Solar piped water systems will include; a production well as a water source, a raw water pumping main to a reservoir, an elevated storage reservoir on a steel tower, Solar Pumps, Solar Panels, chlorine dosing unit, pump motor, pump house, distribution network, and service connections as shown in figure 1-1 below. The project will also support sanitation facilities and water source protection activities in all the project areas.

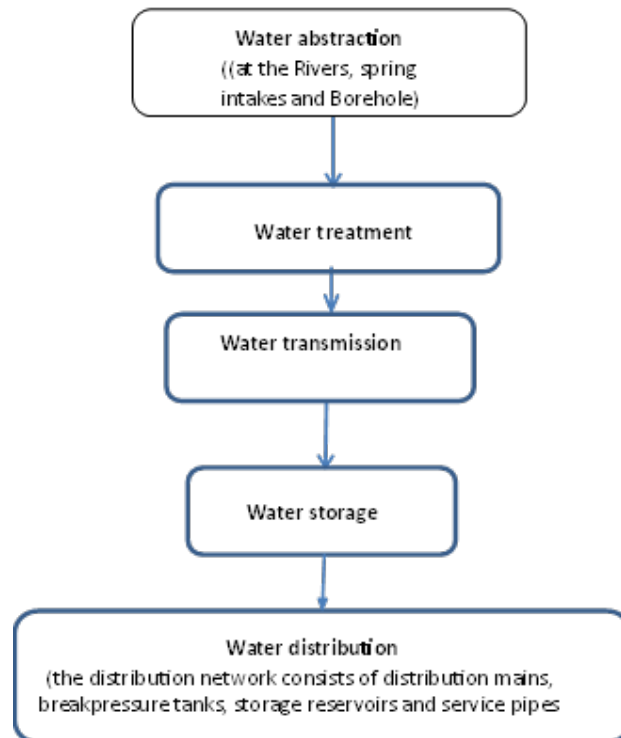


Figure 1-1: Water distribution supply system

1.4 Project Location

Lobe Rural Growth Center is located in Lobe Town Council at coordinates 36N 292622m E; 394568m N for Lobe Trading Centre. The RGC is located in the North-western part of the district. The Lobe RGC proposed project sites shall consist of 13 villages with a population of approximately 10,784 as of 2022. The area has 6 institutions i.e., 4 primary schools (Lobe, Kanabu, Kubali and Drachia) and Lobe Health Centre II. Currently, there are 6 boreholes in the area. The majority of the homesteads are semi-permanent and scattered within the area.



Figure 1-2: Lobe TC Google Map



Plate 1-1: Lobe RGC Trading Centre

Table 1-2: Villages in the proposed project area.

District	Town Council	RGC	Villages / Cells in Lobe Town Council		
Yumbe	Lobe	Lobe	Noki	Taparago	Urungu
			Amabala	Kanabu south	Burongo
			Turu Central	Ogutin	Gobu
			Illisia	Urungo Central	Dukulia

			Giro	Akaya	Awunana
			Kanaba south	Juba	Illumani
			Uringu East	Lobe	Okuba
			Noki Triangle	Odrubi	Ibaku
			Lodua	Kina	Kobua
			Yakata	Adu	Drachia
			Nanguleje	Labe	Kalulua
			Lele	Tendele	Majaka

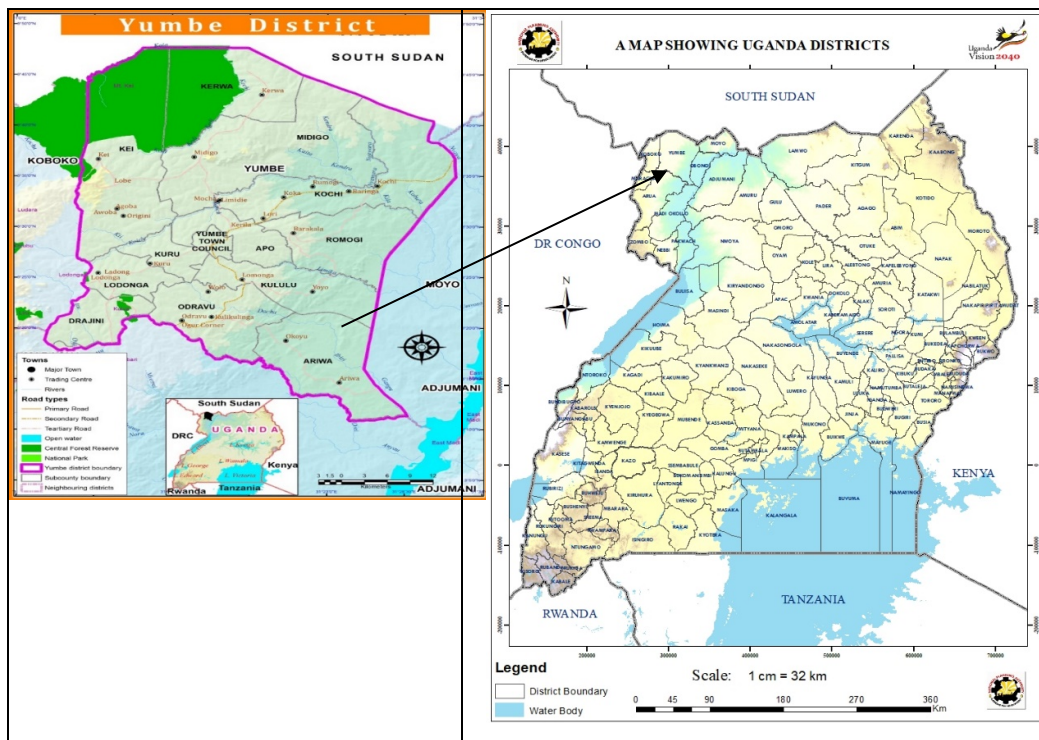


Figure 1-3: Yumbe District Location Map

1.4.1.1 Water Reservoir

Water will be pumped from the boreholes using independent transmission mains into the storage reservoir at Urungu Hill. From there, the distribution network will be fed by gravity from the storage reservoirs. The distribution mains were designed with adequate capacity to meet the peak hour demands of the consumers being supplied. The transmission and distribution corridor will be gained by the use of existing public roads and proposed access roads, as the pipes will be buried in the road reserves.

The proposed project consists of one borehole, with a potential yield for production of 30m³/h located at coordinates UTME 292005 UTMN 392603 in Akaya Parish and Drachia Village.

The borehole is not fenced and its cap is damaged and opened.



Figure 1-4: Borehole drilled for Lobe RGC in Drachia village

1.4.1.2 Transmission and Storage Site

The pumps for the production wells and the size of the transmission main were designed to meet the system output capacity of 1100m³/day. The details of the calculation for the design of the borehole pumps and the main sizing are summarised in the table below.

Table 1-3: Abstraction Water Pumps and Transmission Mains

Parameter	
Submersible water pump	1
Capacity of each pump	30 m ³ /hr
Pumping head	180m
Water transmission pipeline Size (mm) and Material	OD 200mm PN 20 HDPE
Flow velocity, V	0.47m/s
Transmission pipeline length	3045 m
Power requirement	295 KW
Capacity of the prime generator set required	30 KVA 400V – 50HZ

The borehole will be equipped with a submersible vertical pump of capacity suitable to abstract water equivalent to the safe yield respectively. The pumping mains from the borehole will deliver water to the water storage tank in Lobe RGC.

A water storage reservoir is required to store water to form a balance between continuous supply and day demand in the distribution area. Storage capacity of 12 hours of maximum day demand to be provided.

The table below shows summary details of the location of the storage site, where a steel storage tank will be raised.

Table 1-4: Water Storage Tank

Elevated pressed steel section panel tank on a structural steel tower	
Location	291213.37 E, 394251.44 N
Ground Elevation	1077m
Proposed storage capacity	400 m ³
Elevation height	12m above ground

1.4.1.3 Distribution Area

The potential distribution area comprises the trading centre, institutions like schools, health centres and the market, and isolated semi-permanent and temporary structures along the arteries (roads and paths) away from the trading centre.

The distribution network(s) for the project area will be gravity-fed from the Storage Reservoir tank.

1.5 The Developer Contact Details

In line with the Environmental Impact Assessment (EIA) Guidelines (1997) and Regulations (2020) for Uganda, it is the responsibility of any developer intending to set up a project for which an ESIA is required to carry out the ESIA and bear all the costs associated with its conduct. The details of the developer and the consultant are given below:

Table 1-5: Contact details of the project developer

Definition	Details
Client (Project proponent)	Ministry of Water and Environment of Uganda (MWE)
Contact details	Ministry of Water & Environment Plot 3 – 7 Kabalega Crescent Road, Luzira P.O. Box 20026 Kampala, Uganda Tel : +256 417 889 400 Email: mwe@mwe.go.ug Website: www.mwe.go.ug
Funding Agencies	World Bank and GOU

1.6 Project Investment Cost

The cost estimate for the proposed works for Lobe RGC piped water supply and sanitation system is UGX 8,516,072,058 Only. (Refer to Appendix E for Bill of Quantities)

1.7 Project Need and Justification

In Yumbe District, the source of fresh water includes groundwater, springs, rivers, wells, streams, gravity flow schemes and boreholes. Water is needed in all aspects of life, for human consumption and production. Rising demand for increasingly scarce water resources is leading to growing concerns about future access to water, particularly where water resources are shared by two or more sub-counties or districts and areas in the eastern belt of the district where the geology makes underground water very scarce.

There are also critical challenges (Yumbe District Development Plan 2020/2021 – 2024/2025), faced with access to water in the district including:

- Broken down community-based maintenance system due to inactive water user committees. This is tremendously affecting the functionality of water facilities in the district;
- Lack of hand pump spare parts dealers in the district. This affects responses to repairs and increases repair costs;
- Receding ground water tables in some areas of the district during prolonged dry periods greatly affects the functionality of boreholes,
- Low ground water potential also affects the development of water facilities in some areas.

Improving the quality of life necessitates the exploitation of available water resources for the provision and accessibility of clean water. The district doesn't have much surface water but with some groundwater potential. These sources are being exploited for various usages ranging from human consumption to production.

1.8 The Need for Environmental Impact Assessment

The implementation of the Lobe Rural Growth Centre piped water supply and sanitation Project will result in several environmental and social impacts that require an Environmental and Social Impact Study. Furthermore, the project falls under the Fifth Schedule of the National Environment Act No. 5 of 2019 as amended, which lists projects to be considered for ESIA. Section 19 (3) of the National Environment Act No. 5 of 2019 as amended made the utilization of water resources, water supply and sanitation facilities mandatory for Environmental and Social Impact Assessment for all projects or policies that may, are likely to or will have significant impacts on the environment so that adverse impacts can be identified, avoided, reduced, mitigated or compensated for based on the mitigation hierarchy.

The project has triggered compliance with four (4) World Bank Operational Policies, which are Environmental Assessment (OP/BP/GP 4.01), Natural Habitat (OP 4.04), Physical Cultural Resources (OP 4.11) and Involuntary Resettlement (OP/BP 4.12). Additionally, safeguards implementation will adhere to the requirements outlined in the World Bank Group Environmental, Health, and Safety (EHS) Guidelines for general Construction and Decommissioning, as well as the EHS guideline for Water and Sanitation. The Environmental and Social Impact Assessment (ESIA) has been developed in alignment with both National and World Bank safeguards policies and frameworks.

After conducting an environmental and social screening of the proposed project activities, it has been categorized as Environmental Assessment (EA) Category B. This classification is due to the expectation that any negative impacts will be localized, site-specific, and small to moderate in scale. The project is not anticipated to generate any significant, large-scale, or irreversible impacts. Furthermore, it is situated away from environmentally sensitive areas, and any associated impacts can be effectively mitigated with standard mitigation measures.

1.9 Purpose and Specific Objectives of the Environmental Social Impact Assessment

The development of the water supply system is anticipated to have significant impacts on the bio-physical and social environment, and thus the need to evaluate them so that appropriate safeguards are proposed to eliminate and/or minimize them. The main purpose, therefore, is to evaluate the project components, activities and facilities and determine whether it can proceed without unacceptable environmental impacts. This will be achieved by identifying any potentially significant risks to the environment associated with the proposed project and evaluating and suggesting the corresponding safeguards or prevention/mitigation measures.

The output of the study is an Environmental and Social Impact Assessment (ESIA) report that includes a detailed Environmental and Social Management Plan (ESMP) with the necessary mitigation measures. The ESIA has established modalities of implementing the construction works in line with the National Environmental and Social policies, regulations and laws, and the World Bank Environmental and Social Standards (ESS).

The project seeks to enhance environmental and social sustainability through the protection of people's lives and health, the economic basis of their livelihood and their ecological, social and cultural environment as well as the sustainable use of natural resources. Development projects, such as water and sanitation infrastructure construction, can have a significant impact on the environment and local communities. It is therefore essential to ensure that these projects are conducted in an environmentally and socially sustainable manner in essence considering the long-term impacts of a project such as energy efficiency measures can significantly reduce the carbon footprint of a project and contribute towards maintaining a healthy climate. Social sustainability involves taking into account local communities' interests and participation including the involvement of vulnerable groups like children, the elderly or persons with disabilities during the project's planning and implementation phase.

The specific objectives of the study include;

- a) To describe baseline Environmental and Social conditions of the project site and its environs, including the bio-physical, social and cultural aspects, and to assess how these conditions will be affected by the proposed project.
- b) To Assess the site suitability of the proposed project components taking into consideration Environmental and socio-economic concerns by discussing project alternatives.
- c) Identify, analyse and evaluate the type and extent of likely environmental and social risks and impacts on the existing biophysical and socio-economic environment and

their enhancement/mitigation measures that will cost-effectively address the risks and impacts associated with the project;

- d) Undertake public consultations with stakeholders to discuss the environmental and social impacts, as well as key project benefits
- e) Compile an Environmental Social Impact Statement (ESIS) incorporating an Environmental Social Management Plan (ESMP) for all aspects of the development to guide decision-making and act as the basis for future monitoring of the project by the developer and Environmental Management Authorities

2 STUDY APPROACH AND METHODOLOGY

2.1 Overall Approach

The ESIA followed the process as outlined in the National Environment Management Authority (NEMA) Guidelines for Environmental Impact Assessment in Uganda, 1997 (NEMA 1997). The assessment methods used to conduct the assessment are detailed below:

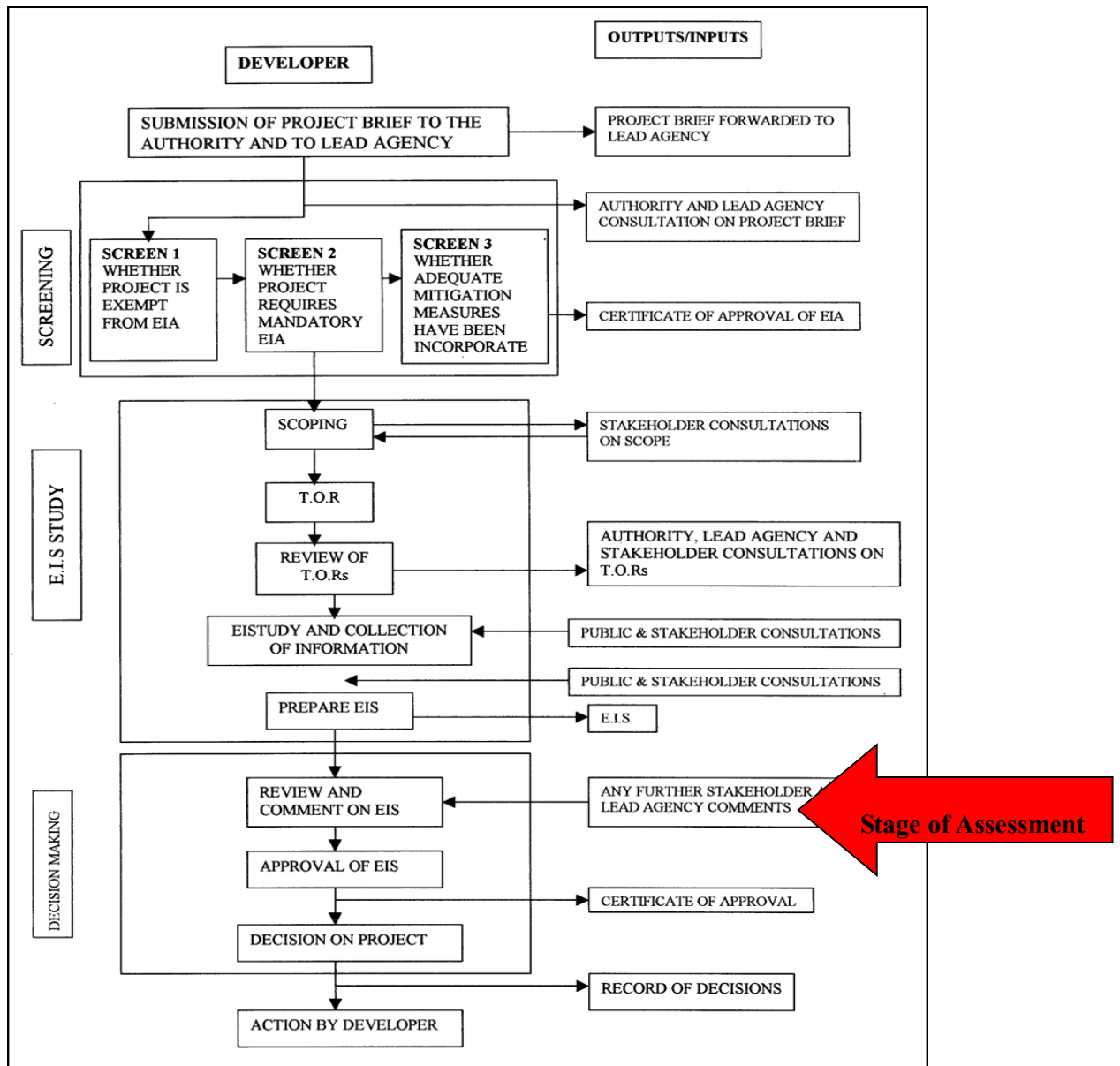


Figure 2-1: ESIA Process in Uganda

2.2 Field visits

This was the initial site acquaintance visit whose main aim was to understand the project area, identify constraints, and develop impressions on topography, soils, existing

developments and the practicality of developing water and sanitation infrastructure within the proposed area. It also marked the major inception meeting with representatives of the project proponent and local administration offices represented in the area to pave the way for further involvement of their officers in subsequent meetings and consultations.

The main objective of these meetings was to agree on expectations of the assignment, its execution procedure, focal and reference points of the proposed project and the work plan. An inception report for the study was prepared at this stage.



Plate 2-1: Meeting with Yumbe District Local Government

2.3 Scoping Study

An essential element of the ESIA is the environmental scoping study which was undertaken following World Bank OP. 4.01 and the EIA Regulations, 2020. A scoping study was undertaken to determine the extent and approach of the ESIA at an early stage in the planning process, identify the important issues to be examined during the ESIA, and thus develop the Terms of Reference (ToR) for the ESIA. The TORs were subsequently approved by NEMA on 9th June 2023 following consultation with lead agencies (Appendix A- NEMA Approval Letter for TOR).

2.4 Literature Review

The purpose of the literature review was to determine the requirements of the project in terms of all relevant legislation, as well as reference the assessment of similar projects and good practices elsewhere, to gain insight into the current state of the area.

During the ESIA process, the team reviewed documents provided by the Developer and those from other sources such as Feasibility Studies and Detailed Engineering Design Reports, IFC Environmental Health and Safety Guidelines for Water and Sanitation Projects, World Bank Safeguards policies and other documents provided by district staffs on project location such as District Development Plans 2020/21-2024/25), district state of environment and health reports among others.

Other documents reviewed include; the National Housing and Population Census (UBOS, 2014), National Household survey reports, (UBOS, 2020), Environment and Social Safeguards Policy 2018, Project Appraisal Document for IWMDP, 2018, The Environmental

and Social Management Framework (ESMF) for the Integrated Water Management and Development Project (IWMDP), policies, regulations, legal framework relevant to water and sanitation sector.

2.5 Public /Stakeholder Consultation and Participation

Public/stakeholders' participation is concerned with involving, informing and consulting the public in planning, management and other decision-making activities for the project. Public participation ensured that due consideration is given to public values, concerns and preferences when decisions are made. It encompasses the public actively, sharing in the decisions that government and other agencies make in their search for solutions to issues of public interest

Public consultation in this project was done with the following aims:

- a) To inform the community and other stakeholders about the proposed project and its objectives.
- b) To seek views, concerns and opinions of the local community and other people around the area concerning the project.
- c) To establish if the local people foresee any positive or negative environmental effects from the proposed project and if so, how they would wish the perceived impacts to be addressed.
- d) Propose and discuss solutions and mitigation measures to the potential negative impacts and various concerns development.

The following principles were taken into consideration during stakeholder engagement:

- a) Openness and life-cycle approach: Public consultations for the proposed project were arranged during the whole life-cycle, carried out openly, free of external manipulation, interference, coercion or intimidation;
- b) Informed participation and feedback: Information was provided to and widely distributed among all stakeholders in an appropriate format; opportunities were provided for communicating stakeholders' feedback, for analysing and addressing comments and concerns;
- c) Inclusiveness and sensitivity: Stakeholder identification was undertaken to support better communications and build effective relationships. The participation process for the projects was inclusive. All stakeholders at all times were encouraged to be involved in the consultation process. Equal access to information was provided to all stakeholders.
- d) Special attention was given to vulnerable groups, in particular women, youth and elderly

Stakeholder consultations were carried out during the assessment process, to ensure that all stakeholder concerns are incorporated into project planning and implementation. This is in line with the statutory consultation requirements under World Bank environmental and social safeguards policies, as well as the first schedule of the ESIA Regulations for Uganda.

Data on the potential environmental and social impacts, stakeholder perceptions, views and concerns were collected through focus group discussions, community meetings and personal

interviews with the target audience including but not limited to all communities in all the benefiting trading centres and villages of the catchment villages for the project include Noki, Taparago, Urungu, Amabala, Kanabu south, Burongo, Turu Central, Ogutin, Gobu, Illisia, Urungo Central, Dukulia, Giro, Akaya, Awunana, Juba, Illumani, Uringu East, Lobe, Okuba, Noki Triangle, Odrubi, Ibaku, Lodua, Kina, Kobua, Yakata, Adu, Drachia, Nanguleje, Labe, Kalulua, Lele, Tendele and Majaka

Based on the proposed borehole sites, and proposed transmission line corridor, the PAPs were identified with the assistance of the Chairpersons Local Council One (LC-1).

The emphasis of the consultations was laid on environmental and social concerns expected in the process of laying transmission and distribution water pipes within the project area, the obligations of the various parties in mitigating the various impacts anticipated and the procedure for operating the water and sanitation project among others.

Discussions with the proponent and consultation with relevant officials at the district and sub-county were held. Similarly, verbal interviews with key project beneficiaries and key stakeholders were carried out. Consultations were conducted at the National and Local levels. Consultations were held with the Office of the Prime Minister, Ministry of Water and Environment Directorate of Water Development Rural Water Supply and Sanitation sector, Yumbe District Local Government, Lobe Town Council officials, LC1 chairman of project villages and their respective local community members.

2.6 Field Survey Methods

2.6.1 Flora

Sampling locations followed pre-determined geo-referenced proposed site alignments that were varying in length and width. Each geo-referenced site was considered an independent transect along which the surveys were conducted to record observed plant species. The sampling conformed to the general baseline (gradsect) (Wessels et al. 1998) that enabled the traversing of existing vegetation types. Site-specific vegetation descriptions to determine habitat types were based on species dominance and floral features such as herbs, shrubs and trees along the transects established at a distance of 3 km apart and at each point a quadrant of 10 x 10 m was established in which assessments were conducted to document.

Upon a comprehensive identification of the flora records and habitat type determination, analysis of the likely impacts onto the vegetation and flora was also assessed visa-viz the anticipated project activities. Also of interest was the occurrence of invasive species in or near the project area, and the proximity of the study area to other ecologically sensitive features.

2.6.2 Fauna

Herptiles

a) Visual Encounter Survey (VES) method

Herptiles (Reptiles and amphibians) were surveyed using the Visual Encounter Survey (VES) method. Random search during VES increases the chances of finding animals in addition to covering a wider survey area. The water line was used as a transect and VES for reptiles was

conducted following the water line visually searching for animals. This method involved a search on the ground, in the leaf litter, along the river and in proximity gardens and encountered species were noted. Species were assessed against the IUCN Redlist to understand their conservation status.

b) Interview with Local People

Reptile surveys for this assignment were also conducted through interviews with local people, asking them about physical signs (skin shades and colour, prints, bones, faecal samples etc.) of Reptile presence within the area.

c) Project Design

Herptiles were sampled along the proposed water lines covering a sampling width of 30m from the edge of the road along the proposed line because herptiles are highly mobile animals. The sampling interval was determined by the spatial distribution of the chosen habitats.

2.6.3 Air Quality surveys

This assessment focused on the Criteria Air Contaminants (CAC) and Greenhouse Gases, which reflect the project emissions of concern for human and environmental health. Major sources of outdoor air pollution in the project area will be vehicular traffic and human and economic activities.

Air pollutants considered in the assessment included Particulate Matter of both inhalable particle sizes between PM10 and below PM2.5, Nitrogen Dioxide (NO₂), Carbon Monoxide (CO), Volatile Organic Carbons (VOCs) and Carbon dioxide (CO₂).

Air quality parameters were measured using the MX6 Multigas Monitor Industrial Equipment, which assessed Carbon dioxide, Carbon monoxide, Nitrogen Oxides (NO_x), Volatile Organic carbon (VOCs), and Carbon dioxide (CO₂) levels.

Suspended Particulate Matter (SPM) was sampled using a Hand-held laser particles counter, specifically Model 3887. This device utilizes suction to filter particles from a predetermined volume of air sample. Particle sizes of 0.3µm, 0.5 µm, and 5.0 µm are measured, and the resulting concentrations are displayed on the screen and recorded accordingly. The sampling method for Suspended Particulate Matter (SPM) involves filtering particles from the air sample volume using suction, with the concentrations of particulate matter being displayed on the screen and recorded.

All measurements were taken during the day, a state that generates varying readings from night-time readings due to influencing environmental seasonal or human factors such as existing economic activities, human or vehicular movements, wind velocity and high or low temperatures.

Spot measurements were undertaken during the field survey and measurement lasted 20 minutes at each air quality monitoring location during which GPS coordinates were taken and maps developed. All field data was recorded using a standard data capture form. All conditions (such as vehicle traffic, human activity, motor engines running, and weather) during measurements were also recorded. Measurements at the intake site (borehole site and

pump house site, sample sites along the transmission route and the proposed site at the reservoir tank were taken accordingly

2.6.4 Noise assessment Survey

Noise pollution is defined as unwanted sounds or sounds that are loud or unpleasant. Sounds are considered noise pollution if they adversely affect wildlife, or human activity or are capable of damaging physical structures regularly.

In addition, it is considered noise pollution if sound disturbs any natural process even if the sound does not occur regularly. Noise from various sources intrudes unreasonably into the daily activities of human beings and animals creating adverse effects.

The sound level was measured by using Precision Integrating Sound Level Meter Type: 4 in one Digital Sound Level Meter, Model CEM DT 8820 (range 35 – 130 dBA) for noise, (-20 – 750°C) for temperature, (25% - 95%) relative humidity and (0 – 20000 LUX) for light intensity.

The charged sound level meter was adjusted for slow time response. Baseline noise measurements were undertaken at locations along the project area with potential receptors (the intake site, borehole site, pump house site, sample sites along the transmission route and the proposed site at the reservoir tank) were taken accordingly with maximum and minimum recordings taken for the particular site and respective average sound levels calculated as the final readings. Data obtained from baseline noise monitoring was processed and presented according to the analysis and compared with the maximum permissible noise levels.

2.6.5 Mapping and Photography

Spatial location data for the major project component sites (reservoir tank, intake area, pump house, water office, sanitation facilities) and key receptor areas were captured using Global Positioning Systems (GPS), and maps were processed and generated using Geographic Information Systems (GIS). Photographs of the site's status quo, stakeholders' meetings and the surrounding environment were taken using digital cameras to record empirical evidence as presented in the various sections of the report.

2.7 Geotechnical Site Investigations

2.7.1 General

The field exploratory activities were conducted by Kagga and Partners (Design Consultant) in accordance with BS EN 1997-2:2007, "Part 2: Ground investigations and testing". The key activities comprised; excavating one (1 No.) test pit at the reservoir tank site to a depth of 1.0m, excavating one (1 No.) at the borehole site to a depth of 0.5m, soil sampling (retrieving both disturbed and undisturbed soil samples), description of soil properties, conducting Dynamic Cone Penetrometer(DCP) at the existing ground and 0.5m (borehole) and 1.0m (reservoir) depth in each of the test pits for covered Regional Growth Center of Lobe, logging and establishing the occurrence of ground water in each trial pits where encountered,

laboratory analysis of retrieved soil samples. The test pit positions were predetermined as enumerated by the coordinate's locations below;

Table 2-1: Test pits Locations

RGC	Reservoirs		Boreholes	
	E	N	E	N
Lobe	289689.4	394809.7	292082.7	392272.8

Furthermore, the soil samples collected are as indicated below.

Table 2-2: Soil samples

RGC	Reservoirs Soil Samples		Boreholes Soil Samples	
	Disturbed	Undisturbed	Disturbed	Undisturbed
Lobe	1	1	1	0

2.7.2 Excavations, Logging and Dynamic Cone Penetration Tests.

The test pits were excavated to a maximum depth of 1.0m (reservoir) and 0.5m (borehole). Based on visual inspection, the soil profile was established from the test pits and sketched. Penetration tests were conducted in the test pit using a standard set of DCP test equipment. The test equipment comprised an 8kg weight dropping through a height of 575mm to drive a 60° cone of diameter 20mm into the ground. The number of blows against penetration was then tabulated and analyzed using the UK DCP V3.1 program (a computer program for the analysis of data).

The photo plates attached below show excavation, logging and in-situ tests carried out.

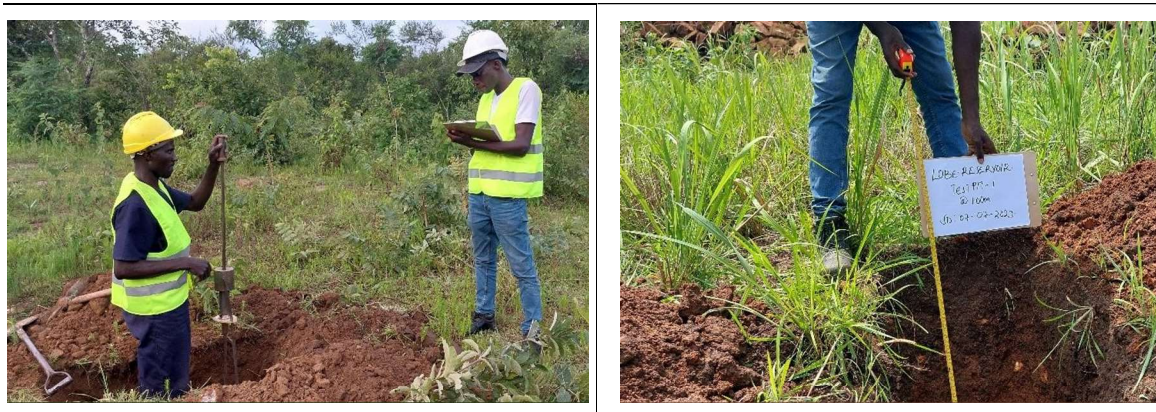


Plate 2-2: Field Activities for Geo-technical soil investigations (Kaaga and Partners-Design Engineer,2023)

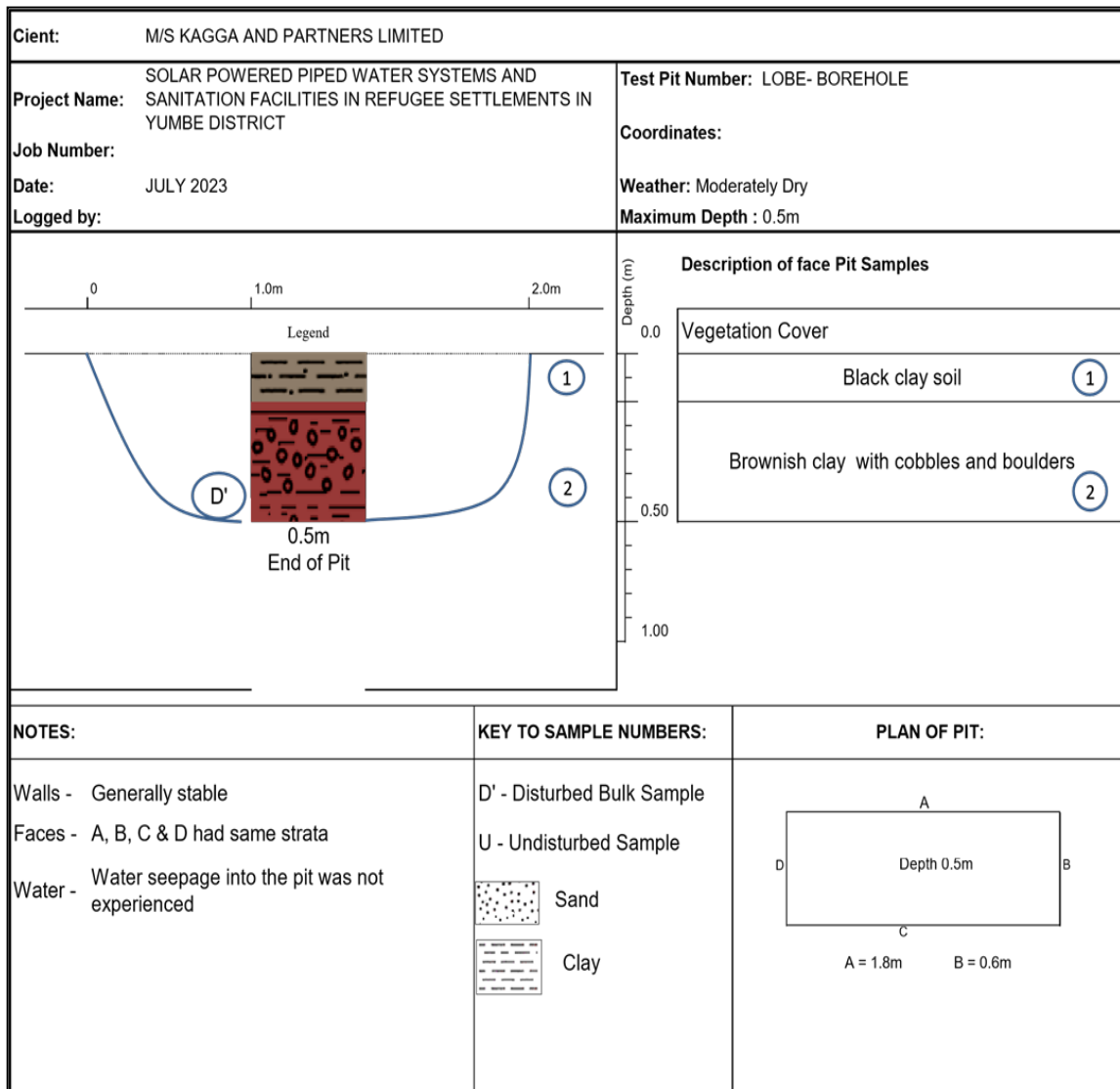


Figure 2-2: Trial Pit No.1 Log (Soil Profile): Borehole site (Kaaga and Partners-Design Engineer,2023)

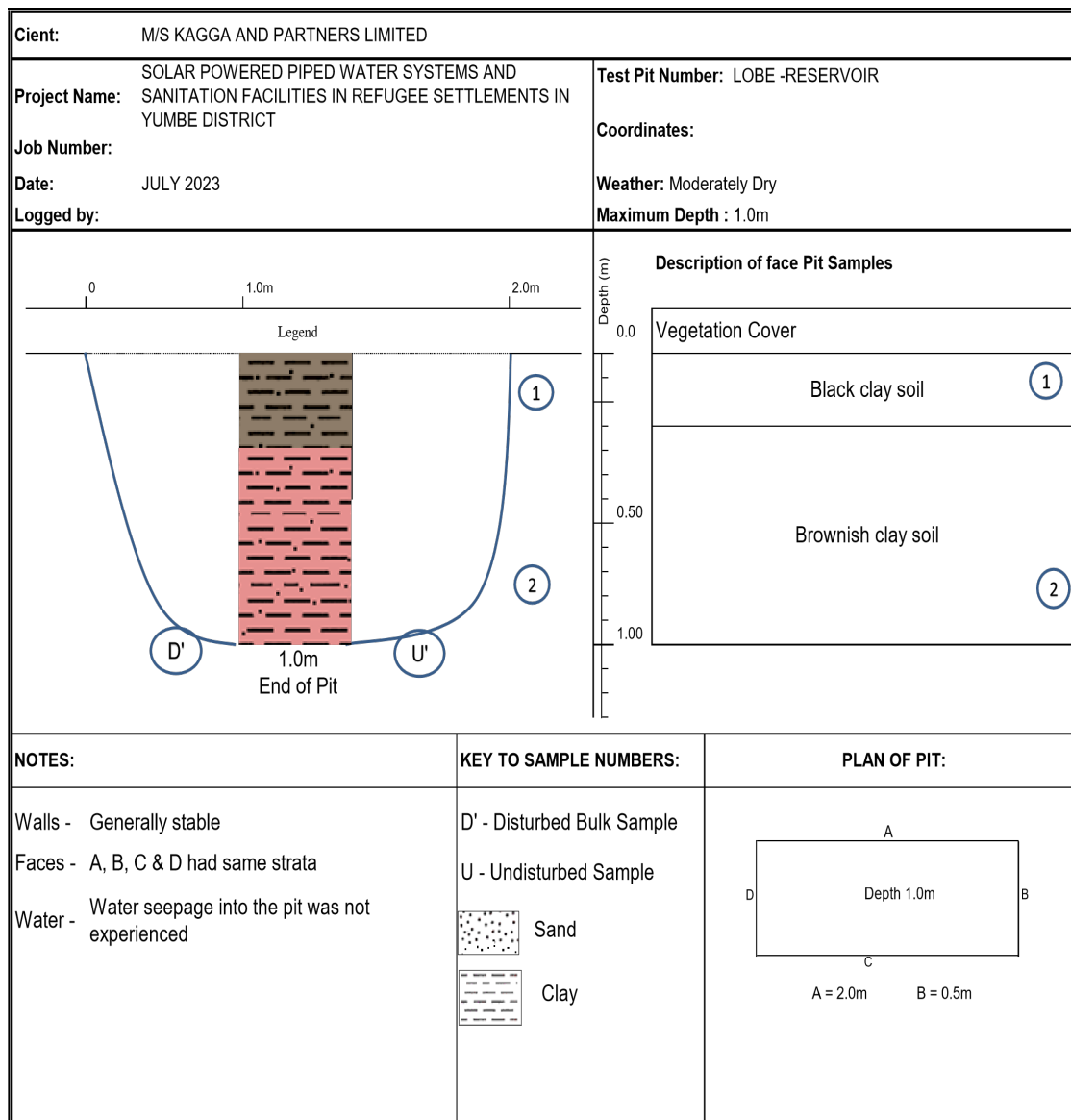


Figure 2-3: Trial Pit No.2 Log (Soil Profile): Reservoir Site (Kaaga and Partners-Design Engineer,2023)

2.7.3 Disturbed and Undisturbed Soil Sampling

Disturbed samples were taken from the test pits for laboratory testing. Representative soil samples were obtained at 1.0m (reservoir) and 0.5m (borehole) depth, placed in an airtight container and transported to the laboratory. In the laboratory, the soil sample was classified in general accordance with techniques outlined in the visual-manual identification procedure (ASTM D 2488) and the Unified Soil Classification System.

Undisturbed samples were recovered at suitable depths from the test pits; 1.0m from each test pit. Core cutters were used for the collection of undisturbed samples. They are thin-wall hollow tube samplers made of seamless steel 10cm in diameter and 15cm in length. The bottom of the tube is sharpened, which acts as a cutting edge.

The sampler was then driven into the soil, with fast and smooth strokes of manual hammering since erratic pressure if applied during hammering, becomes a source of sample disturbance. After driving the sampler up to the required length (equal to the sampler length minus provision for waxing), the sampler was dug out completely by tilting back and forth to shear off the sample from its intact bottom and was then withdrawn.



Plate 2-3: Disturbed and Undisturbed Samples at the RGC sites (Kaaga and partners 2023)

2.7.4 Ground Water Table

The standard practice for determining ground water level was adopted whereby when ground water is encountered, the test pit is left uncovered. The water level is then allowed to stabilize for 24 hours after which it is measured using an electric water level indicator.

2.7.5 Laboratory Testing

Laboratory testing was done to further identify the soils, and to obtain parameters for predicting the strength characteristics of the soils. Classification was carried out on disturbed samples whereas shear tests were done exclusively on undisturbed samples. Details of laboratory tests were conducted according to the following standard methods:

Table 2-3: Standard Test Methods

Test Description	Test Reference Standard
Disturbed soil samples	
Liquid limit (Cone Penetrometer Method)	BS 1377: Part 2, Clause 5: 2022
Plastic limit and plastic index	BS 1377: Part 2, Clause 6: 2022
Particle size distribution	BS 1377: Part 2, Clause 10: 2022
Natural Moisture content	BS 1377: Part 2, Clause 4: 2022
Undisturbed Soil Samples	
Direct Shear Box test	BS EN ISO 17892-10:2018

2.8 Social economic Survey Methods

Social baseline conditions are important in understanding the potential socio-economic impacts of the project components such as its effect on existing social services, availability of local labour and induced changes in population dynamics (in-migration, effects on domestic violence, family breakups, child labour, school dropout rate, early marriages and HIV/AIDS among others). Factors such as literacy levels in the local community influence how objectively a project is perceived and appreciated.

The objective of the socioeconomic baseline study was:

- a) To assess the existing situation of the proposed project area.
- b) To analyze the socioeconomic impact of the proposed project on the local community.
- c) To collect the community's expectations and fears about the proposed project.
- d) To build a prior trust between stakeholders of the project and the local community

2.8.1 Sampling Methods -

The socio-economic baseline adopted the following methods

- a) Purposeful/convenience sampling: Samples were picked from all the lowest administrative units for Lobe RGC and the district local government political leaders and technical personnel as representative of the whole catchment area.
- b) Random sampling: Households were randomly selected from the village lists that were provided by the respective LCI chairpersons. After obtaining the household lists, a simple random sampling method was used to select the sampled households targeting the head of household. Where no one was found at home, a substitute was randomly selected. The study sampled about 10% of households from Lobe RGC. The sample size is provided in Table 2-4 below.

2.8.2 Methods of data collection

a) Key Informant Interviews

Key informant interviews were conducted to gather information from leaders at District, sub-county levels and community. The sample at the district level is included. Chief Administrative Officer, LCV Chairperson, District Natural Resources Officers, District Environment Officers, District Community Development Officers, Engineers, District Physical Planners and District Water Officers, District Education officers, and District gender and probation officers; details of these engagements are in Appendix C

b) Focus Group Discussion

This technique involves a small group of respondents (usually 6-10 respondents) who were interviewed together in a common location. The interviewer leads the discussion and ensures that every person has an opportunity to respond. Focus groups allow a deeper examination of complex issues than other forms of survey methods. Two focus group discussions were held with the women groups, traders and sub-county leaders

c) Structured interviews

Primary data was collected by interviewing randomly sampled households from the rural growth centre members of the study population. The in-personal structured interview method was used to collect household data with the aid of a structured questionnaire

The table below summarises the data collection methods, study participants and sampling method used.

Table 2-4: Summary of study participants and sampling method used

Data Collection Method	Participant category	No of Participants		Sampling Method
		Male	Female	
Structured Questionnaire	Local Residents	60	41	Probability sampling (Random)
Key Informant Interviews	Sub-County Officials	8	5	Purposive
Focus Group Discussion	Women groups & Traders	4	18	Purposive

Direct observation and photography

Direct observation and photography were used to obtain useful and timely information by observing key features in the area such as nearby communities, public institutions such as schools, health centres, markets, roads, water sources, cultural sites, land use patterns and economic activities among others. The team obtained key insights and informed findings that helped in understanding the potential impacts and risks i.e. positive and negative related to the catchment area context.

Data analysis

a) Quantitative data analysis

Data was regularly cleaned before entry. Quantitative data from the questionnaires was entered and

ive data from the questionnaires was entered and

analysed using the Statistical Package for Social Scientists (SPSS). Frequency and percentage tables as well as bar charts were generated and used to present the quantitative results.

b) Qualitative data analysis

Qualitative data was transcribed and arranged according to existing and emerging themes through

content analysis methods. The qualitative analysis largely followed the questions and themes of the study within the interviews and FGD guide.

c) Quality control measures

In a bid to achieve reliable data quality from the socio-economic survey at the household level;

- a) Enumerators with experience in undertaking socioeconomic surveys within the project catchment area were identified and hired.
- b) The enumerators were oriented on the socioeconomic baseline purpose, objectives and scope.
- c) During the training, the tool was pre-tested among themselves to equip them with hands experiences.
- d) Data collection tools were pre-tested to determine if the enumerators and respondents understand the questions, identify redundant questions, determine the suitability of the questions to the sampled households, determine the needed time to complete the tool and check on the logical follow of the questions.
- e) All the recruited enumerators were conversant with Aringa and Lugbra as the commonly used local languages within the project catchment area.
- f) The socioeconomic survey tool was developed with controls including data ranges, skips and most entries.
- g) Documentation of all concerns and issues raised by stakeholders during KIIs and FGDs was undertaken.
- h) All enumerators in the field were supervised by a field-based supervisor and data manager.

2.8.3 Impact Assessment Criteria

This section assesses the level of potential impacts based on various criteria including severity of impacts, duration, geographical scope, and the existence of readily identifiable cost-effective mitigations. The impact assessment also considers the impacts identified by the stakeholders consulted. The methodology for impact evaluation was as follows:

Probability: Probability of occurrence is evaluated by the predicted impact on the subject environment on a Likert scale (Certain, Likely, Very, Possible, Unlikely and Highly unlikely)

Extent: evaluates the area of occurrence/influence by the impact on the subject environment; whether the impact will occur;

- On the site, in a limited area (within 1 km radius of the site);
- Locally (within 5 km radius of the site);
- Regionally (district-wide, nationally or internationally).

Duration: evaluates the duration of impact on the subject environment, whether the impact will be

- Temporary (< 1 year) or during the construction phase only;
- Medium-term (5 – 10 years or lasting after construction has been completed);

- Long-term (>10) or permanent.

Intensity: the quantifiable effects of impacts, measured where possible, against the appropriate standard for a respective environmental component. This includes existing standards, guidelines or scientific evidence and in worst case scenario expert judgment, (Scale of 1 -3: Low, Medium or High).

Magnitude: Magnitude has been represented by the combination of intensity, duration, frequency of occurrence of event or impact, and anticipated extent of impact.

Using professional interpretation of the criteria mentioned above (extent, duration, and magnitude) in combination with the likelihood of occurrence (Table 2-5) and several other factors including ecological/social sensitivity, acceptable regulatory and legal limits, and the sensitivity of the receptor. The **overall Impact Significance:** A product of sensitivity and **Magnitude** is assigned a rating of Low, Medium or High.

Type of Impact: Categorises into direct, indirect or cumulative effects of the specific impact.

Direction: Negative or Positive. **Reversibility:** Irreversible or Reversible

Table 2-5: Likelihood of occurrence classification

Probability of occurrence		
Level	Probability	
5	Certain	<ul style="list-style-type: none"> • Very likely to occur (91 - 100%) Could occur either immediately or within a short period (likely to occur most weeks or months)
4	Likely	<ul style="list-style-type: none"> • This impact will probably occur in most circumstances if controls are not applied (several times a year) (61 - 90%)
3	Possible	<ul style="list-style-type: none"> • This impact could occur at some time if controls are not applied May happen every 1 to 15 years). It is expected that the impact will occur; Chance of occurrence (41 - 60%)
2	Unlikely	<ul style="list-style-type: none"> • This impact is not likely to occur. Chance of Occurrence 11 – 39%.
1	Highly unlikely	<ul style="list-style-type: none"> • Very unlikely to occur (0 - 10%)

Overall assessment of impact: Negligible, minor, Medium and High as presented in Table 2.6 and Table 2.7 below.

Table 2-6: Criteria for rating overall impact severity (environment parameters)

Impact rating	Description of impact
High	<ul style="list-style-type: none"> • Highly noticeable effects on the environment, difficult to reverse.

Impact rating	Description of impact
	<ul style="list-style-type: none"> • Widespread degradation of resources restricts the potential for further usage. • A significant contribution to a known global environmental problem when compared with the industry worldwide. • Sub-lethal effects upon a globally or regionally endangered species compromising reproductive fitness and/or resulting in long-term disruption/disturbance to normal behaviour. • Air quality/noise approaching occupational exposure limits. Water quality parameters approaching maximum stipulated values. • Periodic widespread nuisance both on and off-site.
Medium	<ul style="list-style-type: none"> • Noticeable effects on the environment, reversible over the long term. • Localized degradation of resources restricts the potential for further usage. • Sub-lethal effects upon a globally or regionally endangered species with no effect on reproductive fitness and/or resulting in disruption/disturbance to normal behaviour returning to normal in the medium term. • Elevated contribution to global air pollution problem partly due to preventable releases. • Frequent breaches of water/air quality and noise guidelines. • Causing localized nuisance both on and off-site.
Minor	<ul style="list-style-type: none"> • Noticeable effects on the environment, but returning naturally to the original state in the medium term. • Slight local degradation of resources but not jeopardizing further usage. • Disruption/disturbance to normal behaviour of a globally or regionally endangered species returning to normal in the short term. • A small contribution to the global air problem is through unavoidable releases. • Elevation in ambient water/air pollutant levels greater than 50% of guidelines. • Infrequent localized nuisance.
Negligible	<ul style="list-style-type: none"> • No noticeable or limited local effect upon the environment, rapidly returning to its original state by natural action. • Unlikely to affect resources to a noticeable degree. • No noticeable effects on globally or regionally endangered species. • No significant contribution to the global air pollution problem. • Minor elevation in ambient water/air pollutant levels well below guidelines. • No reported nuisance effects.

Table 2-7: Criteria for rating overall impact severity (Social and economic parameters)

Criteria	Significance Definition	
	Potential; to cause fatalities, mutilations or serious chronic health problems to a person	High
	Potential to cause Lost Time Incidents	Medium
	Not likely to result in Lost Time Incidents	Minor-Negligible
	Major damage to on-site infrastructure, halting operations and incurring substantial delay in supplying replacement equipment	High
	Minor damage to individual items of equipment for which a spare part or replacement can be quickly mobilized to the development	Medium
	Damage resolved by on-site reserves, maintenance equipment and on-site personnel	Minor-Negligible
	Incidents attracting critical reporting requiring the company to take measures to maintain its reputation, or for which the company could be prosecuted and receive a token fine or be required to pay compensation to third parties	High
	Incidents attracting local news coverage and complaints, which involve expense in engaging local communities to apologize, clarify issues and make amends	Medium
	An incident that does not provoke complaints	Minor-Negligible

A tabulated summary of all impacts is presented followed by a discussion of impacts anticipated, mitigation or enhancement measures proposed in Chapter 8, table 8:1 with an overall assessment of impact ratings: Negligible-Low/minor (4-6 rating, Medium (7-8 rating), High (9 and above rating).

2.9 Cumulative Impact Assessment Methodology

Cumulative environmental effects can be defined as effects on the environment which are caused by the combined results of past, current and future activities. The combined, incremental effects of human activity, referred to as cumulative impacts, pose a serious threat to the environment. While they may be insignificant by themselves, cumulative impacts accumulate over time, from one or more sources, and can result in the degradation of important resources. The following methodology was adopted:

Step 1: Scoping Phase I –

VECs, Spatial and Temporal Boundaries: This involved the identification and establishment of VECs, spatial and temporal boundaries of assessment. It further involved identification and agreement on VECs in consultation with stakeholders, determining the time frame and establishing the geographic scope. This guided the assessment and involvement of key stakeholders; and which VEC resources, ecosystems, or human values were affected by the development. The known or anticipated cumulative impact issues within the area; concerns for cumulative impacts were identified in consultation with stakeholders, including potentially affected communities in addition to other regional assessments prepared for other projects within the area or region.

The temporal scope for the Cumulative Impact Assessment (CIA) was defined in relation to the lifespan of the Lobe water and sanitation Project (as described in Chapter 4: Project Description) and the duration of the Project's impacts. In summary, Site Preparation and Enabling Works are scheduled to commence in 2024. The operation of the Project is scheduled to last 20 years after which decommissioning will take place. In total, the Project duration through all phases will be approximately 21 years although the Project's impacts may last beyond this date.

Step 2: Scoping Phase I –

Other Activities and Environmental Drivers: This involved the identification of other past, existing, or planned activities within the analytical boundaries. Assessment of their potential presence of natural and social external influences and stressors. This guided the assessment of existing or planned activities affecting the same VEC and if there are any natural forces and/or phenomena affecting the same VEC. Though not documented, it was reported that there are plans in the future to extend the electricity grid to the area and open community roads in the new town council according to the Physical Development Plan of the area. The development of such infrastructure in the area will further increase infrastructural developments in the form of transformers and distribution lines in the project area and neighbouring in addition to impacts due to the opening of community roads. All these infrastructural development projects have similar socio-economic and biophysical impacts and all the major cumulative impacts of these projects have been highlighted in chapter 8.

Step 3: Establish Information on the Baseline Status of VECs

This involved understanding the VEC's potential reaction to stress, its resilience, and its recovery time through the assessment of trends. This is because determination of the trend of change in the baseline condition of a given VEC over time may indicate the level of concern for cumulative impacts. Therefore, it was helpful; to know the existing condition of the VEC; establish the indicators to be used to assess such conditions; identify any other additional data needed and know those who may already have this information required. Data was limited and targeted to indicators that would allow the determination of any changes in VEC conditions as it provides a baseline condition that integrates the collective effects of all existing developments and exogenous pressures. Other developments within, or likely to overlap with, the Project AoI were noted based on the stakeholder consultations since no feasibility and surveys have been done.

Step 4: Assess Cumulative Impacts on VECs

ss Cumulative Impacts on VECs

This involved estimating the future state of the VECs that may result from the impacts they experience from various past, present, and predictable future developments through identification of potential environmental and social impacts and risks; assessment of expected impacts as the potential change in the condition of the VEC (i.e., viability, sustainability) and identification of any potential additive, countervailing, masking, and/or synergistic effects.

This guided in answering the questions on key potential impacts and risks that could affect the long-term sustainability and/or viability of the VEC; the known or predictable cause-effect relationships and the interaction of these impacts and risks to each other. Given the scale of the Project Area of Influence (AoI), particularly in relation to the project's indirect impacts, the anticipated developments considered have been prioritised based on the following criteria:

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

While the CIA is not solely focussed on the electricity distribution and opening of community roads that was noted during consultations, it recognises that electricity distribution developments and opening of road new roads are the primary sources of cumulative impacts in the area that was assumed and that these developments are interrelated to a certain extent.

Step 5: Assess Significance of Predicted Cumulative Impacts

The significance was evaluated not in terms of the amount of change, but in terms of the potential resulting impact on vulnerability and/or risk to the sustainability of the VECs assessed implying evaluation of CIs in the context of ecological thresholds.

The impact assessment methods for the CIA are aligned with the methods used for the ESIA (based on the magnitude of the impact against the receptor's sensitivity). The significance of a cumulative impact is evaluated in terms of the impact on the sustainability of the VEC i.e. the risk that the threshold will be exceeded.

VEC sensitivity considers how a particular VEC may be susceptible to a given potential impact. More sensitive VECs may experience a greater degree of change, or have less ability to deal with the change, compared with less sensitive receptors that may be more resilient or adaptable. VEC sensitivity is based on multiple characteristics, namely:

- **Vulnerability:** the degree to which a VEC is vulnerable to change (i.e. higher sensitivity) or resilient to change (i.e. lower sensitivity). A VEC that is declining

towards an unsustainable state and/or critical threshold would be of high sensitivity; and

- Value: the degree to which a VEC is valued by stakeholders or protected, with higher value receptors (based on ecological, cultural, social, economic, or other grounds) having a higher sensitivity.

The sensitivity of a receptor may be rated as high, moderate, low, or negligible based on the criteria set out in Table 2-8 below.

Table 2-8: Sensitivity Criteria

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

Impact magnitude

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

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

The magnitude of an impact can be rated as high, moderate, low or negligible based on the criteria set out in Table 2-9 below.

Table 2-9: Impact Magnitude Criteria

Magnitude	Description
High	Major long-term or permanent alteration to key elements/features of the

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

Impact Significance

Once the VEC sensitivity and impact magnitude have been rated, the overall significance of the impact is predicted based on the risk to the sustainability of the VEC. The resulting significance level was also interpreted based on professional judgment and expertise.

2.10 Structure of the Environment Social Impact Statement

This Environmental and Social Impact Statement is divided into 9 Chapters as indicated in Table 2.10 below;

Table 2-9: ESIA Report Structure

Chapter	Approach
Chapter 1: Introduction	
This chapter also details the purpose, need for the study, study objectives, and scope of the ESIA Report It describes the project location and infrastructure, current water supply and sanitation in the district	
Chapter 2: Study Approach and Methodology	
This describes the approach and methodology used during the study <ul style="list-style-type: none"> • A description of the ESIA process; and • A general description of the impact assessment methodology and the adopted impact significance criteria. 	
Chapter 3: Project Description	
This section highlights details of the design overview of the proposed Lobe RGC piped water supply and sanitation system, water abstraction system, central water storage reservoir, distribution pipe network, water treatment units, proposed sanitation facilities and construction methods	
Chapter 4: Policy, Legal & Institutional Framework	

It provides an analysis of the policy, legal and institutional framework within which the proposed Lobe Rural Growth Piped Water Supply and Sanitation project is expected to operate. This Chapter covers relevant Ugandan and Development Partner policies, legislations and guidelines. Key Ugandan legislation governing the conduct of Environmental Impact Assessment (EIA) is the National Environmental Act No.5 of 2019 and the Environmental Impact Assessment Regulations (2020). The National Environmental Act established the National Environment Management Authority (NEMA) and entrusts it with the responsibility to ensure compliance with the EIA process in the planning and execution of development projects.

ensure compliance with the EIA process in the planning and execution of development projects.

Chapter 5: Environmental & Social Economic Baseline

This section describes the major elements of the project area’s environment, encompassing the physical, biological and social environment as well as the condition of the proposed project site. The information presented in this section is based on observation of the project area by the consultants as well as information from secondary literature.

Chapter 6: Consultations & Public Participation

This chapter describes the process of the public consultation conducted to identify the key issues and impacts of the proposed project.

Emphasis has been placed on a fully inclusive, open and transparent public participation process and the transfer of the information regarding the proposed project

Chapter 7: Project Alternatives

This section examines alternatives to the proposed development in terms of alternative water sources, alternative pipeline material, alternative project routes and sanitation options. With this information, reviewers have a basis for decision-making.

Chapter 8: Potential Environment and Social Impacts & Mitigation Measures

This section provides an evaluation of the environmental and social impacts and the corresponding mitigation strategies of the project.

Prediction and analysis of possible positive and negative impacts of construction, operation and decommissioning of the proposed Lobe Town piped water supply and sanitation system.

Chapter 9: Environmental and Social Management Plan (ESMP)

This chapter describes how the Project proposes to manage the environmental and social impacts and risks that will arise during the construction operation and decommissioning phases of the proposed Lobe piped water supply and sanitation system.

It presents institutional arrangements and responsibilities, Detailed ESMP, grievance Redress Mechanisms, monitoring and reporting and Management Plans.

Chapter 10: Conclusion and Recommendations

3 PROJECT DESCRIPTION

3.1 Introduction

To address the water supply gap in Lobe RGC, solar solar-powered piped water supply system with a groundwater source, elevated water storage steel tank and distribution pipes capable of meeting the daily drinking water needs, as the pressure may permit, is proposed.

Lobe RGC will comprise of two components i.e., water supply and sanitation systems. These are discussed in the sub-sections below.

3.2 Project location

The different components of the Lobe RGC are located in Lobe Town Council in Yumbe District.

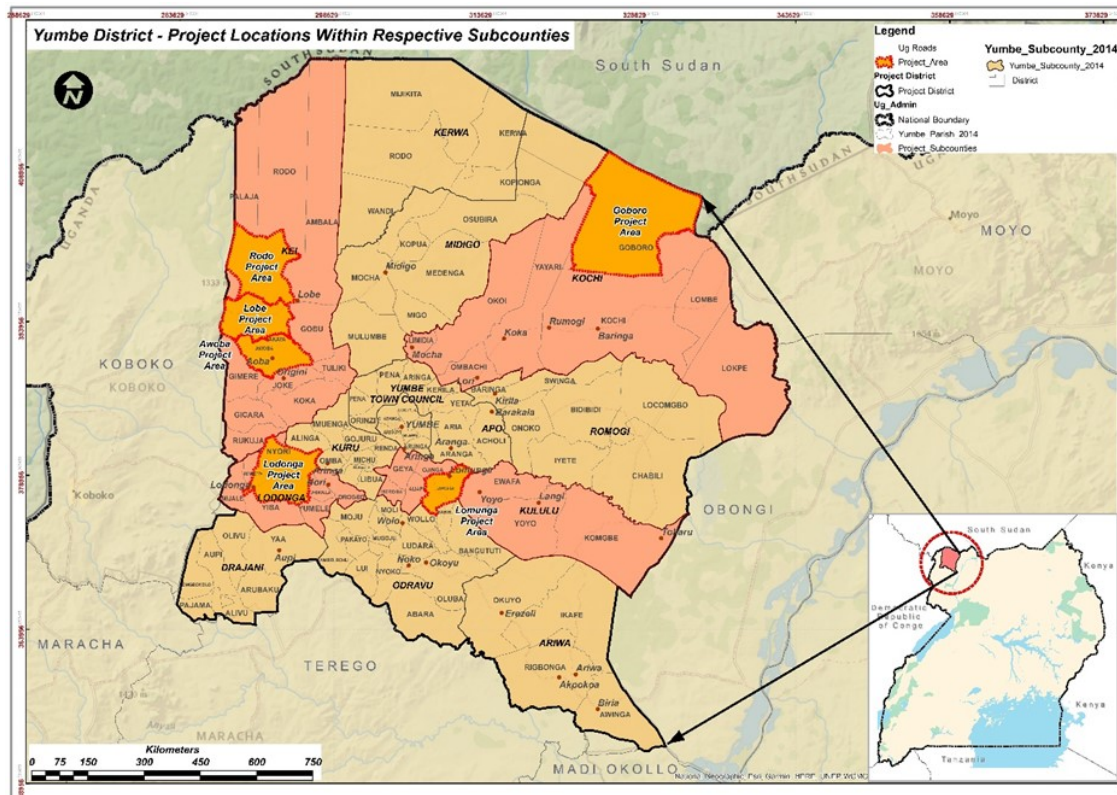


Figure 3-1: Location of Project sites in Yumbe District

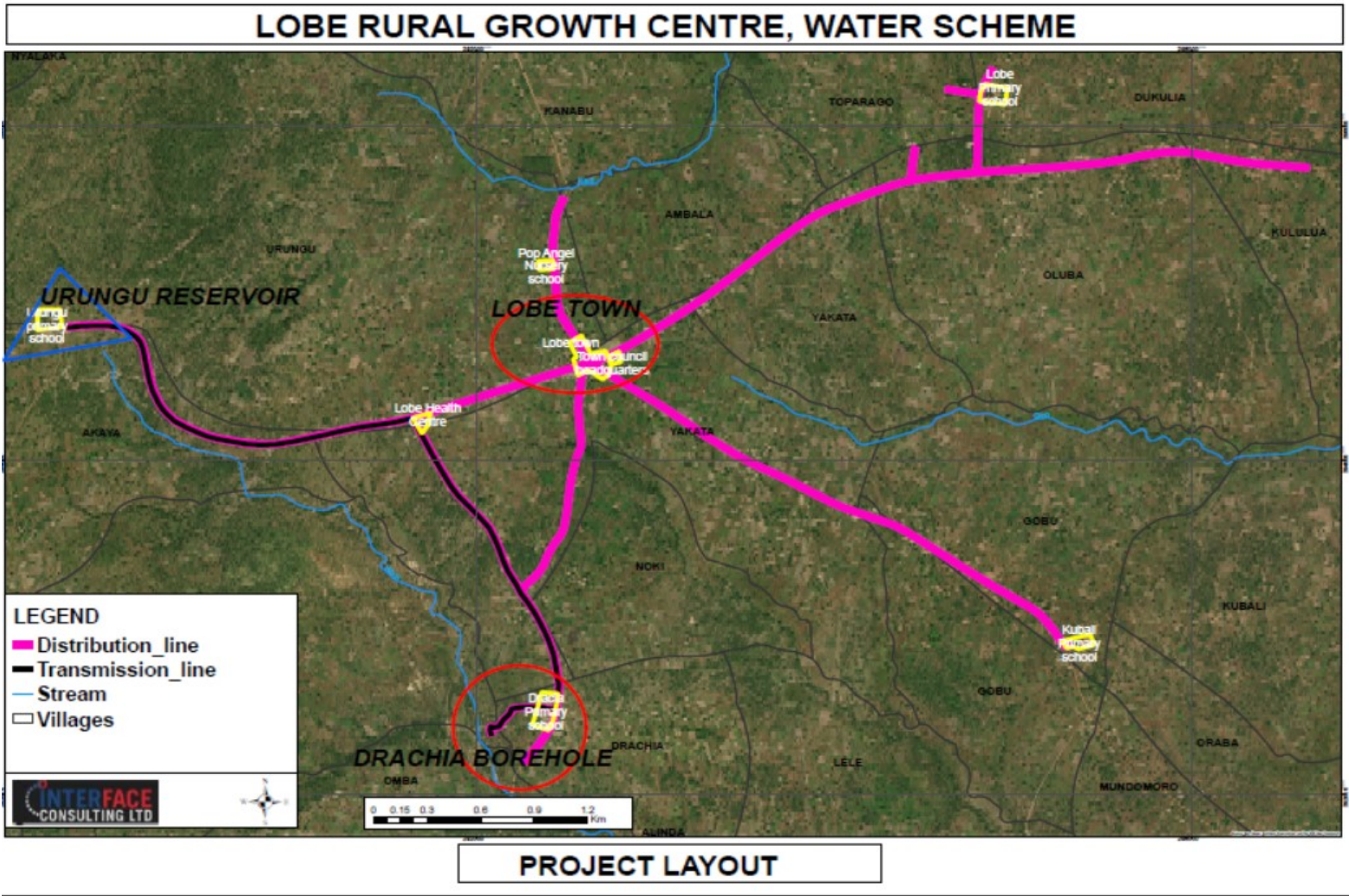


Figure 3-2: Layout of Lobe RGC

3.3 Lobe RGC Piped Water System.

The proposed project has two components namely the water supply component and the sanitation component. The water component will include solar-powered piped water systems sourcing water from Drachia Borehole and pumping it into the reservoir at Urungu Hill from where it will be distributed to different points. The borehole will be equipped with a submersible vertical pump of capacity suitable to abstract water equivalent to the safe yield.

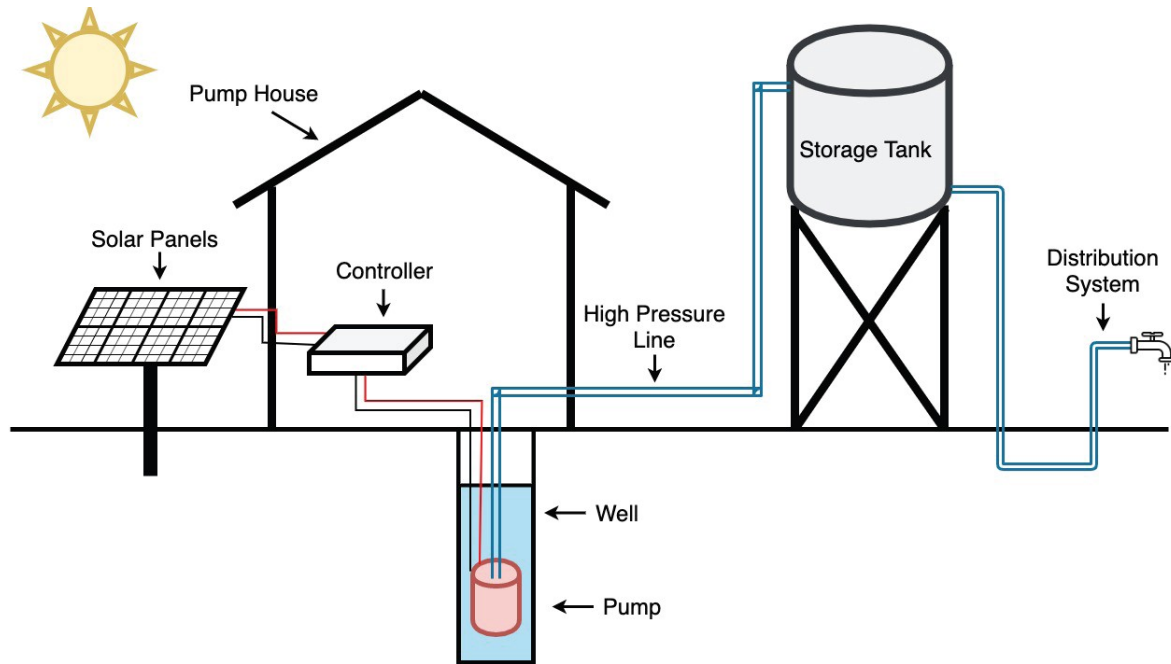


Figure 3-3: Lobe RGC Water Supply System Schematic Diagram

The following components of the water supply system have been designed according to the design criteria to meet the projected demand.

The designing involved hydraulic designs and sizing of the system components with due consideration of best practices.

3.3.1 Project Area Population

Table below shows the locations for the proposed project area of the Lobe RGC water supply system.

District	Sub County	Parish / RGC	UBOS 2023
YUMBE	Driajini	Lobe	10,783

3.4 Design Overview – Water Supply

The following components of the water supply system have been designed according to the design criteria to meet the system output capacity of 1100m³/day.

The designing involved hydraulic designs and sizing of the system components with due consideration of best practices.

3.4.1 Water abstraction system


The water development strategy is to abstract the current and projected water demand for Lobe RGC from the borehole as follows:

Drachia Borehole		
Output	30 m ³ /hr	= (300 m ³ /day for 10 hours of operation a day)

The Drachia borehole will be equipped with a submersible vertical pump of capacity suitable to abstract water equivalent to the safe yield. The pumping mains from the 1 borehole will deliver water to a central water storage tank.

Table 3-1 below presents borehole sources with potential yield for production wells for the solar power piped water supply system in Lobe RGC.

Table 3-1: Borehole Sources with Potential for Development to Production Wells in Lobe

No.	Sub-county	Parish	Village	Source Name	UTME	UTMN	Source ID	Sustainable Yield (m ³ /h)
1.	Lobe TC	Akaya	Drachia	Drachia	292005	392603	89612	30 m ³ /hr= (300 m ³ /day for 10 hours of operation a day)
							Proposed Water Source, Lobe Cell, Drachia	

The Drachia BH pump station comprises the wellhead in the middle of a 2x2m concrete platform and a 60 m² blockwork structure housing the pipework fittings and electrical controls. The pump station is situated on a 1500m² site that is enclosed with a 2.1m high concrete post and chain link fence. Access will be by a 3m wide gravel access road.

The submersible pump will be installed with an HDPE riser pipe, an air release valve (ARV) /vacuum breaker valve at the top of the riser, a swing check non-return valve, scour/blow-off valve and surge protection in the form of a pressure relief valve.

A helix-type bulk flow meter will be installed on each pumping main for flow measurement records.

Pumping of water is envisaged for 10 hours a day into a reinforced concrete reservoir (50 m³) installed above ground at the site. From this RC reservoir, a surface pump (30 m³ discharge and 200 m head) will pump water to the main storage tank (150 m³) elevated at 12 m from the ground.

The pumping mains from the individual boreholes are listed in Table 3-2 below.

Table 3-2: Pumping Mains Details

Source	Pipe Material	OD (mm)	Length (m)
Drachia BH DWD 89612	HDPE PN 20	200	5,005

3.4.2 Water Treatment Units

Based on the test results of the borehole water sources that are within the national drinking water standards, the water from the project boreholes may not require treatment. However, it is recommended as a minimum requirement, for precaution, to provide for filtration and disinfection because of the plausible abrupt change in suspended solids and microbiological qualities that could be harmful to human health.

- Filtration to inline micro-filter to manufacturer’s specification based on the pumping flow rate.
- The dosing of calcium hypochlorite for disinfection will follow the design criteria below:

➤ Chlorine solution strength	10%
➤ Effective chlorine content	65%
➤ The specific gravity of hypochlorite	1.1

The following components for the treatment of the borehole groundwater have been designed based on the test results conducted in July 2023:

- Aerator
- Flocculator
- Sedimentation tank
- Filtration; rapid sand filter
- Disinfection / Chlorination; Dosatron dosing equipment

3.4.3 Ancillary Buildings

Buildings will be required to be constructed for the operation of the water supply system including the following;

• Pump house	- 60 m ² pump house at the borehole station.
• Chemical dosing house	- 3.0 x 6.0m building at the water reservoir site to house the chlorine dosing equipment and chemical storage.
• Staff house (optional)	- 96 m ² residential building to house two staff
• Office and laboratory building	- 110 m ² office building, laboratory and tools store.

3.4.4 Power supply and Electrical installations

Lobe TC has no grid power supply system currently. Therefore, a solar system has been considered to run the system.

An analysis of the above power supply system has been made as follows.

Solar power system

A solar power system has been designed as the preferred power supply system for each borehole station. The required solar power system is to comprise the following components

Table 3-3: Solar power system components

Location	Specifications	
<ul style="list-style-type: none"> Drachia BH DWD 89612 	<p>Submersible pump</p> <p>Flow rate (q) = 30m³/h</p> <p>Workload = 100 m head</p>	<p>Surface pumps</p> <p><i>(1 duty, 1 standby)</i></p> <p>Flow rate (q) = 30m³/h</p> <p>Workload = 200 m head</p>
	<p>Daily Power Demand for 8 hours = 280.29 KWhr</p> <ul style="list-style-type: none"> PV Power rating = 300Wp No. of Solar Panels = 265 Panels PV panels per array = 10 Panels Inverter rating = 22KW, 3phase Total No of inverters required = 20 	

The specifications for electrical wiring, installations and fittings shall be of approved international standards.

Standby Generator set

The following capacities of prime generator sets have been sized for each pumping station respectively.

<u>Location</u>	<u>Specifications</u>
<ul style="list-style-type: none"> Drachia BH DWD 69426 	30KVA

3.4.5 Central Water Storage Reservoir

A 150m³ cold-pressed steel section panel water storage reservoir based on 30% of the maximum day demand of the 20th year, following Section 9.2 (ii) of the Water Supply Design Manual (January 2013-Second Edition of the Ministry of Water and Environment). The tank will be elevated 12m above ground level and is required to be installed to feed the distribution network.

3.4.6 Total Land requirements

The project will require land to host project infrastructure. According to the design consultant, pipelines are to be laid along roads and within road reserves. A working corridor of 3 m along the pipelines is anticipated. Working corridors will be restored after completion of work, and repossessed by the respective owners. Although MWE and the design consultant do not anticipate

land take for pipelines, it's better to assume that land take will be mandatory for the entire water transmission/distribution pipeline. Total land requirements for the Lobe WSS have been estimated at **11.18 acres**. However, the project case scenario is that the treated water transmission primary distribution network will follow the road reserve hence actual land required for the project is **8.27 acres**. This excludes land requirements for access road construction which will be determined by the contractor and based on his approach to the assignment. Details of various land takes are presented in the table below.

Table 3-4: Land requirements for the proposed project

Scheme	Component	Dimensions (m)		AREA		
		Length	Width	m ²	Acres	Hectares
Lobe	Borehole	100	100	10,000	2.47	1.00
	Reservoir	30	30	900	0.22	0.09
	Office	30	30	900	0.22	0.09
	Total			11,800	2.92	1.18
Land requirements for the raw water mains, transmission and primary distribution assuming a width of 3 meters						
Scheme	Component	Details		Length (km)	Land need (acres)	
Lobe	Transmission Pipe 1 from Borehole 1 to the Proposed Reservoir	A 3-meter width easement corridor		4,680	3.71	
	Distribution Pipe	A 3-meter width easement corridor		16,902	4.56	
	Total			21,582	8.27	
Grand total land requirements for all infrastructure (acres)						11.18

Note Primary distribution mains to follow road reserve hence no need for land acquisition since it is public land. Therefore, the actual land to be acquired is approximately 8.27 acres.

3.5 Distribution pipe network

A hydraulic analysis model of the distribution pipe network layout has been analyzed with EPANET 2.2 software with the following parameters:

- 12m elevated storage tank;
- Elevation of the nodes taken from the topographical survey;
- Pipe diameters, lengths and pipe material;

The layout model is presented in Figure 3-4 below. The residual pressures at the nodes range between 12.44 m to 128.83 m at peak flows. The velocities in the pipelines range from 0.21 m/s to 1.52 m/s at peak flows.

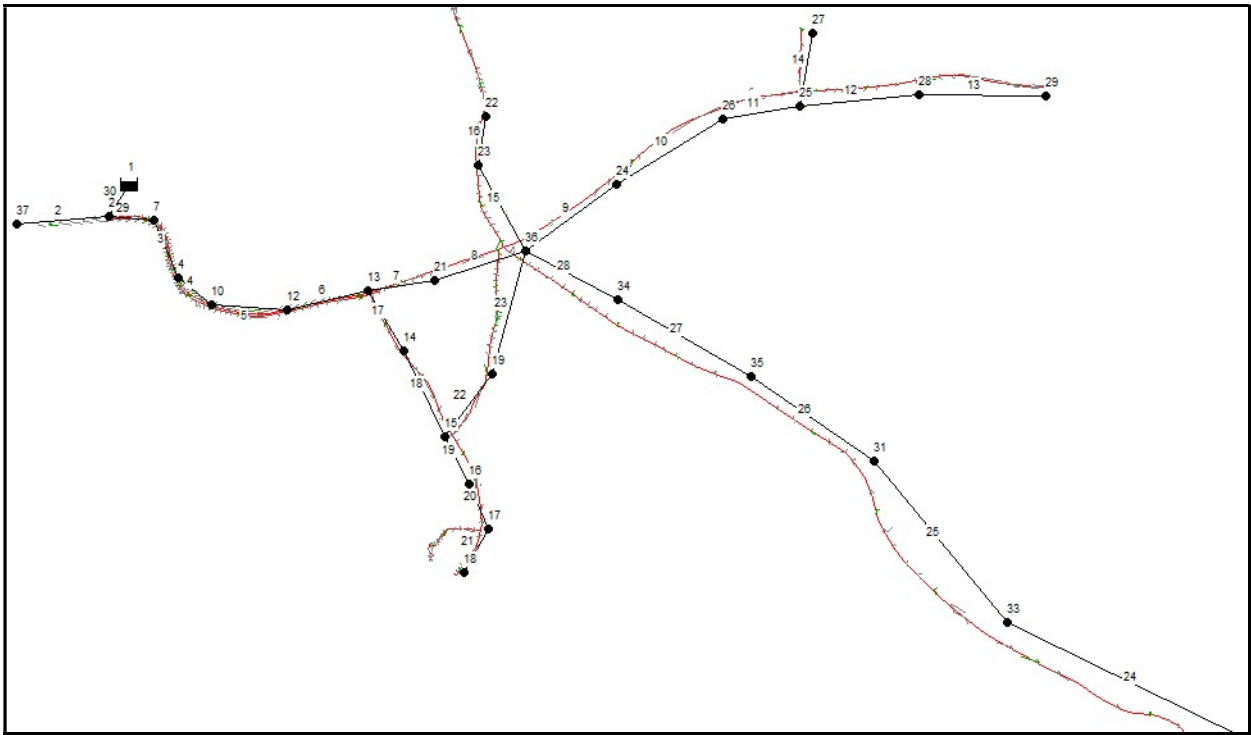


Figure 3-4: EPANET Hydraulic model

The summary of the distribution pipe sizes and respective lengths is in the table below. The entire distribution pipe network is of a total length of 20.020 m.

Table 3-5: Summary of distribution pipes

OD	DN	Material	Length (m)
32	15	HDPE PN 16	961
40	30	HDPE PN 16	490
50	40	HDPE PN 16	230
63	50	HDPE PN 16	3459
75	60	HDPE PN 16	610
90	75	HDPE PN 16	6170
125	100	HDPE PN 16	4660
180	150	HDPE PN 16	1020
200	175	HDPE PN 16	2360
280	225	HDPE PN 16	60
Total			20,020

The area will be served with 46 service connections and 4 PSPs, each with 2 taps. These will be located in strategic locations of the project area taking into consideration a maximum walking distance of 1.5 km, in accordance with Section 7.3.1 of the Water Supply Design Manual (January 2013-Second Edition of the Ministry of Water and Environment). However, due to the management problems associated with PSPs, more emphasis will be put on yard taps and private connections. Those who are willing to pay for yard taps and/or private connections will be connected to the system.

Where possible, distribution lines have been designed to serve communities surrounding the borehole sources. Otherwise, those communities will be catered for using water points installed outside the borehole compound.

3.5.1 External Works

The external works at the pumping stations and the reservoir site include the following:

- Access road and parking
- Chain-link fencing on concrete posts, metallic frame gates and guard house
- Walkways paved with 80mm thick pre-cast concrete pavers laid on well-compacted gravel earth material.
- Landscaping for the borehole pumping stations has been designed for smooth drainage of stormwater to avoid flooding. Unpaved sections will be planted with approved grass.

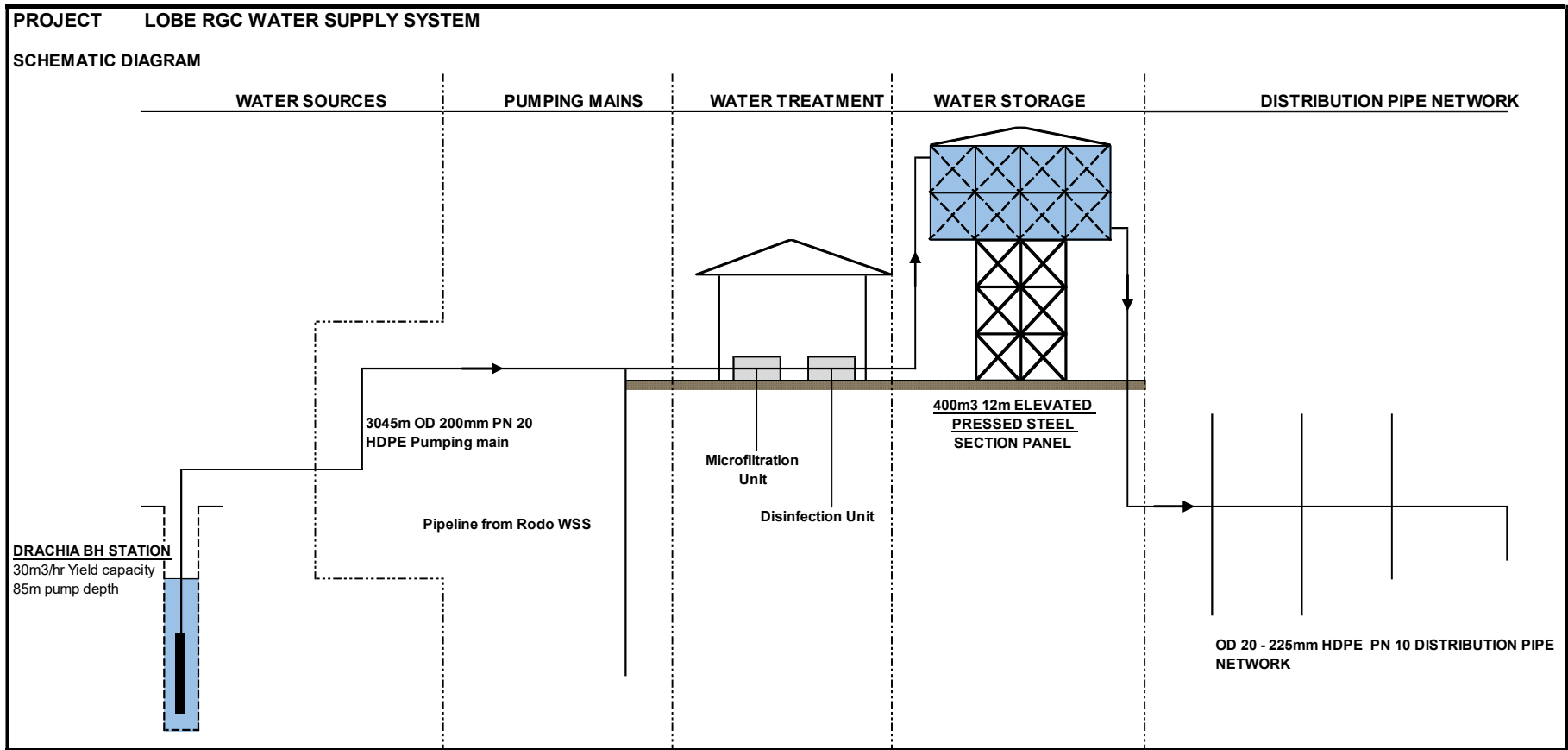


Figure 3-5: Lobe RGC Water Supply System Schematic Diagram

3.6 SANITATION SYSTEMS

3.6.1 Waste water disposal

Wastewater will be produced due to the increased consumption of water after the installation of the piped water supply system. However, a centralized conventional water-borne sewerage system is not practical in the project area due to the low levels of water consumption rate, the semi-permanent type of housing structures and affordability by the majority of the residents.

Soak-away pits are recommended for wastewater disposal for households, institutions and public places that cannot afford a water-borne system such as septic tanks.

3.6.2 Faecal waste management facilities

3.6.2.1 Households and institutions

Households and institutions without plumbing fixtures will continue using pit latrines for human/faecal waste disposal.

Households and institutions with water-borne sanitation facilities and private water service connections are expected to have septic tanks for faecal waste treatment. These facilities should be private installations.

Households and institutions should be encouraged to construct lined pits that can be emptied when filled. Line pit latrines save on cost and space in constructing new latrines when the old ones are full. The pit lining also minimizes ground water pollution in the area.

The Lobe RGC water supply and sanitation project is intended to have 61 household connections including tap yards, and 4 Public standpoints (PSPs).

3.6.2.2 Public places

Public places such as taxi/bus parks, market places and stadia need to be provided with public waterborne sanitation facilities. The maintenance of public sanitation facilities should be the responsibility of the authorities of the respective public places. Consideration for the allocation of sanitation facilities was proposed for the following public places:

S/No	Sub-county	Parish/ward	Village	Site name and description
1	Kerwa	Limu	Central	Kerwa market

The designs for toilets for institutions and public places should be designed with separate facilities for males and females with consideration for persons with disabilities as follows:

Table 3-6: Components of the Sanitation Facilities

	Male side	Female side
Number of toilet stances	3	4
Number of shower stances	3	3
Number of toilet stances for PWDs	1	1
Number of shower stances for PWDs	1	1
Urinal	1	
2000 litre overhead tank	1	1
Biodigester Septic tank with associated soak pit		
Handwash facilities		
3000 litre Rainwater harvesting tank		

3.6.3 Faecal sludge management

A central faecal sludge management facility is under construction in Yumbe Municipality for further treatment for the safe disposal of sludge from the pit latrines and septic tanks.

Sensitisation campaigns should be carried out in the project area for the above-proposed interventions.

3.7 Construction Method

The actual choice of construction method and resources will be the Contractor's responsibility as dictated by the site conditions, productivity, construction schedule and methodology, all of which have a bearing on the cost implication.

In all construction activities safety of operations is paramount. It entails carrying out construction activities and operation of equipment by experienced personnel under the supervision of experienced and qualified staff and the use of well-serviced construction equipment in good working condition. Safety on site will be managed by close supervision of the contractor's Health and Safety Officer and the Engineer's construction supervision staff of the site activities concerning the working environment following the applicable Environment, Safety, Health and Social Safeguard Policy and regulations.

3.8 Earthworks

The earthworks including site clearance, general filling, excavation and trenching can be carried out either by manual labour or mechanical equipment depending on the size of quantities and complexity.

3.8.1 Concrete works

Concrete production is expected to be by the use of concrete mixers. Manual production for small works and where the use of a mixer may be impractical will be employed.

3.8.2 Structural Steel

The lifting of heavy structural steel sections will be done by cranes. The steel sections will be joined by either bolts or welding.

3.8.3 Reinforcement Steel fixing

Various sizes of reinforcement steel bars will be cut to required lengths and bent to design shape either manually or by machines and will be placed and fixed for the works by manual labour.

3.8.4 Masonry

All masonry work is to be done by manual labour using the necessary hand tools.

3.8.5 Pipe laying

Pipe laying is expected to be carried out by manual labour using the necessary hand tools and pipe lifting equipment for the heavy pipes.

3.8.6 Electro-Mechanical Installations

All electro-mechanical installations are to be carried out by manual labour using the necessary hand tools and mechanical lifting equipment by qualified personnel.

3.8.7 Project Management

During the construction phase, the project shall have a supervising consultant who shall oversee the implementation of the project on behalf of the developer. The supervising consultant will have in place an environmental and social safeguards team comprising a Health & Safety officer, an environmental safeguards officer, social safeguards officer, among others.

The operation and management option is to hand over the water supply system and public sanitation facilities to the Northern Umbrella of Water and Sanitation (NUWS). Within the decentralization framework, the experience and capacity of the Umbrella organization, applied directly to the management of the newly constructed facilities will increase the likelihood of sustainable commercial operations and management of the town systems in the next 5-10 years. The Umbrella organisation is under the Urban Water Department of the Ministry of Water and Environment and can effectively plan and manage budgets agreed within a contract framework. It can use the experience gained elsewhere in the past 5 years to extend services to rural & urban poor areas.

3.8.8 Labor Force

Approximately 145 workers (120 workers will be required for the contractor, along with 10 for the supervising consultant, 10 for the stakeholder engagement consultant, and 5 for the Ministry of Water and Environment) will be employed during the construction phase of the proposed Lobe RGC solar motorized piped water supply and sanitation project. They will be split up into categories including key staff, skilled, semi-skilled, and unskilled labourers. Seventy percent of these workers are expected to be locals, and their management will follow World Bank safeguard policies, environmental, health, and safety norms, as well as Ugandan labour laws.

3.8.9 Equipment

The equipment that will be used during the construction of the LobeRGC water supply and sanitation project includes:

- Excavators: Used for digging trenches and excavating earth for the installation of pipelines and other structures.
- Excavator Compactors: These are excavators equipped with compaction attachments, such as vibrating plates or drum compactors, that can be used to compact soil or other materials after excavation.
- Bulldozers: Used for clearing and levelling the ground.
- Dump trucks: Used for transporting materials such as gravel, sand, and earth.
- Wheel loaders: Used for loading and transporting materials on-site.
- Backhoes: Used for digging trenches and other excavation work.
- Compactors: Used for compacting soil and other materials to create a stable base for construction.
- Concrete mixers: Used for mixing and pouring concrete for structures such as foundations and water tanks.
- Pipe laying equipment: Used for laying and connecting pipes for the water supply system.
- Cranes: Used for lifting heavy materials and equipment.
- Welding equipment: Used for welding pipes and other metal structures.
- Pumps: Used for pumping water during construction and for testing the water supply system.
- Generators: Used for providing power to equipment and tools on-site.

4 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

4.1 Introduction

In Uganda, the key legislation governing an ESIA study includes the National Environmental Act No.5 of 2019 of the laws of Uganda and the Environmental Impact Assessment Regulations (2020). National Environmental Act established NEMA and entrusts it with the responsibility to ensure compliance with ESIA processes and procedures in the planning and execution of development projects. The procedures require that a project proponent prepares an EIS with a clear assessment of relevant potential impacts, based on terms of reference (TORs) developed from a scoping exercise. This requires that the ESIA addresses potential direct and indirect socio-environmental impacts during the pre-construction, construction, operation and decommissioning phases together with an attendant environmental and social management plan (ESMP).

This section presents a summary of key policies, laws, regulations and guidelines relevant to the environmental and social management of the project. It also identifies agencies, departments and institutions responsible for the monitoring and enforcement of legal requirements specified therein.

4.2 National Policies Framework

Table 4-1: National Policy Framework

Legislation	Key provisions/requirements	Application to the proposed project
Policies and Strategies		
The National Environmental Management Policy, 1994	The overall goal of the policy is the promotion of sustainable economic and social development that enhances environmental quality without compromising the ability of future generations to meet their needs. The policy states that an Environmental Impact Assessment should be conducted for a policy or project that is likely to have impacts on the environment. The developer has prepared an ESIA to address environmental and social issues.	Concerning this project, the preparation of this ESIA is consistent with the provisions of the policy. In addition, the provisions in this policy are consistent with the World Bank safeguards policies that require the preparation of environmental and social assessments for development projects before their implementation.
The National Land Use Policy 2006	The overall goal for the national land use policy is “To achieve sustainable and equitable socio-economic development through optimal land management and utilization in Uganda”.	Policies, programmes and projects can be used to effectively implement land use plans. The locations for the facilities shall be in line with the land policies
National Policy for the Conservation and Management of Wetland Resources 1995	The policy aims at curtailing the rampant loss of wetland resources and ensuring that benefits from wetlands are sustainable and equitably distributed to all people of Uganda. The policy calls for the application of environmental impact assessment procedures on all activities to	Application of environmental impact assessment procedures on all activities to be carried out in a wetland to ensure that wetland development is well-planned and managed

	be carried out in a wetland to ensure that wetland development is well-planned and managed.	
Buy Uganda Build Uganda (BUBU) policy, 2014	BUBU is relevant to the project because it encourages the production, purchase, supply, and consumption of local goods and services. BUBU also provide capacity building programs to local suppliers of goods and services.	Such Projects are one of the places where BUBU can be promoted by ensuring locally produced goods are accessed.
The Uganda National Land Policy, 2013	In support of the national objectives on poverty eradication and economic growth, while at the same time ensuring sustainable utilization of natural resources including land and water, the National Land Policy's main goal is 'to ensure an efficient, equitable and optimal utilization and management of Uganda's land resources for poverty reduction, wealth creation and overall socio-economic development'.	This is expected to improve the prosperity of the communities.
The Uganda Forestry Policy, 2001	This policy aims at sustainable management of the forest resources in protected areas, public and private land. It also aims to promote increased forest production by the private sector and communities. This policy was drafted on the understanding that Uganda is endowed with a rich diversity of forestry resources, but that these resources are highly threatened by over-exploitation	The construction will lead to the loss of some planted trees. However, the contractor will plant some trees at the end of project works on available spaces on the site (pump house and reservoir site)
The National AIDS Policy and National HIV/AIDS Strategic Plan 2015/16- 2019/20	This Policy underlines the link between GBV and HIV along with recognizing gender-based HIV vulnerability and all aspects of cultural attitudes and practices regarding sex and sexuality that put women at risk. The policy emphasizes integrating sexual and gender-based violence (GBV) prevention and human rights into HIV prevention programming. The policy among others encourages scaling up of comprehensive sexual and reproductive health (SRH)/HIV programmes targeting vulnerable populations such as adolescents (both inside and outside schools) and young people, women, girls and people with disabilities.	The provision of HIV/AIDS services by the contractor such as voluntary counselling and testing as well as free condom distribution can reduce risk.
National Gender Policy (NGP), 2007 and National Action Plan on Women (2007)	This Policy focuses on promoting gender equality and empowerment of women and provides a strategic framework that guides the implementation of gender-focused interventions to combat gender-	Key in the project is, that the policy outlines the legitimacy of gender equality as a fundamental value that should be reflected in Uganda's development choices, poverty reduction strategies and institutional

	based violence. The priority area on gender and rights commits the Government and other actors (including CSOs, and UN agencies) to develop and implement interventions to combat gender-based violence in all its forms and at all levels.	practices which no doubt is consistent with the Banks safeguards policy on gender.
The National Water Policy, 1999	The objective of the policy is to guide the development and management of the water resources of Uganda in an integrated and sustainable manner, to secure and provide water of adequate quantity and quality for all social and economic needs, with full participation of all stakeholders and mindful of the needs of future generations.	Construction will require water which poses a risk of conflict in case the contractors use domestic water sources such as the community stand taps. The contractor will secure the required water abstraction permits from the Directorate of Water Resources Management (DWRM).
National Policy on Elimination of Gender-Based Violence, 2016	The policy emphasizes early intervention to prevent re-victimisation of and long-term effects for girls, including interpersonal violence, sexual coercion, alcohol and drug abuse and mental health problems, Reporting cases of violence against children immediately.	There is an acknowledged existence of Sexual and gender-based violence (SGBV) in the community. The common forms of SGBV include sexual advances, assault, rape, fraud and verbal abuse. The Contractor should have a sexual harassment policy that is communicated to all workers as well as continuous sensitization on GBV, risk and prevention mechanisms. During operation, the water user management committees will require training and capacity building in gender and child protection issues.
National Policy on HIV/AIDS and the World of Work, 2007	The policy obliges developing entities to mainstream HIV/AIDS interventions alongside the planned developments, defines the roles of key stakeholders namely government, employers, workers and the private sector including the informal sector, people living with HIV/AIDS, civil society organizations and development partners. Amongst the roles of employers is the formulation of a sound HIV/AIDS policy, around the principle of non-discrimination, equality, confidentiality, care and support and incorporation of HIV/AIDS training into new worker inductions.	HIV/AIDS mainstreaming is a contractual obligation that will involve collaboration with nominated service providers for HIV/AIDS. The contractors may also sign MoUs with health centres. It is strongly recommended that the services be extended beyond the construction workers to include the immediate surrounding communities.
LAWS		
The Constitution of the Republic of Uganda, 1995	The Constitution is the supreme law of Uganda and it provides for the protection of the environment while it's Article 39 guarantees the right of every Ugandan to a clean and healthy environment. The constitution, therefore, requires that the project be implemented without endangering human health and the	Civil works must be undertaken within the observance of the constitutional rights and responsibilities of the public and state.

	environment.	
The National Environment Act 2019	<p>The new National Environment Act was passed to repeal, replace and reform the law relating to environmental management in Uganda. Every developer must undertake an environmental assessment for projects listed in Schedule 5 of the Act and a Project Brief for projects listed in Schedule 4. Functions of district environment and natural resource committees.</p> <p>(1) The functions of the district environment and natural resources committee are— (f) to monitor all activities within its local jurisdiction to ensure that such activities do not have any significant impact on the environment.</p> <p>(2) The district environment and natural resources committee shall receive funding from among the sources of funds available to the urban or district council for performing its functions under this Act.</p>	<p>For all new materials sites to be established for the project, NEMA approval must be secured while all existing sites should undertake/provide proof of compliance such as having undertaken corrective actions emanating from their environmental compliance audits. The Contractor should work closely with the District Environment Officer to identify sites where construction waste can be reused or disposed of.</p> <p>Yumbe district environment and natural resource committees will be involved in periodic monitoring of the project both during the construction and operational phases. The Yumbe District Environment Officers will participate in the review of environmental and social impact assessment reports, environmental audit reports and other reports to be submitted to NEMA regularly.</p>
The Physical Planning Act 2010	<p>The Act is to provide for the establishment of a National Physical Planning Board; to provide for the composition, functions and procedure of the Board; to establish district and urban physical planning committees; to provide for the making and approval of physical development plans and the applications for development permission; and for related matters.</p>	<p>“Local physical development plan” means a plan for an area or part of an area of a city, municipal, town or urban council and includes a plan regarding any trading centre, marketing centre or rural area. The project is expected to be in line with the approved physical development plans of the area</p>
The Land Acquisition Act, 1965	<p>This Act provides for the acquisition of land after its valuation and along approved procedures which ensure adequate, fair and timely compensation to the landowners.</p>	<p>Land acquisition is envisaged for some project components that will be constructed on private land</p>
The Historical Monuments Act, of 1968	<p>The Act provides for the preservation and protection of historical monuments and objects of archaeological, paleontological, ethnographical and traditional interest and other matters connected therewith. Section 2 provides for the declaration of preserved objects and sub-section (1) mandates preservation of an object of archaeological, paleontological, ethnographical, traditional or historical interest.</p>	<p>Some cultural sites or objects of significance to indigenous communities might be unearthed/encountered during construction. Necessary consultations should be undertaken, and a process followed in line with the requirements of this Act.</p>
The Local Governments Act, Cap	<p>The Local Governments Act (LGA) operationalises the principle of</p>	<p>The proposed project is within the jurisdiction of Yumbe Local Governments</p>

243 as amended	decentralization enshrined in the Constitution. The Act accordingly establishes local governments and administrative units in Uganda and empowers them to manage the development of their respective areas of jurisdiction. In managing development, the law mandates local governments and administrative units to provide certain services.	headed by a Local Council V (LC V) Chairman and Chief Administration Officer (CAO) who are the political head and technical head respectively. Various district offices whose functions would be relevant to the project include offices of Natural Resources/Environment, District Health Inspector, District Planner, Community Development Officer, District Director of Health Services, District Water Officer, Town Council and District Engineer. Equally important is village-level local council administration (LC I and LC III). Leaders at these levels of local administration are closer to residents and therefore important in effective community mobilization, sensitization and dispute resolution. Local government structures are important for mobilizing support for the project as well as monitoring its social-environmental impacts both during the construction and operation phases.
Public Health Act, Cap 281	Section 105 of the Public Health Act imposes a duty on the local authority to take measures to prevent any pollution dangerous to the health of any water supply that the public has a right to use for drinking or domestic purposes.	The developer and the contractor will take all lawful, necessary and reasonable measures to ensure the general public safety concerning any likely negative impacts/cause nuisance or contravening this Act as a result of the project.
The Water Act Cap, 152 1997	The Act provides for the use, protection and management of water resources and supply in Uganda. The Water Resources Regulations of 1998 established under this Act stipulates a requirement to apply for a permit to construct, own, occupy or control any works on or adjacent to the land as per Regulation 10.	Any disposal of waste shall need to be in line with the waste discharge regulations; proper management of fuel/oil spills is essential for minimizing the chances of water contamination. The effluent discharged must meet the standards.
Traffic and Road Safety Act, Cap.361	Section 119 of the Traffic and Road Safety Act stipulates that every person who uses, parks or stands a motor vehicle, trailer or engineering plant on any road carelessly or without reasonable consideration for other persons using the road commits an offence.	The contractor is to ensure the worthiness of vehicles, manage the speed of the vehicles as well and establish a considerate parking site during construction to avoid inconveniences to other road users.
The Occupational Safety and Health Act, 2006	The Occupational Safety and Health Act of 2006 makes provisions for the health, safety, welfare and appropriate training of persons employed in workplaces. It makes it mandatory for employers to have more than 20 workers in place implement a Health and Safety policy and provide adequate safety gear to workers.	The Act is applicable concerning the protection of the project workers, during both construction and operation phases, against injuries during the execution of their duties or work.
The Land Act, Cap	The Land Act, Cap 227 of 1998 provides	The Land Act vests land in Uganda to the

227, of 1998	for the tenure, ownership and management of land. Under Section 44 the Government or the local government shall hold land in trust for the people and protect natural lakes, groundwater, natural streams, wetlands and any other land reserved for ecological purposes for the common good of Ugandans.	people concerning the four land tenure systems.
The Employment Act, 2006	The Employment Act 2006 is the governing legal statutory instrument for the recruitment, contracting, deployment, remuneration, management and compensation of workers. The Act Mandates Labour officers to regularly inspect the working conditions of workers to ascertain that the rights of workers and basic provisions are provided, and workers' welfare is attended to.	Persons employed by the project need to be issued with contracts and their welfare taken care of by the employer.
The Workers' Compensation Act, Cap. 225	The Worker's Compensation Act outlines responsibilities and obligations for both parties (employer and employee) in guaranteeing the safety and health of the workers. The Act outlines matters of compensation for injuries and accidents as well as the responsibility of employees to take care of their health and safety while on the project.	Employers/contractors must have in place a workers' compensation insurance policy.
The Road Act, Cap 358	The Road Act (Cap 358 of the Laws of Uganda) provides for the need to maintain basic control over developments along roads to ensure maintenance of clear visibility along sections of the road in line with safety needs.	The contractors of the project in different sites are obliged to ensure safety along the access roads by use of safety signage, speed limits, traffic controllers and humps.
The National Forestry and Tree Planting Act, 2003	Section 38 of this Act requires that a person intending to undertake a project or activity, that may impact a forest, should undertake environmental and social impact assessment studies to evaluate the magnitude and extent of forest destruction and the mitigation measures for salvaging the forest.	Some project sites have some trees that are likely to be cut down during project implementation, hence, the need for a detailed assessment of impacts across such sites.
Labour Disputes (Arbitration and Settlement) Act, 2006	The Act amongst others, makes provision for referring disputes to the industrial court subject to the discretion of the labour officer and circumstances of the agreement or disagreement.	The Act is applicable concerning the protection of the project workers, during both construction and operation phases, against any disputes between the workers and the labour officer
Children Act Cap 59	The act defines a child as a person below the age of 18. It lists the right for children to be with their parents, circumstances under which they should not, foster care and adoption procedures as well as	There is a marked presence of children around the project area. Some children may seek contract employment and think that they do not need school to make it in life since they already have ideas and knowledge on

	mandates of local authorities and roles of community.	how to make money. Secondly, when school starts, some children might drop out of school to continue with work. Child labour is prohibited during project implementation.
REGULATIONS		
The Environmental Impact Assessment Regulations, 2020	This is a frame guide on how ESIA for development projects is to be conducted and what fees are to be paid for approval purposes of the project.	The developer has prepared this ESIA with a particular focus on the content specified within the First Schedule of these Regulations.
The National Environment (Wetlands, River Banks and Lake Shores Management) Regulations, No. 3/2000	The objective of these regulations is to provide for the conservation and wise use of wetlands and their resources in Uganda, give effect to clause 2 of article 237 of the constitution of Uganda, ensure water catchment conservation and flood control, ensure the sustainable use of wetlands for ecological and tourist purposes for the common good of all citizens, ensure that wetlands are protected as habitats for species of Fauna and Flora, provide for the regulated public use and enjoyment of wetlands, enhance research and its related activities, minimize and control pollution.	However, for cases where the Contractor identifies a good source of materials (sand), then a sand mining permit must be secured from NEMA.
The Water Resources Regulations, 1998	These regulations are meant to ensure that the abstraction of water and discharge of wastewater is carried out sustainably and that water resources are protected from over-exploitation and pollution	Construction will require water that will be abstracted from nearby rivers to avoid conflicts with communities over water sources.
National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations, 1999	These regulations provide standards for effluent discharge. Section 6 (2) details the maximum permissible limits for 54 regulated contaminants, which must not be exceeded before the effluent is discharged into water or on land.	Construction activities will generate effluent waste. The contractor should employ appropriate measures to manage effluent waste generated by project activities. Regarding wastewater and human waste, the design has provided for 1 toilet both with separate stances for men, women and PWDs.
The National Environment (Noise Standards and Control) Regulations, 2003	Part III Sec. (1) requires machinery operators to use the best practicable means to ensure that the emission of noise does not exceed the permissible levels.	Noise will be one of the undesirable consequences of the construction phase arising from construction equipment and haulage fleet, works and workers. Noise generation is inevitable during construction activities, these standards shall apply.
The Waste Management Regulations of 2020	The Regulations require waste disposal in a way that would not contaminate water, soil, and air or impact public health. Regulations require a person who owns or controls a facility or premises, which generates waste to minimize the waste generated by adopting cleaner production	These provisions apply to the proposed Lobe RGC Water Supply and Sanitation Project for the construction process, domestic waste and construction waste. The contractor and other institutions responsible for the generation of this waste shall comply with the provisions of this regulatory standard

	methods.	
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4.3 Key Multilateral Environmental Agreements

4.3.1 International Protocols and Conventions

Table 4-2: International Protocols and Conventions

International Protocols and Conventions	Key Provisions and Relevancy
African Convention on the Conservation of Nature, 1968	Encourages individual and joint action for the conservation, utilisation and development of soil, water, flora and fauna for the present and future welfare of mankind, from an economic, nutritional, scientific, educational, cultural and aesthetic point of view.
United Nations Framework Convention on Climate Change (UNFCCC), 1992	The Convention requires parties to avoid adverse effects on the environment and adopt measures and policies to control carbon dioxide emissions in technologies, considering their common, yet differentiated responsibilities, as well as their specific national and regional development priorities, objectives and circumstances. They are required to take climate change considerations into account, to the extent feasible, in their relevant social, economic and environmental policies and actions, and employ appropriate methods, for example, impact assessments, formulated and determined nationally, with a view to minimising adverse effects on the economy, on public health and on the quality of the environment of projects or measures undertaken by them to mitigate or adapt to climate change.
United Nations Convention to Combat Desertification (UNCCD), 1994	<p>Binding international agreement linking environment and development to sustainable land management. The Convention addresses specifically the arid, semi-arid and dry sub-humid areas, known as the drylands, where some of the most vulnerable ecosystems and peoples can be found.</p> <p>The 10-Year Strategy of the UNCCD (2008-2018) was adopted in 2007 to forge a global partnership to reverse and prevent desertification/land degradation and to mitigate the effects of drought in affected areas to support poverty reduction and environmental sustainability.</p>
Montreal Protocol for the Protection of the Ozone Layer, 1987	The protocol was designed to protect the ozone layer by phasing out the production of numerous substances that are responsible for ozone depletion. All of the ozone-depleting substances controlled by the Montreal Protocol contain either chlorine or bromine (substances containing only fluorine do not harm the ozone layer). The provisions of the Protocol include the requirement that the Parties to the Protocol base their future decisions on the current scientific, environmental, technical, and economic information that is assessed through panels drawn from the worldwide expert communities.
Stockholm Convention on Persistent Organic Pollutants, 2001	Protects human health and the environment from Persistent Organic Pollutants that remain intact in the environment for long periods and can become widely distributed geographically and accumulate in the fatty tissue of humans and wildlife, which can lead to serious health effects.
International Labour Organisation Convention, 1998	Sets out basic principles and labour rights at work, based on international best practices.

4.3.2 World Bank Operational Policies

The Operational Policies provide a basis on which the World Bank screens proposed projects to determine the appropriate extent and type of Environmental Assessment to be undertaken. The Bank classifies proposed projects as Class A, B, C or F1 depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts. The categorization of projects is based on an assessment of their likely environmental and social impacts. Below is a brief description of the different categories:

- **Category A Project:** which may have potentially significant adverse social or environmental impacts that are diverse, irreversible, or unprecedented;
- **Category B Project:** may have potentially limited adverse social or environmental impacts that are few, generally site-specific, largely reversible, and readily addressed through mitigation measures;
- **Category C Project:** likely to have minimal or no adverse social or environmental impacts, including certain financial intermediary projects with minimal or no adverse risks; and
- **Category FI Project:** Assigned to business activities undertaken by Financial Intermediaries or through delivery mechanisms involving financial intermediation.

The table below summarizes safeguards policies that were triggered by the project.

Table 4-3: World Bank Operational Policies

OP No.	World Bank Operational Policies triggered by the project	Triggered/Not Triggered	Key Provisions and Relevance
OP 4.01	Environmental Assessment	Triggered	In general, the project falls under Category B of the World Bank's classification of projects requiring an ESIA/ESMP given that its potentially adverse environmental and social impacts will be site-specific, few if any are irreversible, and in most cases, mitigation measures can be readily designed. Additionally, the World Bank Environment Health and Safety Guidelines (EHSGs), with specific reference to the EHSGs for water and sanitation projects, apply to the project.
OP 4.04	Natural Habitat	Triggered	The Bank supports the protection, maintenance, and rehabilitation of natural habitats and their functions. The conservation of natural habitats is essential for long-term sustainable development. The project will pass through some wetlands and bushes and therefore OP 4.04 is triggered due to the potential loss or degradation of natural

OP No.	World Bank Operational Policies triggered by the project	Triggered/Not Triggered	Key Provisions and Relevance
			habitats as a result of physical project activities
OP 4.12	Involuntary Resettlement	Triggered	<p>This is the guiding policy when a project results in involuntary resettlement. OP 4.12 describes the detail and elements that a resettlement plan should include.</p> <p>These include objectives, potential impacts, socio-economic studies, legal and institutional framework, eligibility, valuation and compensation of losses, resettlement measures, relocation planning, community participation, grievance redress procedures, implementation schedule, costs and budgets, and monitoring and evaluation. This report conforms to the WB policy requirement on contents and structure. OP 4.12 is triggered due to land acquisition at the water intake, and water storage tanks.</p>
OP 4.11	Physical Cultural Resources	Not Triggered	<p>This policy gives guidelines for the preservation of cultural property and seeks to avoid their elimination, otherwise, mitigation activities be undertaken to limit the adverse impacts as far as possible.</p> <p>Whereas there are no serious cultural properties along the proposed water transmission and distribution corridors, chance finds could be encountered during construction especially while trenching channels for the water transmission pipes. Detailed in the EMP are measures to mitigate impacts on cultural properties. When RAP studies are carried out, any physical cultural resources in the water transmission corridor will be enumerated as structures and all affected PAPs will be compensated for such structures to ensure that they are relocated following the cultural norms of the affected people and society.</p> <p>So far in this ESIA, no PCRs like graves and shrines have been found above ground along the project area but are outside the direct area of Influence. However, with excavations chance finds of archaeological/paleontological value may be found. Hence a chance finds procedure has been developed for this project;</p>
OP	Forests	Not Triggered	The objective of this policy is to assist borrowers in harnessing the potential of forests

OP No.	World Bank Safeguards Operational Policies triggered by the project	Triggered/Not Triggered	Key Provisions and Relevance
4.36			to reduce poverty sustainably, integrate forests effectively into sustainable economic development, and protect vital local and global environmental services. Although no forest will be affected, the project will put in place measures that enhance the tree cover in the project area in line with the National forestry and tree planting guidelines.
	World Bank Policy on Access to Information (July 1, 2010)	Triggered	This policy is triggered since there is a need for disclosure of information to all the stakeholders. There is a need for the disclosure of information to all the stakeholders. Compliance shall be ensured by disclosing the information to all the stakeholders such as district technocrats, sub-county leadership, Local council leaders, and communities among others during the consultation process and the information is accessible.

4.3.3 The World Bank Group Environmental, Health and Safety Guidelines for Water and Sanitation project

The EHS Guidelines for water and sanitation projects include information relevant to the operation and maintenance of (i) potable water treatment and distribution systems, and (ii) collection of sewage in centralized systems (such as piped sewer collection networks) or decentralized systems (such as septic tanks subsequently serviced by pump trucks) and treatment of collected sewage at centralized facilities. The document lists environmental issues, occupational health and safety concerns and community health and safety impacts that are associated with water and sanitation projects. All the issues presented in these guidelines were either taken care of at the design stage or are discussed and mitigated as part of this report.

The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP). When one or more guidelines are applied as required by their respective policies and standards. The industry sector EHS guidelines are designed to be used together with the General EHS Guidelines document, which guides users on common EHS issues potentially applicable to all industry sectors.

The guidelines shall govern both workers' (occupational) safety and public safety. The applicability of the EHS Guidelines is tailored to the hazards and risks established for each project based on the results of an environmental assessment in which site-specific factors are considered members of the World Bank Group are involved in a project, the EHS

The guidelines provide for effective management of environmental, health, and safety (EHS) issues entails the inclusion of EHS considerations in the project activities through:

- a) Identifying project hazards and associated risks as early as possible;
- b) Involving EHS professionals, who have the experience, competence, and training necessary to assess and manage EHS impacts and risks, and carry out specialized environmental management functions
- c) Understanding the likelihood and magnitude of the risks
- d) Prioritizing risk management strategies to achieve an overall reduction of risk to human health and the environment;
- e) Favouring strategies that eliminate the cause of the hazard at its source;
- f) Incorporating engineering and management controls to reduce or minimize the possibility and magnitude of undesired consequences;
- g) Preparing workers and nearby communities to respond to accidents;
- h) Improving EHS performance through a combination of ongoing monitoring of facility performance and effective accountability

The following has been considered when assessing the potential risks related to health and safety

- a) Infrastructure and Equipment Safety
- b) Hazardous Materials Safety
- c) Environmental and Natural Resource Issues;
- d) Community safety and exposure to project-related risks
- e) Emergency Preparedness and Response.

4.4 Institutional framework

The Project will be implemented by the Ministry of Water and Environment (MWE) and the host District Local Governments of Yumbe.

Ministry of Water and Environment as the Developer is responsible for the management, coordination and supervision of project activities including the implementation of environmental and social safeguards requirements as detailed in the ESMP.

However, during construction, the Contractor will be responsible for the day-to-day implementation of the ESMP but under the direct supervision of the MWE. Legally, the host district local governments are responsible for day-to-day monitoring of the environmental and social aspects of the project while at the National level, the National Environment Management Authority (NEMA) and the Department of Occupational Safety and Health (DOSHS) of the Ministry of Gender, Labour and Social Development are responsible for the monitoring of environmental, social and safety aspects of the project. This section mainly sets out the roles and responsibilities for the management of the project's safeguards aspects by different government institutions.

4.4.1 Ministry of Water and Environment

The Ministry of Water and Environment (MoWE) has the overall mission: to promote and ensure the rational and sustainable utilization, development and effective management of water and environment resources for the socio-economic development of the country. The ministry has three directorates: the Directorate of Water Resources Management (DWRM), the Directorate of Water Development (DWD) and the Directorate of Environmental Affairs (DEA). MWE regulates water resources utilization and wetlands management through DWRM and DEA respectively. In addition to regulatory functions, MWE shall take the lead on the implementation of the project and shall ensure all recommendations contained in the mitigation plan are implemented.

4.4.2 National Environment Management Authority

National Environment Management Authority (NEMA) was established under the National Environment Act No.5 of 2019 as the principal agency in Uganda charged with the responsibility of coordinating, monitoring, regulating and supervising environmental management in Uganda. In this context, NEMA will be responsible for reviewing and approval of this environmental impact assessment, ensuring proposed mitigation measures are implemented, monitoring compliance with approval conditions, and ensuring any other impacts that may arise are mitigated.

4.4.3 National Forestry Authority

The National Forestry Authority (NFA) is a government statutory entity responsible for the management of Central Forest Reserves (CFRs) on a sustainable basis, as well as, for supplying high-quality forestry-related products and services in Uganda. Although there was no natural forest within the project area, there were pockets of planted forests mainly comprising teak trees along the water transmission and distribution network, there were NFA will be interested in ensuring tree clearance of the plantation forests is minimized. Under catchment management, there is a component of tree planting and NFA would come in to provide training on the best practices for tree planting while also supplying high-quality seedlings.

4.4.4 Wetlands Management Department

Wetlands Management Department (WMD) is mandated to manage wetland resources and its goal is to sustain the biophysical and socio-economic values of the wetlands in Uganda for present and future generations. The Wetlands Management Department is a key stakeholder of the project because some key project components are located in wetlands.

4.4.5 Directorate of Water Resources Management

The Directorate of Water Resources Management (DWRM) is responsible for managing and developing the water resources of Uganda in an integrated and sustainable manner to provide water of adequate quantity and quality for all social and economic needs of the present and future generations. The Directorate comprises four departments namely Water Resources Monitoring and Assessment Department, Water Resources Planning and Regulation

Department, Water Quality Management Department and the International Transboundary and Water Affairs Department.

4.4.6 Ministry of Lands, Housing and Urban Development

The Mandate is “To ensure a rational: sustainable and effective use and management of land and orderly development of urban and rural areas as well as safe, planned and adequate housing for socio-economic development”. The MoLHUD, through the Office of the Chief Government Valuer, and the District Land Boards, will provide guidance on land acquisition and property valuation, where required.

4.4.7 Ministry of Local Government

The 1997 Local Government Act provides for the decentralization and devolution of government functions, powers and services from the central to Local Governments and sets up the political and administrative functions of local governments. The Local Governments are responsible for the protection of the environment in their respective areas of jurisdiction. Local Governments shall be consulted on projects to be located within their jurisdiction and on matters that affect their environment. At the District Level, the District Environmental Officers, District Engineer and Community Development Officers in the respective areas of project implementation will participate in monitoring the projects to ensure that mitigation measures are adequate and advise or point out additional compliance requirements following their inspections. The District Land Boards and Lands Officers will guide on issues of compensation or land acquisition.

4.4.8 Ministry of Gender, Labour and Social Development

The Ministry of Gender Labour and Social Development is a Government Ministry with a responsibility to empower communities in diverse areas. The Ministry came into being by a constitutional requirement of the 1995 Constitution, Chapters 4 and 16 which mandates the government to: “empower communities to harness their potential through skills development, labour productivity and cultural growth. The Ministry promotes cultural growth, skills development and labour productivity while promoting gender equality, labour administration, social protection and transformation of communities.

This Ministry has one of its major tasks to ensure that all Ugandans enjoy better standards of living, especially the disadvantaged and vulnerable groups.” The Directorate of Labor, Employment and Occupational Safety and the Directorate of Gender and Community Development in the Ministry are responsible for the inspection of the workplace environment to safeguard occupational safety, the rights of workers and gender equity. Specifically, DOSH Activities in ensuring enforcement of OSH at workplaces carry out the following activities: i) Developing/reviewing occupational safety and health policy, laws, regulations, technical standards, strategy, guidelines, code of conduct and manuals. ii) Registering all workplaces in the country. This assessment recognises key gender health and safety and social issues, as emerging from stakeholder consultation and places emphasis on the management of such in the ESMP.

4.4.9 The Equal Opportunities Commission (EOC)

The Equal Opportunities Commission (EOC), was established by the Equal Opportunities Act 2007. The Commission is mandated to provide a framework for redressing imbalances, which exist among marginalized groups while promoting equality and fairness to all. The Commission was established under Article 32 (3 – 4) of the Constitution and is a body corporate with perpetual succession and a common seal and may sue or be sued in its corporate name and, may do, enjoy or suffer anything that bodies corporate lawfully do, enjoy or suffer. The Commission gives effect to the State’s constitutional mandate to eliminate discrimination and inequalities against any individual or group of persons on the grounds of sex, age, race, colour, ethnic origin, tribe, birth, creed or religion, health status, social or economic standing, political opinion or disability, and take affirmative action in favour of groups marginalized based on gender, age, disability or any other reason created by history, tradition or custom for redressing imbalances which exist against them; and to provide for other related matters.

4.4.10 Yumbe District Local Government

Yumbe District local government is mandated under the Local Government Act and the National Environmental Act to ensure that all project activities are implemented following the national legal and policy framework. The district is responsible for major functions and services previously carried out by the central government i.e., land administration and surveying; the construction and maintenance of feeder roads, and; the provision and maintenance of water supplies. Therefore, these District Local Governments are key stakeholders in the project

4.5 Permits and Licenses Required by Project Proponent

Table 4-4: Permits and Licenses

Regulations/ Standards/ Approvals	Description	Reference	Issuing Institution	Applicant
ESIA certificate	The certificate will be provided after approval of the ESIA report	National Environment Act, 2019	National Environment Management Authority (NEMA)	Developer
Workplace Registration Certificate	Every workplace is required to be registered and must commit to abide by all of the country’s labour laws	Occupational Safety Health and Welfare Act (1997)	Ministry of Gender, Labour & Social Development	Construction contractor
License to handle and store hazardous waste	Every establishment producing hazardous waste in their production line/ processes need to acquire a license for handling and storage of hazardous waste	National Environment Act, 2019	National Environment Management Authority (NEMA)	Construction contractor

Water Abstraction Rights	For water abstraction, it is a requirement for the project to obtain water abstraction rights	Water Resources Act	Directorate of Water Resources and Management (DWRM)	Developer
Road cutting permit, Permit for working in road reserves	The project plans to construct a water pipeline which will most likely need to cross roads or be laid in the road reserve boundary, this shall require a permit from the Roads Authority	Road Traffic Act (1998)	UNRA and Moyo District Local Government	Construction Contractor
Development Planning Permission	The project is within the jurisdiction of the Yumbe District Councils, which will require to approve the designs and the plans for the proposed water supply and Sanitation Infrastructure	Physical Planning Act 2010 as Amended 2020	Yumbe District/ Local Government	Developer

5 BASELINE BIOPHYSICAL ENVIRONMENT

5.1 Physical Environment

5.1.1 Climate

The climate of Yumbe district is tropical with moderate rainfall and temperature. The district experiences extreme seasonal variation in monthly rainfall. The district receives an average total rainfall of 1250mm. The area experiences two seasonal rainfall, light rains between April and October. The wettest months are usually July to November with over 120mm/month. The period December-February is a long dry with less than 60mm/month. The rains are associated with the northerly and southerly movements of the inter-tropical front. Mean monthly evaporation ranges from 130 mm to 180 mm.

Temperatures are generally low during the nights of dry seasons (Dec-March) and high during day hours whereas during wet seasons, temperatures remain high (28-29C) throughout. The area has a humidity of over 80% in most months which reduces to below 50% during dry seasons especially in December to March.

5.1.2 Topography of the Project Area

Yumbe District is generally flat (plateau) in the middle, with hilly terrains in the North and low-lying Nile belt. The district is elevated at 600-1200 metres above sea level. Although in the Northern, North West and North East parts, there are several hills with two Mountains of Kei and Midigo in the north. Lobe Town Council has several undulations forming narrow valleys often filled with water, especially during the rainy season. The area drains southwards into several seasonal streams.



Plate 5-1: Typical Topographical setting along Lobe RGC

The topography of the project area lies between 1327m to 953m above sea level. Drachia borehole is at the lower end around 1014 m above sea level and Urungu reservoir is higher at 1157m above sea level hence the need for a powered system to pump water from the source to the reservoir.

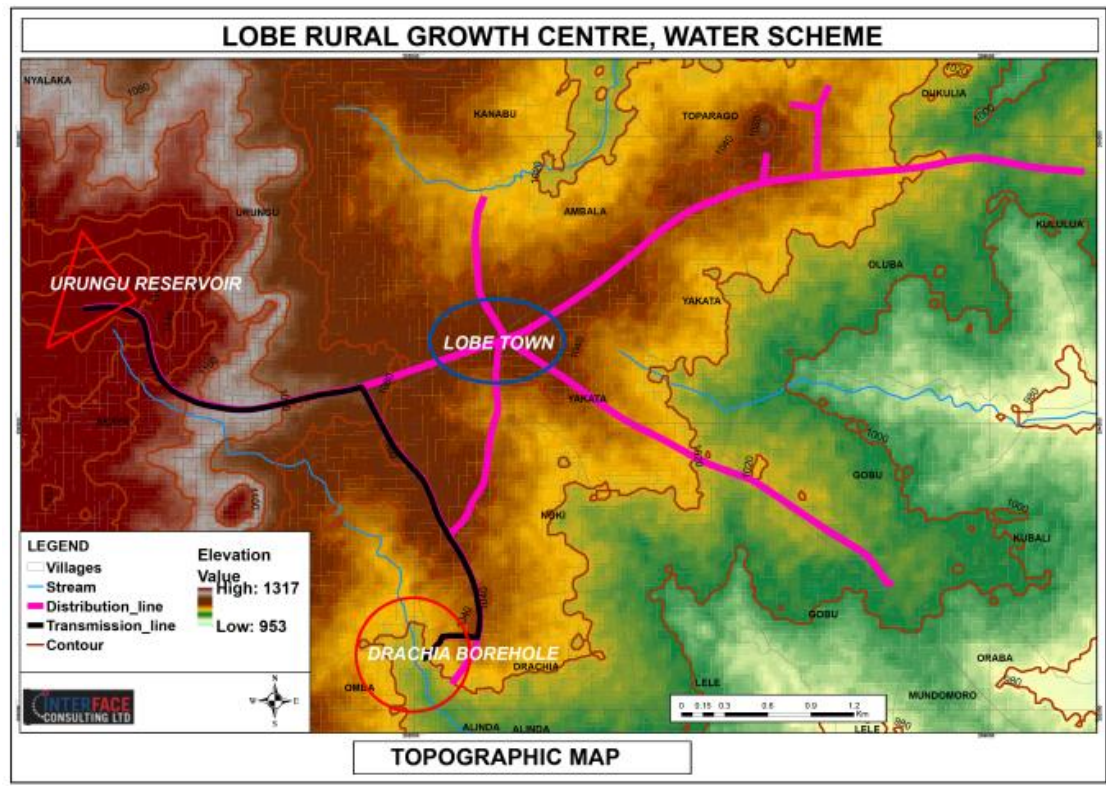


Figure 5-1: Topographic formation of Lobe RGC

5.1.3 Drainage and water resources

Apart from subterranean hydrology, there is no major surface water body in the District except Albert Nile with few dendrites and parallel patterned tributaries that originate from the inland Rivers Kochi, Dacha, Ure, Jure, Ayago, Koro and Newa; streams and wetlands.

The project area is drained by the Wogi stream system flowing south-westwards into other seasonal streams that eventually drain into the Kochi River sub-catchment.

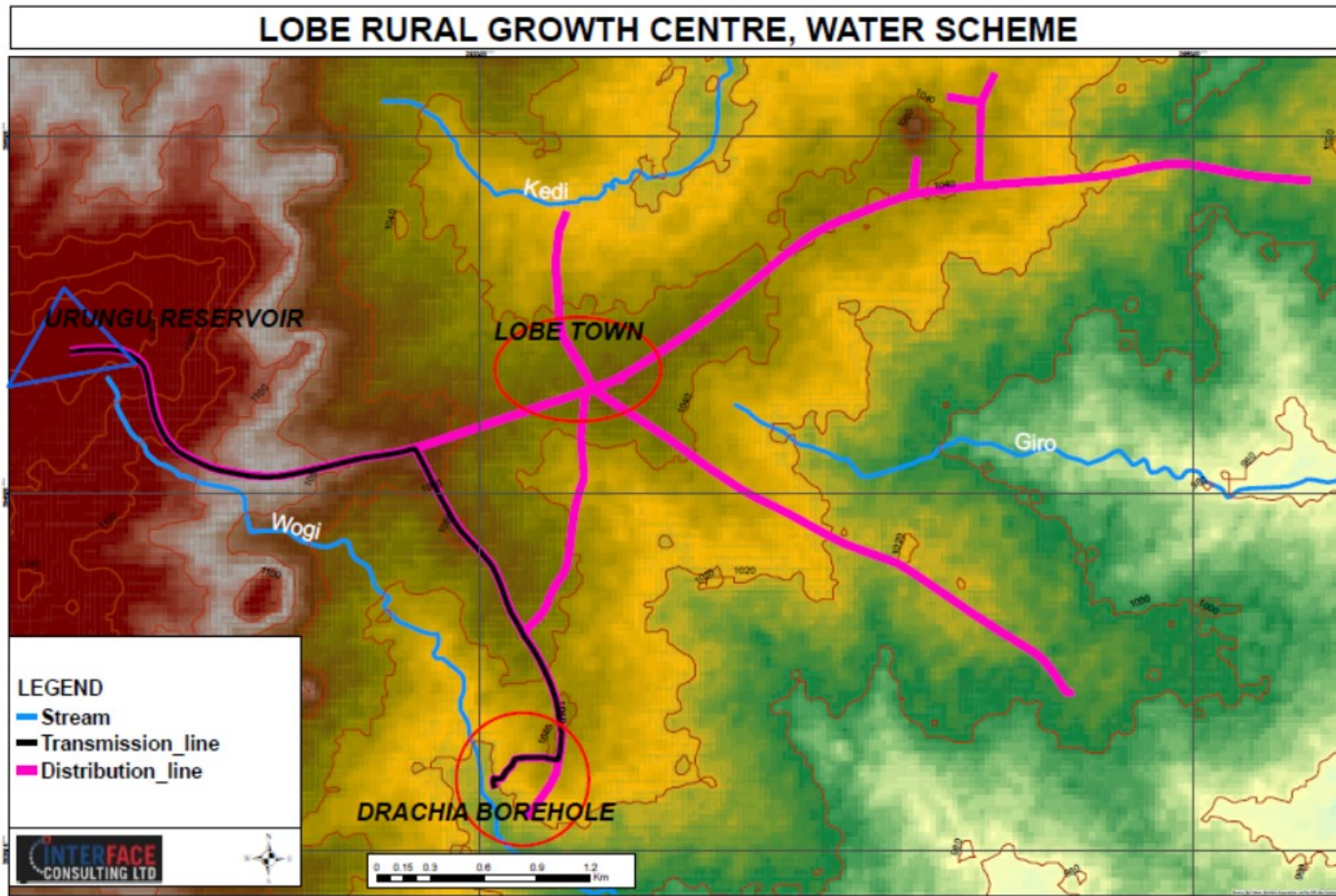


Figure 5-2: Lobe drainage system

5.1.4 Geology and soils

The Precambrian rocks of the basement complex underlie Yumbe district. The rocks are composed largely of granite fascia-grade rocks, which generally form enclaves in the gneiss complex. On hilltops, grey granite and gneiss are left exposed in many places. These granites and gneiss are intensively metamorphosed and deformed.

The soils within the project area (Figure 5-3) are generally considered moderately fertile with shallow soil depths of 30cm and easily nutrient-weathered and leached. It generally has loamy soils which are fairly fertile, especially along valleys. Some alluvial deposits found on the lower portions of the slopes are relatively more fertile. Predominant soils are ferralitic with sandbags most widely spread covering large areas. These soils are finely textured with loose structures erodible and easily leached. Most soils are acidic.

Vertisols are found in the north-western parts of Yumbe district covering part of Kei S/C and Lobe inclusive. These have poor drainage and thus easily become water-logged. There is a lateritic layer in most soils. This reduces the rooting depth and moisture conditions where it is close to the surface, making the land difficult to cultivate. Subsoil lacks minerals except for building/construction purposes. Soil types include: -Yellow-red sandy, clay loams, and latosols varying from dark Grey to dark brown and are slightly acidic, mainly derived from granite, gneiss and sedimentary rocks. They occur on gently undulating hilly topography; Brown-yellow clay loams with laterite horizons with a variation of dark brown to dark greyish brown and slightly acidic. These occur on flat ridge tops or top of undulating topography and Light Grey-mottled loamy soils with laterite horizon ground (water laterite), structure-less loamy sands. These are acidic-alkaline and are mainly found on lower and bottom slopes.

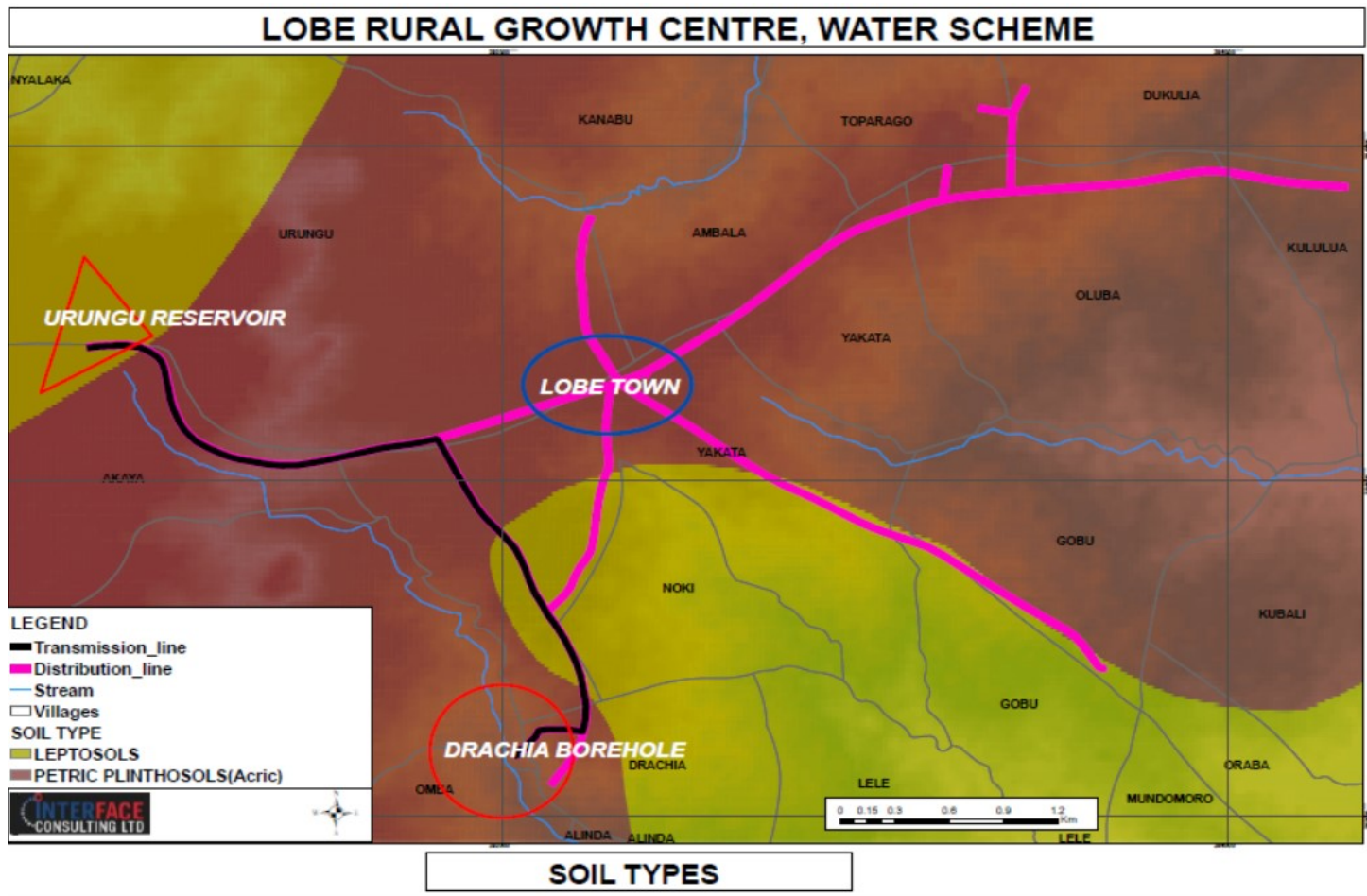


Figure 5-3: Soil types in Lobe Town Council

5.1.5 Seismology

The district is located within Uganda’s North-western area, which is zone 1 of the seismic zoning system. Zone 2 has a moderate likelihood of earthquake occurrence and is seismically active. As a result, moderate earthquake-resistant designs are required. The structural elements, on the other hand, may be engineered to withstand tremors caused by seismic activity. Seismic Code of Practice for Structural Designs (US 319: Uganda National Bureau of Standards, First Edition: June 2003).

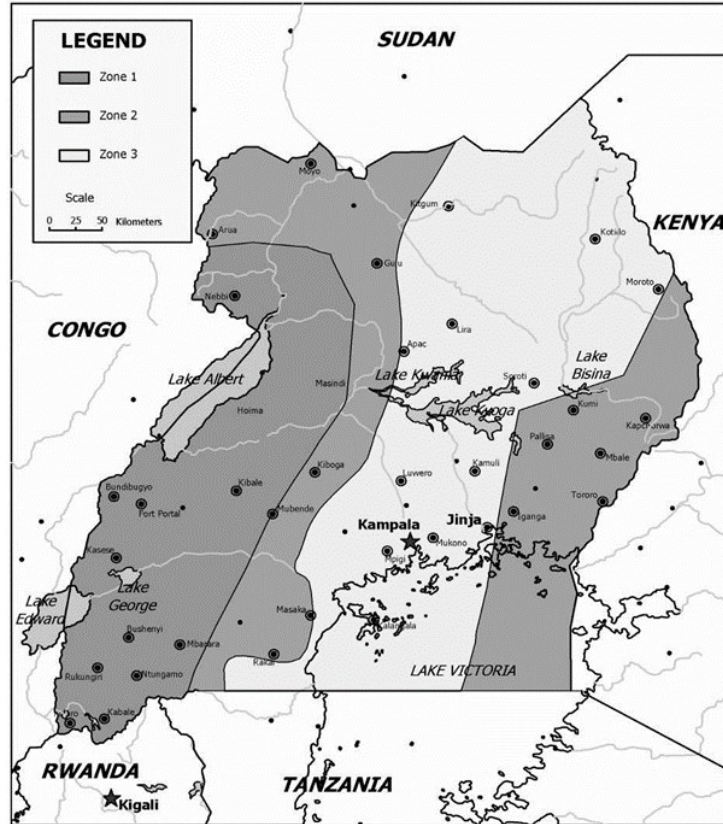


Figure 5-4: Seismic zoning map of Uganda and Project Location (US 319)

The map shows contours (Zones 1, 2, 3) of peak ground acceleration (PGA) corresponding to an average return period of 475 years with the following values of PGA:

- PGA = 1.0 m/sec² for zone 1
- PGA = 0.8 m/sec² for zone 2
- PGA = 0.7 m/sec² for zone 3.

The site lies within zone 1 of the seismic zoning of Uganda, implying that there is a high risk of earthquake occurrence and thus a need for seismic design action, in line with the Seismic Code of Practice for Structural Designs; Uganda National Bureau of Standards, First Edition: June 2003 and earthquake resistant design according to 1997 UBC (Universal Building Code).

Seismic zone factors are shown in the table below.

Table 5-1: Seismic Zone Factor, Z

Zone	1	2A	2B	3	4
Zone Factor, Z	0.075	0.15	0.20	0.30	0.40
Soil Profile	SD				-

Type					
Seismic Coefficient, C_a	0.12				0.44 N_a
Seismic Coefficient, C_v	0.18				0.64 N_v

Note: The zone shall be determined from the seismic zone map shown in Figure 1 shown above.

C_a = acceleration-dependent seismic coefficient

C_v = velocity-dependent seismic coefficient

S_D = Stiff soil profile with SPT-N values between (15-50) and shear wave velocity between (180-360) m/s

N_a = Near - Source Factor (acceleration-dependent)

N_v = Near-Source Factor (velocity-dependent)

5.1.6 Noise

Noise is an 'unwanted sound' and can be considered a nuisance, particularly when sensitive receptors are exposed to it at high magnitudes or unusual frequencies. Vibration can also cause a nuisance, whilst potentially causing damage to structures.

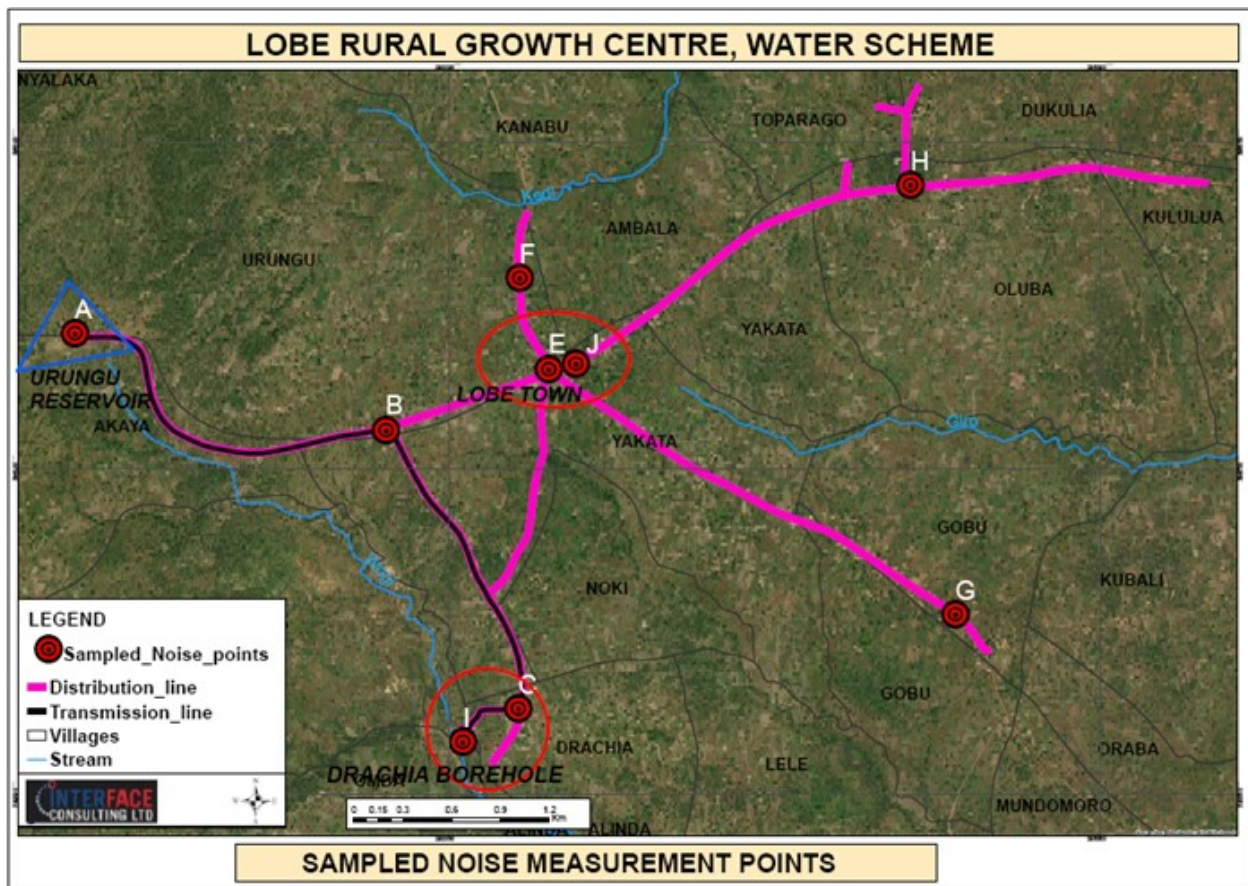


Figure 5-5: Sampled Noise measurements

Table 5-2: Noise Measurements

Point	Name of the site	Coordinates	NOISE dB(A)		Attributing factors
			Min	Max	
A	Proposed Reservoir Tank (Urungu Primary School)	327809.95 m E 402297.84 m N	40	46	Quiet site/ no settlements
B	Transmission line, Yakata village (Lobe health centre)	291622.22 m E 394244.39 m N	37	45	light foot traffic
C	Transmission line, Drachia village (Drachia primary school)	292436.39 m E 392483.40 m N	35.6	42	light foot traffic
E	Lobe Trading Centre	292623.37 m E 394604.83 m N	45	55	motorcycle traffic from the road, trading activities
F	Distribution line, Pop Angel Nursery school	292425.23 m E 395166.20 m N	35	43	School environment

G	Distribution line, Gobu village (Residential settlement next to Kubali primary school)	294940.74 m E 393207.67 m N	36.5	43.5	light foot traffic
H	Distribution line, Oluba village (Junction to Lobe primary school)	294811.90 m E 395725.70 m N	35.6	40	light foot traffic
I	Drachia Borehole site	292096.69 m E 392351.38 m N	35	38	Noise from flowing water from wogi stream and wind
J	Distribution line, Lobe Town Council HQTRS	292790.73 m E 394645.51 m N	46.4	54	Noise from traders and music at the trading centres

Table 5-2 displays the outcomes of noise assessments, indicating adherence to the daytime regulatory thresholds of 55 dBA. These thresholds correspond to the land use zoning described as "Mixed Residential (with some commercial and entertainment)" in accordance with the National Environment (Noise Standards and Control) Regulations, 2003, as outlined in the First Schedule under Part 1.

5.1.7 Air quality

Site assessments were undertaken on humid days and hence no air quality data was collected. Even though no air quality data was collected, it is assumed that the concentrations of Particles of 2.5µm and 10µm diameter in ambient air are below the Ugandan Air Quality Standards which are 60µg/m³ and 100µg/m³ respectively.

There will be a temporary increase in fugitive dust emissions particularly; PM10 and PM2.5 from excavations and construction activities of the proposed project infrastructure hence an increase in ambient air particulate matter concentrations at the site neighbourhood. MWE and nominated contractors will adopt all air pollution control measures presented under Chapter 8 to avoid inconveniencing the immediate neighbours to the project site.

5.1.7.1 Particulate Matter

The Table below presents results for PM 2.5 and PM 10 taken at selected receptors at the intake, borehole site and along the project routes

Table 5-3: Readings for Particulate matter (particles/m3) measured

Dust Sampling Location and coordinates.	Coordinates	Duration in (minutes)	PM _{2.5/ 25} Average Recording	PM ₁₀ 10 µg/m ³ Average Recording	Temperature	Humidity	Current Weather conditions	Potential Sources/Activity
IFC 2007 and WHO Air Quality Guidelines (AQG), 2005								
Proposed Reservoir Tank (Urungu Primary School)	327809.95 m E 402297.84 m N	15	1.7	2.4	38.1	34.3	Sunny day	Generally suspended dust particles in the atmosphere
Transmission line, Yakata village (Lobe health centre)	291622.22 m E 394244.39 m N	15	2.7	3.4	41.0	31.5	Sunny day	Generally suspended dust particles in the atmosphere
Transmission line, Drachia village (Drachia primary school)	292436.39 m E 392483.40 m N	15	3.2	4.5	42.2	33.2	Sunny day	Generally suspended dust particles in the atmosphere
Lobe trading centre	292623.37 m E 394604.83 m N	15	4.5	6.2	40.1	30.5	Sunny day	Generally suspended dust particles in the atmosphere
Distribution line, Pop Angel Nursery school	292425.23 m E 395166.20 m N	15	5.5	7.6	33.6	43.8	Sunny day	Generally suspended dust particles in the atmosphere
Distribution line, Gobu village (Residential settlement next to Kubali primary school)	294940.74 m E 393207.67 m N	15	4.5	7.2	33.9	44.6	Sunny day	Generally suspended dust particles in the atmosphere
Distribution line, Oluba village (Junction to Lobe primary school)	294811.90 m E 395725.70 m N	15	9.9	13.7	37.0	36.2	Sunny day	Generally suspended dust particles in the atmosphere
Drachia Borehole site	292096.69 m E 392351.38 m N	15	6.9	12.7	38.0	44.1	Sunny day	Generally suspended dust particles in the atmosphere
Distribution line, Lobe town council HQTRS	292790.73 m E 394645.51 m N	15	3.2	12.5	33.2	32.0	Sunny day	Generally suspended dust particles in the atmosphere

(Source: Field data source: Air quality and Noise assessment- July- 2023).

Observations:

From the Table below, it was observed that:

- Sample points were taken at the project site and its associated potential receptors (the intake, borehole site and along the project routes) to establish the existing dust emissions levels in the atmosphere. The Particulate matter concentrations ranged from (1.7-9.9) $\mu\text{g}/\text{m}^3$ at all project areas sampled for PM2.5.
- The PM10 concentrations ranged from (12.4-13.7) $\mu\text{g}/\text{m}^3$ with most of the areas having Low concentrations below the permissible levels of Suspended particulate matter in the atmospheres due to the ongoing activities in the area for PM10.
- The existing particulate matter is Low with many sources from the open ground spaces and pollen grains from the plants in the areas sampled.

5.1.7.2 Gas emissions

Gas emission sampling was carried out at project potential sources and receptors areas to establish the existing gas emissions concentration in the area. These will also be affected by the current existing pollution sources like motor vehicles.

Below are the findings of Gas emissions concentration levels for specific areas in the table with the potential existing sources

From Table 5.4 below, along the transmission line, the proposed intake points and the reservoir tank the gas emissions were carried out at various project components to check the point source emissions level from various combustible processes and below are the findings.

- a) Ambient average oxygen concentrations at all sampled points ranged from 15 per cent volume.
- b) There were no concentrations identified for compounds of Carbon monoxide, Hydrogen and Sulphide, LEL (Methane) and VOCs during the time of sampling with all the sampled areas below detectable levels (BDL).

Table 5-4: Details of the Gas Emissions Assessments

Name of Section / GPS Coordinates	Duration 15minutes	Carbon Monoxide CO (PPM)	Hydroge n Sulphide ($\mu\text{g}/\text{m}^3$)	LEL Methane CH ₄	VOC (mgNm- 3)	Impact rating	Potential Sources
National Environment (Draft Air Quality Standard for Ambient Air)		9.0	15	*	6	Low/mediu m/High BDL (Below Detection levels)	
Proposed Reservoir Tank (Urungu Primary School) 327809.95 m E 402297.84 m N	15	0	0		0	BDL	Combustible process from vehicles and motorbikes
Transmission line, Yakata village (Lobe health centre) 291622.22 m E 394244.39 m N	15	0	0	0	0	BDL	Combustible process from vehicles and motorbikes
Transmission line, Drachia village (Drachia primary school) 292436.39 m E 392483.40 m N	15	0	0	0	0	BDL	Combustible process from vehicles and motorbikes
Lobe trading centre 292623.37 m E 394604.83 m N	15	0	0	0	0	BDL	Combustible process from vehicles and motorbikes
Distribution line, Pop Angel Nursery school 292425.23 m E 395166.20 m N	15	0	0	0	0	BDL	Combustible process from vehicles and motorbikes
Distribution line, Gobu village (Residential settlement next to Kubali primary school) 294940.74 m E 393207.67 m N	15	0	0	0	0	BDL	Combustible process from vehicles and motorbikes
Distribution line, Oluba village (Junction to Lobe primary school) 294811.90 m E 395725.70 m N	15	0	0	0	0	BDL	Combustible process from vehicles and motorbikes
Drachia Borehole site 292096.69 m E 392351.38 m N	15	0	0	0	0	BDL	Combustible process from vehicles and motorbikes
Distribution line, Lobe town council HQTRS 292790.73 m E 394645.51 m N	15	0	0	0	0	BDL	Combustible process from vehicles and motorbikes

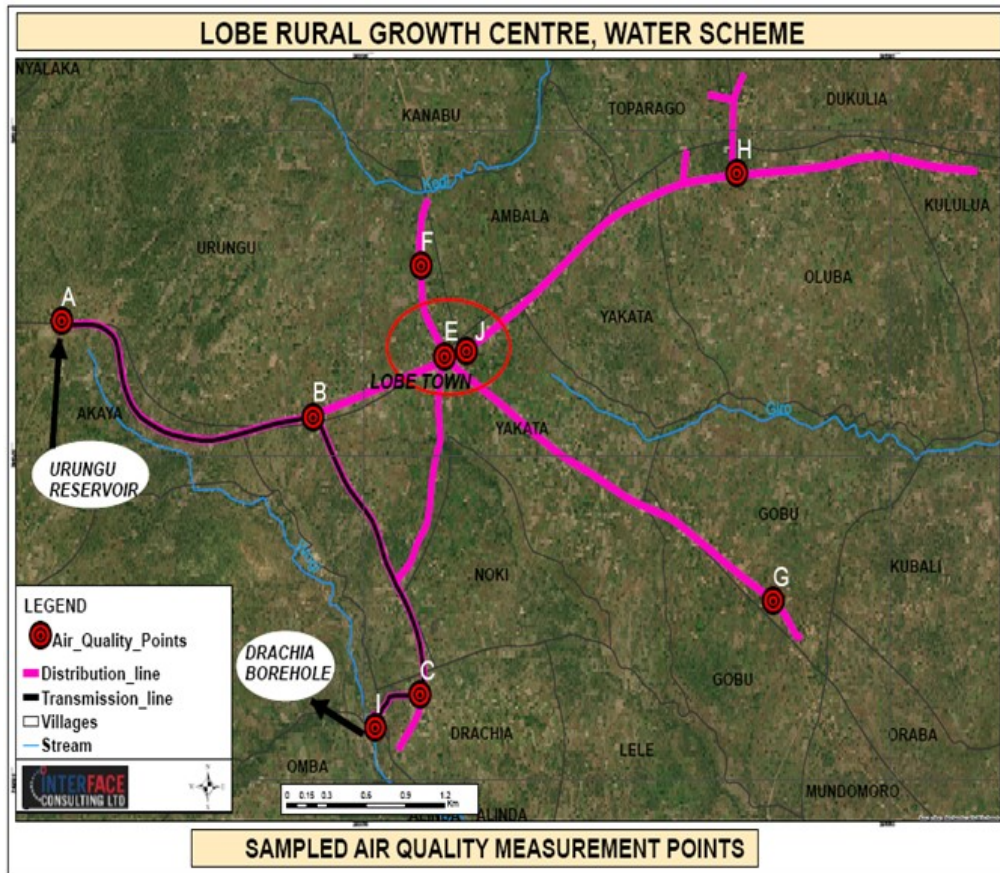


Figure 5-6: Sampled Air Quality Receptor points

5.1.8 Geotechnical Field Findings

The water table was not encountered in test pits at the borehole and reservoir locations. Therefore, the water will not affect the bearing capacity of the soil at the mentioned borehole locations.

5.1.8.1 Dynamic Cone Penetrometer results

Dynamic Cone Penetration (DCP) test was conducted at the existing ground level and depth of 1.0m(reservoir) and 0.5m(borehole). This test was conducted to evaluate the consistency of the underlying soils. Test results are summarized in the table below.

Table 5-5: Summary of DCP Test Results and Consistency

RGC	Test Location	Pit Depth (m)	Layer	Depth-range(m)	Thickness (mm)	Penetration rate (mm/blow)	Layer Consistency
Lobe	Borehole	0.00	I	0.000-0.240	240	34.29	Loose
			II	0.240-0.800	560	8.62	Dense
		0.50	I	0.500-1.020	520	7.54	Dense
	Reservoir	0.00	I	0.000-0.150	150	50.00	Firm
			II	0.150-0.770	620	15.12	Stiff
		1.00	I	1.000-1.370	370	26.43	Stiff
II	1.370-1.770	400	36.36	Firm			

Based on the DCP test results, the consistencies are as indicated below;

The soils at the borehole site exhibited Loose—dense consistency while at the reservoir, the soils exhibited firm—stiff consistency.

Soil strata of very loose and very soft consistencies are not suitable for foundation purposes as they have low bearing strengths. They can only be used after improvement by densification and compaction.

5.1.8.2 Classification and Identification of Soils

Laboratory classification tests were carried out on the Disturbed soil samples recovered from the test pits at the RGCs. Soil classification was carried out using the Unified Soil Classification System as seen in the table below.

Table 5-6: Index Properties and USCS Classification for Retrieved Soil Sample

RGC	SAMPLE LABEL	Depth (m)	Percentage of soil grain size			Atterberg limits			Ic	NMC (%)	USCS
			>5mm	5 - 0.075 mm	<0.075 mm	LL %	PL %	PI %			
Lobe	Borehole	0.5	0	30	70	39	17	22	0.3	32	Lean Clay
	Reservoir	1.0	0	46	54	41	16	25	0.8	20	Lean Clay

At the investigated RGC sites, the soil strata are as indicated below;

Lobe; The borehole site test pit is composed of Lean Clay (CL) with gravel soils with a high plasticity of 22 and a consistency index of 0.3.

At the reservoir site, the test pit is composed of Lean Clay (CL) soils with a high plasticity of 25% having natural moisture content generally higher than the plastic limits of soil and a consistency index of 0.8.

5.1.8.3 Shear Strength Test Results

Shear strength tests were conducted on undisturbed soil samples retrieved from the test pits at 1.0m depth from the reservoir sites of all the suggested RGCs. Laboratory shear strength test results revealed that the soils are mixed C-Ø soils. Such soils derive their shear strength from both cohesion and inter-particle friction. The results are summarized in the table below.

Table 5-7: Summary of Soil Shear strength parameters

TP Location	Depth (m)	Shear Parameters		Bulk Density γ (Mg/m ³)
		Cohesion Intercept, C (kPa)	Angle of Friction, ϕ (degrees)	
Lobe	1.00	11	25	1.870

The explored test pits exhibited cohesion values ranging from 11kPa with an angle of internal friction of 25° and bulk density of 1.870Mg/m^3 . The shear strength parameters can be used in foundation designs.

5.1.8.4 Bearing Capacity Evaluation

Bearing capacity values were determined using SPT-N values derived from Dynamic Cone Penetrometer test results carried out at existing ground and 1.0m (reservoir) and 0.5m (borehole) depth and Shear strength analysis which was conducted on undisturbed soil samples obtained from all test pits at 1.0m depth.

Evaluation of bearing capacities based on N-values.

Bearing capacity values were determined using SPT N - values derived from Dynamic Cone Penetrometer test results carried out at existing ground and 1.0m (reservoir) and 0.5m (borehole) depth in the test pit to obtain the penetration rate measured in mm/blow and thereafter converting into blows per 100mm in accordance with the method developed by (Ampadu, Ayeh, & Boadu, 2018) as follows:

- a) For coarse-grained soils above the groundwater table, the correlation is a non-linear equation represented by $N_{SPT} = 1.78 (N_{DCP})^{0.77}$;
- b) For fine-grained soils above groundwater level, the correlation equation is $N_{SPT} = 0.216N_{DCP} + 7.6$; and
- c) For both fine-grained and coarse-grained soils below the groundwater level, the correlation equation is given by $N_{SPT} = 0.216N_{DCP} + 0.4$.

Where:

N_{DCP} = blows per 100mm (the number of blows required to drive the DCP cone 100mm into the ground); and

N_{SPT} = blows per 300mm (the number of blows required to drive the split spoon sampler 300mm into the ground) using a hammer of 10kg and 63.5kg for DCP and SPT equipment respectively.

Evaluation of bearing capacities based on N-values

The maximum pressures the soils are capable of resisting were estimated from the field N-values based on empirical relations and the following assumptions:

- a) The Peck et al (1967) relationship between N-values and unconfined compressive strength is valid for cohesive soils;
- b) Footing width 1.0m and
- c) The maximum allowable settlement in non-cohesive soils is 25mm

The corresponding bearing capacity values are summarized in the table below.

Table 5-8: Evaluated Bearing Capacities of Sub Soils Based on N- Values

LOBE	Depth	Layer	Depth-Range (M)	Thickness (Mm)	Soil Type	Penetration Rate	Ndcp	Nspt	Unconfined Compressive Strength	Undrained Cohesion	Ultimate Bearing Capacity	Allowable Bearing Capacity
	(m)					mm/blow	blow/100m	blow/300mm	q _u	c _u	q _{ult}	q _{all}
									(kPa)	(kPa)	(kPa)	(kPa)
BOREHOLE	0.00	I	0.000-0.240	240	Sand	34.29	3	4	53	27	137	46
		II	0.240-0.800	560		8.62	12	12	154	77	396	132
	0.50	I	0.500-1.020	520		7.54	13	13	171	85	439	146
		II	1.020-1.370	370		26.43	4	5	65	32	167	56
RESERVOIR RESE	0.00	I	0.000-0.150	150	Sand	50.00	2	3	40	20	102	34
		II	0.150-0.770	620		15.12	7	8	100	50	257	86
	1.00	I	1.000-1.370	370		26.43	4	5	65	32	167	56
		II	1.370-1.770	400		36.36	3	4	51	25	131	44

For cohesive soils, the relationship $q_u = 13.1 \times \text{Design N-value}$ is used for evaluation of the Unconfined Compressive Strength q_u , the cohesion $C_u = q_u/2$ and $q_{ult} = 5.14 \times C_u$. q_{all} is evaluated using a factor of safety of 3 Allowable Bearing capacity with settlement limited to approximately 25mm for cohesionless soils read off directly from the Chart (Published by Terzaghi and Peck 1967).

Note:

DCP test results above are given based on the layer strengths of test observations taken at given depths Based on the bearing capacities evaluated using SPT-N values;

At Lobe RGC; the bearing capacity reflected at 1.0m depth at the reservoir site is 56kPa and at 1.370 – 1.770m depth is 44kPa. The bearing capacity at 0.5m depth at the borehole site is 132kPa and 146kPa at the depth of 0.500 – 1.020m.

Evaluation of bearing capacities based on the Shear Strength Parameter

The maximum pressures the soils are capable of resisting have been estimated from the shear strength parameters obtained from the laboratory tests.

The following assumptions were made;

- a) A 1.0m square footing was assumed along with the following considerations;
- b) Terzaghi's bearing capacity equations are valid for laboratory test results,
- c) Failure mechanism is by both general shear and local shear; and
- d) The factor of safety against shear failure is 3.0.

The detailed evaluations are summarized in the table below.

Table 5-9: Summary of Evaluation for Bearing Capacity based on Local Strength Parameters

TP Location	Depth (m)	Modified Shear Parameters		Bulk Density (Mg/m ³)	Allowable Bearing capacity (Local shear) (kPa)
		Cohesion Intercept, (kPa)	Angle of Friction, Ø' (degrees)		
Lobe	1.00	7	17	1.870	88

Bearing capacity evaluations based on local shear failure mechanism indicated close bearing capacities ranging to 88kPa within the explored depth of the test pits at the reservoir sites.

For the borehole site, the most critical unit is the backwash tank with area and pressure. During construction when soil is opened up, further analysis of the foundation soil will be carried out for the confirmation of the bearing capacity. Should the general foundation soils be of a lower bearing capacity than that of the trial pit foundation, treatment will be necessary and will involve a fill of compacted hardcore of a layer not less than 500mm thickness beneath the formation level of the respective structures.

5.1.8.5 Structural Designs

The structural designs are based on accumulated experience in optimising the fundamental requirements and at the same time minimising costs.

5.1.8.6 Design loads

The following loads have been considered in the detailed design of the structures:

- Dead loads
- Live loads
- Wind loads

- Seismic/Earthquake loads
- Hydrostatic pressure and dynamic thrust
- Uplift and buoyancy
- Earth pressure
- Erection loads

5.1.8.7 Design Information

This design information used for the designs is presented in Table 5-8 below.

Table 5-10: Design Information

	PARAMETER DESCRIPTION	VALUE USED FOR THIS DESIGN
1	Code of Practice	BS 8007
2	Grade of concrete	C 30 for water-retaining structures C 25 for all others
3	Grade of steel	500 N/mm ²
4	Minimum cover to reinforcement	50 mm
5	Minimum lap for reinforcement	40 times the bar diameter
6	Seismology	
7	Seismic zone	1
8	Average excavation below the existing ground surface level for each	To be determined from the geotechnical investigations
9	References	Design of Liquid-retaining concrete structures. Second Edition. Robert D. Anchor. BS EN 1998-1:2004 Design of Structures for Earthquake Resistance. General rules, seismic actions and rules for buildings US 319:2003 Seismic Code of Practice for Structural Designs; Uganda National Bureau of Standards, First Edition. Geotechnical Investigation Report for the Proposed Construction of a Water Treatment Plant and Reservoir Tanks.

5.1.8.8 External Works

The external works at the pumping stations and the reservoir site include the following:

- Access road and parking
- Chain-link fencing on concrete posts, metallic frame gate and guard house
- Walkways paved with 80mm thick pre-cast concrete pavers laid on well-compacted gravel earth material.
- Landscaping for the borehole pumping stations has been designed for smooth drainage of stormwater to avoid flooding. Unpaved sections will be planted with approved grass.

5.2 Biological Environmental

5.2.1 Flora

There are different segments of vegetation along the project from the source to the reservoir. These include savanna mosaic of bushlands and thickets graduating into extensive woodlands at the water source.

Lobe natural vegetation is characterized by open lands with savannah grasslands of equatorial types with small pockets of natural forests on hills and along the South Sudan border, northern parts of the district.

The vegetation cover of Lobe is mainly savannah woodland and therefore rich in biodiversity. Savannah grassland is by far the predominant vegetation in the Lobe project area comprising *Combretum adenogonium*, *Combretum collinum*, *Combretum molle*, *Eucalyptus grandis*, *Ficus species*, *Flueggea virosa*, *Gmelina arborea*, *Grewia mollis*, *Grewia trichocarpa*, *Hyparrhenia rufa*, *Penisetum Perpurium*, *Eleusine indica*, *Typha ssp*, *Commelina ssp*, *Khaya anthotheca*, *Lonchocarpus capassa*, *Lophira alata*, *Maytenus senegalensis*, *Morus lacteal*, *Piliostigma thonningii*, *Psidium guajava*, *Rhus natalensis*, *Sarcocephalus latifolius*, *Schefflera volkensii*, *Senna siamea*, *Tamarindus indica*, *Vitellaria paradoxa*, *Tectona grandis*, *Mangifera indica*, and *Borassus aethiopum*.

Based on the IUCN Red List of Threatened Species 2018 none of the recorded species are of conservation concern, they are all recorded as of least concern (LC).

Other vegetation may be divided into the following:

- Agroforestry: Lobe is greatly characterized by tree farming/ man-made woodlands, with a limited range of habitats for plants and animals. Tree species especially shea trees, mangoes, avocados, jackfruit trees and pawpaws are common.
- Crops include maize, sweet potatoes, sorghum, cassava, sim sim, groundnut, finger millet, cowpeas and beans.



Plate 5-2: Flora community around the project site

5.2.2 Mammals

Yumbe Districts is generally a modified environment. The sites sampled were near settlements, woodlots/tree plantations, riverine areas, grasslands, and cultivated areas. Rodent, shrew species, Bats and mongoose are the wild mammals identified in the area. Domesticated animals including cattle, goats and sheep also occur in the project area.

5.2.3 Birds

The most represented birds in the project area are *Streptopelia* with four species and genus *Euplectes* with three species.

The most common species occurring in the project area include the African Palm Swift, Northern Red Bishop, Black-Headed Weaver, Common Bulbul, Piapiac, African Mourning Dove, Red-eyed Dove, Laughing Dove and Vinaceous Dove. The area supports a high proportion of species associated with open habitats and grassland.

5.2.3.1 Water Quality

Detailed water quality tests were carried out with the following objectives in mind:

Establishing the quality of the groundwater and the most suitable water treatment options required to ensure a safe water supply to Lobe RGC consumers against the lowest costs.

Tests were carried out on water samples at Makerere University Department of Chemistry laboratory in December 2021 as shown in Table 5-11 below. Additional testing was carried out in July 2023 to verify the above results and these are included in the table. A copy of the Certificate of Analysis is in Appendix B.

The samples tested showed satisfactory physio-chemical and microbiology characteristics of the source which were commensurate with the National Standards for natural potable water. Groundwater is suitable for domestic water supply.

Table 5-11: Water Quality Data for the Boreholes

Parameters	Units	National Standards for Natural Potable Water	December 2021 results	July 2023 results
PH		5.5-9.5	6.54	7.57
Conductivity	Us/cm	2500	359	618
Turbidity	Ntu	25	2.1	0
Total Dissolved Solids	Mg/l	1500	278	450
Alkalinity	Mg/l	500	86.0	390
Magnesium	Mg/l	100	4.8	20.0
Calcium	Mg/l	150	12.50	10.8
Hardness	Mg/l	600	64.0	109
Iron	Mg/l	0.3	0.102	0.31
Suspended solids	Mg/l	0.0	0	Nd
Chlorides	Mg/l	250	7	3.8
Nitrates	Mg/l	45	0	0.37
Colour	Ptco	50	22	0
Sulphates	Mg/l	400	0	3.0
Phosphorus	Mg/l	5	0.15	
Ammonia	Mg/l	0.5		nd
Sodium	Mg/l	200		50.8
Manganese	Mg/l	0.1		nd
Copper	Mg/l	1.0		0.83
Zinc	Mg/l	5		27.05
Lead	Mg/l	0.01		nd
Mercury	Mg/l	0.001		nd
Arsenic	Mg/l	0.01		nd
Cadmium	Mg/l	0.01		nd
Aluminum	Mg/l	0.2		0.16
COD	Mg/l	ns		27

5.3 Social Economic Baseline Environment

5.3.1 Overview

The baseline survey examined the socioeconomic profiles of the target beneficiary communities in Lobe Town Council. Specifically, it examined the demographic

characteristics, housing typology, income sources, crop and livestock production, income streams and expenditure patterns, access to water, sanitation and hygiene, waste disposal, health service delivery, education service delivery, HIV/AIDS, and gender-based violence among others.

5.3.2 Demographic Information

The demographic information looked at various aspects including the sex of respondents, household relationships, respondents' age, marital status, religious affiliation, ethnicity and education among others.

5.3.2.1 Sex of respondents

The baseline examined the sex of the respondents. Findings suggest that a bigger proportion of the respondents were female (65%) while the males constituted more than a third (36%). This is attributed to the fact that during household-level interviews, most of the male household heads were not at home.

Table 5-12: Percentage of respondents by sex

Sex	Frequency	Percent
Male	110	35%
Female	207	65%
Total	317	100%

Source: Baseline survey, 2023

5.3.3 Relationship of the respondent to the household head

Table 5-13 below shows that (47%) of the respondents were household heads, (49%) were wives to the household heads while (4%) were biological children to the household heads. This is an indication that the views given in this baseline are representative of the socioeconomic conditions of the beneficiary households for Lobe Town Council.

Table 5-13: Relationship to household head

Relation to the household head	Frequency	Percent
Household Head	148	47%
Wife to Household Head	154	49%
Child to Household Head	12	4%
Sibling to Household Head	3	1%
Total	317	100%

Source: Baseline survey, 2023

5.3.4 Age of respondents

Baseline findings indicate that a large proportion of the respondents are in the age bracket of 19 to 50 years. Table 5-14 below reveals that (45%) of the respondents were aged between 19 to 30 years while (44%) were aged between 31 and 50 years. This is an indication of a youthful population that is likely to benefit from the casual labour opportunities that will be created during the project construction phase. Findings also suggest that none of the respondents were aged above 61 years.

Table 5-14: Age category of respondents

Age category	Frequency	Percent
<18yrs	3	1%
19 to 30yrs	143	45%
31 to 50yrs	139	44%
51 to 60yrs	28	9%
61yrs >	0	0%
Total	313	100%

Source: Baseline survey, 2023

5.3.5 Marital status of the respondents

Table 5-15 below indicates that more than half (52%) of the respondents were in polygamous marriages, (18%) were widowed, (13%) were divorced, (11%) were in monogamous marriages and (6%) had never been married. The fact that most of the respondents were in polygamous marriages is a true reflection of a Muslim community. The majority of the respondents being in some form of marriage is a potential cause of domestic violence.

Table 5-15: Marital status of the respondent

Marital status	Frequency	Percent
Married Polygamous	57	18%
Widowed / Spinster	19	6%
Divorced	32	10%
Married Monogamous	190	60%
Never married	19	6%
Total	317	100%

Source: Baseline survey, 2023

5.4 Religion of respondent

The majority of the beneficiary communities subscribe to the Muslim faith. Data in Table 5-16 below shows that most (87%) of the respondents were of the Moslems, followed by Anglican (7%) and Catholics (6%). The project activities should be cautious of organizing activities on religious days especially Fridays when the Muslim community has prayers.

Table 5-16: Religion of respondent

Religion	Frequency	Percent
Muslim	276	87%
Anglican	22	7%
Catholic	19	6%
Total	317	100%

Source: Baseline survey, 2023

5.5 Level of Education

According to the baseline survey findings, close to half (43%) of the respondents had attended primary level but not completed PLE while (16%) had never any form of formal education. Only (19%) had completed the primary level. This finding suggests that education attainment within Lobe town council is semi-literate population. The implication is that most of the project messages and IEC materials should be translated into locally used languages.

Table 5-17: Education level of respondent

Education level	Frequency	Percent
None	52	16%
Primary/not completed	137	43%
Completed Primary	60	19%
O-level/incomplete	31	10%
O-level complete	31	10%
A-level	0	0%
Post-secondary	3	1%
Junior	3	1%
Total	317	100%
Literacy level	Frequency	Percent
Cannot read and write	177	94%
Can read and write	11	6%
Total	188	100%

Source: Baseline survey, 2023

The baseline survey also examined the literacy levels of the respondents. Findings show that almost (94%) of the respondents could not read and write while an insignificant proportion (6%) could read and write in any language. This finding reinforces the notion that the beneficiary community in Lobe TC is semi-literate with a need to translate project messages into local languages.

5.6 Ethnicity

According to the Yumbe district development plan, Lobe Town Council is largely inhabited by the Aringa ethnic group. However, there are other tribes including Lugbara, Kuku, Kakwa and Madi and also some refugees of Sudanic origin.

5.7 Population

The study established the distribution of the population in Lobe town council. According to Table 5-18, Lobe Town Council has a provisional population of 10,269. More than half (58%) of the population are women while the men make up (42%). Kanabu ward has the highest population of 1,912 while Urungu has the least of 862 persons.

Table 5-18: Population distribution by ward and sex

Town Council	Ward	Male	Female	Total
Lobe	Noki	465	610	1,075
	Akaya	360	602	962
	Yakata	528	1,252	1,780
	Kalulua	451	620	1,071
	Kanabu	592	1,320	1,912
	Urungu	410	702	862
	Turu	513	873	1,136
Total		4,290 (42%)	5,979 (58%)	10,269

Source: Lobe town council, 2021/22

5.4 Land tenure system

The land tenure system in Lobe Town Council is predominantly customary. According to the Yumbe district development plan, the customary land tenure system is partly responsible for the low commercialization of agriculture leading to limited agricultural production and productivity. It is also responsible for the high fragmentation of the land within Lobe Town Council.

5.5 Settlement Patterns & Housing

The settlement patterns in Lobe TC were observed to be linear and nucleated. This is mainly attributed to linear settlement patterns along the main roads networking area, the concentration of businesses around the town and access to public facilities such as schools, health centres, water points and access to utility lines by the Rural Electrification Programme.

5.8 Source of energy for lighting and cooking

The survey assessed the major sources of energy for lighting and cooking. Findings in Figure 5-7 below show that there are two (2) major sources of energy for lighting including solar accounting for (56%) and torches (43%). Concerning energy sources for cooking, most (85%) of the interviewed households use firewood with a small proportion using charcoal (13%). Overreliance on biomass energy for cooking within the project area threatens the degradation of the environment.

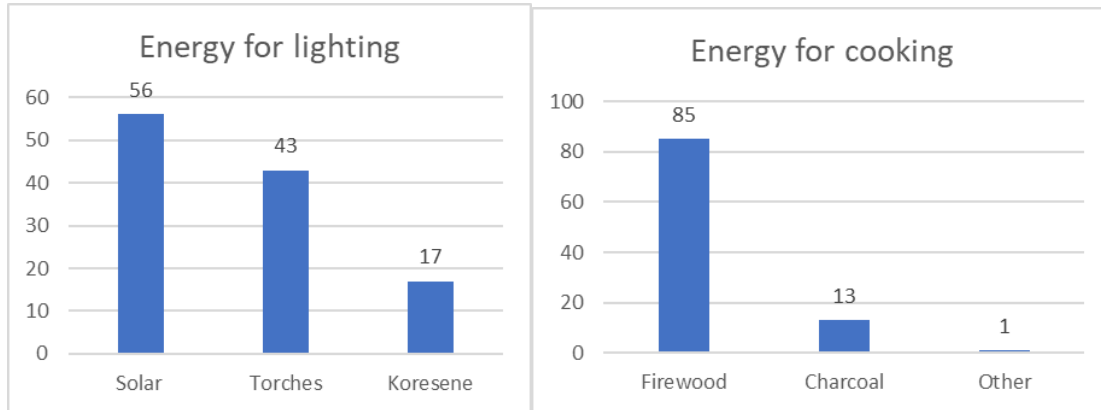


Figure 5-7: Source of energy for lighting and cooking

5.9 Transport

Yume District has a total road length of 1,691Kms of which 322km (19%) are National roads managed under UNRA of which 93km (28.9%) are in good condition, 130km (40.4%) are in fair condition and 99km (30.7%) are in poor condition. 292 Kms (17.3%) are feeder roads managed under the district, of which 68 Kms (23.3%) are in good condition, 135km (46.2) are in a fair state and 89km (30.5%) are in a poor state. Community Access Roads (CAR) account for 61.5% (1040.9km) of the total road lengths in the district managed at sub-county throughout the district, of this only 92.2kms (8.9%) are in good condition, 190.9kms (18.3%) are in a fair state while 757.8kms (72.8%) are at poor state.

Urban Roads are only 2.1% (36.1 km) of the total district roads managed by Yumbe Town Council. Of this 0.6km (1.7%) is tarmacked representing 0.035% of the total road length tarmacked in the district, 23.1km (64%) of the urban roads are in good condition, 12.9km (35%) are in fair condition and 2.1km (5.7%) are in a poor state. The total road length of 1,691 km is generally in a poor state of 947.9km representing 56%. The fair portion is 468.8km representing (27.7%) while the roads in good condition only account for 16.3% (276.3km) of the total road length in the district. The statistics presented exclude the data from most settlement roads as of June 2019. This can be illustrated in a table manner as illustrated below.

Table 5-19: Road Infrastructure in Yumbe District

S/N	TYPE	Total Length (Kms)	CONDITIONS									
			GOOD				FAIR			POOR		
			Tarmac	Marum	Earth	Total	Marum	Earth	Total	Marum	Earth	Total
1	National/Trunk Roads	322		41	52	93	34	96	130	27	72	99
2	District/Feeder Roads	292		54	14	68	98	37	135	26	63	89
3	Community Access Roads	1040.9		21.2	71	92.2	48.9	142	190.9	63.7	721.1	757.8
4	Urban Roads	36.1	0.6	14.1	8.4	23.1	3.3	9.6	12.9	-	2.1	2.1
	TOTALS	1691		130.3	145.4	276.3	184.2	284.6	468.8	116.7	858.2	947.9

Source: Works Department Yumbe



Plate 5-3: Existing Road Condition around the project site

The road links that are in good condition include; Most roads in Bidibidi Settlement due to partners' interventions, Yumbe -Moyo, Yumbe-Obongi, Yumbe Terego, Yumbe to Morta Bridge to the border with South Sudan. While those in poor states are mostly outside the settlements including Kuru –Arilo-Matuma-Chakulia in Koboko, Aliodraanusi-kela-kerwa, and Ariwa-Tokuro-Barakala. Lobe Town Council is accessed by the Yumbe- Lobe Murram road which is in fair condition except in areas along wetlands that have poor drainage.

5.10 Communication channels

Observations during the survey reveal that most of the households had a radio as a means of communication. Radio stations like Ribat FM, Pacis Radio, Arua 1, and Voice of the Nile in Moyo are the most listened-to stations in the project area. MTN and Airtel are communication networks used. According to the District data, regarding communication and information, the main Sources of information to the population include; Radios providing 44.4% source of information, 7.4% Community announcers (announcements) and 10.1% Telephone. The proportion of the population with access to and use of ICT is as indicated below:

- 46.5% of those 18 years and above have at least a mobile phone
- 11.8% of those 18 years and above use the internet.

5.11 Land use

The highest proportion of the project area is under agriculture at 79% dealing in maize, beans, cassava and peas majorly for subsistence production. Less financial investment is done in agriculture as the sector depends on nature and ancient tools and therefore there is less income generated from the activity. Land is predominantly owned by men given that West Nile is a patriarchal society. According to Mokoro – Land Rights in Africa – 2014, over 86% reported accessing land in West Nile under customary land ownership through their husbands. Access to land by women was not dependent on formal documentation but on being married to a man who owned land.

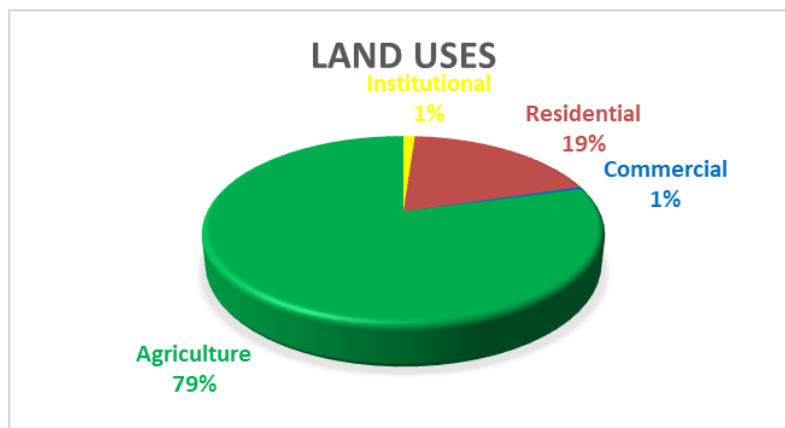


Figure 5-8: Land use pattern in Lobe

Residential use is common with 19% of the project area in the form of clustered settlements made up of temporary structures that are closer to the trading centre so that they can easily access services. Lastly, institutional and Commercial use all occupy 1% each, the commercial includes Lobe market, wholesale and retail shops that are essential in providing revenues to Lobe Town Council.

The institutions include schools, and health centres that are essential in community development and the well-being of society.

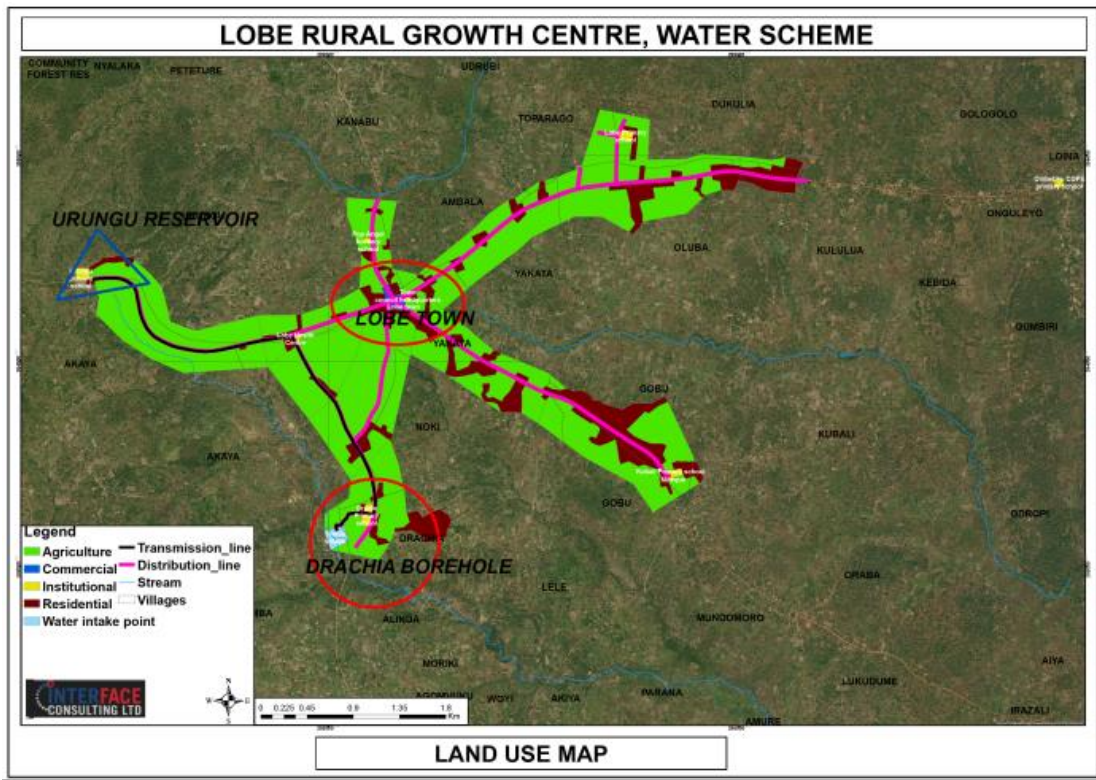


Figure 5-9: Existing Land Use Map

5.12 Utility lines

Power has been extended to Lobe Town Council with a 50kVA transformer that is pending commissioning. Solar is utilized for power generation to charge equipment. The proposed water supply project should have alternative power sources installed for power generation when the weather is not favourable. The borehole source is not covered by the Rural electrification project, though the electricity distribution project is still under construction



Plate 5-4: Rural Electrification utility lines within the major Roads of Lobe Town Council

5.13 Economic status

Economic status was examined in terms of the major sources of income at the household level, household monthly income and expenditure patterns.

5.13.1 Household's Main Source of Income

Baseline survey results in the table indicate that most (87%) of the households in Lobe TC RGC are involved in crop farming, followed by those in salaried employment (6%) and trading in produce (3%). Households involved in crop farming and trading are likely to benefit during the construction phase by selling their agricultural produce and trade commodities.

Table 5-20: Main source of income for the household head

Income source	Frequency	Percent
Farming	276	87%
Monthly salary	19	6%
Produce trade	10	3%
Retail trade	6	2%
Transport business	3	1%
Other	3	1%
Total	317	100%

Source: Baseline survey, 2023



Plate 5-5: Lobe Central Market

5.13.2 Household monthly income

Table 5-19 shows the range of household incomes per month. (30%) of household heads earned a maximum of Shs 50,000, followed by (29%) earning between Shs 50,001 to 100,000 while more than a quarter (29%) earned above Uganda shillings 200,000. This finding suggests low-income beneficiary households.

Table 5-21: Household monthly income

Income range	Frequency	Percent
<50,000	95	30%
50,001 to 100,000	91	29%
100,000 to 150,000	25	8%
150,001 to 200,000	15	5%
200,001	91	29%
Total	317	100%

Source: Baseline survey, 2023

5.13.3 Household expenditure patterns

Figure 5-10 below shows the percentage of households' expenditure on various items needed in a household. Findings suggest that most of the households (89%) spend on school fees, followed by expenditure on education (74%), transport (72%), food (70%), airtime (65%) and energy (61%). By creating local employment opportunities, especially during the construction phase, the project is likely to boost household income and expenditure streams.

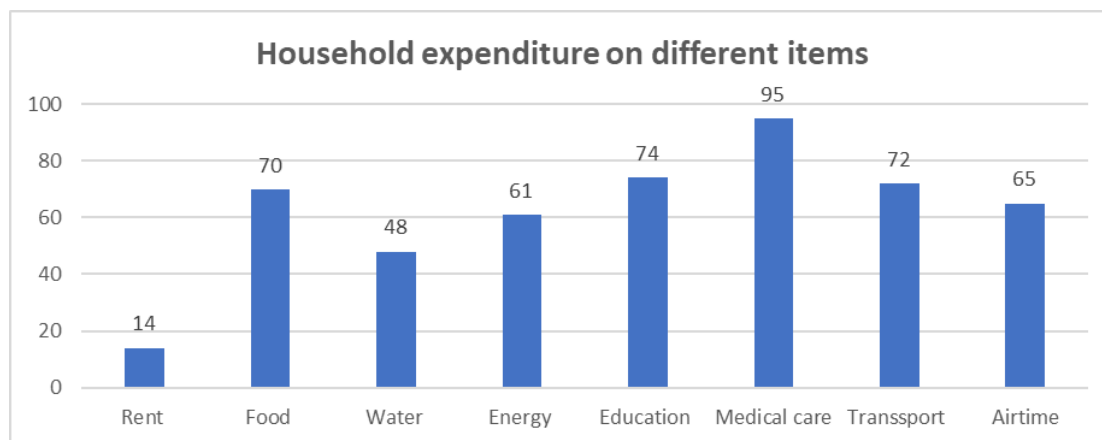


Figure 5-10: Percentage of household expenditure on different items. *Source: Baseline survey, 2023*

5.14 Household production

The baseline survey examined household production in terms of crop farming and livestock production.

5.14.1 Crop farming

The baseline explored the different crops grown by the beneficiary households. Findings indicate that there are about eight (8) crops grown in the project area of which four (4) are the main crops grown including peas (92%), beans (91%) and cassava (87%). Any livelihood restoration programme should focus on improving farming methods for crops

already grown by beneficiary households. Focus group discussion with women in Lobe market noted that women are also involved in the production of maize and groundnuts as major food crops.

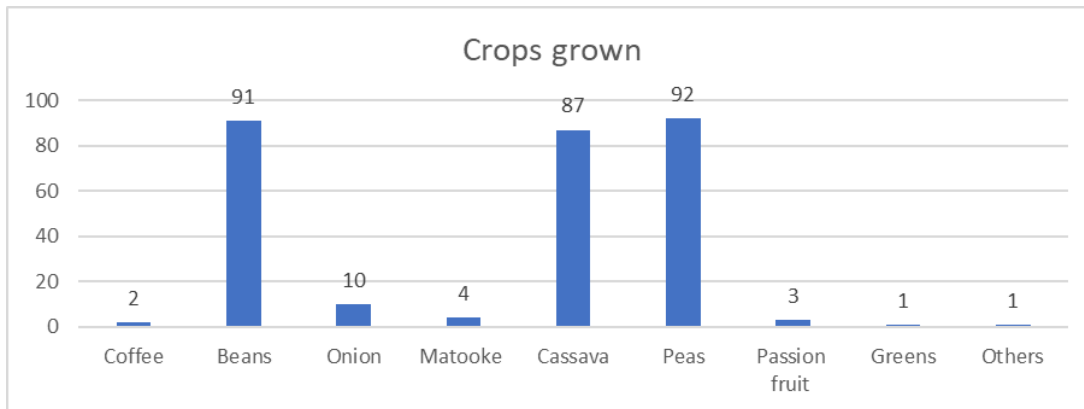


Figure 5-11: Crops grown by households

5.14.2 Challenges Affecting Crop Production

Focus group discussions with women groups within Lobe market revealed the following challenges in crop farming.

- Poor farming equipment leads to poor production and production for subsistence farming
- Climate change whereby the dry season has become more frequent i.e., March – July
- There is a lack of potential market for crop produce especially cassava because Lobe town council is far from Yumbe town. In addition, farmers are ignorant of potential markets
- There are rampant pests and diseases, especially for beans, cassava and maize.

5.14.3 Domestic animals kept by Households

Most (87%) of the households are involved in keeping domestic animals or birds. Figure 5-12 further indicates that more than half (59%) of the households keep goats, followed by those that keep chicken (59%), cows (25%) and sheep (25%).

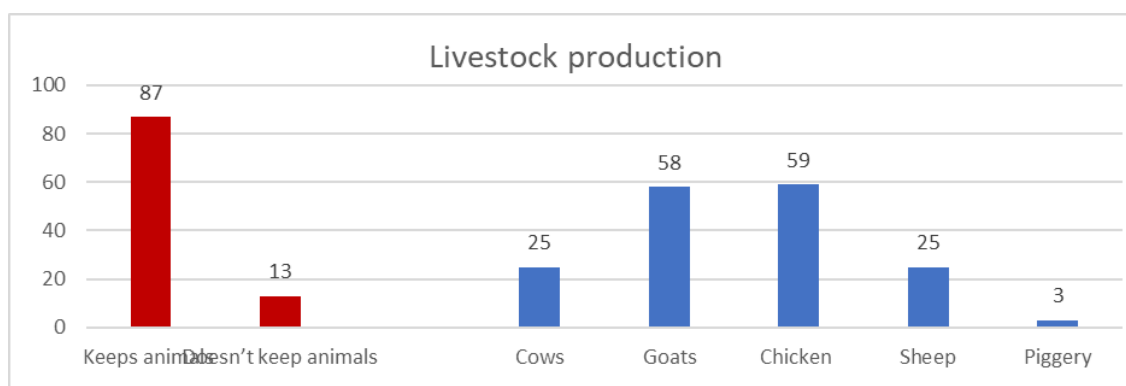


Figure 5-12: Livestock production. *Source: Baseline survey, 2023*

5.15 Water and sanitation-related diseases

Yumbe district local government is relatively flat in terms of topography with limited surface water which is very seasonal, especially during the dry seasons. The district entirely relies on the exploitation of underground water to provide fresh water supply to the communities. The safe water situational analysis for the district indicates safe water coverage of 48% (based on a source man ratio of 300 people served by 1 deep borehole, 300 people served by 1 shallow well, 200 people served by 1 protected spring, and 150 people served by 1 Tap stance).

Table 5-22: Current Water Supply Coverage by sub-County

S/N	SUB COUNTY	PROJECTED POPULATION 2020	PEOPLE SERVED	SAFE WATER COVERAGE
1	Apo	54,958	28,200	51.3
2	Drajini	42,719	28,300	66.2
3	Lodonga	44,484	23,500	52.8
4	Kei	62,490	25,300	40.5
5	Kululu	50,486	21,600	42.8
6	Kuru	55,782	20,300	36.4
7	Midigo	50,016	21,050	42.1
8	Kerwa	44,131	21,000	47.6
9	Odravu	57,783	31,050	53.7
10	Ariwa	32,834	14,400	43.9
11	Romogi	62,372	28,500	45.7
12	Kochi	56,488	29,100	51.5
13	Yumbe town council	47,544	26,850	56.5
	Aringa	662,087	319,150	48.2

	Rural water	614,543	292,300	47.6
	District	662,087	319,150	48.2

The district has adopted a community-based maintenance approach for the operation and maintenance of water facilities. Every water facility is managed by the water user committees for effective operation and maintenance and supported by the hand pump mechanics designated in every sub-county.

Table 5-23: Available water sources by technology and functionality status in the Host Community

Sub County	Water Resources by Source							
	Boreholes		Shallow wells		Protected springs		Taps	
Status	F	N	F	N	F	N	F	N
Apo	71	0	3	15	0	2	0	0
Ariwa	37	4	2	4	0	0	0	0
Drajini	69	1	2	3	2	6	0	0
Kei	60	5	6	3	3	7	0	0
Kerwa	62	0	3	3	0	0	0	0
Kochi	73	8	7	3	1	0	0	0
Kululu	56	3	2	6	0	0	0	0
Kuru	50	2	8	4	0	4	120	15
Lodonga	51	1	2	3	1	3	68	8
Midigo	37	1	5	2	2	4	113	0
Odravu	81	7	6	5	0	0	10	0
Romogi	76	5	9	5	0	0	09	0
Yumbe TC	41	0	0	5	0	0	484	199
Total	764	37	59	61	9	26	804	222

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Critical challenges under water in the district are more pronounced in the areas of:

- 1) Broken down community-based maintenance system due to inactive water user committees. This is tremendously affecting the functionality of water facilities in the district;
- 2) Lack of hand pump spare parts dealers in the district. This affects responses to repairs and increases repair costs;

- 3) Receding ground water tables in some areas of the district during prolonged dry periods greatly affects the functionality of boreholes,
- 4) Bad ground water quality in some areas such as Tokuro in Ariwa sub-county affects the development of water facilities in those areas;
- 5) Low ground water potential – also affects the development of water facilities in some areas.

The district strategies to address some of these bottlenecks in water include; strengthening the community-based maintenance system in the district to improve functionality and instituting a spare parts depot at the District Water Office to serve as a revolving fund to ensure that the water user communities access the spares within their reach and at affordable costs. Motorizing a borehole with the installation of a storage reservoir comes in handy to address the current water supply challenges.

5.15.1 Access to water

The baseline inquired about the main and alternative water sources accessed by the beneficiary households in Lobe TC. Findings in Figure 5-13 indicate that there are about 6, however, the 2 main sources include public boreholes (92%) and swamps (36%). Discussions with the women groups at Lobe Market indicate that 2 out of 3 existing boreholes are functional despite having functional committees. The community also uses a borehole in Lobe Primary School but the water is yellowish. The streams are considered the major alternative water source during the dry season.

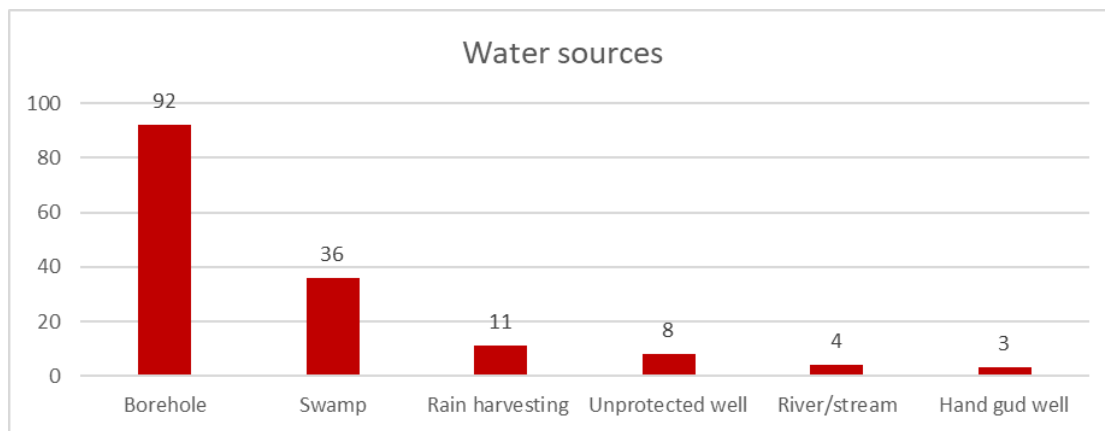


Figure 5-13: Main and alternative water sources. *Source: Baseline survey, 2023*

5.15.2 Distance from Homes to Main Water Source

Figure 5-14 below shows that the majority (76%) of households move an average of 0.5km to the main water source, followed by (15%) that move between 0.51 to 1km while (8%) move between 1.01 to 2km. The average distance to the main water increases with variations in climate with the longest journeys walked during dry season.

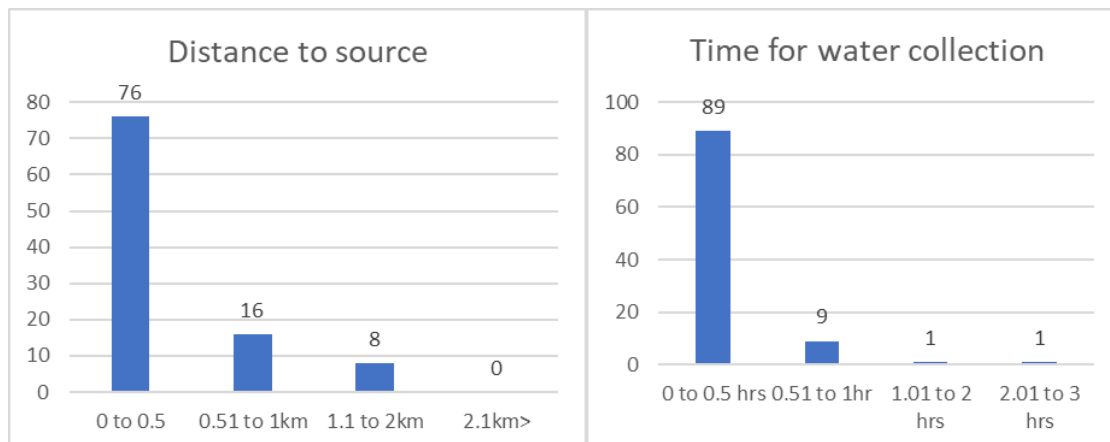


Figure 5-14: Average distance to the main water source and time taken to collect water. **Source: Baseline survey, 2023**

Regarding the average time spent on water collection, Figure 5-14 above further shows that most (89%) households spend more than 0 to 0.5 hours on water collection. This is an indication that the water sources are nearer to the homes and not crowded. A small proportion (9%) spend between 0.51 to 1hrs collecting water. With the introduction of the project, the distance and time spent on collecting water will drastically reduce. This will allow the beneficiary households to have adequate time to engage in economic activities and enough time for school-going children.

5.15.3 Role of women and girls in water collection

As indicated in Table 5-24, a significant portion of households assigns the responsibility of fetching water primarily to women and girls (39%) or to all members of the household (31%). A minor fraction (4%) opts to employ a vendor for water collection. Insights from focus group discussions highlight that the predominant method of fetching water involves carrying it on the head or back. Furthermore, these discussions underscore that morning water collection stands out as the primary factor contributing to tiredness and absenteeism from school.

Table 5-24: Responsibility of fetching water at the household level

Who fetches water	Frequency	Percent
Women & girls	124	39%
All household members	98	31%
Women	60	19%
Vendor	13	4%
Girls	10	3%
Women & boys	3	1%
Boys & girls	3	1%
Boys	3	1%
Total	317	100%

Source: Baseline survey, 2023

Improved water access and hygiene through on-site water will not only improve their well-being and mitigate vulnerability to gender-based violence but will free up girls' time for uninterrupted schooling; women's time for agriculture, work and entrepreneurship; and women and girls' time for engaging in social activities that support their mental and emotional well-being.

5.15.4 Challenges associated with water Collection

The baseline survey assessed the water collection challenges during wet and dry seasons. Findings in Table 5-25 indicate that during the wet and dry seasons, Lobe faces several challenges associated with water collection. However, the three (3) predominant challenges experienced by households during the wet season include overcrowding (59%), long waiting time (19%) and poor-quality water (13%) while during the dry season, the three (3) major challenges associated with water collection are over-crowding (77%), conflicts (7%) and long waiting time (6%).

Table 5-25: Challenges with water collection

Water collection challenges	Wet season	Dry season
Over crowding	59%	77%
Long waiting time	19%	6%
Poor quality water	13%	0%
Inadequate water	3%	1%
Conflicts	1%	7%
Difficult terrain	0%	0%
Children playing at the source	1%	0%
Total	100%	100%

Source: Baseline survey, 2023

Focus group discussions with women groups in Lobe market also noted some challenges associated with the water sources including;

- Overcrowding during day time
- Long distances of above 2km to the streams to fetch water, especially in the dry season.

The proposed project should aim at addressing and solving the above challenges by designing a sustainable and reliable water supply system.

5.15.5 Amount of Water Used by Households

On average more than half (53%) of the households use between 5 to 10 jerrycans of water per day, followed by those (18%) that use between below 5 jerrycans. See Table 5-26 for details.

Table 5-26: amount of water used at the household level

Challenges	Frequency	Percent
< 5	130	41%
5.1 to 10	167	53%
10.1 to 15	20	6%
15.1 to 20	0	0%
20 <	0	0%
Total	101	100%

Source: Baseline survey, 2023

Focus group discussions with the Town Council Community Development Officer (CDO) and the community meetings indicate that water is mainly used for domestic use by public institutions such as schools and health centres, brick making, and livestock watering among others.

5.15.6 Households' payment towards maintenance of water sources

Table 5-27 below shows that all (100%) households pay for domestic water while less than half (42%) pay for the maintenance of the existing water sources. The low rate of payment for the operation and maintenance of the water source is a negative indicator towards the willingness of the beneficiary households towards contributing user fees towards the sustainable operation and maintenance of the proposed water supply system.

Table 5-27: Payment for domestic and maintenance of water sources

Pays for water	Payment for domestic	Payment for maintenance of water
Yes	42%	100%
No	58%	0%
Total	100%	100%

Source: Baseline survey, 2023

5.15.7 Women's Involvement in the Management of Water Sources

The baseline survey included an assessment of women's involvement in the management of water sources. Findings suggest that over (85%) of the women are involved in the management of Lobe TC water sources and they sit on the water user committees. Table 5-18 further shows the roles women play in water management. Findings indicate that more than half (51%) are treasures on the user committees, about a quarter (27%) serve in the capacity of chairpersons and a third (31%) are secretaries. The project through its institutional development should be able to empower and build the capacity of women to take on a more active role in the sustainable management of the proposed water supply and sanitation project since women are the main users of water at the community and household level.

Table 5-28: Women's involvement in water management

Women involved	Frequency	Percent
Yes	269	85%

No	48	15%
Total	317	100%
Women roles	Frequency	Percent
Treasurer	162	51%
Chairperson	86	27%
Secretary	98	31%
Other	16	5%
None	48	15%
Total	410	100

Source: Baseline survey, 2023

5.16 Sanitation and hygiene

Under sanitation and hygiene, the baseline survey examined the following key variables. Availability of toilet facilities, challenges with toilet facilities, existence of public toilets, waste disposal and prevalence of waterborne diseases.

5.16.1 Availability of toilet facilities

Baseline survey findings indicate that almost all (91%) of the households had a toilet facility while a significant proportion (9%) had no toilet facility but used a communal toilet facility or shared it with neighbours. Homes without facilities are highly exposed to health-related hazards.

The survey further examined the type of toilet facility possessed at the household level. Findings suggest that almost all (93%) of the households had traditional pit latrines while a few (4%) reported having VIP latrines and water-borne toilets (3%) as indicated in Table 5-29 below. Observation in Lobe TC suggests that VIP toilets and water-borne toilets are mostly found in public institutions.

Table 5-29: Availability and type of toilet facility

Availability of facility	Frequency	Percent
Yes	288	91%
No	29	9%
Total	321	100%
Type of toilet facility	Frequency	Percent
Traditional pit latrine	272	93%
VIP latrine	12	4%
Ecosan	8	3%
Total	292	100

Source: Baseline survey, 2023

5.16.2 Challenges with toilet facilities

Several challenges are faced with the toilet facilities with Lobe TC. However, based on the findings in Table 5-30, the major challenge is the area being swampy (67%). Others included rocky grounds and collapsing soils which render the construction of toilet facilities in the

RGC a challenge. Qualitative data suggest that constructing in swampy and rocky areas increases the cost of construction and emptying the latrines.

Table 5-30: Latrine construction challenges

Challenges	Frequency	Percent
Swampy area	212	67%
Rocky grounds	51	16%
Collapsing soils	38	12%
Other	16	5%
Total	317	100%

Source: Baseline survey, 2023

5.16.3 Public toilets

The survey included an assessment of the presence of public toilets in Lobe Town Council. Close to half (44%) of respondents confessed that there were no public toilets in the town council. This expresses the need for public toilets in Lobe TC. Table 5-31 denotes that the majority (77%) noted that there was a need for public toilets. The need for public toilet facilities will be addressed by the project under the sanitation component.

Table 5-31: Presence and need for public toilets

Presence of public toilets	Frequency	Percent
Yes	141	44%
No	180	56%
Total	321	100%
Need for public toilets	Frequency	Percent
Yes	128	77%
No	52	23%
Total	180	100

Source: Baseline survey, 2023

The location of toilet facilities should be partly informed by the input of the beneficiary communities including the village water and health committee and the respective LC chairpersons of the different villages where the facilities will be proposed.

5.16.4 Waste disposal

The baseline survey inquired about the disposal of wastewater and solid waste. Wastewater is managed in different ways, however, according to Table 5-32, the three common ways of disposing of wastewater included pouring in the garden (79%), dumping in open spaces (52%) and dumping on the roadside (17%). Regarding disposal of solid waste, a large proportion (69%) of the respondents noted that they dump solid waste in rubbish pits, close to half (49%) revealed dumping in gardens and about a quarter (26%) collect and burn. This finding points to the notion that there is no streamlined system for the collection and management of solid waste by Lobe Town Council authorities.

Table 5-32: Water and solid waste management

Disposal of wastewater	Frequency	Percent
Scatter in garden	250	79%
Dump in the open collection area	165	52%
Dump on the roadside	35	17%
Dump in soak pit	19	6%
Total	469	100
Disposal of solid water	Frequency	Percent
Rubbish pit	218	69%
Dump in garden	155	49%
Collect and burn	82	26%
Dumping into compound	32	10%
Others	3	1%
Total	317	100%

Source: Baseline survey, 2023

5.16.5 Waterborne diseases

Findings suggest that the most common waterborne diseases in Lobe town council are malaria (79%), typhoid (44%) and diarrhoea (33%). The baseline survey findings are consistent with Lobe TC which shows that according to engagements with the community elders, the construction of reliable sources of clean and safe water and the construction of toilet facilities within Lobe TC, the rate of prevalence of waterborne diseases is likely to reduce.

Table 5-33: Common waterborne diseases

Diseases	Frequency	Percent
Malaria	250	79%
Typhoid	139	44%
Diarrhoea	104	33%
Bilharzia	6	2%
Total	499	100%

5.17 Health service delivery

The whole population of Lobe TC is served by only one Health Centre II i.e., Lobe HC II which is owned and run by a Faith Based Organization (Arua Diocese). According to the Government standard, each ward and town council is supposed to have a health Centre Grade II and III respectively. The Health Centre population ratio is about 1:38,681 persons per clinical officer. This is attributed to the fact that Lobe Health Centre III regularly receives patients from Lobule sub-county and Yumbe Town Council and South Sudan nationals. Given the above circumstances, there is a need for the Yumbe district local government to prioritize the construction of more health units for the Town Council to meet the increasing demand for health services within and outside the Town Council.



Plate 5-6: Lobe Health Centre II

Lobe HC II offers both outpatient and in-patient services. The outpatient services include; diagnosis and treatment of common diseases, monthly antenatal visits, routine immunization and health education. On the other hand, inpatient services mostly include maternity, PMTCT and admission of other serious diseases. Critical cases are normally referred to Yumbe Hospital.

Lobe HC II also lacks a toilet facility because the existing toilet facility is filled up and has not been emptied. Patients in critical conditions use the staff quarters' toilet facilities.

Staffing at Lobe HCII

The current staffing at the health facility stands at 70% which is an indication of the need to recruit more staff by the health Centre to cater for the increasing population both the locals and South Sudan nationals.

Other Community Level Health Structures

There exists the Village Health Team (VHT) that consists of volunteers selected by the community to assist with health-related issues. This is the Health Centre Grade I and is found at least 2 in every cell in the town council.

Private Health Services

There are 8 drug shops in Lobe Town Council mostly run by unqualified personnel. There is a lack of enforcement by the local authorities to ensure that the drug shops are operated by qualified staff.

5.18 Educational Institutions

Primary schools

According to Lobe TC's 3-year development plan, the TC has 2 nursery schools and 5 government-aided primary schools. The town council has no secondary school. The 5 primary schools are spread throughout the 5 wards of the TC. Pupils who graduate to the secondary level have to be enrolled in a secondary school outside the town council which makes secondary education expensive.



Plate 5-7: Drachia Primary School

School enrolment and facilities in primary schools

By 2019, primary schools in Lobe Town Council had a total of 5,158 pupils with 2,648 boys and 2,510 girls. This enrolment is low compared to the current population projections of the town council standing at 38,681 as of 2021. The current enrolment represents only (55%) of the school-going children in school.

Table 5-34: Enrolment and school facilities for Lobe TC

School	Enrolment			No. of teachers	classrooms	Desks	Latrine stances	Water sources		
	Girls	Boys	Total					Borehole	Other	Total
Drachia P/S	344	450	794	8	7	321	10	1	0	1
Urungu P/S	288	379	667	7	7	232	10	1	0	1
Kubali P/S	520	451	971	13	8	420	10	0	0	0
Kanabu P/S	504	360	864	8	7	314	5	0	0	0

Lobe P/S	470	402	872	13	10	315	10	1	0	1
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Lobe TC 3-Year Development Plan

Status of education service delivery

All the primary schools in the town council have inadequate classrooms with the pupil classroom ratio of 88:1 against the ideal national of 53:1. In addition, during most of the school visits, the head teachers complained of inadequate desks which makes the learning environment unfriendly. Concerning the adequacy of teachers, the current pupil-teacher ratio is 105:1 which is far above the recommended ratio of 52:1.

Regarding water and sanitation, the current pupil stance ratio in Lobe Town Council primary schools stands at 81:1 which is below the ideal ratio of 40:1. Some of the toilet facilities in the schools were observed to be dilapidated with high health and safety risks. Similarly, as observed from the table above, the number of safe water sources in primary schools is still insufficient to cater for the ever-increasing number of learners. For instance, in Table 5-32 above, Kanabu P/S and Kabuli P/S do not have a single water source. They draw water from the nearest community water points.

School Drop-out rate

There is a high dropout rate in Lobe Town Council. According to the Lobe TC CDO, most of the pupils who drop out are between primary 4 and primary 7. Lobe Town Council development plan attributes the high dropout out to the following reasons;

- Early marriages especially among girls
- Engaging pupils in economic activities
- High poverty and inability to pay school dues and buy scholastic materials
- Peer influence especially bad habits learnt from social media

The project should endeavour not to exacerbate the above factors and increase the rate of school dropouts in the town council. The project should strictly prohibit employing school-going children and have strict laws against engaging minors in sexual relations.

5.2.13 HIV/ AIDS Situation

Baseline survey findings suggest that all (100%) of respondents were aware of HIV / AIDS and the risky groups include teenage girls (52%), teenage boys (51%), adult men (39%) and adult women (27%). See Figure 5-15 for details.

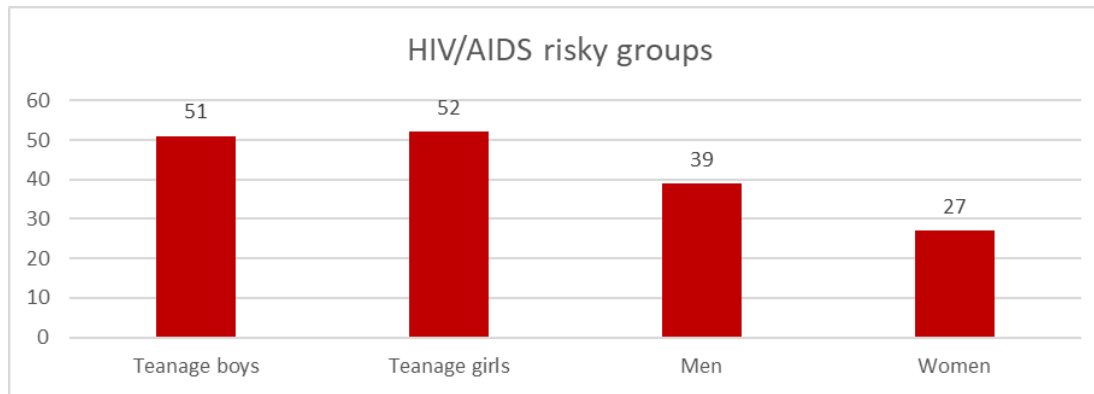


Figure 5-15: HIV/AIDS risky groups

According to the Lobe TC development plan, the major interventions taken by the District and some NGOs towards the prevention of HIV/AIDS were identified as:

- Sensitization of dangers and prevention measures
- Provision of condoms, and
- Provision of medicines (ARVs)

Challenges related to HIV/AIDS services

- Limited access to HIV AIDS services,
- Stigma, Mainstreaming,
- Limited funding for HIV AIDS services.
- Few Anti-Retroviral Treatment (ART) sites,
- Low couple counselling and testing, the high stigma associated with HIV,
- An increasing population of most at-risk populations (MARPS),
- Stock out of medicines and supplies – HIV test kits,
- Frequent changes in policies and treatment guidelines.
- Limited access to HIV AIDS services and Inadequate mainstreaming of HIV AIDS into plans and budgets stemming from Inadequate funding,
- Capacity and poor attitude of some sectors to integrate. This has led to increased incidences of HIV AIDS in the district.

Recommendations for strengthening HIV/AIDS services

- Accreditation of more health facilities to provide in the prevention of HIV AIDS through the use of expert clients,
- Community sensitization on availability of meetings and dialogues
- Promote intensive adherence counselling and
- Promote moonlight HIV counselling and testing in the district.

5.2.14 Gender-Based Violence

The survey inquired about the prevalence of gender-based violence within Lobe Town Council. Findings indicate that most (82%) of the respondents were not aware of the prevalence of gender-based violence in their community while (18%) had heard of or witnessed the vice. In addition, close to a third (29%) of the respondents confessed that child abuse exists in Lobe Town Council.

Despite the low occurrence of gender-based violence and child abuse, the project may worsen the practices if appropriate mitigation measures are not designed to address them.

The three (3) main measures cited by the respondents for preventing GBV and child abuse include sensitizing the community on the dangers of GBV (66%), making the perpetrators undertake community service (31%) and chasing the perpetrators from the project area (26%).

, The District Community Development officer noted that the drivers of GBV are household poverty, power relations, access to asset ownership, illiteracy, and negative attitudes towards women. The effects of GBV include divorce which affects women more than it affects men, withdrawal, child neglect school dropout, especially for girls, and low self-esteem. Sexual violence is a disease that has both short-term and long-term impacts on the mental and physical health of survivors, yet it remains high in the communities. Polygamous families in most communities of Yumbe record high incidences of GBV. Men in such relationships tend to provide for one wife and her children and neglect the other family

Table 5-35: Prevalence of gender-based violence in the community

Knowledge of GBV in the community	Frequency	Percent
Yes	56	18%
No	261	82%
Total	317	100%
Knowledge of child abuse in the community	Frequency	Percent
Yes	92	29%
No	225	71%
Total	317	100%
Measures for preventing GBV		
Sensitization on dangers	209	66%
Community service	98	31%
Chasing culprits from the area	82	26%
Imprisonment of culprits	16	5%
Nothing	3	1%

5.19 Settlement patterns & housing

5.19.1 Housing Typology

Table 5-36 below shows that overall, more than a half (60%) of the respondents lived in temporary houses (mud floors, mud and wattle walls, grass thatched), followed by about a

quarter (28%) living in semi-permanent houses (unburnt bricks, mud floors, iron sheet roof) while only (12%) lived in permanent structures (cemented floor, burnt brick, iron sheet roof).

Table 5-36: Type of the main house

Type of house	Frequency	Percent
Permanent	40	12%
Semi-permanent	88	28%
Temporary	189	60%
Total	317	100%
Type of roof		
Iron sheet	64	20%
Grass thatched	249	79%
Other	4	1%
Total	264	100%

According to the District Development Plan III 2020/2021 – 2024/2025, most areas of the district are faced with poor housing conditions constituting (33%) permanent buildings, (32%) Semi-permanent and (32%) temporary structures, with better structures in the trading centres.

The type of housing structure largely dictates the water service level for the household. However, household service connections for water supply are possible for permanent structures. Households living in semi-permanent and temporary housing structures may require the provision of yard taps or public stand posts in their compounds or strategic places in their communities respectively.

The settlement pattern in the district is mostly linear, nucleated and scattered patterns of settlement. This has been greatly influenced by several factors as discussed;

- linear settlement patterns have been widely evidenced along the main roads that have networked the district.
- Nucleated settlement patterns have been influenced by productive resources such as areas with fertile soils, and sources of clean water for both consumption and production, especially along the valleys and hills to the North of the District, such areas have often developed and are rapidly developing into Rural Growth Centres (RGCs) both along and off the main roads.
- Scattered settlement patterns are also evidenced in the rocky areas unable to support farming but suitable for keeping livestock.



Plate 5-8: Settlement and Housing in Lobe Town Council

Lobe Town Council is a nucleated comprised of both nuclear linear settlements. There both permanent houses, constructed of hardened bricks, motor and roofed with iron sheets. These are dominating commercial units in the trading centre. Semipermanent houses constructed of mud and wattle and roofed with grass. These are common in the trading centre suburb area. Houses are constructed with proper road reserves in the front.

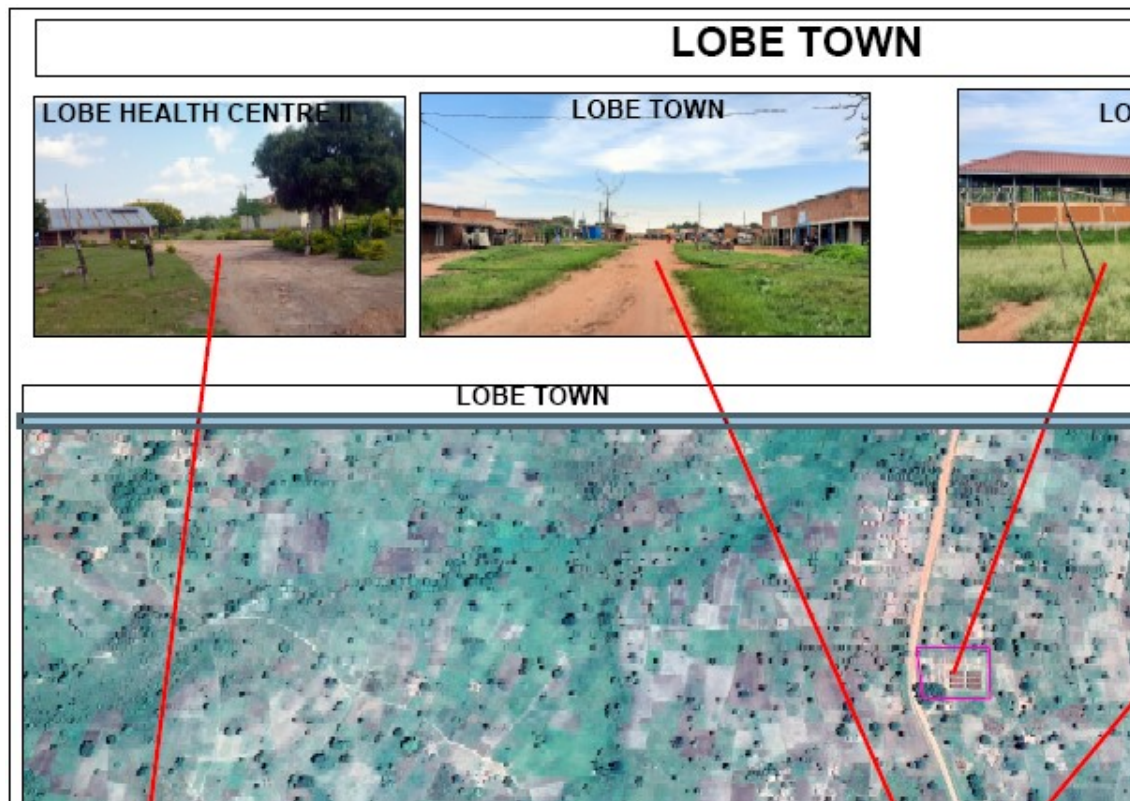


Figure 5-16 Key features within Lobe Town Council

5.20 Poverty

West Nile has high poverty incidences of 59.1% (UBOS Multidimensional Poverty Index Report 2022) despite having the highest multidimensional differences between the two poverty measures in 2016/17 and 2019/20 (ranging between 34% – 42%), West Nile registered the highest Poverty incidences and intensity.

Several people categorized as vulnerable were identified in the project area and these included young female heads, orphans and vulnerable children, widows and widowers, women because of the patriarchal nature of Ugandan societies, the youth, the poor and the landless. Extreme poverty was the principal driver of poverty in the project host community. According to Owori 2020, 50-70% of the population in the West Nile region was categorized as poor. Poverty levels are generally higher among women. Consequently, the poverty and livelihood analyses have guided entry points for the district during the implementation of the project. Similarly, MWE should mainstream issues of marginal groups and devise ways on how such groups will benefit from the project.

5.20.1 Land and Property Ownership

Land in Yumbe District is mainly communally owned and governed by the customary system of land tenure. Under this tenure arrangement, land ownership is vested in the lineage and is allocated by a father to his sons, who in turn, assign it to their wives and children for cultivation. Women therefore tend to be excluded from owning land, although they are allowed the right of use

Property inheritance continues to be a challenge, especially for women. It is a crisis exacerbated by the traditional norms, beliefs and values embedded in the cultures of West Nile. Widows in most of the communities are not allowed to inherit property after the husband's death, an issue that has had tragic impacts on the lives of women.

5.21 Physical Cultural Resources (PCR)

Worship centres, graves and communal burial grounds were the PCR recorded in the project area. Burial grounds are areas where family members remember their departed ones and it is one of the safeguarded identities in the cultural setting of a given ethnicity. Most of these were non-recognizable because they were earth graves and some had been washed away.

Efforts will be made to ensure that all burial grounds along the proposed route for the proposed water transmission and distribution pipes will not affect identified burial grounds. However, details of what may be affected will be captured during the RAP study and specifics will be detailed in the RAP report. The proposed project largely traverses rural areas that culturally do not have central burial areas hence chances of encountering some burial grounds could exist.

6 STAKEHOLDER CONSULTATION AND DISCLOSURE

6.1 Introduction

The Stakeholder engagement and consultation process was undertaken as per the requirements of the National Environment (Environmental and Social Impact Assessment) Regulations 2020. Under sub-regulation (1) of the regulation (16) of the National Environmental and Social Impact Assessment Regulations (2020) and best international practice, the project developer is required to undertake relevant stakeholder consultations during the ESIA process as detailed below. The developer shall, in carrying out the consultations under regulation 16;

- (a) Choose the mode of consultation, taking into account the nature and location of the project and the key issues to be consulted on;*
- (b) Give advance notice of the proposed consultation, with a minimum notice of seven days;*
- (c) Hold meetings with relevant stakeholders, communities likely to be affected by the project and the public to explain the project, its likely benefits, likely negative impacts and proposed mitigation measures, and to receive their oral or written views;*
- (d) Where the consultations involve holding meetings, ensure that the venues and time for the meetings are convenient to the relevant stakeholders, communities likely to be affected by the project and the public; and*
- (e) Ensure that the comments received during consultations are recorded, made publicly available and taken into account during the environmental and social impact study.*

Source: Extracted from the National Environment (Environmental and Social Assessments) Regulations 2020

6.2 Public participation objectives

Meaningful consultation by communities (especially targeted groups) and stakeholders that are likely to be affected by or benefit from the proposed water scheme will continue to be sought throughout the project life cycle, commencing as early as possible. The objective of such stakeholder consultation was to ensure that communities contribute to the development of management plans and provide feedback on the activities preceding the proposed project. Consultations were conducted to solicit broad community support for the project (especially a category A project or one that is highly sensitive to climate and social risks) and to ensure that affected people endorse the proposed mitigation/risk reduction and management measures. Stakeholders' consultation sought to create awareness about the project and obtain their perceived positive and negative social and environmental impacts. Specifically, consultations were undertaken to;

- a) Explain the project and create awareness;
- b) Ensure Compliance with both national regulations and international best practice
- c) Obtain baseline environmental and social conditions in the proposed project area based on local knowledge;
- d) Obtain perceived economic, social and environmental benefits so that they can be enhanced during project implementation and operation;

- e) Capture perceived potential negative environmental and social impacts so that they can be mitigated;
- f) Provide equal opportunity to stakeholders to get involved in project planning;
- g) Manage Expectations and Concerns: by providing a mechanism for stakeholders to engage with the Project about their concerns and expectations and provide a mechanism for receiving, documenting and addressing comments received;
- h) Build trust with the stakeholders.

6.3 Stakeholder identification

Identification of stakeholder groups started with investigating groups/agencies that present threats and opportunities associated with the proposed Lobe Rural Growth Centre Water Supply Project. This was based on some key questions below:

- a) Who will the project benefit/ affect?
- b) Who are the key players in the development and implementation of the project?
- c) What key resources will be impacted?
- d) Who is most dependent on resources likely to be affected?
- e) Who possesses claims on resources to be affected – including legal jurisdiction and customary use?
- f) Are several government sectors and ministry departments involved?
- g) Which agencies license certain aspects or resources to be affected (forestry, wetlands, wildlife areas)?
- h) Are there major events or trends currently affecting the stakeholders (e.g. development initiatives, migration, population growth)?

The ESIA team particularly targeted officials of the district of Yumbe and Lobe Town Council. A stakeholder engagement plan was prepared to guide the ESIA study in identifying stakeholders and their probable interests. These included; directly affected and indirectly affected community members, local leaders, district leadership and Government Agencies.

6.4 Stakeholder mobilization

Consultation of government agencies and district officials was done through formal meetings held with the respective agencies and district leadership. A letter of introduction for this purpose was issued by the Ministry of Water and Environment, the client. To date, the different national agencies consulted included the Ministry of Water and Environment. Agencies such as the Ministry of Gender Labour and Social Development, the National Environment Management Authority, the Ministry of Water and Environment and the Directorate of Water Resources Development will be consulted in due course. At the District level, key stakeholders from relevant departments such as Natural resources and Community development, planning and engineering were mobilized.

At the community level, mobilization was through different structures as highlighted below. At the District, the CAO was notified about the intention of the ESIA team to conduct consultations with affected communities. A contact person from the water department was then allocated by the office of the CAO to guide the team and liaise with the leadership of the four sub-counties. At the Sub County, the leadership was notified about the project and their views sought.

At the village level, identified villages and their representatives were mobilized through L.C.I. leaders. Local leaders from the identified villages would then select a central meeting place where village members and their leaders convened. Meetings were held with local leaders, representatives of the youth, women, the old and disabled, potential water users, land owners and users among others.

Below is a pictorial view of some of the stakeholder meetings conducted during the ESIA study.



Plate 6-1: Settlement and Housing in Lobe Town Council

6.5 Methods of engagement

Stakeholder engagement during the ESIA study involved different methods. These included formal meetings, key informant interviews, focus group discussions and public meetings as illustrated in Table 6.1 below.

Table 6-1: Summary of stakeholders identified and consulted during the ESIA process

Activities	Stakeholder	Purpose of Information sharing/ disclosure
Awareness/sensitization meetings by the ESIA team	PAPs, Landowners, beneficiaries and communities	General overview of the project and implications
Focus groups	Women Youth Elderly Persons with disability Area leaders Other interest groups	General overview of the project and implications Disclosure of mitigation measures and grievance mechanism Identification of views and expectations
Village meeting / public consultation	All PAPs Indirectly affected people Beneficiaries Communities	General project overview Identification of views and expectations Disclosure of mitigation measures Acquisition of information for input into ESIA
Formal meetings	Government bodies Local government	Overview of project and implications Disclosure of mitigation measures Acquisition of information for input into ESIA
Key informant interviews	Local government Government officers Local and political leaders Cultural Leaders	Overview of project and implications Baseline data Feedback on the project proposals

6.6 Stakeholder consultation findings

Key issues merging from the consultations

Consultations with the stakeholders as listed in Section 3.3, were held between 3rd July and 9th July 2023. Some of the key issues/expectations raised during the consultations are summarized in (Table 6-2).

Table 6-2: Summary of key issues from consultation meetings

Stakeholder	Key issues	Response by consultant
Lobe TC official	<ul style="list-style-type: none"> The project should install more water points along the existing boreholes because the boreholes are unreliable during the dry season. The project should support farming activities that are located far from the distribution pipes especially where the farming community is interested in irrigating their farms with project water. The design of the project should take into consideration the terrain of Lobe town 	<ul style="list-style-type: none"> According to the design, several water points will be installed across the Lobe TC The project has a provision to extend water to homesteads although it will be at a cost. A resettlement action plan has been prepared that identifies all affected private properties, and attaches values to inform compensation. The Ministry of Water will recruit a

	<p>council which is a hilly area that may affect the transmission and distribution of water</p> <ul style="list-style-type: none"> • The project should consider extending the water supply to private homes at the request of the community members. • The processes of assessing and compensating affected private properties should be stipulated. • Will the proposed reservoir location be compensated for? • Management of the pipes should be spelt out especially in case of major repairs to avoid interruption in the water supply • There should be continuous sensitization of the communities throughout its lifecycle on the different components of the project. 	<p>Stakeholder Engagement Consultant who will be responsible for ongoing sensitisation of communities about the different components of the project under the different phases</p>
<p>Lobe TC Community</p>	<ul style="list-style-type: none"> • The project has to compensate for affected crops and trees along the transmission and distribution lines. Compensation should be timely and adequate. • Priority should be given to the youth within the Lobe community when recruiting for casual labour. • Among the three proposed locations for the reservoir, which one is the most preferred site. • The roads of Lobe town council aren't demarcated, how does the project determine the RoW for laying the water pipelines since they are supposed to be laid in road reserves • The project should extend water supply to households at the request of private individuals. • The project should sensitize the community on the user charges that are to be paid for connection and as user fees. 	<ul style="list-style-type: none"> • Transmission and distribution lines will be laid along the existing road corridors. However, where private properties are affected, a RAP has been prepared to compensate for affected properties. • The project will strictly enforce local content and semi-skilled labour will be sourced from local communities • The project will use the existing physical development plan to identify un-opened roads and corridors. • the design consultant made population projections and allow for future extension to private homes. • Users are enlightened on the importance of water fees for sustainable O&M of the water system
<p>Lobe police post</p>	<ul style="list-style-type: none"> • The area is secure and the crime rate is low. The contractor should endeavour to recruit the locals to avert crime that may be caused by the influx of external workers. • For the project to be embraced, the contractor should give priority to the youths when recruiting for casual labour • To avoid family breakdowns, the contractor should recruit locals because external workers may encroach on people's wives • By recruiting local people, the project will contribute to the fight against domestic violence which is partly attributed to the 	<ul style="list-style-type: none"> • The contractor will be compelled to enforce local content to avoid social ills associated with external influx of workers • During the recruitment of local labour, priority will be given to the youth. • The contractor will develop a code of conduct that prohibits workers from engaging in sexual relations with minors and married women

	<p>failure of men to provide for their families.</p> <ul style="list-style-type: none"> • The contractor should have strict laws that prohibit workers from engaging in love affairs with married women. 	
Lobe HCII	<ul style="list-style-type: none"> • The borehole is the main source of water for the health facility and is shared with the community, however, during the dry season it gets congested i.e. November to February. The proposed water supply system should extend a line to the facility to meet its water demands • The borehole has a user committee which can be strengthened for the sustainable O&M of the new water supply system • Lobe HCII should be provided with a sanitation facility because the existing one is filled up and needs rehabilitation. The absence of a toilet facility is the biggest challenge faced by the facility. • The existing toilet should be rehabilitated to control the spread of infectious diseases, especially diarrhoea. • The project is likely to strengthen the implementation of the Infection, Prevention and Control initiative funded by IDI which depends on reliable water supply. 	<ul style="list-style-type: none"> • According to the design, a water point will be extended to the facility • The existing water user committees for borehole will be targeted with capacity building for sustainable O&M of the project • The health facility's toilet has filled up and may be prioritized for the sanitation facility • The project does not fund the rehabilitation of existing sanitation facilities
Drachia Primary School	<ul style="list-style-type: none"> • The borehole is the main water source for the school which is shared with the community. Therefore, there is a need to extend a water point to the school. • The existing water user committee should be strengthened to serve on the proposed water supply system. • The project should embed a small user fee for the operation and maintenance of the water supply system. Already the school pays 1000 per month for the maintenance of the existing borehole and is ready to adopt the practice of contributing water user fees. • The school has 2 pit latrines with 5 stances. The project under its sanitation component should construct washrooms and changing rooms for girls. • The project will benefit the school by supplying enough water to support its 	<ul style="list-style-type: none"> • Extending a water point to the school will depend on the approved design. However, at an appropriate time, the school can apply for an extension to its premises. • There are arrangements to build the capacity of existing water user committees in O&M • The sites for the location of sanitary facility/toilet will follow a certain criterion including demand and absence of a toilet facility at the school.

	<p>nutrition programme “Uganda Food Security Program”</p> <ul style="list-style-type: none"> • The project should supply the school with adequate water to facilitate its brick-laying initiative to support the construction of more classroom blocks 	
Women groups – Lobe TC market	<ul style="list-style-type: none"> • The contractor should be encouraged to buy local products from women, especially food crops such as cassava and vegetables because there is a limited market for their produce. • The project should install enough water points to meet the current water needs since the major water source is a seasonal stream. 2 out of 3 boreholes are functional • The project should extend more water points to the community to enable women to have enough time for their families hence strengthening families • The contractor should be forced to recruit locally since the influx of external workers is likely to cause social vices. • The project should have strict regulations against contractor workers defiling school girls. • The project should have an ethical code of conduct barring workers from engaging in love affairs with married women. • Women should witness the valuation and compensation processes for privately affected land and properties. This will ensure that women also benefit from compensation cash especially where the affected crops belong to them. • There are cases of GBV in the community, the project should devise means of avoiding causing more GBV in the community. 	<ul style="list-style-type: none"> • The contractor will be encouraged to enforce local content including buying food items from local markets and ring-fencing some jobs for women • More water points will be installed across the RGC as per the design • Contractors’ workers will be required to sign a code of conduct prohibiting engaging minors in sexual affairs. • Where there are affected private properties, wives will be empowered to witness the compensation process.
Kanabu primary school	<ul style="list-style-type: none"> • The project should extend a distribution line to the school because the borehole which is the main water source is outside the school premises • Extending a water point to the school will be of great relief because the community borehole frequently breaks down • The project needs to constitute a 	<ul style="list-style-type: none"> • The project has a provision for extending water points to public institutions including schools and health centres • The project will build the capacity of the existing water user committee in O&M • Contractors will be required to develop a code of conduct that prohibits their workers from engaging in sexual relations

	<p>management committee for the new water supply system because the existing one is non-functional and the school is not represented.</p> <ul style="list-style-type: none"> • The school should be provided with a toilet facility because the existing one is inadequate compared to the school population. In addition, the school should be equipped with a changing room for girls. • A water point should be installed at the teachers' quarters to help reduce the time teachers spend fetching water from the community borehole which is often crowded • There is a need to sensitize school girls about the project and its associated risks including dropping out of school, HIV/AIDS, unwanted pregnancies, early marriages etc. • The project should support the schools in developing talking compounds with appropriate messages against defilement and unwanted pregnancies. 	<p>with school girls.</p>
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7 ANALYSIS OF ALTERNATIVES

7.1 Introduction

Analysis of feasible environmentally and socially sound alternatives for this project touches on several aspects including a no-project development option, the water pipeline construction intervention option, alternative sites for the pipelines, timing and scheduling and environmental classification alternatives.

7.2 The No Project Alternative

SDG target 6.1 aims to increase universal and equitable access to safe and affordable water supply for all by 2030. Uganda's Vision 2040 aims to transform Uganda's economy to a middle-income status and have a portable water supply to every parish in the country. In a bid to achieve sustainable and equitable economic development for all, the Ministry of Water and Environment intends to establish Piped water supply systems in Rural growth centres in Refugees hosting Districts

According to Yumbe District Development Plan (2021-2025), The safe water coverage for the district is only 48% (based on a source man ratio of 300 people served by 1 deep borehole, 300 people served by 1 shallow well, 200 people served by 1 protected spring, and 150 people served by 1 Tap stance). The district has for a long time been struggling to cope with chronic water shortages and the inadequacies of their existing water infrastructure. During dry seasons residents are forced to walk long distances (1-5km) in search of water, hence wasting significant economic time and energy in addition to poor hygiene.

A No Project alternative will leave the residents of Lobe Town Council in this current dire situation and deny them adequate drinking water, sanitation, and hygiene which are essential ingredients to ensure human health.

7.3 Alternative Sources of Water

7.3.1 The surface water source (Stream)

As regards surface water, the nearest surface water source within the project area is the Wogi Stream, near the Drachia water source (Bore). However, according to the feasibility study, the source would not be able to provide the required water quantity since the stream is seasonal. This implies that in the dry season, most parts of the district are devoid of water reserves. Moreover, as noted above, most existing wetlands have been reclaimed for agricultural activities.

Besides the source being seasonal, the cost of treating this water would be very expensive since the river is highly polluted and water quality is very low due to high turbidity

7.3.2 Groundwater Sources

7.3.2.1 Borehole alternatives.

From the drilling and pump testing report by M/s Sumadhura Technologies Ltd as of May 2022, two sites were allocated as alternatives for drilling boreholes: Ambala village at coordinates 292248 m E and 395819 m N, Drachia village at coordinates 292005 m E and 392603 m N. However, point B at Drachia was later considered for final drilling which is attributed to accessibility and water yields. More so there is an offset of 292 m from Drachia point B to the actual borehole site which can be attributed to land availability for support infrastructure at the water source.



Figure 7-1: Alternative Borehole Sites

The borehole at Drachia was preferred, drilled and test-pumped over 72 hours and gave sustainable yields of 30 m³/hr. In reviewing the test data, the borehole exhibited recovery during the constant discharge test indicating higher yields were possible.

Details of the boreholes are given in Table 7-1 below.

Table 7-1: Borehole Data

Location	BH	Diameter	Ground elevation	Static Water	Dynamic Water	Sustainable yield	Recommended depth of the

		(inch)	(m)	Level (SWL- m)	Level (DWL-m)	(m ³ /hr)	pump (m)
Drachia	DWD 89612	6	1024	4.74	28.41	30	85

The borehole showed considerable drawdown and recovery during the constant discharge test both of which attest to the fact that the borehole has sufficient yield for a production well of 30 m³/hr (300 m³/day for 10 hours of operation a day),

7.3.3 Adequacy of the Ground Water Sources

The production well is to be powered by a solar system. Comparison of the available water with the projected maximum day demand Table 7-2 below.

Table 7-2: Water Demand

WATER DEMAND SUMMARY				
Year		Total Day Demand	UFW	ADD
		m ³ /day	m ³ /day	m ³ /day
Ist year	2025	112	11	123
5th year	2029	136	14	150
10th year	2034	174	17	192
15th year	2039	225	22	248
20th year	2044	291	29	321

The system can supply adequate water up to about the year 2043 as shown in the graph in Figure 7-2 below.

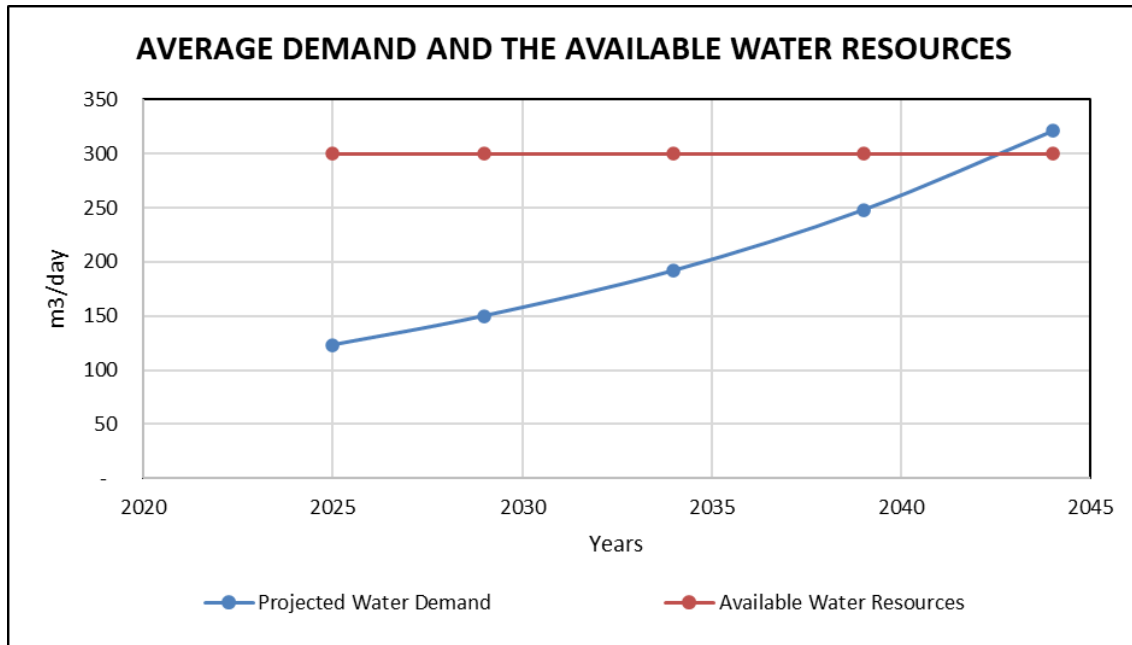


Figure 7-2: Average Demand in relation to the available water resources from Drachia BH

The source of water for this project is the Drachia borehole with a sustainable yield of 30 m³/hr, located in Lobe Town Council, Akaya Parish; Drachia Village. The borehole will be equipped with a submersible vertical pump of 30 m³/hr and 110 m head capacity suitable to abstract water equivalent to the above safe yield respectively

Conclusion:

Therefore, the option of exploiting surface water sources as an alternative to the Lobe RGC Water supply system is not a feasible one. It's very expensive and not achievable.

Swamps are reported to be seasonal and therefore not considered viable water sources of water supply

Based on the explanation above, the most viable water option is ground water source from the Drachia Borehole.

7.3.4 Roof Catchment:

A roof becomes a catchment when it is used for harvesting rainwater. Then it can be called a "Roof catchment". Roofs are the most common type of catchment used for harvesting rainfall. Rainwater harvesting from impervious roofs made of corrugated iron sheets corrugated plastic and clay tiles is a popular method for providing portable water directly from rainfall. The system provides water at home, is affordable, easy to practice regardless of physical or climatic conditions and can be designed to suit different conditions (available finances, roof area, family size, rainfall or roof area).

Institutions such as schools, health facilities, offices, churches and other such buildings have large roofs that can be used to harvest larger quantities of water.

They however need good management to regulate water abstraction rates as the water will be used by many people. Wherever possible, the roofs of individual households are preferable to communal systems. Roof water harvesting is particularly attractive where the main alternatives are surface water sources are unavailable and groundwater is either difficult to secure or has been rendered unusable by fluoride, salinity or arsenic.

Roof catchment was not ideal because tapping roof water is not capable of meeting the water demands of Lobe RGC since most of the houses in the project area were grass-thatched making it impossible to harvest rainwater. However, it was recommended for the key institutions like Primary Schools within Lobe RGC, Lobe Health Centre and Lobe Town Council Offices since they had large roofs for rainwater harvesting to supplement the Piped water system.

7.3.5 Alternatives Pipeline Material

Materials commonly used to construct water pipes include polyvinyl chloride (uPVC), cast iron, copper, steel and in older systems concrete or fired clay. Joining individual water pipe lengths to make up extended runs is possible with flange, nipple, compression or soldered joints.

In this project, the use of concrete, cast iron and copper was not considered.

The type of pipelines to be used will be polyvinyl chloride (uPVC) and galvanized pipe steel. This galvanized coating keeps the water from corroding the pipe. The project will also use High-density polyethylene (HDPE) or polyethylene high-density (PEHD) is a thermoplastic polymer produced from the monomer ethylene with a high strength-to-density ratio, HDPE is used in the production of corrosion-resistant piping. The use of asbestos concrete pipes was rejected owing to the environmental and social risks and so is the use of concrete pipes or copper pipes due to cost implication and conformity with the best practice in the industry which has scaled down on their usage.

7.3.6 Alternative Access to Water Sources.

The water source is located far from the existing roads, the available route is an access that was opened up by the drilling contractor, however, to date secondary regrowth of trees especially shrubs has occurred. This is a shorter route though it goes through a neighbouring homestead, Church and Drachia Primary School football ground thereby disrupting sports activities.



Plate 7-1: Existing footpath to the water source

The alternative access road is currently a footpath from the borehole source and was later colonized by shrubs and savannah grassland and would require clearing, especially along Drachia-Lobe Road which would require some land take before joining the existing footpath in Figure 7-3 and plate 7-2 below.

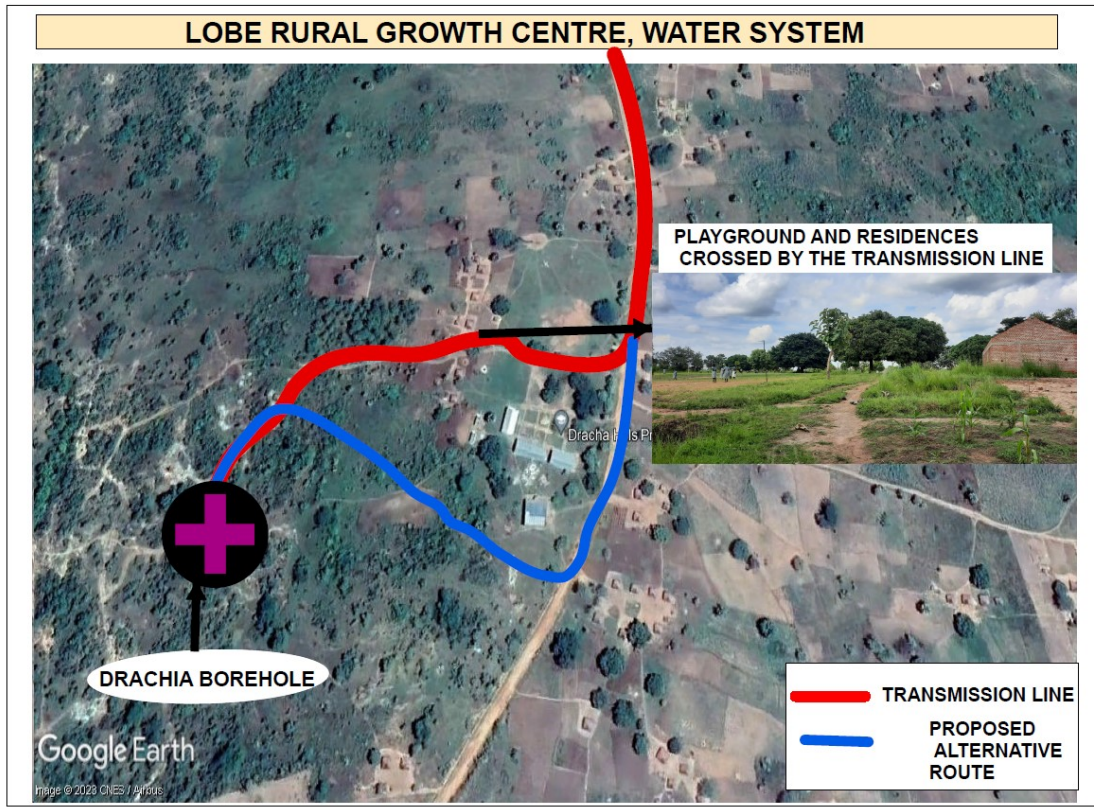


Figure 7-3: Alternative footpath to the water source

The access road would not affect any homesteads. This is a preferred alternative since it will avoid disruption of social activities.



Plate 7-2: Alternative footpath to the water source

7.3.7 Power supply options

Lobe RGC has no grid power supply system currently, though there is a rural electrification project ongoing. Therefore, two alternative sources of power supply have been considered for the running of the submersible borehole pumps, viz;

- Generator sets
- Solar power system

A comparison of the solar power and the diesel generator power supply systems is presented below.

Solar power system

A solar power system has been designed as the preferred power supply system for each borehole station. The required solar power system is to comprise the following components.

Table 7-3: Solar power system components

Location	Specifications	
<ul style="list-style-type: none"> • Drachia BH DWD 89612 	Submersible pump Flow rate (q) = 30m ³ /h Workload = 100 m head	Surface pumps <i>(1 duty, 1 standby)</i> Flow rate (q) = 30m ³ /h Workload = 200 m head
	Daily Power Demand for 8 hours = 280.29 KWhr <ul style="list-style-type: none"> • PV Power rating = 300Wp • No. of Solar Panels = 265 Panels • PV panels per array = 10 Panels • Inverter rating = 22KW, 3phase • Total No of inverters required = 20 	

The specifications for electrical wiring, installations and fittings shall be of approved international standards.

The specifications for electrical wiring, installations and fittings shall be of approved international standards.

Table 7-4: Comparison between solar power and diesel power generator

FACTORS	GENERATOR POWER	SOLAR POWER
1. Reliability	Offers reliable constant power	Solar can be affected by weather leading to failure to adequately charge the batteries

	supply	for full efficiency to run the system.
2. Capital Cost	The capital cost for the generator is lower compared to the solar system of similar capacity.	Solar initial infrastructure costs are very high. The current estimate is at UGV 406 million and UGX 435 million for Maru and Malanga stations respectively. The recovery period of the capital cost for the solar system is less than 3 years (based on the O&M elements that are eliminated for the generator sets)
3. Environmental impact	Environmentally less friendly due to air pollution, noise and dirt.	Environmentally friendlier.
4. Vulnerability	Minimal vulnerable risks such as vandalism	Very vulnerable to vandalism.
5. Space (land) requirement	Minimal land space	The solar system required will occupy a minimum of 536m ² of land.
6. Useful economic life	Economically viable for 15 years	Economically viable for 30 years
7. O&M costs	Generator operating and maintenance costs are high and regular in terms of fuel, frequent periodic servicing, repairs of the equipment and spare parts replacements.	Cheaper operating and maintenance costs require changing of batteries every 3 years, lamps, cleaning and replacement of panels.
8. Suitability for backup	Generators can act as a backup for the solar system.	The solar system charges batteries during the day and pumps at night.

Based on the analysis above the solar system benefits outweigh the use of the power generator. As a renewable source of power, solar energy has an important role in reducing greenhouse gas emissions and mitigating climate change, which is critical to protecting humans, wildlife, and ecosystems and this is in line with the project initiatives.

7.4 Sanitation Options

The Large solar-powered water supply and sanitation system includes a component on sanitation for households and institutions. Several basic facilities have been appraised both onsite and offsite systems. The ESIA has presented two basic systems for analysis.

7.4.1 Central Sewerage System

The Central Sewerage system is an offsite treatment system. The Central sewerage system requires that adequate waste water should be generated to drive the excreta down the sewers. A sewage generation rate of 5m³ d/ha⁴ is considered the lowest rate at which a central sewerage system can properly function. This requires functional water house connections with in-house sanitary facilities. For towns with existing water supply systems, an indication of sewage generation is the existence of Septic Tanks. From the sampled households in the project area, no household had access to a flush toilet, and all public toilets were VIP. This means that a centralized sewerage system is not suitable for the sanitation intervention. The high investment and associated infrastructure rule out such a system, notwithstanding its efficiency.

7.4.2 On-Site Sanitation Systems

On-site sanitation systems comprising septic tanks and Ventilated Improved Pit Latrines are efficient systems that can serve rural populations. They are relatively cheaper to install, easy to construct and maintain although septic tanks require emptying from time to time. On-site sanitation systems can be progressively upgraded with time to connect them to a sewerage network. A Fecal Sludge treatment plant has been recently constructed in Yumbe Town Council to enable the final treatment of faecal sludge. Given the low investment costs, nature of settlement patterns, environmental and social realities, the ESIA therefore proposes the implementation of an onsite sanitation system for Lobe Water Supply and Sanitation as follows:

- a) Septic tank system for the medium-income group i.e., households with in-house connections,
- b) Ventilated Improved pit latrines for low-income groups i.e., households with yard taps and those who use public stand posts

8 POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION MEASURES

8.1 Introduction

This chapter identifies and evaluates significant environmental consequences associated with the construction and operation phases of the proposed project. While positive impacts should be enhanced, the proposed mitigation measures should be implemented as suggested to minimize or eliminate the predicted negative environmental and social impacts.

8.2 Impact Evaluation and Analysis

This section assesses the level of potential impacts based on various criteria including the severity of impacts, duration, geographical scope, and the existence of readily identifiable cost-effective mitigations. The impact assessment also considers the impacts identified by the stakeholders consulted. The methodology for impact evaluation is contained in Chapter 2, section 2.3

Potential and apparent impacts have been identified based on proposed activities to be undertaken, through specialist studies on-site and through a consultative process with key stakeholders as summarised in the environmental and social matrix Table 8.1 below

Table 8-1: Environmental and Social Impact Matrix

Impact	Source	Probability of occurrence (LMH)	Receptor	Magnitude				Overall Significance		
				Frequency (1-3)	Duration (1-3)	Extent (1-3)	Intensity (1-3)	Impact Sensitivity	Magnitude	Impact Significance
Loss of Flora	Pre-construction and Construction phase site clearing	H	Community, flora and fauna	2	1	2	2	Medium (2)	Medium (7)	Medium
Land take	ROW Acquisition	H	Community	1	3	2	2	Medium (2)	Medium (8)	Medium
Soil compaction and loss of soil structure	Site clearance, road construction, movement of heavy machinery	M	Community, flora and fauna	1	2	1	1	Low (1)	Low (5)	Minor
Erosion and siltation of water resources	Increased water runoff and erosion, Vegetation clearance	M	Community, flora	1	2	2	2	Medium (2)	Medium (7)	Medium
Disturbance of Fauna and Habitat Alteration	Construction phase disturbance, noise, human presence and pollution	M	All vegetation Mammals, reptiles amphibians, fish	1	1	2	1	Low (1)	Low (5)	Low
Visual Alteration	visual scenery alteration in the project area	M	Community, Landscape and fauna	1	3	1	1	Low (1)	Low (6)	Low
Noise and Vibration	machinery and construction activities	H	Community and fauna	1	2	2	2	High (3)	Medium (7)	High

Impact	Source	Probability of occurrence (LMH)	Receptor	Magnitude				Overall Significance		
				Frequency (1-3)	Duration (1-3)	Extent (1-3)	Intensity (1-3)	Impact Sensitivity	Magnitude	Impact Significance
Air quality alteration & emissions	machinery and construction activities	H	Community and fauna	2	2	1	2	Medium (2)	Medium (7)	Medium
Increase in Traffic accidents and Safety	Traffic and Road accidents	H	Community and fauna	1	3	2	2	High (3)	Medium (8)	High
Poor sanitation/Waste Management	Wastes generated could be both hazardous and non-hazardous	H	Community, flora and fauna	1	3	2	2	Medium (2)	Medium (8)	Medium
Introduction of alien and invasive species	site clearing, construction and operational stages due to the movement of soils and trampling	M	Community, flora and fauna	1	3	2	1	Medium (2)	Medium (7)	Medium
Increased Spread of HIV/AIDS & the Communicable Diseases	An influx of migrant labour, sexual behaviours	H	Community	2	3	3	1	Medium (2)	High (9)	High
Theft and Vandalism	Construction camps construction, equipment storage, services, materials stockpiles	M	Community	1	2	1	1	Low (1)	Low(5)	Low
The influx of construction workers and	lack the security of a definite tenure and basic social and employment protection, social ills	H	Community and workers	1	2	2	2	Medium (2)	Medium (7)	Medium

Impact	Source	Probability of occurrence (LMH)	Receptor	Magnitude				Overall Significance		
				Frequency (1-3)	Duration (1-3)	Extent (1-3)	Intensity (1-3)	Impact Sensitivity	Magnitude	Impact Significance
Labour 7 social ills										
Occupational Safety and Health hazards	Risks in terms of occupational health and safety	H	Community	2	3	2	2	Medium (2)	High (9)	High
Impacts on Physical Cultural Resources and Indigenous People	Property and cultural aspect disturbance	M	Community	1	2	1	1	Low (1)	Low(5)	Low
Gender & vulnerable groups related impacts	An influx of migrant labour and increased income in the communities	H	Community	1	3	2	2	Medium (2)	Medium (8)	Medium
Operational Phase										
Pollution of soil, surface and groundwater	Pollution of soil, and water resources due to waste oils, spills, sediments and other wastes	M	Community, water resources, flora and fauna	1	2	2	2	Medium (3)	Medium (7)	Medium
Noise and Vibration	Machinery and construction activities	M	Community and fauna	1	2	2	2	Medium (3)	Medium (7)	Medium
Visual Alteration	visual scenery alteration in the project area	L	Community, Landscape and fauna	1	3	1	1	Low (1)	Low (6)	Low
Occupational	Risks in terms of occupational health	M	Community &	2	2	1	2	Medium	Medium	Medium

Impact	Source	Probability of occurrence (LMIH)	Receptor	Magnitude				Overall Significance		
				Frequency (1-3)	Duration (1-3)	Extent (1-3)	Intensity (1-3)	Impact Sensitivity	Magnitude	Impact Significance
Safety and Health hazards	and safety		Workers					(2)	(7)	
Poor sanitation around the project site	Wastes generated could be both hazardous and non-hazardous	L	Community & Workers	1	3	1	1	Low (1)	Low (6)	Low
Visual Alteration	visual scenery alteration in the project area	L	Community, Landscape and fauna	1	3	1	1	Low (1)	Low (6)	Low
Theft and Vandalism	Construction camps construction, equipment storage, serviced, materials stockpiles	M	Community	1	2	2	2	Low (1)	Medium (7)	Medium

8.3 POSITIVE IMPACTS

The proposed project will have positive impacts and these are outlined as follows with recommendations for their enhancement. The positive impacts are presented below separately for the construction and operation phases.

8.3.1 Creation of local employment opportunities

The construction phase of the project will entail several activities that will require both skilled and unskilled labour such as clearance of land, excavation and laying of pipes, concrete and masonry building works, site levelling, and establishment of workers' campsites among other construction activities. The contractor will be obliged to get the bulk of his unskilled labour from Yumbe District and specifically Lobe rural growth centres with 30% of the jobs preserved for women. Given the youthful population outlook the young people presented in the baseline conditions will greatly benefit from the created employment opportunities and the project will be a source of livelihood for many households.

Operation and maintenance of the water supply system after it has been commissioned will also present employment opportunities for the operators.

The overall impact assessment is hence **minimal positive** and **short-lived** and applies mainly to the months of intensive excavation. The long-term jobs for O&M of the water supply system and providing security to the solar system house and other project infrastructure will also benefit a few individuals making the benefits minimal.

Enhancement measures

- a) The selected contractor will work with the local leaders especially the LC1s to ensure that the locals are given priority during the recruitment process of local workers
- b) The LC1 chairpersons give recommendations for the locals who meet the requirements to avert contractors and sub-contractors from bringing external workers. However, should be available strictly to persons above 18 years of age;
- c) Advertise the available jobs through the Local chairpersons and Community Development Officer of Yumbe Town Council
- d) The contractor is to reserve 30% of the local jobs reserved for women to make the process more gender sensitive.
- e) Deliberate efforts be made to ensure women get opportunities to work on the project during its construction phase;
- f) The contractor should evaluate worker performance;
- g) Worker grievance redress mechanism be established with the involvement of District Labour Officers.

8.3.2 Increased market for agricultural produce and local goods

It is anticipated that during the construction phase, there will be an increased market for agricultural produce and local goods. Lobe RGC residents engaged in crop farming will benefit by selling their produce to contractors' workers, especially raw food crops and cooked food. In addition, locally available goods such as construction materials will be sold to the contractor and sub-contractors which in the long run will improve the income and livelihood of the residents of Lobe RGC.

The overall impact assessment is minimal because it will be short-lived and applies mainly to the periods of construction work. The benefits will only accrue to locals engaged in crop farming and dealing in local goods with high demand by the contractors.

Enhancement measures

- a) The selected contractor(s) will be encouraged to purchase materials that can be locally available from the local markets including food crops, mineral water, bricks, sand, timber, and stone aggregates among others;
- b) The sub-country/parish through sensitization will encourage local people to start up small enterprises, for example, kiosks and sale of food items and domestic supplies, to serve the construction crew.
- c) The contractor should ensure timely payment to workers;
- d) Encourage workers to form saving groups;
- e) Local Content Policy provisions should be ensured.

8.3.3 Income to Material/ Equipment Suppliers and Contractors

The project will require the supply of various materials and/ or equipment. For example, construction will require cement, aggregates, sand, etc. some of which can be sourced locally. Some equipment and materials, for example, pumps, and solar panels, required for the project will be sourced nationally and internationally to ensure that the desired quality is achieved. Local suppliers of materials and equipment who get involved in the project will benefit financially. The project-affected communities would benefit mostly during the construction phase.

Enhancement measures

- a) Earth materials needed for construction, for example, murrum, and aggregate (stones and sand) are obtained from quarry operations. These should be largely obtained from the project district. However, conscious or unwitting purchase of these materials from unlicensed operations indirectly promotes environmental degradation at illegal quarry sites and can cause medium-term negative impacts. It will therefore be a contractual obligation for

contractors to procure construction materials from quarries legitimately licensed by the project District Local Governments and duly approved by NEMA

8.3.4 Improved Skills for Local Communities

The Project is under contractual obligation to maximise the use of local people for construction works. The benefit that is in for the locals lies in the unique chances for the transfer of skills and technical knowledge in construction and related technical sectors. A considerable number of the employed workforce will convert themselves into fully skilled labourers in work such as plumbers among others. These skills will not only benefit the locals by providing long-term employment opportunities but also contribute to local human resource development in Project areas that otherwise have restricted opportunities.

Enhancement measures

- a) Hiring local workers is a priority, especially for unspecialized jobs. Adopt procurement policies promoting local products and services;
- b) Encourage the recruitment of female workers, with equal payment for male and female workers, for equivalent jobs;

8.3.5 Improving the growth of the economy

Through the use of locally available materials during the construction phase of the project including cement, concrete and ceramic tiles, timber, sand, pipes etc., the project will contribute towards the growth of the economy by contributing to the gross domestic product. The consumption of these materials, fuel oil and others will attract taxes including VAT which will be payable to the government hence increasing government revenue while the cost of these raw materials will be payable directly to the producers.

Enhancement measure

- a) Hiring local workers is a priority, especially for unspecialized jobs. Adopt procurement policies promoting local products and services;
- b) Encourage the recruitment of female workers, with equal payment for male and female workers, for equivalent jobs

8.3.6 Employment opportunities

Employment opportunities will be available to construction-related professions, and other non-skilled employment opportunities for casuals. Cumulatively the project will present a beneficial social economic impact on development. Other employment opportunities shall present themselves in the form of, security personnel, housekeepers, and porters at the construction site

among others. The employment opportunities will, however, be temporary during the construction phase for about 12 months.

Enhancement measures

- a) Workers employed to work at the construction site or facility should be paid on time and have signed contracts.

8.3.7 Improved Site Aesthetics

Construction of the proposed water supply system and proper landscaping will give a better outlook of the area making it more visually attractive and appealing.

Enhancement measures

- Ensure proper clean-up and landscaping work after completion of the construction phase.
- There is a need to have a maintenance plan to keep the premises more visually attractive and appealing.

8.3.8 Market for Construction Materials

Some of the construction materials will be procured locally and this will provide revenue to the local economy. Some of the materials produced locally can be procured from local supplies. These will include sand, bricks aggregate stones, and cement. The proceeds from the sale of the raw materials for construction purposes at the proposed project site will boost the local economy in the form of increased earnings

8.4 NEGATIVE CONSTRUCTION PHASE ENVIRONMENTAL AND SOCIAL IMPACTS

8.4.1 Flora (vegetation clearance and destruction of crops)

The analysis of the impact discussed in this section is related to the project activities that include construction of the project infrastructure and this will involve site clearance which could remove and/or disturb vegetation in affected areas. For instance, construction of the pump and guard house, office and reservoir may lead to clearance of vegetation at such locations leading to loss of terrestrial, agroforestry and crop vegetation.

The vegetation traversed by the project is indicated in Section 5.2.1. Project infrastructure such as the pump house/office, and transmission line traverses through savanna grassland and crop gardens. The vegetation cover in Lobe Trading Centre is highly transformed from its original natural state and in contrast, hosts few remaining species. Very little remaining natural vegetation

cover of conservation importance was recorded, due to extensive human activities. Most of the existing vegetation is fruit trees comprising mainly mangoes and agroforestry trees (teak). Tectona is a genus of tropical hardwood trees in the mint family, Lamiaceae.

There is no characterization of rare and/or restricted-range species in the actual project footprint.

The clearing of the corridor, movement of equipment and contractor staff and laying of pipes will lead to spot destruction of vegetation especially in areas under fallow and those planted with private wood Lots (plantation forests). These areas are mainly farmlands, savannah grasslands and woodlands.

Clearing the 3-meter strip of land within the road reserve will indeed result in the destruction of vegetation. However, the anticipated impact on the conservation status of the flora and ecosystems in question is projected to be minimal, as there are no particular species of conservation concern expected to be eradicated along this corridor.

Risk assessment matrix

The vegetation clearance along the water transmission/distribution line, as well as at the reservoir, pump house, and access road sites, although permanent in areas where crucial project infrastructure will be installed, will result in localized and minor impacts that are reversible and non-cumulative. Consequently, a minor alteration is anticipated. Therefore, the impact of construction activities on vegetation and habitats is expected to be moderate, but this could be further reduced to a low significance through the proper implementation of mitigation measures.

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Loss of vegetation and terrestrial habitat alteration	Local	Low	Temporary	High	Medium

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Mitigation Measures	<ul style="list-style-type: none"> • A RAP shall be developed and implemented by MWE to ensure that affected crops are compensated. Compensation should be in line with the World Bank and Government Chief Valuers approved RAP report. • Before compensating destroyed crops, and the affected persons, adequate community sensitization meetings shall be carried out to ensure that the PAPs are aware of the entire program including the visitation schedule per village, parish and or sub-county and how each PAP will be contacted and approached for payment. • The construction of the proposed water transmission and distribution lines shall only commence when all the affected farmers have been fully sensitized to the pending activities. Before the construction phase, farmers shall be sensitized on the pending project at least 6 months in advance such that cultivation under the line and within the water pipe corridor is stopped or reduced. This will give affected farmers ample time to plan. • Limit the project activities to the footprint of the required project area; • Prohibit off-road driving and parking outside of the project area, perimeter fence and designated parking area; • Establish a containerised storage for construction/ project materials to limit the number of movements; and • Stockpile the surface soil on the side of the project site for future use in landscaping. • After construction, there should be landscaping and then grass left to recolonize the disturbed area naturally. The Developer shall set aside funds to contribute towards local environmental programs. MWE shall remit funds towards district and sub-county afforestation projects as part of the catchment management program to compensate for biomass lost during corridor clearing and habitat fragmentation. In case the destruction is due to the contractor's negligence, it will be the responsibility of the contractor to make compensation. MWE shall take the overall responsibility however, the contractor takes the liability for those plants/trees destroyed either knowingly or unknowingly and which are outside the Corridor. • The contractor should restore sites where activities will be carried out at all the project sites. The topsoil that will have been removed before pitting the trenches for the pipeline should be put back to cover the trenches so that the crops can regrow in a natural environment. Excess soil, stones and boulders should be dumped in an area that has been approved by the District Environment Officer. • MWE should also identify and support afforestation initiatives to enhance tree cover areas as a way of reducing its project footprint. 				
Cumulative Impact	<p>At the time of assessment, no visible projects were being implemented or planned, however, it was noted that extension of the electricity grid to the rural areas and opening of community access roads within the town council is likely in the future. Therefore, the compounding effect on Vegetation clearance as a result of other projects may lead to increased soil erosion, as vegetation helps to hold soil in place. This will lead to the sedimentation of water bodies such as wogi stream affecting its water quality and</p>				

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
	aquatic habitats. The impact significance is medium to High.				
	<p>Mitigation Measure</p> <p>Plant trees and restore vegetation to mitigate the impacts of climate change.</p> <p>Encourage sustainable land use practices, such as agroforestry and re-afforestation in local communities</p>				
Residual Impact	Due to the construction of the project, there is the likelihood of a minor residue negative impact even after the implementation of the proposed mitigation measures.				
Reversibility	Yes				

8.4.2 Land take

The analysis of the potential impact discussed in this section is based on the fact that land will be acquired during the implementation of the proposed project activities. The baseline information indicates that land ownership in the project areas is mainly communally owned and governed by the customary system of land tenure system (see section 5.21) and agriculture is the main form of land use in the area.

Land take and associated impacts are only limited to the pre-construction and construction phases. Land for the establishment of the pump house, the reservoir and other project components would have to be acquired before the commissioning of project activities and any further project activities. The construction of infrastructure is planned within the footprint of the project site.

The construction of the project infrastructure will necessitate the acquisition of land for permanent activities. Permanent land take will result from the construction of the pump house and the reservoir facilities, and related infrastructure such as link roads, and fences among others.

To access the sites during project construction and operation, it could be necessary to upgrade the community road, including widening the existing road as well as constructing new link roads to the project site, these activities could further lead to permanent loss of land to the project. All the land required for the construction of project infrastructure was previously owned by the local community under the communal customary land tenure system.

This impact will lead to the permanent abandonment of activities such as farming, and animal tethering that are being carried out within the project footprint. In addition, land take is likely to

threaten the food security of the local communities that depend on land for both agriculture and fruit harvesting.

According to the present project design, there will be no physical relocation of any house as a result of the proposed project.

The impact is only limited to the construction phase as there is no further significant land requirement during the operation of the Water Supply and sanitation System even though extensions could happen in the future.

Risk assessment matrix

The identified effects of land take and habitat due to construction activities were assessed to be moderate which could be mitigated to a further low significance with proper implementation of the mitigation measures.

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Loss of land to the water infrastructure	Local	Low	Long term	High	Medium
Mitigation Measures	<ul style="list-style-type: none"> • Limit the project activities to the footprint of the required project area; • Prohibit off-road driving and parking outside of the project area, perimeter fence and designated parking area; • Establish a containerized storage for construction materials to limit the number of movements; and • Stockpile the surface soil on the side of the project site for future use in landscaping. 				
Cumulative Impact	<p>The increased land take from other projects may affect the agricultural activities of local communities, particularly those who depend on agriculture and fruit harvesting for sustenance. The combined cumulative land take for all developments in the area represents a minor reduction in the overall land available for crop farming and animal husbandry, which is likely to minimally reduce the overall agricultural production over the short to medium term at least. The impact significance is medium due.</p> <p>Mitigation Measures</p> <ul style="list-style-type: none"> • Seek community input on land-use decisions to ensure development aligns with local priorities • Liaise with the Land acquisition committee for standard rates and compensation timing to avoid double impact or disruption of the same community or individuals • Develop and implement land use planning strategies that ensure minimal disruption to agricultural activities. This could involve identifying alternative areas for project development that have less impact on agricultural land. 				
Residual Impact	Due to the construction of the project, there is the likelihood of a minor residue negative				

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
	impact even after the implementation of the proposed mitigation measures.				
Reversibility	Yes				

8.4.3 Soil erosion and siltation of water resources

Site preparation activities will include clearance of vegetation within the footprint of the pump house/ office, reservoir, access road etc. These activities will result in the stripping of vegetation and topsoil, which will need to be stockpiled, backfilled and/or spread on-site. This will loosen the ground due to the removal of plant roots and exposure of the ground to agents of erosion. Compaction of the ground will also result in accelerated rates of stormwater runoff which directly increases the rate of soil erosion. Eroded soil could also affect the silting of the wetland and downstream of the project area. This could also affect the aquatic ecosystem.

The impact is only limited to the construction phase as there are no further significant vegetation clearance and ground disturbances during the operation of the Lobe RGC Water Supply and sanitation system.

Risk assessment matrix

The identified effects of soil erosion and siltation of water resources due to project construction were assessed to be minor with reduced significance due to proper implementation of the mitigation measures.

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Loss of land to the water infrastructure	Local	Low	Temporary	Medium	Minor
Mitigation Measures	<ul style="list-style-type: none"> • Site preparation should be undertaken systematically to reduce the risk of open ground to erosion; • There will be controlled clearance of vegetation and this should be limited to only sections that are required for the establishment of project infrastructure; • An efficient drainage system should be incorporated in the project design to cater for efficient and effective drainage of stormwater from the project site and along the access road; • Where possible, construction activities should not take place during heavy rain seasons; • Disturbed areas will be rehabilitated using suitable indigenous cover grasses; and • Landscaping of affected areas should be undertaken following the completion of the construction phase to stabilise surfaces. 				

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Cumulative Impact	Soil erosion and siltation of water resources will be a result of the additive effect caused by land clearance associated with construction projects in the area.				
	Mitigation Measures				
	<ul style="list-style-type: none"> • Implementing proper drainage systems to manage stormwater runoff effectively and prevent soil erosion. • Conducting regular monitoring of soil erosion and water quality parameters to detect any adverse impacts early and take prompt corrective actions. • Educating construction workers and contractors about the importance of erosion control and proper sediment management practices. 				
Residual Impact	Due to the construction of the project, there is the likelihood of a minor residue negative impact even after the implementation of the proposed mitigation measures.				
Reversibility	Yes				

8.4.4 Disturbance of Fauna (Loss of wildlife, invertebrates, birds, etc.)

The analysis in this section focuses on the potential impact of the project on fauna within the project area, particularly concerning the disturbance caused by vegetation removal and construction-related activities such as noise and vibrations. The removal of vegetation not only destroys fauna habitat but also disrupts or alters habitats for birds, which were the main fauna identified in the area according to the baseline data presented in section 5.2.1. Additionally, the project area is characterized by different segments of vegetation along the project from the source to the reservoir. These include savanna mosaic of bushlands and thickets graduating into extensive woodlands at the water source, human settlement and limited natural vegetation, indicating a highly modified environment.

This may lead to the establishment of new invasive species. However, it is possible to address these potential biodiversity impacts at all stages of the project, from planning and implementation to post-construction. It's important to note that the impact is primarily limited to the construction phase, as there is no significant vegetation clearance during the operation of the Water Supply and Sanitation System.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Loss of biodiversity	Local	Low	Temporary	Medium	Medium

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Mitigation Measures					<ul style="list-style-type: none"> • Movement of equipment (vehicles, contractors and the entire construction crew) must follow designated pathways or agreed-upon access roads. This will avoid unintended damage to fauna. • The contractor should restore sites where activities will be carried out at all the project sites. • If wild animals are encountered, the Contractor shall notify the Environment/UWA department at the district so that it is managed and taken to a secure place. • Trenching, pipework laying as well as well and backfilling will be done concurrently. The contractor shall plan to only excavate trenches after securing and delivering pipes to be laid to reduce on maintenance of open pits. • Implement environmental awareness programs/training among all project employees, particularly during construction. They should be trained to identify arboreal or burrowing species exposed by vegetation and soil stripping and should have immediate access to a competent specialist on site (e.g. the Environment Officer) who can capture and translocate them to an undisturbed area. • There are no specific measures for the protection of invertebrates because of the difficulty in identifying these species for those unfamiliar with entomology and practical reasons for topsoil collection and storage. However, all mitigation measures related to minimizing habitat fragmentation, prevention of soil and water pollution, minimizing trampling and control of invasive species should be applied. • Restrict vehicle movements to and from the project site to the project access road - off-road driving should be prohibited. • Following construction, rehabilitation of all areas disturbed during the construction phase and that are not required for regular maintenance operations must be undertaken. • All exposed areas are to be re-vegetated using indigenous species
Cumulative Impact					<p>The visible construction activities may be perceived differently by different stakeholders, with some considering them unsightly or disruptive to the natural environment. The impact significance is medium</p> <p>Mitigation Measures</p> <ul style="list-style-type: none"> • Design infrastructure and construction activities to minimize visual impact and blend harmoniously with the surrounding landscape. • Engage with local communities and stakeholders to understand their concerns and incorporate their feedback into the project design and implementation. • Use natural or man-made screening, such as vegetation or fencing, to visually shield construction activities from view
Residual Impact					Due to the construction of the project, there is a likelihood of minor residue negative impact even after the implementation of the proposed mitigation measures.
Reversibility	Yes				

8.4.5 Visual Alteration (Aesthetics pollution)

The topography of the area is gently sloping enabling gravity flow of water from Urungu Reservoir to the beneficiaries in lower areas of Lobe Town Council (See section 5.1.3). site clearance, excavations and heaping of spoil soil or storage of the construction materials will be visible because of the nature of the area and may be aesthetically not pleasing to the community.

The construction activities if not masked to blend with the environmental setting might affect the visual amenity around the area, especially for Drachia and Urungu Villages. There is a couple of institutional development in the broader Lobe Town Council.

The project will involve the construction of a pump house, water reservoirs, an office and sanitary facilities. These being above ground may lead to visual disruption. Because of this, the project may attract complaints from a section of the affected people which may slow down the project implementation pace. A well-planned and designed development of this nature with well-kept green areas may be aesthetically pleasing to the eye compared to the current land use. Although this will be permanent, the extent will be local and the magnitude is low hence the impact is rated as minor.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Aesthetics pollution	Local	low	permanent	Medium	Minor
Mitigation Measures	<ul style="list-style-type: none"> Restore disturbed areas following completion of construction activities; Construct a perimeter fence around the project site before the establishment of the project component; and Sensitize community members on the planned development Establish a community liaison officer for the flow of information 				
Cumulative Impact	<p>The visible construction activities may be perceived differently by different stakeholders, with some considering them unsightly or disruptive to the natural environment. The impact significance is medium</p> <p>Mitigation Measures</p> <ul style="list-style-type: none"> Design infrastructure and construction activities to minimize visual impact and blend harmoniously with the surrounding landscape. Engage with local communities and stakeholders to understand their concerns and incorporate their feedback into the project design and implementation. Use natural or man-made screening, such as vegetation or fencing, to visually shield construction activities from view 				
Residual Impact	There is the likelihood of a minor residue negative impact even after the implementation of the proposed mitigation measures during the operation of the water supply system.				
Reversibility	Yes				

8.4.6 Impact on temporal structures

Although the proposed Lobe RGC will be undertaken through the road reserves of the existing public roads. Trenching through the Lobe Trading Centre may displace some temporary roadside kiosks, signposts, and makeshift stalls within the road reserve. Therefore, the community shall be informed before the commencement to shift the stalls from the road reserves to allow the construction work. However, the impact on structures is very low.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Impact on structures	Local	Medium	Long term	High	Medium
Mitigation Measures	<ul style="list-style-type: none"> MWE shall work with local council committees, Town Council committees, Councilors, district land boards, CAOs, RDCs, Politicians and other local leaders to sensitize all people to be affected. MWE shall conduct a Resettlement Action Plan (RAP) in accordance with the Land Act and World Bank environmental and social Safeguard Policies especially Involuntary Resettlement (OP 4.12). MWE shall negotiate with land and structural owners in compliance with local market prices and government rates to establish rational figures for compensation and resettlement. All sorts of compensation and settlements must be done at least 6 months before structures are demolished. All physically or economically displaced people should be offered an option between either a full resettlement package, including the provision of replacement residential land and a house, or cash compensation. Any grievances in the course of project implementation shall be addressed following the grievance redress mechanism. 				
Cumulative Impact	Effect on structures could be associated with other projects developed and operated in the area. Mitigation Measures <ul style="list-style-type: none"> Establishing setback requirements or buffer zones between new developments and existing structures to minimize potential impacts. Maintaining a safe distance between projects can reduce the risk of damage to nearby buildings. 				
Residual Impact	There is the likelihood of a minor residue negative impact even after the implementation of the proposed mitigation measures during the operation of the Water Supply System.				
Reversibility	Yes				

8.4.7 Noise generation

During the implementation of project activities, noise will be generated which could become a nuisance to the local communities within and neighbouring homesteads along the access roads. Baseline noise levels at the project site were determined. The baseline noise levels were then used to assess the likely increase in noise levels as a result of the proposed construction activities. Reference was also made to the National Environment (Noise Standards and Control) Regulations, 2003 and in particular to permissible noise levels for different environmental settings (see Table 5.1 and 8.4 below) as well as the professional judgment of the consultants and experience from similar projects.

The noise created at the site during construction is not expected to noticeably alter baseline noise levels, but some events may result in noise levels that exceed the maximum permissible noise levels for construction sites affecting key receptor areas such as Lobe Town Council offices, Lobe Health Centre, Urungu Primary School, Lobe Mosque, Drachia Primary School, Lobe Primary School, Kubali Primary School and Mosque and Pope Angel nursery school. Noise levels generated will pose a greater nuisance if construction activities take place at night. However, based on current planning this is not envisaged.

Table 8-2: Maximum permissible noise levels for construction sites and accelerating vehicles

Facility	Maximum Permissible Noise Levels dB (A)	
	Day*	Night*
Construction Sites		
(i) Hospitals, schools, institutions of higher learning, homes for the disabled etc.	60	50
(ii) Buildings other than those prescribed in paragraph (i) above	75	65
(iii) Industrial	85	65
Accelerating Vehicles		
Vehicles intended for the carriage of goods and having a maximum mass exceeding 3.5 tonnes		
a) With an engine power of less than 75KW		81
b) With an engine power of not less than 75Kw but less than 150KW		83
c) With an engine power of not less than 150KW		84

The letters “A” following the abbreviation “dB” designate a frequency-response function that filters the sounds that are picked up by the microphone in the sound level meter. (A) is used to measure hearing risk and for compliance with the Occupational Safety and Health Act, 2006

regulations that specify permissible noise exposures in terms of a time-weighted average sound level or daily noise dose.

Time Frame (The time frame takes into consideration human activity).

Day: 6.00 a.m-10.00 p.m., Night: 10.00p.m- 6.00 a.m.

Source: *Environmental Legislation of Uganda Handbook (2003).*

The major sources of noise and vibration during the construction of the project infrastructure will be mainly during construction equipment and the construction crew. Some of these noise sources are continuous e.g. access road construction activities, while others are intermittent, such as earthworks, site levelling, ramming of the mounting structures etc.

In addition, unlike the noise associated with the actual site activities, the noise generated along the access road will not be continuous and/or stationary and this noise is therefore not considered particularly relevant, nevertheless noise mitigation measures have been suggested for the access road as well.

It is important to note however, that, noise levels generated tend to reduce exponentially with increasing distance from the source, and therefore irrespective of the sensitivity of the receptor, it is the intensity of the impact that influences the severity of the noise impact.

Risk assessment matrix

The identified effects of noise generation and vibration as a result of project construction were assessed to be moderate which could be mitigated to lower significance with proper implementation of the mitigation measures.

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Noise and vibration	Local	Medium	Long term	High	Medium

Mitigation Measure	<ul style="list-style-type: none"> • Prior notice/community awareness will be undertaken for the local community members to keep them informed of what will take place/schedules of the project activities so that they can plan accordingly. Where necessary, they will be advised to avoid some sections at certain times of the construction phase to avoid noise disturbances/nuisance; • Noise events will be scheduled for appropriate times of the day to avoid disturbance of any programmed community gatherings and school programmes • Construction activities will be limited to only day-time hours; • Unnecessary noise from the construction crew (such as loud vocalizations and music) will be prohibited; • Adherence to national noise regulations as stipulated in the National Environment (Noise Standards and Control) Regulations (2003) will be ensured; • A grievance mechanism will be established to enable local people to express their concerns; • Noise monitoring will be undertaken within the area and at nearby sensitive receptor sites during construction; • The use of well-maintained and serviced equipment that generates low noise levels will be emphasized; • Workers involved in construction activities will be provided with requisite Personal Protective Equipment; • Idling of machinery including vehicles will be prohibited unless necessary; • The use of horns should be reserved for safety considerations, and not used as a common communication method; and • Acoustic insulation (e.g. screens or bunds) will be deployed when necessary, especially on compressors, when possible.
Cumulative Impact	<p>The increase in noise levels from construction activities will most likely lead to noise pollution and this is likely to occur in the same project footprint, which can have adverse effects on human health and well-being in receptor areas such as Lobe Trading Centre and Town Council Office trading center, institutions along distribution lines etc. The impact significance is High.</p> <p>Mitigation Measures</p> <p>Engage with local communities to raise awareness</p> <ul style="list-style-type: none"> • All entities should follow the limits provided in the National Environment (Noise Standards and Control) Regulations 2003
Residual Impact	<p>Due to the construction of the project, there is the likelihood of a minor residue negative impact even after the implementation of the proposed mitigation measures.</p>
Reversibility	<p>Yes</p>

8.4.8 Pollution of soil, surface and groundwater

During the conduct of the implementation of project activities, poor waste management and oil and fuel leaks will contaminate the soil, surface and ground water thus affecting its quality.

Sources of hazardous chemicals that may temporarily contaminate the environmental quality were identified and analysed on a case-by-case basis. These were then used to discuss the likely

decline in the soil and water quality that is likely to be caused as a result of the implementation of activities.

The potential contaminants during the construction phase for the Lobe Water Supply and Sanitation System include packaging (paper, plastics, wood); plastic liners; food; oil spillages, worn-out personal protective and oily rugs. If not properly managed, this waste has the potential to contaminate soil in or within the vicinity of the project area. The construction activities could affect the Wogi stream which is close to the Drachia borehole source since the site is undulating towards the stream.

Risk assessment matrix

The identified effects of pollution of soil surface and ground water due to project construction were assessed to be Low and remain low with proper implementation of the mitigation measures.

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Pollution of soil, surface and groundwater	Local	Medium	Long term	High	Medium
Mitigation Measures	<ul style="list-style-type: none"> • The project proponent will ensure that all wastes generated during construction activities such as conductors, steel and metallic bars, insulators and other accessories are collected and disposed of appropriately at designated sites; • All organic waste generated at the project site such as food waste shall be collected and transported by a licensed waste collection entity to designated landfills/dumping sites within the project area; • All plastic waste generated in the course of undertaking works such as mineral water bottles, polythene bags, and jerry cans, will be collected preferably in waste bins/ mobile vans and handed over to a licensed waste collector or re-used; • All wastes emanating from the refueling procedures and contaminated soils will be treated as hazardous waste; • Undertake monitoring of the soil quality and devise corrective action when changes attributed to project implementation have been observed; • The waste management hierarchy will be followed during the construction phase. According to this hierarchy, source reduction of waste will be the first option and disposal of unavoidable waste as the option of the last resort; • Undertake routine preventive maintenance of motorized equipment to avoid any fuel leakage and spills; and • All waste generated from project activities will be collected and disposed of following the local district guidelines, National Environment (Waste Management) Regulations 1999 and international best practices. 				
Cumulative Impact	Contaminants can leach into nearby water bodies, leading to water contamination. This can pose risks to public health through the consumption of contaminated water or food grown in contaminated				

	<p>soil. The impact significance is High.</p> <p>Mitigation Measures</p> <ul style="list-style-type: none"> • Dispose of waste in accordance with local regulations and guidelines to prevent contamination of soil and water. • Provide training to workers on proper waste management practices and raise awareness among the local community about the importance of waste management. • Regular monitoring of waste management practices to ensure compliance with regulations and to identify and address any issues promptly.
Residual Impact	Due to the construction of the project, there is the likelihood of a minor residue negative impact even after the implementation of the proposed mitigation measures.
Reversibility	Yes

8.4.9 Soil compaction and loss of soil functions

During the implementation of proposed project activities, soils within the project perimeter will be compacted which may result in loss of its functioning. The professional judgment of the consultants and experience from similar projects were used to assess changes in soil compaction and functioning between the current baseline and following the proposed project activities.

The main cause of this impact will be the movement of the construction equipment within the project perimeter, pressure exerted on the ground may result in the compaction of sub-surface soils.

Soil compaction alters soil's physical and chemical properties by reducing the composition of air, reducing the rate of infiltration and formation of a hard pan which increases soil resistance to root penetration. As a result, the productivity of the soil decreases, hence the loss of soil functioning.

Risk assessment matrix

The identified effects of soil compaction and loss of soil function due to project construction were assessed to be low.

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Soil compaction and loss of soil functions	Local	Low	Long term	High	Low

Mitigation Measures	<ul style="list-style-type: none"> • Limit the project activities to the footprint of the required project area; • Prohibit off-road driving and parking outside of the project area, perimeter fence and designated parking area; • Establish a containerized storage for construction materials to limit the number of movements; and • Stockpile the surface soil on the side of the project site for future use in landscaping.
Cumulative Impact	<p>The interaction of the construction of the proposed project with “other” projects and/or plans, especially the envisaged electricity distribution lines in the area may lead to increased soil compaction due to the movement of the construction equipment that may alter the physical and chemical properties of soil, reducing its ability to support soil organisms and perform essential ecosystem functions such as nutrient cycling and water regulation. The impact significance is Low to moderate.</p> <p>Mitigation Measures</p> <p>itigation Measures</p> <ul style="list-style-type: none"> • Establish designated access routes for construction vehicles to minimize their impact on sensitive soil areas. • Designate specific staging areas for construction vehicles to park and unload materials without traversing sensitive soil zones.
Residual Impact	Due to the construction of the project, there is the likelihood of a minor residue negative impact even after the implementation of the proposed mitigation measures.
Reversibility	Yes

8.4.10 Alteration of air quality due to the generation of dust and emissions

Construction activities will result in dust emissions as a result of vegetation clearance at the proposed project site during earthworks for the establishment of the different water supply and sanitation system infrastructure components and along the access road route as a result of vehicular movement. Dust will also be generated during the transportation of required construction materials from the different source points to the proposed project site. Fugitive dust may be stimulated by heavy wind and storm along the cleared access road, cleared project site and from soil stockpile(s). Dust emissions, particularly in the form of particulate matter (PM10 and PM25) at the proposed project site and majorly along the roads that will be used to access the site during construction are likely to pose a nuisance to local community members and other road users, who in addition to project workers will constitute the key sensitive receptors. Drachia Primary School located along the access road to the borehole source, Lobe Health Centre and Urungu Primary School are likely to be affected by trucks delivering materials to the reservoir site at Urungu Hill.

The proposed project area is generally rural with interfaces of natural vegetation and lands under cultivation. The area is largely vegetated which limits exposure of soils to wind, and the dust

raised by wind could be essentially retained by vegetation. There are also low levels of traffic through the village and as such, low fugitive dust levels at the proposed project area.

The most significant sources of gaseous emissions during the construction phase are expected to be from the operation of vehicles and equipment.

The construction equipment could include but will not be limited to; cranes, excavators, trucks, and roller compactor machines. The gaseous emissions caused by the project based on the above-listed equipment, are expected to include CO², NO², SO², volatile organic compounds and BTEX, since most of the construction equipment and machinery will be powered by diesel engines.

Significant receptors as far as any changes in ambient air quality are concerned, will be the local community members surrounding the proposed project area and all construction sites. It is also important to note that, gaseous emissions are not restricted to the project area, they can spread to a wider area as determined by the direction of the wind.

Air quality impacts from the construction of the water supply and sanitation infrastructure would be temporary and dependent on both manmade factors (e.g., intensity of activity, control measures, etc.) and natural factors (e.g., wind speed, wind direction, soil moisture, etc.). However, even under unusually adverse conditions, these emissions would have, at most, a minor, transient impact on off-site air quality and be well below the ambient air quality standard. Overall, the direct air quality and GHG emissions impact of the construction of the water supply and sanitation system would not be significant.

There are no major industrial developments within the proposed project area, and the only primary sources of air emissions in the area would be the traffic that plies the community roads and generator operations for power generation in the Lobe Trading Centre approximately 2km project site water source.

Emissions associated with Lobe RGC are therefore not expected to noticeably alter air quality or cause concentrations that exceed the National Environment (Draft Air Quality) Standards 2006 for Uganda.

Continuous and long-term exposure to polluted air is associated with effects on human and animal health, especially respiratory-related infections. Such health complications are not anticipated due to the non-continuous nature of the emissions.

Risk assessment matrix

The identified effects on air quality as a result of the generation of dust associated with project construction activities were assessed to be minor.

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Alteration of air quality due to the generation of dust and emissions	Local	Low	Long term	High	Minor
Mitigation Measures	<ul style="list-style-type: none"> • The access road should be routinely watered by watering trucks or a constant sprinkling of water so that surfaces remain damp at all times when in use during construction. The proponent should make provisions to have an adequate amount of water and appropriate equipment to disperse water onsite at all times; • All truckloads that enter or leave the site should be covered to minimize dust along community roads; • Clearing of land should be carried out systematically - with clearing restricted to only the required areas to minimize disturbed and exposed areas; • Stockpiles of construction materials should be shielded from wind using materials or tools such as tarpaulins or they should be dropped at low heights and monitored. In addition, they will be located away from the public (e.g. residential areas); • All vehicle movements should be subject to risk assessment (which allows for the incorporation of project-specific controls) and all drivers should be inducted on health, safety and social and environmental issues; • A speed limit of 40km/h for light vehicles and 30km/h for heavy vehicles should be maintained on the community road to access the project site; • Community awareness and sensitization about the proposed project should be created before construction activities so that community members become more vigilant and are aware of what to expect in terms of potential nuisances; and • A grievance mechanism will be put in place to address grievances from local communities. • Construction equipment deployed at the project site will be in good condition and will be routinely maintained to ensure they are efficient and emit relatively low exhaust fumes; • Open burning of waste should be discouraged; • Vehicles and machinery should be fitted with appropriate exhaust systems and devices; • Machinery and vehicles should be serviced regularly and in accordance with the manufacturers' specifications to maintain efficiency; • All emission-producing equipment should be operated only when necessary and unnecessary idling of equipment will be avoided; • Journey management will be undertaken to ensure that only the necessary trips required for the construction activities are made. 				
Cumulative Impact	<p>Impacts may occur from the compounding of an issue (e.g. pollution from different sources affecting the same receptor). Such impacts include Inhalation of dust particles generated by the movement of construction vehicles within the project area can pose respiratory health risks, especially to vulnerable populations such as children, the elderly, and individuals with pre-existing respiratory conditions. The impact significance is medium</p> <p>Mitigation Measures</p> <ul style="list-style-type: none"> • Implement dust control measures such as watering of roads and construction areas, use 				

	<p>of dust suppressants, and covering of materials to minimize dust emissions.</p> <ul style="list-style-type: none"> • Raise awareness among local communities • Proper site management practices, including minimizing the area of disturbance and scheduling construction activities to minimize dust generation during sensitive times.
Residual Impact	Due to the construction of the project, there is the likelihood of a minor residue negative impact even after the implementation of the proposed mitigation measures.
Reversibility	Yes

8.4.11 Increased traffic and associated risks

During the implementation of the different phases of the project, traffic in the area will increase as a result of project-related vehicles and equipment that will be brought into the area.

The anticipated level of traffic as a result of project activities was determined and analysed on a case-by-case basis. This was then used to discuss the likely increase in traffic in the area as a result of project activities. The professional judgment of the consultants and understanding of the communities and experience from similar surveys were used to assess the potential increase in traffic from the current baseline as a result of the survey activities.

Construction activities have risks of accidents from heavy trucks, vehicles and equipment movements. The accidents may not be limited to road kills, they could also be collisions involving community traffic, especially on the community Road. These accidents could impact livestock and people causing injuries and fatalities. The cause of an accident could be over-speeding, reckless driving or driving under the influence of drugs. There is a small volume of traffic plying the community road and limited/ no traffic within the Drachia Village, Urungu areas and other parts of Lobe Town Council

Risk assessment matrix

The identified effects of traffic risks due to project construction were assessed to be substantial which could be mitigated to low significance with proper implementation of the mitigation measures.

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Increased traffic and associated risks	Local	Low	Long term	High	High

Mitigation Measures	<ul style="list-style-type: none"> • Traffic warning signages should be elected along the community Road notifying road users of ongoing activities on site; • Establish a driving policy for vehicle and equipment operators; • Establish a grievance resolution mechanism for handling any community complaints and establish proper reporting lines; • Report any accident involving project trucks and equipment to the local authority and the police; • Provide training for drivers to respect other road users; and • Develop and implement a traffic management plan for project vehicles and equipment.
Cumulative Impact	<p>Traffic risks will be a result of the cumulative effect caused by the construction project trucks on the existing community Roads</p> <p>Mitigation Measures:</p> <ul style="list-style-type: none"> • Arrange construction activities to reduce disruptions during peak traffic hours. • Plan significant deliveries and heavy construction tasks for times when traffic is lighter.
Residual Impact	<p>Due to the construction of the project, there is a likelihood of minor residue negative impact even after the implementation of the proposed mitigation measures.</p>
Reversibility	<p>Yes</p>

8.4.12 Poor sanitation around the project site

The potential for the waste generated during project activities to be poorly handled and result in a decline in the sanitation levels within the project area is assessed in the section below.

Construction waste to be generated during this phase may include emptied cement containers, used oils from construction vehicles, machinery and equipment, and packaging materials in the form of plastics and paper. In addition, domestic wastes that may include food waste, food packaging materials brought to the site by construction workers, and sewage and human waste, among others will also be generated during the construction phase.

If not properly handled, domestic and construction waste may turn out to be a sanitation hazard as well as attracting vermin such as rodents and plastic wastes could affect the health of livestock if ingested. Waste handling facilities were not available in Lobe Trading Centre particularly at the proposed project site (proposed source) although it is typical of rural areas to dispose of waste in open land spaces, gardens and pits. Additionally, no waste litter was observed within the project area.

Poor sanitation could also result from poorly disposed human waste. There are limited constructed pit latrines around the project site for use by project workers.

Risk assessment matrix

The identified effects of poor sanitation as a result of project construction activities were assessed to be Moderate and could be reduced to minor with proper implementation of the mitigation measures.

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Poor sanitation around the project site	Local	Low	Long term	High	Medium
Mitigation Measures	<ul style="list-style-type: none"> The contractor will ensure that all waste generated from construction activities is properly collected and handled before disposal. Biodegradable, non-biodegradable, hazardous and non-hazardous wastes will be segregated accordingly during collection; Install and properly maintain a mobile toilet on site for use by the construction crew; All waste collected should be disposed of appropriately e.g. a licensed waste collector should be contracted to transport waste material from the site to the designated disposal area; The on-site ablution facility will be serviced regularly; Anti-vermin safeguards (such as covering bins with lids) will be put in place; and Construction activities will aim to reduce, reuse and recycle waste in preference to disposal. 				
Residual Impact	Due to the construction of the project, there is a likelihood of minor residue negative impact even after the implementation of the proposed mitigation measures.				
Reversibility	Yes				

8.4.13 Introduction of alien and invasive species

Although the proposed project site currently has different land use forms including natural grassland, woodland and crop gardens and is therefore ‘somewhat disturbed’ and thus prone to invasive plant species, invasive plant species may be introduced in the area as a result of implementation of the proposed project activities.

In addition to the above, loss of indigenous vegetation may lead to increased spread of invasive plant species already on site by creating favorable grounds for the spread of existing invasive species on site. The baseline assessment of the proposed project site did not identify any invasive plant species.

Construction equipment that is not properly cleaned and sterilized has the potential to transport seeds of invasive species from other parts of Uganda or if imported into Uganda, other parts of the world. There are a variety of carriers of exotics ranging from boot soles to the cherry picker.

The use of resources/ murrum obtained from elsewhere to construct the project facilities and access roads and the removal of native vegetation may result in the introduction of alien invasive plant species. Such species can spread quickly and inhibit the growth of native species.

Landscaping and beautification of the facility after construction tend to leave open areas that can lead to invasion by the introduction of alien species. Other invasive species may be introduced as ornamental plants during landscaping. This would eventually affect the ecological integrity and biodiversity in the area.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Introduction of alien and invasive species	Local	Low	Long term	Medium	Medium
Mitigation Measures	<ul style="list-style-type: none"> Indigenous plant species will be considered for landscaping the compounds at the project site (where required) as opposed to the use of alien plants; Areas that will act as a source of murrum should first be examined for the presence of invasive species and if any are found, these should first be eliminated before murrum is excavated; Areas, where murrum is placed, should be monitored and any invasive species, removed mechanically; 				
	<ul style="list-style-type: none"> Any recognized IAS will be cleared from the area before it spreads. Invasive species will be controlled throughout the construction period by mechanical removal before flowering; Areas where murrum has been placed will be monitored and any invasive species will be removed manually; Native topsoil and rootstock removed during site preparation will be stored for subsequent restoration works. Re-vegetation will be accomplished using indigenous species; and Landscaping monitoring will be undertaken over at least one year, and any invasive species will be removed manually. 				
Cumulative Impact	The introduction of invasive species effects will be a result of the cumulative effects caused by projects located in the area.				

Residual Impact	During the construction of the water supply and sanitation infrastructure and components, there is a low likelihood of minor residue negative impact even after the implementation of the proposed mitigation measures.
Reversibility	Yes

8.4.14 Increased spread of HIV/AIDS and communicable diseases due to population influx

The analysis of the potential impact discussed in this section is related to the possibility that during the implementation of the proposed Lobe RGC, there may be increased spread of sexually transmitted diseases. The potential for increased spread of sexually transmitted diseases to occur is assessed below.

The proposed project is expected to attract various categories of people in search of employment opportunities at the project, especially during construction. Some of these will be locals while others will come from outside the project area. The migrant workers may be largely male and of young age. Their continuous movement from place to place keeps them away from their wives and families rendering them susceptible to commercial sex, which normally exposes them to the risk of HIV/AIDS or other sexually transmitted diseases (STDs). Though the workers are at the greatest risk, the people in the community are also at risk due to possible sexual relations with migrant construction workers. Though the impact is temporal (exists only as long as the construction is taking place), the consequences of catching a disease like HIV/AIDS may be irreversible.

The baseline information is presented in Section 5.17. The predominant health condition suffered among the project-affected persons (PAPs) household members was malaria 62%, but some cases of typhoid, eye sores, worms, stomach ache, Ulcers, Backache, Hypertension, Hernia, and Kidney are known.

The spread of communicable diseases like tuberculosis, diarrhoea, cholera and skin diseases is also likely to increase as more people come to work in the area. Without adequate water, skin and eye infections will spread easily. However, the extent of disease transmission between the communities and in-migrants will depend on the level of interaction between the two, the size of the workforce and their health status the nature of the casual migrants, and their susceptibility to disease infection. In addition, the living conditions, access to healthcare and workforce management, will also influence the significance of disease transmissions.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Increased spread of HIV/AIDS and communicable diseases due to population influx	Local	Medium	Short term	High	Medium
Mitigation Measures	<ul style="list-style-type: none"> • Undertake awareness and sensitization campaigns on the dangers of sexually transmitted diseases including HIV/AIDS and methods of spread and control. The HIV/AIDS awareness trainer will be expected to collaborate with local NGOs, CBOs and District Health Officers for sustainability and integration of activities into the existing structures of the local health institutions • Carry out pre-employment medical checks on new and potential employees as part of the recruitment process; • Ensure that the worker's camp and construction areas are open only to formal employees; • Provide the workforce with access to primary healthcare onsite, insecticide-treated mosquito nets, prescriptions, prophylactics and condoms, and basic testing for TB, STDs and HIV/AIDS; • Engage an NGO to prepare community institutions for any influx of in-migrants (for example, by developing by-laws and community policing systems for larger numbers of in-migrants); • Support local healthcare facilities through training of local healthcare professionals, regular supply of medical supplies and up-to-date equipment; • Establish a community health programme including providing support to existing or new local programs such as mother and child nutrition, community health awareness, HIV/AIDS awareness, hygiene and immunization, malaria control measures (indoor spraying of insecticides, personal protection measures, and control of mosquito larvae), and local Voluntary Counselling and Testing (VCT) programmes; and • Induct workers in relevant codes of conduct that minimise exposure to risky lifestyles including unsafe sex practices. 				
Cumulative Impact	<p>Due to the increase in the migrant population with its associated social impacts such as increased Sexual encounters between migrant workers and community members in Lobe RGC can serve as a conduit for the increased spread of HIV/AIDS and other sexually transmitted diseases (STDs) within the community. This can result in higher infection rates and pose a significant public health challenge. The impact significance is Medium to High.</p> <p>Mitigation Measures</p> <p>res</p> <ul style="list-style-type: none"> • Establish Voluntary Counselling and Testing (VCT) centres to encourage individuals to know their HIV status. • Liaise with the concerned entity of common community liaison or engagement • Undertake continuous sensitization of communities in the affected areas 				
Residual Impact	During the operation of the water supply system, there is the likelihood of minor residue negative impact even after the implementation of the proposed mitigation measures.				
Reversibility	Yes				

8.4.15 Theft and vandalism of property

With construction activities ongoing at the site, a lot of construction materials will be required for these activities which if not properly handled could attract the wrong elements who steal some of these items which include cement, iron bars and timber among others. If this is not adequately addressed, it could sabotage the smooth running of construction activities.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Theft and vandalism of property	Local	Medium	Short term	Medium	Minor
Mitigation Measures	<ul style="list-style-type: none"> • A Containerized storage facility for some of the construction materials (cement, iron bars and timber) will be set up at the construction site with secure locking and manned by a storekeeper; • The casual labourers hired at the site will be screened with the help of the local leaders to screen the wrong elements; • Security guards will be contracted to watch over the activities at the construction site; and • The developer in collaboration with the local leadership will hire people from the project area to benefit from a neighborhood watch scheme. 				
Residual Impact	There is a likelihood of a minor residue negative impact even after the implementation of the proposed mitigation measures during the operation of the Lobe Water Supply and Sanitation System.				
Reversibility	Yes				

8.4.16 Social ills or Influx of construction labour

The influx of workers, typically young males seeking construction jobs will likely be associated with a series of social challenges such as crime, alcoholism/illicit drug abuse, Sexual Exploitation and Abuse (SEA) of women and girls and prostitution. These are often related to the spread of sexually transmitted diseases including HIV/AIDS. Vices such as drug abuse and prostitution would affect social coherence and security in project communities tarnishing the image and intent of an otherwise good project.

- **Crime, drug abuse and prostitution**

Unless sensitization of all workers is undertaken by the contractor, this impact is highly sensitive (considering that the project area hosts refugees within some of the communities). The duration of the above-mentioned social ills will be short-term ending with the completion of the water supply and sanitation construction but associated social and health effects can be long-term and irreversible, especially addiction to drugs making the impact magnitude high.

- **HIV/AIDS Risk**

The influx of male workers into the project area may increase the risk of HIV/AIDS transmission. The concentration of young males in worker’s camps may lead to illicit and unsafe sexual behaviour that may push up infection rates in the local areas. However, since most of the labour force will be below 40 years and residents, it is expected that behavioural change will help stabilize the infection rate. Risky sexual behaviour and drug abuse are ranked as likely to occur due to common attitudes of contract labour though this will be moderated by high rates of sensitization on HIV/AIDs. However, should infections occur due to lapses in awareness, sensitivity is high and impact magnitude is **high**. This is therefore an impact of **Major** significance.

- **Sexual Harassment (SH)**

Sexual harassment can occur between workers, particularly male workers against female workers when there is insufficient sensitization of workers against prohibitions for sexual harassment, as well as the absence of reporting and disciplinary measures.

- **Sexual Exploitation and Abuse (SEA)**

Construction workers are predominantly males. When attitudes that condone gender inequality and abuse of power are prevalent in the work sites and/or the culture, this may increase the risk for women and girls in the community of sexual exploitation and abuse committed by construction workers, particularly in settings where there is impunity for this violence. A large influx of male construction workers may also contribute to human trafficking, whereby women and girls are forced into sex work.

- **Gender-based violence (GBV) at the community level**

This impact refers to GBV that women and girls may experience as a result of Project implementation. This includes, for example, an increase in intimate partner violence (IPV) when compensation schemes that share funds equally among husband and wife at the household level do not provide adequate sensitization and safety measures to reduce the potential for increased tensions due to females receiving funds. This also refers to other GBV-related risks incurred as a result of projects creating changes in the communities in which they operate and causing shifts in power dynamics between community members and within households. Male jealousy, a key driver of GBV, can be triggered by labour influx on a project when workers are believed to be interacting with community women with the fear that it could exacerbate the risk of family breakdown.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Social issues	Local	High	Short –medium-term	High	High

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
					<ul style="list-style-type: none"> • The contractor shall involve local (LC) leaders in labour recruitment to ensure people hired have no criminal record. • Local governments and the contractor shall collaborate with police to contain criminal activities. • A register of all construction workers shall be filed with local authorities to aid in tracking cases of child neglect. • With the assistance of a competent sub-contractor, the contractor shall draft an HIV/AIDS policy • A service provider for professional HIV/AIDS activities shall be procured and engaged • The contractors shall put in place worker place committees to oversee the implementation of HIV/AIDS control activities. • The contractor will provide counselling support and a work-based positive culture to post-test workers • The contractor will provide condoms to all workers free of charge placed in private and areas of confidence. • Peer-based awareness and counselling shall be instituted within the workforce. • All workers (permanent or temporary) will be required to sign the project code of conduct before commencing their assignments. • A worker Grievance mechanism shall be established and operated. • Signing of codes of conduct by workers • Ensure that there is recruitment of (a) service provider(s) to support prevention (sensitization) and response (referral pathway) activities. • Develop and implement a SEA/SH action plan with an Accountability and Response Framework as part of the C-ESMP. The SEA/SH action plan will follow guidance on the World Bank's Good Practice Note for Addressing Gender-based Violence in Investment Project Financing Involving Major Civil Works (Sept 2018). The SEA/SH action plan will include how the project will ensure necessary steps are in place for: <ul style="list-style-type: none"> ○ Prevention of SEA/SH: including COCs and ongoing sensitization of staff on responsibilities related to the COC and consequences of non-compliance; ○ Response to SEA/SH: including survivor-centred, multi-sectoral referral and assistance to complainants; staff reporting mechanisms; written procedures related to case oversight, investigation and disciplinary procedures at the project level ○ Engagement with the community: including the development of confidential community-based complaints mechanisms GM; mainstreaming of SEA awareness-raising in all community engagement activities; IEC materials; regular community outreach to women and girls about social risks and their SEA-related rights; ○ Management and Coordination: including integration of SEA/SH in job descriptions, employment contracts, performance appraisal systems, etc.; development of contract policies related to SEA/SH, including whistleblower protection; training for all project management; management of coordination mechanism for case oversight, investigations and disciplinary procedures; supervision of dedicated SEA focal points and trained community liaison officers as applicable.

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Mitigation Measures					<ul style="list-style-type: none"> • Develop and implement provisions that ensure that gender-based violence at the community level is not triggered by the project, including: <ul style="list-style-type: none"> ○ effective and ongoing community engagement and consultation, particularly with women and girls; ○ review of specific project components that are known to heighten GBV risk at the community level, e.g. compensation schemes; employment schemes for women; resettlement; etc. ○ A specific plan for mitigating these known risks, e.g., sensitization around gender-equitable approaches to compensation and employment; etc.
Cumulative Impact					<p>Workers engaged in diverse construction activities will most likely be exposed to various occupational hazards, including machinery accidents, exposure to hazardous substances, and musculoskeletal injuries. The impact significance is Medium-High.</p> <p>Mitigation Measures</p> <ul style="list-style-type: none"> • Conduct comprehensive risk assessments for each construction activity to identify potential hazards and implement appropriate control measures. • Provide personal protective equipment (PPE) such as hard hats, safety goggles, gloves, and harnesses to all workers, and enforce their use at all times. • Implement safety protocols and procedures for working at heights, including the use of guardrails, safety nets, and fall arrest systems. • Provide training and certification programs for workers on safe work practices, equipment operation, and emergency procedures.
Residual Impact					Due to the construction of the project, there is the likelihood of minor residue negative impact even after the implementation of the proposed mitigation measures.
Reversibility	Yes				

8.4.17 Occupational health and safety of workers

Construction will involve excavations, and compaction, working with cement, welding, and woodwork and working at elevated heights among others. The workers will be exposed to various forms of hazards including wastes, dust, noise, gaseous emissions from vehicular movements, the possibility of accidents, injuries, and exposure to communicable diseases and HIV/AIDS.

The construction site is expected to employ about 120 workers on average to participate in the construction of the project infrastructure. These will be involved in a range of activities like excavation, masonry, steel fixing, carpentry, excavations, lifting, working at heights, stonework, drilling, welding, demolitions, offloading materials from trucks, and mechanical and electrical works among others.

The incidence of drowning is likely to occur during construction. This is likely in rural communities that may be tempted to use open water ponds or sources to meet their daily needs in case of abandoned ponds during project construction especially trenching which may increase their risk of drowning often experiencing long-term disability as a result. Children aged 1-9 years

old are the most affected by drowning. The installation of pipelines in trenches filled with water is likely to pose a drowning risk for the workers.

If no mitigation measures are in place, the construction site with all its features presents a hazard to the health and safety of workers and visitors on site. Nevertheless, most of the potential hazards are avoidable although minor injuries have been reported to be inevitable at most construction sites. These may include shallow cuts and bruises. Deaths have been reported at construction sites within Uganda, the probability of this occurring is low considering that in most cases, death has occurred at sites due to other reasons mainly on inappropriate architectural drawings being adapted in areas other than those where structures were originally intended, or lack of supervision and adherence to standard construction best practices. There are also cases of failure of mechanized equipment.

The extent of this impact will be limited to the site and the magnitude will be medium considering the number of workers at the construction site, the sensitivity of the receptor will be high.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Occupational health and safety of workers	Within limited area	High	Temporary	High	High

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Mitigation Measures	<ul style="list-style-type: none"> • Use the lightest tools for any given job; • Ensure that equipment and machinery are securely fastened down and where necessary rail guarded; • Deploy properly trained personnel/ flagmen to control traffic, especially for construction vehicles turning to the site; • Regular toolbox meetings will be conducted; • Ensure adequate planning and supervision of trial mixes and works; • Ensure regular inspection of formwork, falsework and temporary supports before loading or pouring concrete; • Ensure barriers are in place before work including guardrails and warning tape; • Use properly trained personnel to carry out construction works; • Regularly inspect equipment and machinery and routinely maintain them according to manufacturer’s instructions; • Provide warning tape for example “falling debris”, and any other suitable barriers to prohibit unauthorized access to the workplace; • Progressive wetting of work areas to minimize dust emission will be done; • Work areas will be cleaned up Progressively to prevent debris/rubbish from becoming a trip hazard; • Undertake job risk analysis and provide appropriate Personal Protective Equipment to all workers. These may include hard hats, dust masks, ear plugs, safety goggles, safety boots, gloves and overalls • Ensure safe access to work at height using appropriate ladders, scaffolds, harnesses and safety belts. • Ensure the proper use of PPE for example helmets, nose masks, safety shoes, gloves, welding goggles, safety belts, and overalls. This may be achieved through regular training on the proper use and handling of PPE; • Ensure even spreading of heavy loads on temporary structures; • Secure site boundaries with fences or hoardings as appropriate; • Mechanical aids will be used for the movement or placement of heavy loads; • Ensure safe working heights through the provision of work platforms, scaffolds and adequate supervision; • Provide workers with safe drinking water and food where needed; • Establish contact with the nearest referral medical facility for assistance during an emergency; • A well-equipped First Aid kit for use during minor incidents will be available on-site, and training in administering first aid will be provided; • All workers will be trained in occupational health safety and incident response; • All areas on site will be demarcated and labelled appropriately using instructional and cautionary signs and • The fenced structure will have emergency exits, fire assembly points, firefighting equipment, and lightning arrestors. 				
Cumulative Impact	<p>Occupational health and safety could be a result of the cumulative effect caused by the establishment and operation of different business enterprises in the area.</p> <p>Mitigation Measures</p> <ul style="list-style-type: none"> • Provide regular training sessions for employees on safety protocols, hazard identification, and emergency response procedures. • Develop and communicate comprehensive emergency response plans to address potential accidents, injuries, or hazardous material spills. 				

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Residual Impact	Due to the construction and operation of the project, there is the likelihood of minor residue negative impact even after the implementation of the proposed mitigation measures.				
Reversibility	Yes				

8.4.18 Physical Cultural Resources impacts

Some cultural properties as highlighted in 5.22 exist in the project area (mainly graves). Although most of the major cultural sites identified are quite far from the proposed project infrastructure, the possibility that some cultural features (along the transmission route or where the treatment plant and other infrastructure will be located) can be encountered can't be ruled out. In general, the impact on Physical Cultural property will be minor since hardly any existing cultural properties are likely to be affected.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Impact on Physical Cultural Property	Within limited area	Medium	Temporary	Medium	Minor

Mitigation

- Structures like shrines and graves if any will be relocated following the existing rituals and norms of the society. Loss of income shall also be compensated for since the owners may take some time without any income from them especially if it's deemed necessary to relocate them far from their original site due to cultural rituals involved. Details of compensation shall be contained in the RAP.
- Sites that are buried may be discovered during project implementation. Such discoveries of archaeological nature are termed '**archaeological chance finds**'. These could be concentrations of pottery, animals and human bones, worked stone etc. Chance Find Procedures be adhered to. In summary, the following shall be undertaken:
 - On discovering evidence of possible scientific, Paleontological, historical, prehistoric, or archaeological remains, the contractor shall notify the Department of Museums and Monuments giving the location and nature of the finds.
 - The Contractor shall cease work in the vicinity of the site and request the responsible officer from the Department of Museums and Monuments to inspect the site and make recommendations on possible salvage within 72 hours.
 - The Contractor shall exercise care so as not to damage artefacts or fossils uncovered during excavation operations and shall provide such cooperation and assistance as may be necessary to preserve the findings.

- To mitigate damage to archaeological resources, it is proposed that the construction foremen inform the construction crew to be aware of the possibility of discovering fossils or archaeological remains, what form these would take (bones, fossils in rock, shards or pottery, arrowheads etc.) and the procedure to be followed shall be as stated above.
- Further still, the contractor shall develop and implement avoidance procedures. In the event of human remains, there shall be no further excavations or disturbance of the site until the responsible police authorities have been informed.

8.4.19 Gender and vulnerable groups

8.4.19.1 Gender Impacts

This impact is related to the effect of the proposed project on direct and indirect gender impacts focusing specifically on access and utilization of resources and reducing the gender poverty gap.

- The project has considerable potential to generate positive impacts on women's and men's livelihood opportunities and empower women, through inclusion in roles from which they have traditionally been excluded. The project has the potential to make a significant difference in women's health, labour burdens, time use, safety and security, and increase possibilities for income generation.
- The provision of safe water to all, men and women within the trading centres, government institutions and facilities such as health centres, churches, mosques, schools etc., will be perceived by the District Local Government Officials at various levels and by the local communities, as a direct positive impact of the project on gender considerations. In addition, the impact on the local economic and employment dynamics and especially the anticipated opportunities for both men and women to provide local supplies and services will be an additional benefit in the context of gender equality.
- Women in a rural setting such as the Project Site, are predominantly engaged in demanding household chores including spending long hours fetching water for domestic use. The supply of community piped water will provide time savings that will in turn widen women's opportunities to gain employment and income outside the home.
- However, the project also has the potential to reinforce existing gender disparities and biases, in which positive benefits (employment, compensation, etc.) are felt disproportionately more by men and the negative impacts by women. For example, stakeholder consultations in the Project Area identified the following concerns which they perceived as potentially negative gender-biased impacts of the project:
 - a) limited engagement of women in project activities;

- b) increase in sexual harassment of women and young girls by construction workers;
- c) increase in sexually transmitted diseases including HIV/AIDS;
- d) sexual exploitation of young girls which could lead to increased incidents of school drop-out;
- e) social tension within households, gender-based violence, disruption of family units; and
- f) In addition, evidence from previous infrastructure projects demonstrates that women-owned businesses (kiosks, grinding, milling, tailoring, grocery shops, etc.) have less access to property and land for economic activities, and even less access to credit needed for business investment, including electricity connection. The need to address this imbalance will require careful consideration, as it cuts across several government sectors and entities, including financing institutions.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Gender impacts	Local	High	Long term	Medium	High

Mitigation Measures

- A key consideration for the proposed project is the ability to effectively involve key stakeholders in a realistic and positive participatory process to combat gender violence and the abuse and mishandling of women and children on such government infrastructure projects and the Contractor must present a plan to address such.
- Conducting appropriate sensitization on gender issues at all levels within the Project Area and creating awareness of the responsibility of all concerned during the various phases of the project to address specific gender concerns. This should entail consultation with both women and men in the Project Area and within the construction teams.
- MWE and the Contractor should ensure that:
 - a) effective gender responsive and equality activities under the proposed project are duly defined and implemented through participatory engagement;
 - b) The targets and indicators for monitoring the gender impacts and outcomes are clearly defined in the contract documentation;
 - c) the quantifiable and none quantifiable, gender and social-related direct and indirect benefits have been defined and duly achieved; and
 - d) A social specialist is deployed on the project to oversee among others, gender mainstreaming in the project cycle is observed and implemented.

- e) A Gender Awareness Program be established and an HIV/AIDS awareness campaign must be regularly conducted for PAPs, workers and local communities, as well as activities promoting access to health services, treatment and counselling

8.4.19.2 Impacts on vulnerable groups

This impact is related to the effect of the proposed project on vulnerable groups (women, children, and persons with disabilities).

Stakeholder consultations conducted in the project identified child abuse as a problem that has emerged from previous infrastructure projects. There is therefore concern in the local communities and amongst some of the leadership at various levels that this project may also have the potential to impact school children as vulnerable members of society.

The proposed project traverses areas with schools and settlements and some project workers could likely engage in sexual relations with school and under-aged children. This could result in an increase in child pregnancy/marriage, which was established to be at about 8% in the project area. In addition, sex work involving children and school dropouts, defilement of school children and marrying school girls, were also cited as potential impacts that could be generated by the project.

The local communities are also concerned that during the construction phase of the project, as has happened in previous infrastructure projects, the Contractors are likely to be tempted to use children as labourers, to save money on labour costs; this amounts to child labour and abuse.

As mentioned in previous sections of this document, the project has the potential to make a positive and significant contribution to women's livelihoods through the provision of employment opportunities, increased income levels, improved maternal healthcare and gender empowerment.

Equally though, the project has the potential to exacerbate existing gender inequalities and lead to a situation in which women become the target of the potential negative impacts of the project. Examples of such impact include limited engagement in available project work and tasks; sexual harassment and exploitation; social tension in some homes; disruption of marriages; and gender-based violence, among others.

Male construction workers are also likely to lure school girls with money and other gifts which ultimately leads to incidents of sexual exploitation of young girls, pregnancies and school dropout. School attendance is also likely to be affected; some children might decide to skip school to earn money from the project, while others may spend time simply watching construction works.

For people with disabilities, access to water and sanitation is an essential service. In addition, people with disabilities are often more likely to have less income and therefore struggle to get employment, afford water costs, and therefore end up requiring greater assistance for basic

services. There is concern that people with disabilities are likely to experience the same challenges throughout the life of this project.

Risk assessment matrix

In general, incidents of child abuse, gender-based violence, sexual harassment and exploitation of women, as well as the exclusion of persons with disabilities are issues of serious concern that require considerable attention and remedial action by all concerned parties in infrastructure projects, such as the proposed distribution line project. While the above negative impacts are likely to be localised in geographical extent, their cumulative effects will continue to be felt during the operation and maintenance phases of the project. Consequently, the significance of the impact of the project on vulnerable groups is considerable in intensity and duration.

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Vulnerable group impacts	Local	High	Long term	High	Medium

Mitigation Measures

- A Child Protection Plan should be developed and provided to all the Contractors and school management to discourage the Contractors from using children as labourers. In addition, Contractors will be required to avoid employing workers who are below eighteen years old. They will also be required to keep records that show the ages of their workers.
- Ensure that the community and local leadership have access to and know of and report abuse using the National Child Abuse Hotline 116. The existence of the hotline can be displayed near the construction site and in the community at large.
- The Contractor should ensure that mechanisms for close monitoring of workers’ behaviour/conduct are in place e.g. Contractor could discreetly engage the police to identify anonymous informers from among the workers to monitor and report any negative behaviour by the workers including child abuse-related misconduct, display a call line or suggestion box where the community can provide feedback on workers behaviour.
- MWE and the Contractor should ensure that all local leaders and women/child representatives are fully oriented to the labour force-related risks for children engaging in construction-related activities.
- Talks with the Contractor and his workforce by relevant officials (including the police) on child protection should be encouraged and appropriately scheduled, including continuous popularization of the child helpline 116. Parents/guardians

should be sensitized and held accountable for children leaving and arriving home before dark.

- MWE and the Contractor should ensure strict compliance with the provision of relevant safeguard policies concerning persons with disabilities. MWE and the Contractor should ensure that there is full and effective participation of persons with disabilities and other vulnerable groups, like children and through representative organizations, in all phases of the project, including monitoring and evaluation.

8.4.19.3 Potential abuse to women and girls

The proposed water and sanitation project is likely to attract women who will be employed as labourers. During employment and execution of their duties, it is possible that their sexual rights as women may be abused by educate and unchecked sexual behaviours of contractors and their workers. Impacts relating to women will include issues like denial of employment opportunities, and gender-based violence when husbands forcefully demand their wives pay.

Other potential negative impacts on women include exposure to HIV/AIDS and STIs and increased sexual exploitation of young girls which may likely lead to unwanted pregnancies, drop-out from school and others. These are large negative impacts which are of medium significance and magnitude making the overall impact moderate. These are proposed to be mitigated through the following measures:

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Gender concerns	Local	Medium	Temporary	Medium	Medium

Mitigation measures

- Workers will be sensitized about their sexual rights. MWE shall Work with the contractor on establishing zero-tolerance policies and codes of conduct related to violence against women and girls (VAWG). All employees must be made aware of the zero-tolerance policy and codes of conduct for employees.
- All workers shall receive adequate briefing and education on the laws against defilement and other sexual offences.
- To the extent possible, there will be gender sensitivity in task allocation;
- The contractor shall conduct gender sensitization to the workforce on matters such as gender-sensitive communication and on the gender-sensitive conduct of workers towards women including putting in place toilets segregated by gender amongst others;
- There will be a Specialist (Sociologist) to oversee amongst others gender mainstreaming in the project.

8.4.19.4 Potential child abuse

The proposed project transverses areas with several schools and settlements and it is likely that some project workers could engage in sexual relations with school and under-aged children. This could result in an increase in child pregnancy/marriage, sex work involving children and school dropouts/Defilement of school children/marrying school girls. In addition, during the construction phase contractors could be tempted to use children as labourers to save money on labour costs, which amounts to child labour and abuse. Sensitivity is medium due to relative public awareness about child abuse which makes the overall impact significance substantial.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Potential child abuse	Limited area	Very high	Temporary	Medium	Minor

Mitigation measures

- A child protection plan will be developed by MWE and provided to all the contractors and school management to discourage the contractors from using children as labourers. In addition, contractors will be required to avoid employing workers who are below eighteen (18) years old. They will also be required to keep records that show the ages of their workers.
- Ensure that the community and local leadership have access to and know of and report abuse using the National Child Abuse Hotline 611. The existence of the hotline can be displayed near the construction site and in the community at large.
- The contractor shall ensure that mechanisms for close monitoring of worker's behaviour/conduct are in place e.g. contractor could discreetly engage the police to identify anonymous informers from among the workers to monitor and report any negative behaviour by the workers including child abuse-related misconduct, display a call line or suggestion box where the community can provide feedback on workers behaviour.
- MWE and the contractor shall ensure that all local leaders and women/child representatives are fully oriented to the labour force-related risks for children engaging in construction-related activities.
- Talks with the contractor and his workforce by relevant guests (including the police) on child protection shall be encouraged and appropriately scheduled, including continuous popularization of the child helpline 611.
- Parents/guardians shall be sensitized and held accountable for children leaving and arriving home before dark.
- Any person involved in child abuse shall be dealt with under the law.

8.5 NEGATIVE OPERATIONAL PHASE ENVIRONMENTAL AND SOCIAL IMPACTS

The operational phase of the project refers to the period during which the building is being used for its intended purpose. It begins after construction is completed and continues until the project is no longer in use or is repurposed for a different use.

8.5.1 Visual Alteration (Aesthetics pollution)

The infrastructural components of the Water Supply and Sanitation System and the related facilities coupled with the proximity to the Lobe trading centre will make the site visible.

Risk assessment matrix

Increased pressure due to the construction and operation of the water supply system was assessed to be low which remains low with proper implementation of the mitigation measures.

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Aesthetics pollution	Local	low	permanent	High	Minor
Mitigation Measures	<ul style="list-style-type: none"> Landscaping should be undertaken to make the place attractive to any passerby Undertake routine maintenance of the project infrastructure to be attractive. 				
Cumulative Impact	<p>Residents living near the project site components (borehole and reservoir tank) and other projects that shall be erected in the area may experience a loss of visual privacy due to the increased visibility of infrastructure components, leading to feelings of discomfort and intrusion. The impact significance is Low -medium</p> <p>Mitigation Measures</p> <ul style="list-style-type: none"> Optimize the site layout and placement of infrastructure components to minimize visibility from sensitive viewpoints such as residential areas and public spaces. Utilize topography, existing vegetation, and built features to strategically conceal or integrate infrastructure within the landscape, maximizing visual compatibility with the surrounding environment. 				
Residual Impact	There is the likelihood of a minor residue negative impact even after the implementation of the proposed mitigation measures during the operation of the Water Supply and Sanitation System.				
Reversibility	Yes				

8.5.2 Noise generation

Noise emissions during the operations phase will be from vehicles transporting the maintenance crew. Noise could also be generated from generator operation during power generation. Such noise is likely to slightly alter the ambient noise levels even though it is likely to be generated for a limited duration of time during a power outage.

Risk assessment matrix

The identified effects of noise and vibration due to the operation of the Water Supply System were assessed to be low which remains low with proper implementation of the mitigation measures.

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Noise and vibration	Local	Low	Short-term	Medium	Minor
Mitigation Measures	<ul style="list-style-type: none"> Noise events will be scheduled for appropriate times of the day to avoid disturbance of any programmed community gatherings and school programmes Construction activities will be limited to only day-time hours; Unnecessary noise from the construction crew (such as loud vocalisations and music) will be prohibited; Adherence to national noise regulations as stipulated in the National Environment (Noise Standards and Control) Regulations (2003) will be ensured; A grievance mechanism will be established to enable local people to express their concerns; The use of well-maintained and serviced equipment that generates low noise levels will be emphasized; Workers involved in maintenance activities will be provided with requisite Personal Protective Equipment; Acoustic insulation (e.g., screens or bunds) will be deployed, when necessary, especially on compressors, when possible, for example, the insulation of generator house Fitting machinery such as stand-by generators with silencers 				
Cumulative Impact	<p>The continuous or intermittent noise from maintenance activities by the Northern Umbrella Authority such as trenching and equipment servicing especially Cumulative noise and vibration due to simultaneous maintenance works will disturb the peace of local communities in Lobe RGC especially those carrying out business in trading centres. The impact significance is medium-high.</p> <p>Mitigation Measures</p> <ul style="list-style-type: none"> Implement noise control measures such as sound barriers, acoustic enclosures, and mufflers on equipment to minimize noise emissions during maintenance activities. Schedule noisy activities during times when they are least likely to cause disturbance to residents, such as during daytime hours or avoiding sensitive times like early mornings and late evenings. Engage with local communities to communicate project schedules, activities, and potential noise impacts in advance, fostering understanding and cooperation.. 				
Residual Impact	Due to the construction of the project, there is the likelihood of minor residue negative impact even after the implementation of the proposed mitigation measures.				

Reversibility	Yes
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8.5.3 Pollution of soil, surface and groundwater

Pollution of water resources could result from any chemical and oil spillage/ leakages from chemical storage, workshops and along transportation routes that could be infiltrated into water resources in the area. Poor handling of spent chemicals could also result in pollution. Poorly managed waste (domestic waste) could also result in environmental component pollution.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Pollution of soil, surface and groundwater	Local	Medium	Long term	Medium	Medium
Mitigation Measures	<ul style="list-style-type: none"> Undertake routine maintenance of motorized equipment to improve operation efficiency and control spillages; Construct perimeter drainage around fuel handling areas that should drain into an interceptor from where oil can be skimmed off and handled following hazardous waste handling procedure; Put in place spillage contingency measures for all chemicals including cleaning equipment and train staff in spill clean-up. Chemical-contaminated materials will be handled following hazardous material/ waste handling procedures; Design and install a septic tank system for human sanitary purposes; Provide disposal facilities for waste; and Undertake regular monitoring of soil and water resources for any pollution and ensure efforts to remediate in case any pollution is detected. 				
Cumulative Impact	<p>Improper disposal of wastes during maintenance from several project activities including new projects in the area will lead to the leaching of pollutants into soil and water sources, contaminating Wogi stream and soils in the project area. The impact significance is medium.</p> <p style="text-align: center;">Mitigation Measures</p> <ul style="list-style-type: none"> Implement strict protocols for handling, storage, and transportation of chemicals and hazardous materials to minimize the risk of spills and leaks. Conduct regular inspections and maintenance of storage facilities, workshops, and transportation routes to identify and address potential sources of contamination. Utilize double containment systems, secondary containment, and leak detection devices to prevent and detect spills. 				
Residual Impact	<p>Due to the construction of the project, there is a likelihood of minor residue negative impact even after the implementation of the proposed mitigation measures.</p>				

Reversibility	Yes
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8.5.4 Soil compaction and loss of soil functions

During the operations phase, only light vehicles will be utilised by operational staff accessing the water supply system and this will be restricted to designated routes.

The extent of compaction likely to be caused is considered negligible and the impact is therefore not assessed further.

8.5.5 Dust generation

The likely increment in dust levels during the running of the water supply system will be insignificant. During this phase, therefore, dust generation will be minimal and restricted to light vehicles associated with transport activities, such as staff commutes, maintenance activities, waste removals, and miscellaneous deliveries. This impact has therefore not been assessed further.

Gaseous emissions during this phase may majorly arise from light vehicles making deliveries to the project site, operation of generators and grass slashing. Operation vehicles will contribute to the increase of traffic flow in the area associated with maintenance activities, waste removals, and miscellaneous deliveries. Of particular importance is the traffic along the Yumbe- Lobe Road which will be used by these vehicles. However, traffic during this phase will involve a limited number of light vehicles, making a limited number of trips to and from the site as required for day-to-day operations.

This impact is therefore considered insignificant during the operations phase and has therefore not been assessed further.

8.5.6 Traffic-Related Risks

The cause of the traffic risks during the operation of the water supply system will be the same as that during the construction phase. However, at this stage, the increment in traffic levels will be low and of less heavy-duty vehicles (i.e. there will be light vehicles for operators to and from the site).

8.5.7 Waste Management

Solid waste, if not properly managed, can lead to visual blight, public health risks, malodours, soil and water pollution.

Improper management of human waste could also result in sanitation-related problems that could affect public health. During the operation phase, water-borne toilets would have been constructed on-site. The likelihood that waste will be disposed of in the surrounding area which would potentially pollute the area and also result in disease outbreaks like cholera and dysentery among others is minimal.

Risk assessment matrix

The identified effects of poor sanitation as a result of project operational activities were assessed to be minor and remain low with proper implementation of the mitigation measures.

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Poor sanitation around the project site	Local	Low	Long term	Medium	Minor
Mitigation Measures	<ul style="list-style-type: none"> The proponent will ensure that all waste generated from site operations is properly collected and handled before disposal. Biodegradable, non-biodegradable, hazardous and non-hazardous wastes will be segregated accordingly during collection; All waste collected should be disposed of appropriately e.g. a licensed waste collector should be contracted to transport waste material from the site to the designated disposal area; The on-site ablution facility will be serviced regularly; Anti-vermin safeguards (such as covering bins with lids) will be put in place; Separate sanitary facilities for different sexes will be constructed on maintained on site; A staff will be dedicated to ensuring proper maintenance of toilet facilities; and Septic tanks will be properly designed constructed and regularly emptied 				
Cumulative Impact	<p>Poor sanitation could be a result of the additive effect caused by the establishment and operation of different business enterprises in the area.</p> <p>Mitigation Measures</p> <p>ation Measures</p> <ul style="list-style-type: none"> Strengthen enforcement of sanitation regulations and ordinances to ensure businesses comply with waste disposal and sanitation standards. This may involve increased inspections, penalties for non-compliance, and regular monitoring of business practices 				
Residual Impact	<p>Due to the operation of the project, there is the likelihood of minor residue negative impact even after implementation of the proposed mitigation measures.</p>				
Reversibility	<p>Yes</p>				

8.5.8 Theft and vandalism of property

The operational aspects of the Water Supply System might attract wrong elements who could attempt to steal property/cash or even vandalize equipment and machinery at the site.

Risk assessment matrix

Theft and vandalism of property during operation were assessed to be minor which remains low with proper implementation of the mitigation measures.

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Theft and vandalism of property	Local	Medium	Short term	Medium	Medium
Mitigation Measures	<ul style="list-style-type: none"> Workers except for local workers who will return to their homes in the local communities, will be housed in local guest houses (for workers from outside the region) and will have access to the necessary social service amenities such as water and sanitation facilities provided at the guest house; The developer should endeavour to rehabilitate social service resources such as health services as part of Corporate Social Responsibility (CSR) initiatives to improve their availability for both the local community members and project workers; Adequate and appropriate sanitary facilities will be constructed for use by the construction workers at the construction site; A water source will be established to supply water demands for the project activities; The developer should employ all unskilled workers from within the project area of influence if they qualify for the work at hand; and The developer should arrange for hygiene and sanitation campaigns targeting the project area of influence as a way of sanitation awareness in a bid to control outbreaks of diseases. 				
Cumulative Impact	<p>Unauthorized individuals may target valuable equipment, machinery, or materials stored at the pump house and other project equipment leading to losses and disruptions to the operations of different projects in the area. The impact significance is Low-medium</p> <p>Mitigation Measures</p> <p>Employ trained security personnel or engage security firms to provide surveillance, monitoring, and protection services at the project site, especially during non-working hours and weekends.</p>				
Residual Impact	<p>There is the likelihood of a minor residue negative impact even after the implementation of the proposed mitigation measures during the operation of the water supply system.</p>				
Reversibility	<p>Yes</p>				

8.6 NEGATIVE DECOMMISSIONING PHASE ENVIRONMENTAL AND SOCIAL IMPACTS

It is worth noting that although MWE does not envisage this aspect of the project lifecycle in its long-term plans, it's nevertheless worth noting that there are several impacts associated with this phase. Key among these are:

- Job losses/ creation;
- Decommissioning waste;
- Decommissioning health and safety concerns such as incidents/ accidents; and
- A derelict or brownfield site.

Therefore, the above factors will have to be taken into account as part of any future decommissioning plan.

9 ENVIRONMENTAL SOCIAL MANAGEMENT AND MONITORING PLAN

9.1 General Considerations

The Environment and Social management and monitoring plan proposed in Table 9.1 specifies mitigation measures and monitoring actions with time frames, specific responsibilities assigned and follow-up actions defined to check the progress and the effects on the environment by the construction works of the project. Monitoring shall begin right away and shall continue through both the construction stage and through to the operation phase. One important aspect of monitoring shall be to assess the effectiveness of the mitigation measures suggested. Where they are found lacking, appropriate new actions to mitigate any adverse effects shall be undertaken.

Implementations of these measures have to be carried out at different stages of project construction & operation phases. During the detailed design stage, the consultant shall incorporate proposed mitigation measures into the final design and tender documents. The contractual agreement shall also include articles to enforce the environmental issues. Construction stage activities are mainly the responsibility of the contractor and that of the construction supervision consultant. The actual physical implementation works are carried out mostly at this stage. The execution of construction works for the proposed Lobe Rural Growth Centre project shall also equally treat the Implementation of the physical works of Environmental Mitigation Measures.

9.2 Scope and Objectives of the ESMP

This ESMP focuses on mitigating the impacts identified during the environmental assessment. It is an instrument that will allow the project component and the contractor to integrate environmental and social management measures during the various phases of the proposed project. This plan is meant to establish measures and procedures to control the identified impacts and monitor the progress of implementation of the recommended mitigation measures.

It will achieve the following in the long run:

- a) Provide the National Environment Management Authority (NEMA) with a tool to make easy the evaluation of the implementation status of commitments made by the proponent during the ESIA study phase;
- b) Provide clear and mandatory instructions to the contractor concerning their environmental and social responsibilities during the project implementation phase;
- c) Ensure continuous compliance of the contractor with National legislation and policies regarding environment conservation and management;

- d) Assure the regulators and interested and affected parties the satisfaction of their demands about the environmental and social performance of the project;
- e) Ensure that adequate financial and human resources are allocated to the project to give effect to such requirements or commitments, and to ensure that the scale of ESMP-related interventions is consistent with the significance of identified impacts;
- f) Provide a coherent and pragmatic framework for the implementation of the requirements, ranging from the formation of structures to administer the implementation, through the roles and responsibilities of the key project role-players, to the auditing and reporting of compliance; and
- g) Ensure suitably qualified personnel with adequate power of authority are integrated with the various project implementation organisations to timeously identify and render appropriate and proactive corrective actions to unforeseen changes in project implementation not considered in the ESIA process.

Table 9-1: Environmental Social Management and Monitoring Plan Matrix

Impact	Desired Outcome	Mitigation/Enhancement Measure	Monitoring Indicator (s)	Responsibility for implementation	External Monitoring responsibility	Required capacity Building	Estimated cost (UGX)
Land take	Land take is limited to that acceptable for project components. Minimised disruption of community members and land conflicts	Restricted land clearance to that required for project components.	Land take monitoring report Land Ownership documents	MWE Contractors Lobe Town Council	Yumbe District Environment Officer Chief Government Valuer Lobe Town Council Leadership Village LC.1	Land acquisition Stakeholder mobilization and engagement Grievance Redress Mechanism	80,000,000.
		Sensitise project-affected persons (PAPs) on the intentions of land acquisition.	Record of PAPs sensitisation				
		Limit project activities within the boundary of the acquired plot	Clearly marked project				
Vegetation clearance and loss of habitats	Minimised clearance of vegetation	Replant affected areas with indigenous vegetation upon completion of construction activities.	Presence of indigenous vegetation in restored areas	MWE Contractors Lobe Town Council	Yumbe District Environment Officer	Biodiversity conservation	20,000,000.
		Restrict access to the project site(s) through a designated route(s).	Presence of designated access route(s) to different project components/sites.				
		Peg out project components layout to be cleared. Avoid vegetation of conservation concern during the pegging out of	Site clearance monitoring report				

Impact	Desired Outcome	Mitigation/Enhancement Measure	Monitoring Indicator (s)	Responsibility for implementation	External Monitoring responsibility	Required capacity Building	Estimated cost (UGX)
		project components					
		Limit project activities to the required project component footprint.	Properly marked project boundaries				
		Establish a grievance mechanism to enable local stakeholders to express their concerns.	Availability of resolved grievance records				
		Compensate for any lost crops and property following property valuation assessment.	Presence of compensation records for PAPs				
		Restore temporarily disturbed areas.	Restored disturbed areas				
		Provide a detailed work plan of the proposed construction activities and abide by it.	Presence of a construction work plan				
Soil Compaction	Minimised and localised effect of soil compaction	Limit the land clearing to only the required footprint.	Approved structural plans	MWE Preferred contractors	Yumbe District Environmental Officer and Wetlands Officer	Biodiversity conservation	NIL
		Limit the project activities to the footprint of the required project area.					
		Designate parking for	Presence of parking on				

Impact	Desired Outcome	Mitigation/Enhancement Measure	Monitoring Indicator (s)	Responsibility for implementation	External Monitoring responsibility	Required capacity Building	Estimated cost (UGX)
		project vehicles.	site				
		Install a containerised storage for construction materials	Presence of a storage container on site				
Soil erosion	Minimised incidence of erosion	Limit vegetation clearance to project structures to be constructed.	Monitoring records for vegetation clearance	MWE	Yumbe District Environmental Officer and Wetlands Officer	Erosion control Biodiversity conservation	5,000,000.
		Preferably, undertake construction activities in the dry seasons.	Records of the construction phase activities	Preferred contractors			
		Re-vegetate project-affected areas to stabilise the ground.	Re-vegetation monitoring records				
		Establish proper drainage around the facility.	Existence of proper drainage around the project site.				
Introduction of alien and invasive species	Maintained the integrity of the area's vegetation	Clear any recognized IAS from the area before it spreads. Native topsoil and rootstock removed during site preparation will be stored for subsequent restoration works. Re-vegetation will be	Record of invasive species uprooted from the site	MWE Preferred contractors	Yumbe District Environmental Officer	Invasive plant identification	25,000,000.

Impact	Desired Outcome	Mitigation/Enhancement Measure	Monitoring Indicator (s)	Responsibility for implementation	External Monitoring responsibility	Required capacity Building	Estimated cost (UGX)
		accomplished using indigenous species.					
		Invasive species will be controlled throughout the construction period by mechanical removal before flowering.					
		Areas where murrum has been placed will be monitored and any invasive species will be removed manually.					
		Landscaping monitoring will be undertaken over at least one year, and any invasive species will be removed manually.					
Increased traffic and associated risks	Zero traffic accidents and incidents	Maintain records of all accidents and incidents involving project vehicles.	Accident and incidence records	MWE	Yumbe District Environmental Officer Traffic Police Local Leadership	Traffic and logistic management and planning	10,000,000.
		Undertake Journey-specific risk assessments.	Records of journey-specific risk assessments	Contractors			
		Employ qualified and experienced drivers to operate vehicles.	Records of driver qualifications				
		Employ traffic guides	Implementation of traffic				

Impact	Desired Outcome	Mitigation/Enhancement Measure	Monitoring Indicator (s)	Responsibility for implementation	External Monitoring responsibility	Required capacity Building	Estimated cost (UGX)
		(flag boys) to control community and project traffic.	management plan – the presence of traffic guides along project roads				
Pollution of soil and water quality	Maintained water quality to acceptable national standards	Install oil/water interceptors on site	Availability of suitably constructed oil/water interceptors	MWE	Yumbe District Environmental Officer	Water quality monitoring Spill response and clean-up	12,500,000.
		Install human waste handling facilities.	Availability of waste handling facilities.	Contractors	Traffic Police Local Leadership		
		Install secondary containment at fuels, oils, and lubricants storage tanks.	Presence of secondary containment at fuel and oil storage areas.	MWE	Yumbe District Environmental Officer		
		Put in place a spill contingency plan with spill clean-up equipment and train workers on how to use them.	Availability of a spill contingency plan and evidence of its implementation	Contractors	Traffic Police Local Leadership		
		Undertake water quality monitoring from community water sources and any surface water body in the area.	Availability of water quality monitoring records				
		Limit access to workers' camps and construction areas only to authorised	Site access plan and subsequent access records				

Impact	Desired Outcome	Mitigation/Enhancement Measure	Monitoring Indicator (s)	Responsibility for implementation	External Monitoring responsibility	Required capacity Building	Estimated cost (UGX)
		personnel. Monitor the quality of community water resources regularly.	Availability of water quality test results.				
Poor sanitation due to poor domestic waste management	Good hygiene and sanitation around the construction site.	Collect and sort all waste generated from the demolition of built-up structures. Train and conduct toolbox talks on proper waste management. Install and properly label waste bins for the collection of different categories of waste.	Clean and hygienic construction site and surrounding Clearly sorted waste material Availability of training records on proper waste management Presence of labelled waste bins	MWE Contractors	Yumbe District Environmental Officer Local Leadership	Waste collection and proper handling	8,000,000.
Increased risk of spread of HIV/AIDS and STIs	Responsible behaviour among staff and contractors	Accommodate workers except for local workers, in the workers' camp and provide access to health services such as HIV/AIDs counselling.	Presence of the workers' camp for workers with access to health facilities	MWE Contractors	Yumbe District Health Officer Yumbe Community Development	HIV/AIDS Spread control strategies	25,000,000.

Impact	Desired Outcome	Mitigation/Enhancement Measure	Monitoring Indicator (s)	Responsibility for implementation	External Monitoring responsibility	Required capacity Building	Estimated cost (UGX)
	Safe sex practices among project personnel	Provide the workforce with onsite access to primary healthcare, insecticide-treated mosquito nets, prescriptions, prophylactics and condoms, and basic testing for TB, and STDs, especially HIV/AIDS.	The workers' camp with access to onsite primary healthcare facilities		Officer Local Leadership		
Spread of communicable diseases	Controlled spread and outbreak of diseases	<p>Continuous sensitization of the construction workers and neighbouring community against the spread of COVID-19</p> <p>Stringent measures regarding observing the Standard Operating Procedures (SOPs) that prevent the spread of COVID-19 such as workers having their masks shall be followed</p> <p>Isolation of workers with signs and symptoms of COVID-19 should be done</p> <p>Hand washing points shall</p>	<p>Presence of ICT poster on site</p> <p>Presence of washing cans</p>	Contractors	Yumbe District Health and Environment office	Disease early warning signs	12,000,000.

Impact	Desired Outcome	Mitigation/Enhancement Measure	Monitoring Indicator (s)	Responsibility for implementation	External Monitoring responsibility	Required capacity Building	Estimated cost (UGX)
		be put in place around and within the market.					
Alteration of air quality due to dust	Maintained the quality of the ambient air	Undertake routine watering of the access road during the dry season.	Availability of watering schedule for the access road.	MWE Contractors	Yumbe District Environmental Officer Lobe Town Council local leadership	Air quality monitoring	12,500,000.
		Cover construction trucks that deliver construction materials	Covering of construction materials during delivery				
		Clear vegetation according to the structural layout.	Availability of structural drawing for infrastructure components				
		Shield stockpiles of construction materials from the wind.					
		Undertake community awareness and sensitisation about the proposed project	Records of community meetings				
		A speed limit of 40km/h for light vehicles and 30km/h for heavy vehicles should be maintained on the community road to access the project site; Record and resolve all	Speed limit signage was installed along the access road				

Impact	Desired Outcome	Mitigation/Enhancement Measure	Monitoring Indicator (s)	Responsibility for implementation	External Monitoring responsibility	Required capacity Building	Estimated cost (UGX)
		grievances associated with the generation of dust					
		Install a containerized storage for some of the materials to reduce movement	Presence of a containerized storage for equipment	MWE Contractors	Yumbe District Water Officer		
Vehicular and other equipment emissions	Gaseous emissions within acceptable limits following the National Environment (Draft Air and Emission) Regulations	Undertake routine maintenance of vehicles and equipment to maintain efficiency.	Machinery and vehicle maintenance records	MWE Contractors	Yumbe District Environmental Officer		
		Subject vehicle movement to Journey management	Availability of completed journey management forms				
		Discourage Open burning of waste.	Availability of waste management procedure				
Noise and vibrations affect local communities	Noise generation in compliance with the set permissible noise levels (the Nation Environment (Noise Control and Mitigation) Regulation 2003)	Undertake noise monitoring within the project area and at nearby sensitive receptor sites.	Noise monitoring records	MWE Contractors	Yumbe District Environmental Officer	Noise pollution control and monitoring	11,500,000.
		Use well-maintained and serviced equipment.	Maintenance records for vehicles and equipment				
		Prohibit the idling of machinery including vehicles.	Vehicle and machinery standard operating procedures				
		Undertake routine	Availability of				

Impact	Desired Outcome	Mitigation/Enhancement Measure	Monitoring Indicator (s)	Responsibility for implementation	External Monitoring responsibility	Required capacity Building	Estimated cost (UGX)
		maintenance of motorised equipment	maintenance records for equipment				
Occupational Health and Safety risks	Zero accidents at the construction site	Adhere to standard and comprehensive health and safety measures.	Health and Safety Management Plan implementation records	MWE Contractors	Yumbe District Environmental Officer District Labour officer	Construction safety and health management	50,000,000.
		Resolve any complaints resulting from excavations/ project activities According to the grievance mechanism	Well-maintained complaints register				
		Employ trained and experienced workers for all construction operations.	Qualification records for all construction workers				
		Provide for supervision of construction activities.	The presence of a construction supervisor at all construction sites				
		Provide workers with Personal Protective Equipment (PPE).	Requisite PPE provided to workers				
		Institute an emergency plan including First Aid services and evacuation plans.	Presence of onsite standard first aid boxes and first aiders. Documentation of				

Impact	Desired Outcome	Mitigation/Enhancement Measure	Monitoring Indicator (s)	Responsibility for implementation	External Monitoring responsibility	Required capacity Building	Estimated cost (UGX)
			emergency/evacuation occurrences in line with the emergency and evacuation plans				
Fire risks	Instituted fire preparedness measure	Institute a fire emergency plan including training on the use of firefighting equipment/materials such as fire extinguishers, sand and water.	Presence of fully serviced fire extinguishers and firefighting training records	MWE Contractors	Yumbe District Environmental Officer District Labour officer	Fire preparedness and prevention	10,000,000.
		Design and display safety signage at locations of fire hazard areas	Properly mapped fire hazards				
Theft and vandalism of project property	Proper security and minimized incidents of theft from the site	Install a containerized storage facility for some of the construction materials Screen the casual labourers hired from the community with the help of the local leaders.	Availability of a containerized material storage on site	MWE Contractors	District Environmental Officer Local Leadership	Remote security management	7,500,000.
		Hire people from the project area to benefit from a neighbourhood watch scheme.	Employment of people from the project neighbourhood				
		Contract security guards to watch over the	Presence of security guards				

Impact	Desired Outcome	Mitigation/Enhancement Measure	Monitoring Indicator (s)	Responsibility for implementation	External Monitoring responsibility	Required capacity Building	Estimated cost (UGX)
		activities at the construction site.					
Visual and landscape effect	Project acceptance among community members	Restore disturbed areas following completion of construction activities;	Restored disturbed area	MWE Contractors	District Environmental Officer Area Local Leadership	Landscaping Community engagement	Covered under BOQ
		Construct a fence around the project site before the establishment of the project component.	The presence of a fence around the project site				
		Avoid sensitive areas during setting out as much as possible	Presence of standing vegetation in project infrastructure				
		Sensitize community members on the planned development	Sensitisation records for community members				
Estimated construction ESMP total cost 3.16% of total project cost Of 8,516,072,058 Billion Uganda Shillings				Uganda shillings 269,000,000			

9.3 Environmental and Social Monitoring Programme

9.3.1 Purpose of Monitoring

To achieve the desired objectives, a monitoring program seeks to guarantee that suggested mitigation and enhancement actions are carried out; if not, the measures must be adjusted, discontinued, or replaced as necessary. Additionally, monitoring will enable evaluation of adherence to both national and World Bank regulations and guidelines. A monitoring system for the oversight, observation, and enforcement of E&S regulations has been established by the Ministry. The MWE teams, comprising the PST, as well as the contractors and supervisory consultants, make up the mechanism. Additionally, the ministry has set aside money specifically for this consultant to hire a specialist to handle stakeholder engagement tasks, GRM development, training, and tooling, and other E&S risk management operations.

9.3.2 Scope Of Environmental And Social Monitoring

Environmental monitoring will be undertaken at different levels as described below

Surveillance: Undertaken by the Supervision Engineer on behalf of MWE.

Quarterly Monitoring: Joint by all relevant stakeholders at various levels.

Audit activities: To be done by a NEMA registered Environmental Auditor.

Spot checks: By Supervising Engineer, MWE, Contractor, District Leadership, NEMA.

9.3.3 Monitoring Activities and Processes

9.3.3.1 Weather Forecasts

Weather monitoring and forecasting are important to ensure that the Contractor plans for activities and provides mitigation where weather especially rainfall may pose challenges. This will be critical during excavation works

9.3.3.2 Site Inspection

To cover all aspects of the site's environmental and social management, routine inspections will be conducted. Weekly, monthly, and quarterly inspections will confirm that the daily inspections are identifying any maintenance requirements and that these are being completed promptly. Daily inspections seek to identify any environmental issues and address them without delay. The Contractor shall conduct site inspections as directed by the Supervision Consultant.

eted promptly. Daily inspections seek to identify any environmental issues and address them without delay. The Contractor shall conduct site inspections as directed by the Supervision Consultant.

9.3.3.3 Meetings

The project progress will be discussed in monthly site meetings, when safeguards issues will be adequately discussed. This will entail an assessment of the mitigation strategies' efficacy

as well as its successes and non-compliances. As a response to the contractor's presentation and in light of the joint inspection, the Engineer, the client (MWE), and the World Bank will be able to discuss any environmental concerns on this forum.

inspection, the Engineer, the client (MWE), and the World Bank will be able to discuss any environmental concerns on this forum.

9.3.3.4 Record keeping

MWE will see to it that all pertinent compliance and monitoring records are easily accessed. A lead agency or the Authority may require the developer to submit monitoring reports in a prescribed form, according to subsection (7) of the NEA (2019), which also states that "A developer shall maintain proper records of the monitoring undertaken under subsection (2), which shall be made available to the Authority or lead agency upon request."

hich shall be made available to the Authority or lead agency upon request."

9.3.3.5 Monthly and Quarterly Environmental and Social Report

To fulfil the Contractor's contractual reporting requirements, either a stand-alone Monthly Environment and Social report must be generated, or the Contractor's Monthly Progress Report must adequately cover safeguards. The report will outline various actions made to manage the project's environmental and social components following the terms of the contract, Ugandan laws, norms, plans, and policies, as well as World Bank Safeguard policies. The supervising consultant will also need to confirm and approve this report. Planning is usually done continuously for the management of environmental aspects. To that end, each month's success report ought to include a plan for the upcoming month's social and environmental events.

This Contractor's Monthly Report is expected to summarize the following:

- Progress in implementing the CESMP and the standalone management plans;
- Status of key approvals and documentation for the project;
- Compliance with legal obligations and specifications;
- Compliance with the commitment to child protection and GBV (SEA & SH) prevention and management
- Findings of the monitoring programs, with emphasis on any breaches of the control standards, action levels or standards of general site management;
- Summary of any complaints by the community and actions taken/to be taken; and
- Key environmental activities for the next month.

Quarterly, the supervising consultant will prepare an Environment and Social Report covering similar thematic areas as listed above (for the quarter) that will be submitted to the developer (MWE). This report will inform the MWE quarterly report that will be shared with the World Bank and other stakeholders.

MWE should stipulate reporting requirements in the bidding documents for sourcing the project contractor and supervising consultant, and binding clauses should also be included in the subsequent contracts to ensure compliance.

9.3.3.6 Accident and Incident Reporting

While MWE will ensure comparable notification to the World Bank within 48 hours of their occurrence, the supervising consultant and contractor shall ensure reporting of any critical and severe occurrences to MWE within 24 hours of their occurrence.

9.3.3.7 Environmental compliance audit

In accordance with the National Environment Act of 2019 and the Audit Regulations of 2020, MWE shall assume responsibility for fulfilling the requirements for an environmental and social audit, neither more than 12 months nor less than 36 months following project completion or the start of operations, respectively.

9.3.3.8 Approval of the ESMP activities

Implementation of ESMP activities will be approved by MWE and safeguards compliance will be one of the bases for payment. Final payment for the contractor shall be tagged to the successful restoration of all disturbed areas and clean-up of all construction sites.

9.3.3.9 Enforcement Of Compliance

The supervising engineer will strictly supervise the implementation of the ESMP and where there are breaches, the supervising engineer shall issue written instructions, cautions, and warnings as applicable. Where the contractor fails to comply, contractual clauses shall be invoked, and penalties or fines effected. If necessary, the civil works can be suspended if the contractor repeatedly fails to adhere to instructions. MWE shall penalize the supervising consultant if he fails to supervise and enforce ESMP implementation by the contractor

9.4 E&S Action Plans and Method Statements

Action Plans from the Contractor will be required for overall E&S management. Action Plans will indicate what further plans/programs the Contractor has compiled to manage, for instance, HIV/AIDS, gender equality, gender-based violence and the abuse of children, amongst others. Method Statements from the Contractor are more specific and will be required for specific sensitive actions. A Method Statement describes how sensitive area work takes place, and is a dynamic document in which modifications are agreed on between the Contractor and E&S Supervising Consultant/s during the construction phase, as construction works progress. A Method Statement describes the scope of the intended work in a step-by-step process for the E&S Supervising Consultant to understand the Contractor's intentions and methods. This will enable them to assist in linking mitigation measures, which would reduce environmental and social impacts during the execution of these construction activities. For each instance wherein, it is recommended that the Contractor submits a Method Statement to the satisfaction of the E&S Supervising Consultant, the format should indicate the following:

- Description of the activity to be undertaken;

- Detailed description of the process of work, methods, equipment and materials storage and movement to work sites;
- Description/sketch map of the locality of work;
- The sequence of actions with commencement dates and completion date estimates;
- Management of any emergencies, like contamination and spills, if they should occur; and
- Show how E&S risks will be managed.

The Contractor must submit E&S component-specific Action/Management Plan/s and Method Statement/s before commencement of any particular construction activity, and work may not commence until these have been approved by MWE. The approval of the Methods Statement/s or E&S component-specific contractor management plan does not absolve the Contractor from other or additional obligations or responsibilities as contained in the terms of the contract, the ESMP and their E&S Action Plan.

For this project, the Methods Statement/E&S specific contractor management plan that shall be required are:

- **Influx Management Plan**

While project-induced influx can benefit the project and host communities (e.g., by increasing business opportunities, improving the availability of goods and services, and offering employment to locals), the influx can pose significant risks and impacts. If not carefully managed, labour influx can negatively affect public infrastructure, utilities, public services, housing, health, food security and social dynamics in the project area, especially in rural, remote or small communities, which typically have less absorptive capacity than a large urban environment. The Plan will detail measures aimed at: a) avoiding or reducing negative influx impacts and enhancing positive impacts in the project area of influence; and b) providing capacity building for Contractors, local government and communities to help them cope with project-induced in-migration.

- **Emergency Response Plan**

The Emergency Response Plan (ERP) will cover the required actions for all situations that could generate emergencies during the project's construction phase. The ERP will provide guidance to manage emergency events during different stages of construction. It will include general guidelines and procedures for the management of emergency events including emergency management command structure and mechanisms for incident reporting and investigation.

- **Labour Management Plan**

The Contractor is expected to have a clear plan for the recruitment of workers to promote project ownership by the communities. The Contractor should give preference to local people

by recruiting unskilled and semi-skilled labour from project villages and this should be done through local areas councils from where those seeking employment should get letters of recommendation.

- **Traffic Management Plan**

The major purpose of the Traffic Management Plan is to help protect road users and workers and keep traffic delays to a minimum through proper and clear signage and controls. The Traffic Management Plan will provide actions to ensure the safety of road users and construction staff during the construction of the project. It will outline traffic control and traffic management procedures to prevent potential hazards associated with road use during construction. Any work resulting in obstruction of roads needs to be managed so that safety is not compromised and disruptions and delays to road users are kept to a minimum. The Plan should include a road safety awareness program.

- **Security Management Plan**

The Plan will provide guidance and requirements on safety and security for the Project. It will identify potential security risks present during the construction phase, methods and actions to mitigate these risks, and the requirements to ensure the highest levels of safety and security in the implementation of the Project. It will, therefore, set out the commitment of the Project to security under the project. MWE will not sanction any use of force by direct or contracted workers in providing security except when used for preventive and defensive purposes in proportion to the nature and extent of the threat. MWE will (a) make reasonable inquiries to verify that the direct or contracted workers retained by the Contractors to provide security are not implicated in past abuses; (b) train them adequately in the use of force and appropriate conduct towards workers and host communities; (c) require them to act within the applicable law and Bank safeguards policies; (d) MWE will review all allegations of unlawful or abusive acts of security personnel, take action to prevent recurrence and where necessary report unlawful and abusive acts to relevant Authorities such as the Police, Local Councils, District Local Governments; (e) MWE shall require that all deployed Security personnel sign a Code of Conduct to make behavioral commitments; (f) MWE shall require establishment of a clear and accessible Grievance Redress Mechanism handle complaints from both the Workers and the host community; (g) Establish coordination and reporting arrangements between the Project Security and the Public Security Agencies; and (h) Put in place appropriate site access and control measures such as fencing of facilities, installing manned gates, surveillance cameras etc.

- **Noise Control Plan**

The noise-sensitive receptors mainly include schools and residential areas located within less than 100m of the direct project footprint. Workers exposed to construction noise are sensitive receptors as well. The Noise Control Plan will consolidate the noise control mitigations and methods to be compiled by the contractor while undertaking activities leading to noise impacts. The objective is to mitigate noise nuisance and disturbances to other public/ socio-economic activities and land uses sensitive to noise. It will be a requirement in the plan that

construction activities will be prohibited between 10 p.m. and 6 a.m. in residential areas. Also, when operating close to sensitive areas (within 250m) such as residential, schools or medical facilities, the contractor's working hours shall be limited to 7 a.m. to 6 p.m.

- **Air Quality and Dust Control Plan**

This plan will detail the actions to be taken to mitigate dust generation and air emissions associated with construction works. It will identify the sources of air pollution, the predicted levels in the ESIA, the sensitive receptors, management actions and details of the air quality monitoring program. The objectives of the Plan are as follows:

- To minimize the nuisance impact on surrounding communities of dust generation during construction activities;
- To minimize potential risks from dust generation;
- Identify all possible air pollution sources related to construction activities as well as actions to minimize emissions into the air.
- Ensure there is regular monitoring and reporting of air quality aspects.

- **Erosion and Pollution Control Plan**

Erosion risks are expected to be mainly associated with vegetation clearance, construction of access roads and storage of excavated materials. In some cases, the project area may receive high amounts of rainfall that will be associated with several soil erosion and drainage impacts, such as siltation and water stagnation that could be experienced in the direct project area. It is recommended that the Contractor includes a comprehensive Erosion, Sedimentation & Pollution Control Plan Checklist.

- **Waste Management Plan**

The Waste Management Plan should include the following:

- Waste sources and streams
- Management Hierarchy (3Rs)
- Practices (collection + storage + disposal) for non-hazardous waste
- Practices (collection + storage + disposal) for hazardous waste
- Logistics (bins, etc.)
- Permitting requirements
- Monitoring + Reporting (KPIs)

The Contractor will implement waste management measures and practices throughout the construction period to mitigate risks. The Contractor shall undertake measures to respond to all generated categories of wastes i.e., solid wastes (food residues, metal scraps, bottles, plastics, polythene sheets, wood pallets, papers, faecal matter and other parking materials), construction wastes such as rejects/offcuts of bricks, steel reinforcement, nails, iron sheets,

timber among others and liquid wastes (waste oil, wastewater, urine etc.). The Contractor should be aware that large quantities of cut-to-spoil may be generated which will require disposal. Therefore, the contractor is expected to identify potential sites for waste disposal before excavation works commence to secure the requisite approvals promptly.

- **Quality management plan**

A quality management plan defines the quality policies and procedures relevant to the project for both project deliverables and project processes and who is charged with what responsibility to ensure compliance to set standards. Given the nature of this project, the contractor should have a quality management plan to guide the quality control and assurance processes to achieve the intended outcomes in terms of social, design, structural, and investment outcomes in line with environmental and social safeguards policies.

- **Occupational Health and Safety Plan**

The Contractor will have to prepare a document that presents the framework for occupational health and safety management and monitoring measures that he will undertake. The OHS plan should typically cover safety programs that will be applied for promoting health and safety, preventing harm, fatality and hazards to the employees, sub-contractors, properties and the general public.

- **Community Health and Safety Plan**

The community health and safety plan will apply to project construction activities and the associated risks and potential impacts that these activities may have on community health and safety. The geographic scope is the project area of influence. The risks and potential project impacts on community health and safety can emerge from both within and outside the project catchment area. Therefore, the scope of these measures and procedures will focus on the management of aspects associated with the interaction of construction activities, the workforce and the community. The measures and procedures should include control measures designed to avoid, minimize or mitigate the adverse effects of project activities on the health and safety of the community, while at the same time, enhancing the beneficial effects and capitalising on opportunities that may contribute to improving overall community well-being.

- **HIV/AIDS Management Plan**

The Contractor in pursuit of his commitment to health and safety will organize training, and conduct awareness and education on the use of infection control measures in the workplace. The Contractor is expected to provide appropriate PPE to protect workers from the risk of exposure to HIV/AIDS and incorporate HIV/AIDS information in occupational health and safety inductions, provide guidelines in preventing the spread of HIV/AIDS and other sexually transmitted infections (STIs), publicize knowledge related to HIV/AIDS and STIs to the work crews and the surrounding communities, provide information on good HIV prevention interventions, including promotion of the correct use of condoms and ensure sufficient resources are available for HIV programs.

- **Gender Management Plan**

The contractor is expected to also come up with a Gender Management Plan (GMP). The GMP will cover gender-related aspects, such as GBV risks at community and worker level, Sexual Harassment to protect women workers as well as community members, mitigation measures, responses and who is in charge of different actions, show aspects of gender division of labour in terms of equality and equity, gender segregation (for example female workers having separate toilets and changing rooms from male workers), gender working conditions, provision of job opportunities where the contractor identifies areas where ladies are given high opportunities such as cleaning, human resource positions, working in laboratories, flag ladies among others.

The GMP should show gender sensitivity and show a clear code of conduct. The GMP should also provide a checklist to help identify whether the project is gender complainant.

- **Child Protection Plan**

Child protection shall be an integral process throughout the project. The contractor shall have a Child Protection policy that will state the commitment of the contractor, employees, agents, suppliers, and visitors to uphold and guarantee the rights of children in the community. All employees, suppliers, visitors and agents shall have to be oriented, read, understand and sign acceptance and commitment to the Child Protection Policy.

- **Site Restoration/ Decommissioning Plan**

At the end of construction activities, the Contractor shall ensure restoration of the disturbed natural sites through environmental rehabilitation, backfilling and restoring topsoil, (re-) introduction of genetic species (e.g., natural re-grassing) similar to those destroyed to re-establish the natural local ecology. The decommissioning phase will focus on any of the following as applicable:

- Workers' camp
- The parking/ equipment yards
- Material stockpile areas
- Access roads
- Quarries and borrow pits

Specifically, the process of rehabilitating and restoring the site shall follow the following sequential approach:

All facility structures shall be demolished; the rubble/debris shall be used for fill purposes or taken to an approved disposal site;

- All equipment, vehicles, trucks and machinery shall be removed from sites;
- Makeshift access roads shall be closed, cut and revegetated
- Backfilling all openings with soil and leftover overburden
- Planting fast-growing trees and grasses to stabilize excavated areas with native species;
- Fencing off the re-vegetated areas should be provided until the reinstated vegetation has reached maturity

Joint site inspections will be conducted to ensure site restoration before the handover of the project to assess the progress of restoration activities. They will constitute the Contractor, MWE, Supervision Consultant and District Environment Officer.

Progressive restoration should be encouraged throughout project implementation, especially for the exhausted materials areas/sites, including parts of quarries, etc. The need for restoration plans to be prepared in advance and where necessary approved by NEMA and other responsible statutory bodies.

- **Stakeholder Engagement and Information Disclosure**

Environment and Social Safeguards requirements recognize the importance of open and transparent engagement with project stakeholders. The success of any project is hinged on the level and quality of stakeholder engagement which is an inclusive process expected to occur throughout the project life cycle. Engagement is more useful when introduced in the early phases of project development and is mainstreamed into all levels of decision-making.

Under Stakeholder Engagement and Information Disclosure, the following scope is envisaged:

- Stakeholder identification and analysis: This requires the identification of key project-affected parties and those with interests in the project. At this level, the emphasis is on vulnerable people or groups of people whose situations are likely to be accelerated by project implementation. Identification should be able to bring out different sets of affected people and their interests.
- Stakeholder Engagement Plan: A Stakeholder Engagement Plan (SEP) shall be drafted in consultation with the Bank. The SEP will be disclosed at all appropriate levels to afford all affected and interested inputs into project design and implementation.
- Information Disclosure: The borrower is obliged to undertake timely and effective disclosure of information regarding the project including its purpose, nature, scale, potential risks and impacts on the local communities and further present possible mitigation measures.
- Meaningful Consultations: Consultation is meaningful if a dialogue exists, communities and individuals should be allowed to interact with respect and dignity. Interactions should be based on prior disclosure of project-relevant information to all parties.
- Engagement during project implementation and external reporting: Continuous interaction with project-affected persons throughout the project lifecycle is key for the successful implementation of the project. Project-affected Persons shall be availed of all relevant information using appropriate means to enable them to reach an informed decision.
- Grievance mechanism: A grievance mechanism is expected to guide the resolution and management of concerns, complaints and issues that may arise during the entire

project life cycle. The GRM will be proportionate to identified potential risks and impacts.

- Organizational capacity and Commitment: MWE shall define clear roles, responsibilities and authority and further designate properly skilled personnel to be responsible for the implementation of specific stakeholder assignments.

Before construction activities, and in pursuit of timely, meaningful and appropriate stakeholder engagement, the contractor shall develop a clear strategy for stakeholder engagement to assist in managing and facilitating engagement through the construction activities. The SEP at this stage will be guided by that developed by the borrower at the project planning stage. This stakeholder engagement plan will adopt an inclusive perspective. The SEP will inform ongoing stakeholder engagement through the various stages of construction, decommissioning and the defects liability period.

9.5 Institutional Implementation Arrangements

The Project will be implemented by MoWE through its regional entities (WMZs, WSDFs) in close collaboration with Yumbe District local governments and their partner (e.g., private sector operators). To facilitate integration within the sector, MOU/MOUs outlining joint responsibilities will be signed between the MoWE and Yumbe District Local Government.

The Project's primary stakeholders are the: (a) MoWE through which the project will be implemented in coordination with its relevant departments (e.g., DWRM, DWD, DEA); (b) Yumbe District Local Government(c) and local communities and consumers who will participate in project planning, and benefit from the outputs and outcomes of the project.

9.5.1 Role of NEMA

- The National Environmental Management Authority (NEMA) will, in consultation with a lead agency;
- First and foremost, must review and assess the ESIA for this proposed project site and activities for its approval (before project construction).
- Monitor all environmental issues to assess any possible changes in the environment and their possible impacts (During both establishment and operation).
- Monitor the operation of the project activity to determine its immediate and long-term effects on the environment. (During project construction/operation).
- Appointing an environmental inspector by the authority; who may enter the project premises at free will to monitor the effects on the environment of any activities carried out on the premises (During project construction/operation).

9.5.2 Role of Yumbe District Local Government

- Engineer; inspect the project works as per the engineering specifications and verify all acquired permits.

- District Water Officer (DWO); inspects the project on behalf of the district technical administration wing/ Chief Administrative Officer (CAO). Monitor all technical water- works.
- District Environmental Officer (DEO); inspects the project sites on behalf of NEMA and monitors against NEMA approval project environmental conditions.
- Senior Community Development Officer (SCDO); inspect the project sites on behalf of the district and monitor against NEMA approval project social conditions, review and approve community engagement minutes and reports, and assess the effectiveness of the project grievance system
- The District Labour Officer (DLO); inspects the project sites on behalf of MGLSD, and monitors the project site working environment in relation to OHS-defined standards.

9.5.3 The Role of MWE

- MWE will have the secondary role in delivering on the measures set out in the ESMP, as the developer.
- MWE has complied by utilization of services of a NEMA-registered environmental firm to guide in preparation of this ESIA for submission to the authority for its approval (before construction)
- Giving details of a proposed project before commencement and making copies of the nontechnical summary of any Environmental Impact Statement available at the site (before construction).
- MWE will be responsible for ensuring compliance with all relevant legislation as well as adherence to all environmental and socio-economic mitigation measures specified in the ESMP (during construction).
- MWE through its Yumbe field office will appoint the technical members, the project focal person to oversee the day-to-day implementation of the ESMP, and to whom the contractor will report.
- Undertake scheduled site supervision to determine the state of environmental and social compliance.
- Overall supervision of this ESMP and evaluation of its implementation.
- Review the proposed project activities, methodologies and plans in relation to the requirements of the mitigation and management measures of this ESMP.
- Receive, record, and investigate any grievance and order the contractor to make corrective actions and respond to the public on the corrections conducted. Work with communities to address any social issues. Handle social issues during the project operation stage.

- Carry out sensitization sessions for the community members and contractors about the project, safety and health measures, and environmental practices (during construction).
- Will serve to build strong and open communication with Local authorities, communities, and faith organizations among others within this project area.

9.5.4 The Role of the Contractor

- The hired contractor will have the primary role in delivering on the measures set out in the ESMMP, as a contractor.
- The contractor will be responsible for ensuring compliance with all relevant legislation as well as adherence to all environmental and socio-economic mitigation measures specified in the ESMP (during construction).
- Ensuring that all environmental monitoring data is made available at regular intervals and that any divergences from performance standards will be fully explained, together with any necessary preventative (during construction).
- The contractor may appoint a Safety and Health officer preferably the site agent to develop and enforce safety and health precautionary measures for both the workers and the community at large (during construction).
- The contractor's site agent will act as the Contractor's Community Liaison Officer to bridge the gap between the contractor and the community, handle grievances, and face the project in the community (during construction). Ensure community concerns are addressed
- Implement project site layout design and project daily operational activities to ensure compliance with project engineering design and the ESMP with regard to environmental protection and impact mitigation.
- Day-to-day monitoring of environmental matters - this will include wider environmental aspects including matters not directly concerned with the actual construction.
- Awareness raising and training of contractor's staff with respect to environmental issues; this will include notification of the severe penalties for non-compliance with instructions which may include dismissal. Design and conduct appropriate induction training for all workers on recruitment about safety, health, and environment while working in the project areas.
- Preparation of weekly and monthly environmental inspection and monitoring reports in a format acceptable to MWE
- Undertake mainstreaming of gender issues into the entire project including but not limited to work placements, tools and fixtures, sanitary utilities, creating awareness on sexual harassment and any other forms of discrimination based on gender, ethnic background and race.

- Ensure that all workers are provided with appropriate PPEs and further enforce their use at all times

9.5.5 Role of Supervising Consultant

The Supervising Consultant will be in charge of providing general direction and instructions to the contractor, including reviewing and approving the contractor's management plans. Their teams should at the very least include an Environment Specialist and a Social Specialist. In close collaboration with the MWE Safeguards Team, the Environmental and Social Safeguards Specialists will oversee the contractor. Furthermore, the Supervising Consultant will carry out planned site supervision to keep an eye on the contractors' documented or actualized condition of safeguards compliance. Along with other project-wide concerns, the Supervising Consultant will be responsible for monitoring adherence to and observance of environmental, safety, health, and social regulations.

9.5.6 Role of the Umbrella Organisation

- After construction, the piped water supply and sanitation system will be handed over to the Northern umbrella organization for management. This will play several roles as listed below;
- Provide operation and maintenance support to the scheme operators.
- Help to restore functionality in emergencies and implement repair works and scheme extensions,
- Provide training to local Water Boards,
- Promote payment for water services (water metering),
- Conduct advisory financial audits
- Monitor drinking water quality through regular sampling.

9.5.7 The Water User Committee (WUC)

It is recommended that a WUC be constituted where each tap stand shall nominate two representatives who shall represent the tap community in the central water user committee (CWUC). At least one of the representatives of each tap stand shall be a woman. The WUC shall consist of these 2 representatives of each tap stand and a local council 1 representative; the committee shall then form an executive consisting of a Chairman, Treasurer, and Secretary. The rest shall be members. Since the scheme covers more than one village, each of the 2 villages shall nominate a local council (LC1) representative to the WUC.

The role and responsibilities of the CWUC shall be as follows:

- Mobilize user communities to meet their obligations towards any form of contribution to the construction, operation, and maintenance of the scheme.
- Ensure effective representation of every tap stand at the CWUC meetings.

9.5.8 The role of the Scheme Operator (SO)

While the piped water supply and sanitation system shall be under the management of the Northern umbrella organization, the water Scheme shall be operated by a Scheme Operator (SO). The SO shall be an individual with zeal and willingness to manage the day-to-day affairs of the scheme for and on behalf of the Umbrella organization and the entire beneficiary community for an agreed management fee.

The roles and responsibilities of the SO will include:

- Ensure smooth running of the scheme and constant supply of water to the user community.
- Engage services of trained mechanics/plumbers to carry out repairs on the system when the need arises and pay them accordingly.
- Attend to community complaints and provide regular updates to the Umbrella organization and CWUC about such complaints.
- Maintain order at the water collection point
- Ensure the security of the scheme at all times.
- Keep a clean working environment
- Prepare monthly / quarterly technical and financial reports on the scheme operations and report to the Umbrella organization.

Report suspected system malfunctions or illegal connections to the Umbrella organization and where necessary to the WUC.

9.6 Grievance Redress Mechanism

This section presents procedures for affected persons to lodge a complaint or express a grievance against the project staff or contractors during project implementation. It also describes the roles and responsibilities for addressing grievances. The objectives of the grievance process are:

- Ensure that appropriate and mutually acceptable corrective actions are identified and implemented to address complaints;
- Verify that complainants are satisfied with the outcomes of corrective actions;
- Avoid the need to resort to judicial proceedings.
- The project will operate two major grievance redress mechanisms, namely:
 - i. Worker's grievance redress mechanism, and
 - ii. Community Grievance Redress Mechanism.

Grievances are useful indicators of a project's performance therefore have to be treated with the due care they deserve.

A high number of grievances may be an indicator of poor work practices. Likewise, a low number of grievances may not necessarily mean everything is working out smoothly but could point to a nonfunctional system that is inaccessible to PAPs or is inefficient and ineffective in handling project-related complaints.

The following guiding principles shall be followed during grievance and complaint redress;

- a) Equity and fairness in project implementation.
- b) Access and effective participation of stakeholders in grievance management
- c) Transparency and accountability in implementing the sub-project at all times and levels
- d) Independence from all interested parties, and bound by a clear set of rules and standards.
- e) Predictability in terms of clearly defined procedures/processes for addressing complaints with clear timelines for solving complaints.

9.6.1 Village and District Grievances Redress Committees

Dedicated Grievance Management Committees (GMCs) will be established to manage grievances during project implementation. The committees will utilize existing administrative structures with the support of technical teams to ensure easy access and inclusion of stakeholders and to facilitate the appeal process.

When required, the GMCs shall be formed at village/ parish levels, Sub-County, Town Council, Municipal Council, District levels and MWE level. This guideline does not propose a size fits all to structure, composition and level of GMCs for all projects. The principle of proportionality should guide the degree of effort.

It is proposed that dispute resolution will depend on Grievance Redress Committees (GRC) which will be initiated at the village level to record grievances and also help in mediation.

The committee shall be formed either at the village or parish level given that linear projects traverse several communities. Committees must be accessible to communities at the village or parish level.

Village and Parish GRM committees will be established as voluntary committees for each infrastructure to be constructed at village or parish levels depending on the community dynamics, area covered and nature of works. Community GRM Committees will have 10 members including:

- Chairperson,
- Vice Chairperson,

- Secretary,
- Other Members (7) including a youth, Elderly Person, PWD and at least 3 members should be female. Quorum sitting shall be of at least five (5 members).
- The LC I Chairpersons and Vice-Chairpersons will be ex-officials to these committees.

NB: The committee shall be formed either at the village or parish level given that linear projects traverse several communities. Committees must be accessible to communities at the village or parish level.

9.6.2 Roles and Responsibilities of Community GMC

- Providing project information and attending to complaints that may be resolved by providing information
- Registering all grievances from the community or as referred to at different levels
- Addressing those grievances that are manageable by the committee
- Referring any grievances to higher levels for action and further follow-up.
- Escalating any unresolved grievances to appropriate levels as stated in these guidelines
- Liaising with local leaders to ensure the health, safety and security of the communities, workers and construction materials during the project implementation

9.6.3 Project Workers Grievances Redress Committees

Each construction site shall have a Workers' GMC responsible for handling all community grievances related to construction including those grievances referred by the village/ Parish GMC. The Site GMC shall comprise the following;

- The Resident Engineer/ Supervising Consultant (Chairperson)
- The Contractor's Contract Manager
- Sociologist for the Consultant
- Sociologist for Contractor (Secretary)
- Environmentalist for the Consultant
- Environmentalist for the Contractor
- Health and Safety Officer for the Contractor
- 2 Community Representatives (1 Female and 1 Male)

This committee shall consolidate and address all grievances from the community at the site and escalate any matters appropriately to the respective Local Government and MWE.

Under the supervision of the consultant Site Sociologist, the contractor shall make immediate, responses to matters related to the project construction, contractor's workers, agents, sub-contractors or suppliers. Unresolved matters by the contractors shall be escalated or referred to the MWE's Grievance Redress Committee.

Complaints are likely to arise during construction activities. Project Workers' Grievance Committees (WGCs) shall be set up to receive and resolve such complaints. This may include; physical violence, non-compliance in the use of PPE, Illegal drug taking, possession of drugs or the consumption of alcohol during operations, undesirable working conditions in physical terms, changes without prior notice, poor employee relations, improper wage adjustments, dissatisfactory office policies in case of promotion, demotion, leaves, overtime, violation of laws, labour-management hostility, incidences of workplace favouritism and nepotism, among others. etc.

Any complaints that may not be handled by the WGCs shall be referred to the government authorities such as the Uganda Police. The WGCs will comprise the Project Manager, Foreman and the social and environmental safeguards personnel and representatives of the following categories of workers; Casual workers, Drivers, Operators and Turn men, Flag Personnel, Site Cooks and cleaners and Technical. The disciplinary process will be conducted in five stages and can be initiated by an employee as well. These stages include; initial action where a reminder to the individual is provided, issuing a warning, stopping the work, removing the individual from the site; disciplinary report, escalation, discipline review and contract cancellation.

9.6.4 Roles of Workers Grievance Redress Committees

These committees shall proactively and fairly handle complaints registered by workers or employers. The Committee doesn't take on the obligations of the project management but rather provides an opportunity for any aggrieved workers of the employer to register complaints and have them resolved fairly. Workers' Grievance Redress Committee shall:

The roles of the Workers' Grievance Management System include:

- Providing a forum for consultation, frank exchange of information, discussion and joint problem-solving between management and employee representatives on issues about staff welfare, rights, discipline; and any proposed changes dealing with policies, procedures and working conditions.
- Receiving and reporting workers' complaints/grievances to management and negotiating for timely redress, / participating in arbitration of cases between workers and management through disciplinary hearings and/or between fellow workers through conflict resolution meetings

- Representing the interests of workers about their terms and conditions of employment, staff welfare, staff development and other matters of concern to the workers, and negotiating with the contractor’s management on their behalf accordingly.
- Educating Workers on their rights, discipline, code of conduct, the spirit of staff unity across the project as well as on respect for cultural diversity among workers of different races, tribes, religions and other cultural differences
- Regularly soliciting employees' suggestions/opinions to management through appropriate and organized channels such as their representatives, suggestion box, or joint meetings from time to time
- Act as a point of contact between the employees and employer’s management; establish and maintain good relations, foster effective two-way communication and mutual understanding between workers on one hand, and with management on another.
- Identifying and representing concerns of special interest groups on the project such as women, expectant and lactating mothers, workers with disabilities etc.
- Organizing and conducting monthly Workers’ meetings to review and discuss staff welfare, discipline and related matters; compile and share on-time meeting minutes with the contractor, supervising consultant and MWE pointing to key action areas requiring attention.
- Reporting any incident(s) of violation of workers’ rights, staff indiscipline and related issues to management for redress
- Keeping an adequate log and other documentation of all matters that come before the Workers’ committees for better reference and effective management

9.6.5 MWE’S Internal Grievance Redress Committee

At the Ministry of Water and Environment, a National Grievance Management Committee (GRM) shall consist of a MOWE Chair, the IWMDP Project Coordinator, the Coordinator for Social Safeguards (Secretary), the Coordinator for Environmental safeguards, the Social Safeguards Specialist, the Environmental Specialist, the chair of the community mediation board, and a member of a recognized non-government organization.

9.6.6 MC at Sub County Level

The committee will be formed at the sub-county level and its membership shall consist of;

- Local Council III (chairperson);
- The Sub County Chief,
- Community Development Officer (Secretary)

- Environment focal person
- Representatives of PAPs
- Parish Chief of the respective area where the complaint originated from.

9.6.7 GMC at Town Council/ Municipal Level

Given its extended nature of staffing and complexity, the town council grievance management committee shall include the following members;

- LC III Chairperson/ Mayor (Chairperson)
- Town Clerk
- Council Community Development Officer (Secretary)
- Environment Officer
- Physical Planner
- Representative of the PAPs

9.6.8 GMC at the District Level

At the District Level, the Grievances Management Committee shall consist of;

- LC V Chairperson (Chairman)
- Chief Administrative Officer or his/ her Representative
- District Community Development Officer (Secretary)
- Head of Natural Resources
- District Water Officer
- Representatives from the PAPs
- District Lands officer

Note: Due to the complex nature of grievances, the committees can be extended to include any other relevant officers suitable for addressing the prevailing grievances.

9.6.9 Contractor/workers GRM

Workplace concerns are usually different from issues raised by project-affected communities and other stakeholders and therefore call for a separate mechanism to address them. For better organisation and management of the contractor's workers' grievances and concerns, the contractor shall establish a Grievance Management Committee (GMC) to handle workers' welfare-related grievances including low pay, delayed payment, unfair termination of

contracts, working overtime, heavy workload, sexual harassment, poor working conditions among others.

The workers' GMC shall be established and headed by a chairperson elected by workers representing the different sections of the contractor. The other members of the worker's GMC will include the Vice Chairperson, Secretary, Mobiliser and ex-officials who will be representatives of the workers from the different sections. The contractor's sociologist shall be the secretary to document and manage the grievance logbook, and minutes and writing the workers' GMC reports.

At the beginning of the project, contractor workers should be sensitised to the grievance redress mechanism and the measures put in place to channel their grievances and concerns and the referral pathways. The principle of accessibility should be highly emphasized by the workers' GMC.

9.6.10 Process of Handling Grievances

The following sub-section provides the procedure for receiving and hearing complaints as well as appealing against any decision from the grievance management committees at the village, construction site, sub-county/ Town Council/ Municipal Council, District, MWE and other mandated agencies.

a) Receiving and Registering Complaints at the Village/ Parish Level

The following procedure will be followed in registering a complaint at all community GMCs

- A verbal or written complaint is logged in to any member of the GMC by a complainant
- The secretary seeks clarification of the specified details of the complaint
- A complaint is registered into the complaints register provided by MWE
- If the complaint is not clearly understood, requires urgent attention, is grave, fatal and/or bears serious implications, the GMC will visit the site for spot assessment and consultations
- The Community GMC will sit and decide if the issue can be addressed at their level of required referral. If the concern can be addressed, the committee will sit with the complainant and decide on the course of action. The secretary will document the minutes and attendance list and if concluded, the complainant will sign off in the grievance register acknowledging the resolution of his/her grievance. If the matter cannot be resolved by the village GMC then the GMC will forward it to the construction site for immediate redress.

NB: It is recommended that the Contractor transfer all grievances in the village GMC and consolidate them in the construction site grievance register every week and follow up to ensure that all grievances were well handled. This is because all grievances that are project-

related have been triggered by construction activities. The construction team should therefore be the pivot of grievance documentation, redress and follow-up.

b) Screening, Assessing and handling Community Grievances at the Construction Site

All complaints from the village/ parish GMCs shall be collected and consolidated into the main complaints register at the construction site. The Grievances Officer/ Contractor's Sociologist at the Construction site, will screen all complaints received to determine whether action can be taken at the level of his/her office in consultation with other responsible officials, the project contractor and the complainant. The site team should ensure that resolutions are made and compliant resolved within 5 days.

c) Referral/ Appeals to Sub County/ Town Council and Municipal Council Grievance Management Committees

The Contract Manager for the Contractor will refer unresolved grievances to the Sub-county Town Council or Municipal Grievances Management Committee for consideration. The Sub County GMC/ Town Council/ Municipal Council GMC will ensure that the grievance is addressed within 7 days.

Where the grievance hearing session is required, the complainant will be invited to the grievance hearing and redress meeting. Depending on the matter being addressed, it will be important that the area LC I Chairperson of the village where the complaint was lodged be invited to attend the meeting along with the complainant. This is intended to ensure fairness and the LC I will be observing and making inquiries to ensure that both parties understand each other point of view.

This will instil confidence in the complainant as well. Upon successful resolution, the Chairperson of the Committee shall formally write to the complainant specifying details of actions, timeframes and any other details pertinent to the resolution. On agreeing to the resolution, the complainant will sign a consent form binding him/her to the negotiated resolutions.

d) Referral/ Appeals to District Grievance Management Committees (DGMC)

If the Sub County/ Town Council/ Municipal Grievance Management Committee fails to resolve the matter or if the complainant is not satisfied, the Chairperson on behalf of the GMC shall refer the matter to the District GMC. The DCDO will register the referred/ appealed case in the District Complaints Register that will be provided by MWE.

The DCDO who will also act as the Secretary to the DGMC will screen the matter referred and bring it to the attention of the LC V chairperson who will write to invite the complainant together with the respective LC I Chairperson to the DGMC within Seven (7) days. A fair hearing process will then commence at the DGMC and upon satisfaction of the resolutions/ agreement, the complainant shall sign the consent form and the grievance chairperson will

officially write to the complainant with a copy to the LC III, Sub-county Chief/ Town/ Municipal Clerk and the contractor/ Consultant.

If the matter cannot be resolved by the DGMC, then it will be referred to the Ministry of Water and Environment. The CAO on behalf of the District will officially refer the case to the Permanent Secretary MWE with a copy to the Project Coordinator IWMDP for action within 14 days. The Complainant can also appeal to the PS MWE if s/he was not satisfied with the outcomes of the DGMC.

e) Referrals/ Appeals to MWE

Any unresolved grievances will be referred to MWE for appropriate action. The Grievance Desk (Principal Sociologist) shall work with PST to establish all necessary facts within 14 days of receipt of the complaint. A report with the recommended course of action shall be forwarded to the Project Coordinator for implementation and follow-up.

As much as possible, the Ministry team will engage the complainant at the district, sub-county or village levels to arrive at amicable solutions. Upon arriving at an agreed understanding, the complainant shall sign a consent form witnessed by the LC I Chairperson to close the grievance. If no agreement is reached at this level, the complainant shall be advised or shall decide on his/ her own to use any other lawful arrangements as may be applicable.

f) Implementation and Verification of Negotiated Corrective Actions

Agreed corrective action will be undertaken by the responsible agency/ part for example a Local government, MWE, contractor or authorized sub-contractor in close consultation with the complainant within the agreed timeframe and completed action recorded in the grievance database.

To verify satisfaction, the Grievance Committee will upon receipt of a completion report from the GO verify that corrective actions have been implemented. A signature of the complainant will be obtained on the consent form. If the complainant is not satisfied with the outcome of corrective action, additional steps may be undertaken to reach an agreement or an appeal will be lodged by the complainant.

9.6.11 Flow Chart of the Grievance Management Process

The grievance management process has several interdependent steps that will be followed as summarized below;

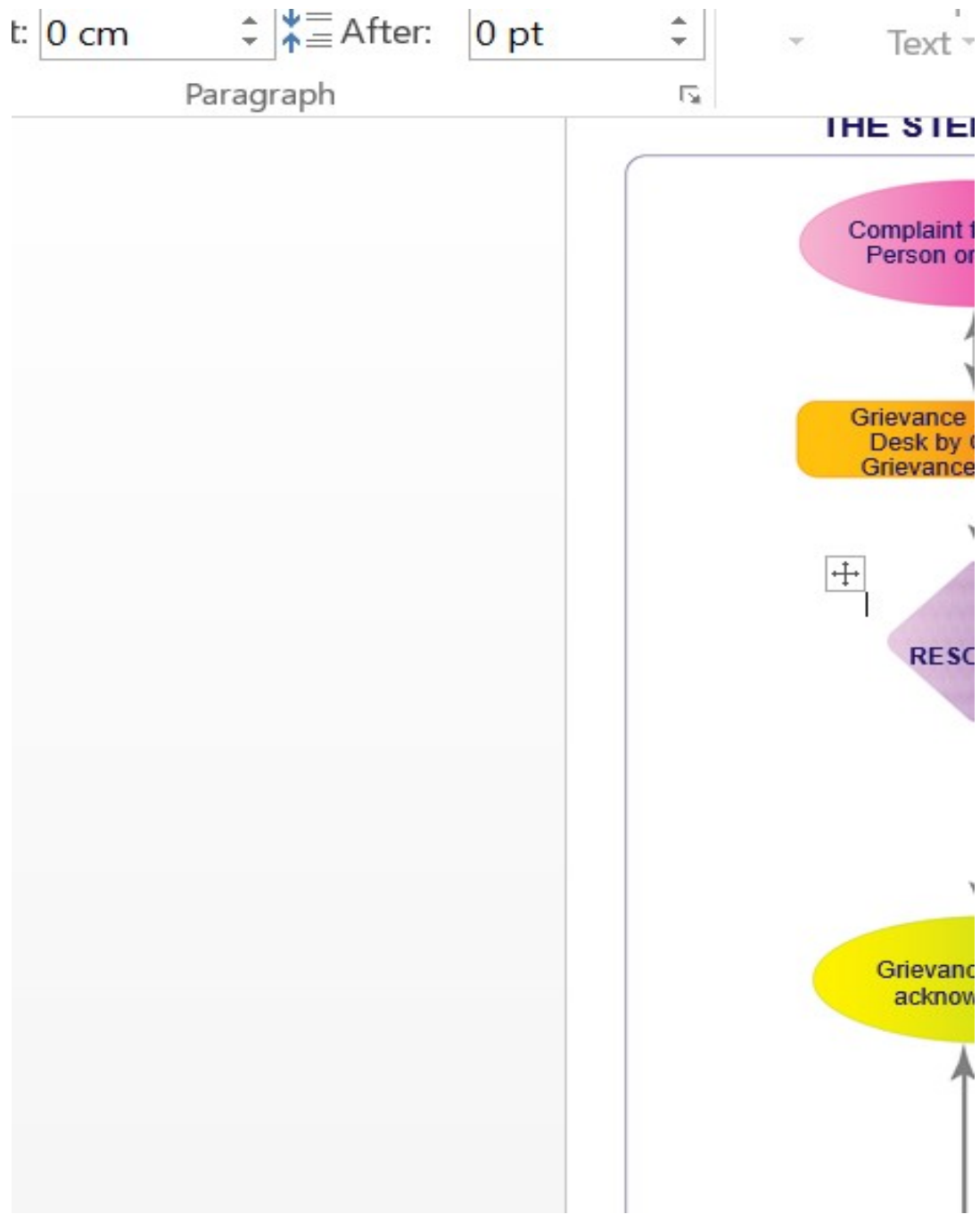


Figure: 9-1: The Grievance Handling Flow for Community (MoWE)

9.6.12 Complaints Handling Flow Chart for Workers

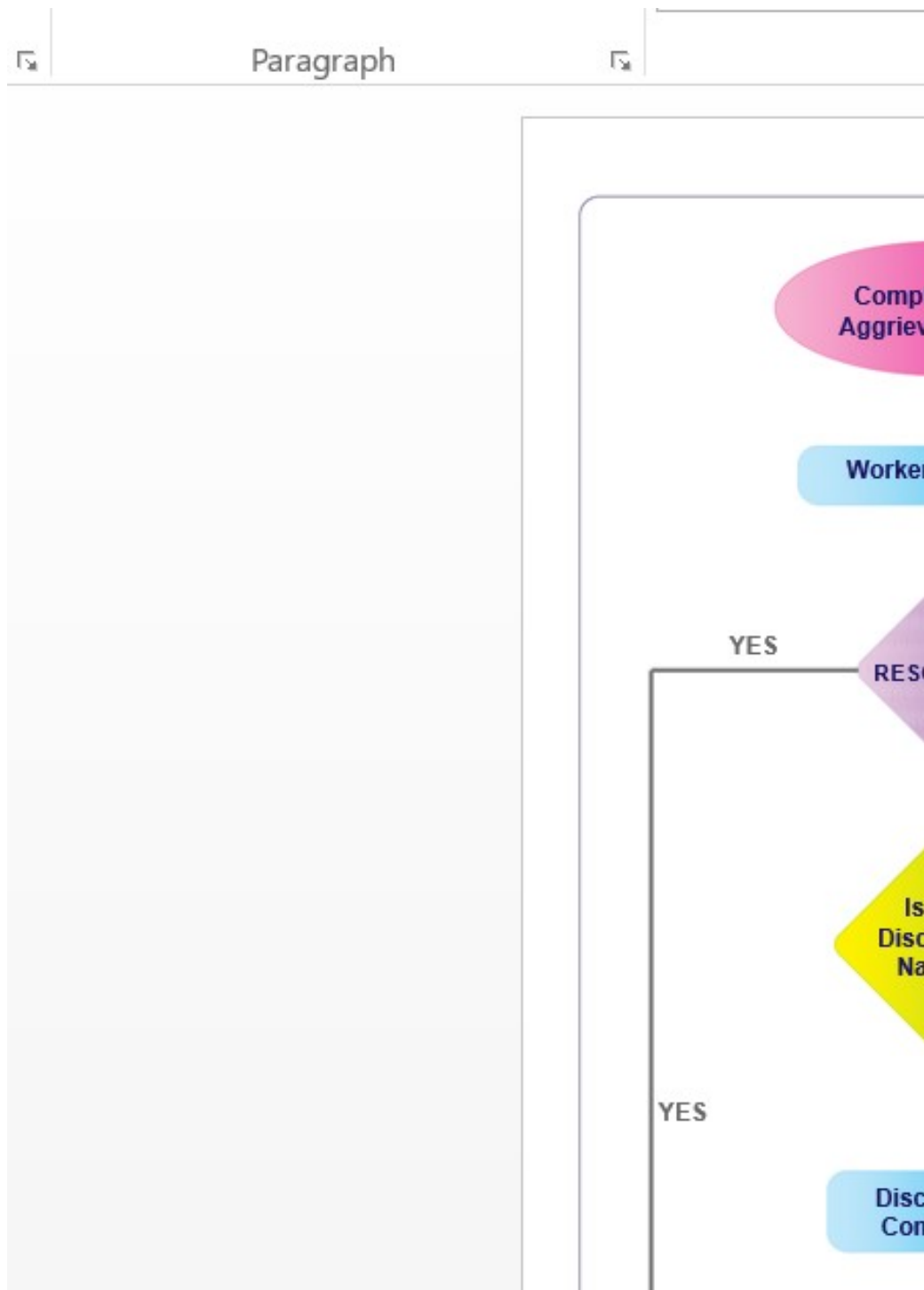


Figure: 9-2: The Complaints Handling Flow for Workers (MoWE)

NB: In all cases, criminal matters (SEAH/GBV, CH etc.) shall be explicitly handled following the Criminal Code Act and other laws governing criminal issues in Uganda. i.e. these cases shall be directly referred to the police for investigations and submission to the Office of Director of Public Prosecution for sanctioning.

- In case the complainant is satisfied with the proposed solution, the solution will be affected and the grievance closed out. The complainant will sign a grievance closure form witnessed by the MWE or appointed representative.
- The second tier is where the complainant is not satisfied with the resolution at the first tier. A mediator will be identified to mediate between the complainant and MWE or contractor/consultant. Possible mediators include religious leaders, family/clan leaders, elders and CSO leaders or managers.
- At the second tier, a near process described in the table above will apply.
- In case the complainant is satisfied with the mediator's proposed solution, the resolution will be effected and the grievance closed out. The complainant will sign a grievance closure form witnessed by the mediator or appointed representative.
- In case the complainant is not satisfied with the mediation resolution, this GRM provides for recourse to the formal and traditional judicial system. For SEA/SH/GBV cases, the GRM shall adopt a survivor-centred approach facilitating safe and confidential access to services by complainants/survivors. The project shall support the survivor with psycho-social support by using the existing administrative, social and health structures like health centres.

9.6.13 Publicity of the GRM and GRCs

MWE shall ensure that stakeholder engagement plans include sensitization of stakeholders on the available grievance redress system for the project. The sensitizations shall be done through various channels including but not limited to meetings, IEC materials, radio talk shows and announcements among others.

It will be the responsibility of MWE to provide adequate resources including funds, personnel and equipment to operationalize grievance redress mechanisms on the project. On IWMDP, MWE has provided dedicated stakeholder engagement, and environment and social risk management consultants for every sub-project with an adequate budget to implement a grievance redress mechanism for each sub-project. During stakeholder engagements, resulting feedback shall be utilized to continuously improve the GRM of the project.

9.6.14 Monitoring and Evaluation of the Grievance Handling System

Complaints and grievances redress mechanism will be an integral part of the M&E framework of all the sub-project activities including site visits, field visits and missions. Review of minutes of the committees, communications on file, updated complaints and grievances registers at the Community, Construction Site, Sub-County, Town Council,

Municipal, District and Ministry levels shall be among the verification modalities for the different stakeholders.

Beneficiary satisfaction surveys which will be conducted by independent consultants that will be procured by MWE will also encompass the complaints and grievance mechanisms to assess the performance of the grievance redress mechanisms for each sub-project.

Monitoring and Evaluation Indicators shall among others include the following;

- No of GM Committees formed
- No of GM Committees trained
- No of grievance related community sensitizations conducted
- No of committees facilitated with basic stationery, standard grievance registers, & PPEs
- No of people (M, F) sensitized
- No of grievances registered
- The proportion of complaints resolved
- % of cases referred to higher committees
- % of cases appealed to other agencies of the Government
- % of resources spent of C&G

9.6.15 Training of the GRCs

The GRC will be trained on the following:

- 1.) Execution of the terms of reference
- 2.) Categorization of complaints/grievances
- 3.) Referral pathway for each category of complaints/grievances
- 4.) Basic mediation, conflict resolution techniques and skills
- 5.) Communication and basic public relations skills
- 6.) The property valuation process
- 7.) Scope of the project and the associated risks
- 8.) Code of conduct for the contractor

- 9.) The committee's mandate: The committee will be charged with the responsibility of ensuring the timely resolution of complaints from site workers and PAPs to ensure project success.

9.6.16 Facilitation of the GRCs

MoWE will provide the following to facilitate the GRC's work:

- 1.) Grievance Logbooks and related logistics;
- 2.) Orientation/training of GRCs on grievance resolution;
- 3.) Materials such as pens, notebooks; and
- 4.) Branded items such as MWE T-shirts, pens, folders etc. for motivation.

9.6.17 Reporting Requirements

All grievances and any cases detected on-site and in the community that are project-related are recorded in the grievance register at all levels. Cases which are criminal for example sexual harassment, and gender-based violence shall be reported to Uganda Police and the Ministry notified within 12 hours. Any other life-threatening grievances and incidents like accidents, homicides, etc. shall be reported to the Ministry immediately.

The Ministry shall then give initial notifications to the World Bank within 24 hours, and a detailed incident report submitted to the World Bank within 48 hours. All other mandate agencies like Uganda Police, and Community Development Officers shall be involved to have well-documented cases and investigations. The contractor shall provide in her monthly report the progress of implementing the grievance redress mechanism for the community and workers. The MWE shall also update the World Bank on the progress of grievance handling during monthly and quarterly reporting. During monitoring field visits by the MWE teams, there shall be meetings with GMC committees and reviewing their registers to ensure that all grievances are well documented and closed.

10 CONCLUSION

The proposed Lobe RGC water supply and sanitation system is not foreseen to cause irreversible environmental impacts having undergone a comprehensive assessment and mitigation planning process. Mitigation measures have been devised for all phases, including construction and operation to establish an environmentally sustainable water supply and sanitation system.

The Ministry of Water and Environment is dedicated to carrying out the environmental management plan that has been developed, in addition to the requirements outlined in the organizational manual. It will also make sure that any additional negative effects that arise during project implementation are promptly addressed. The project is therefore recommended for approval by NEMA and other lead agencies based on the assessment results.

APPENDICES

Appendix A: Approved Terms Of Reference



NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)

NEMA/4.5

9th June, 2023

The Permanent Secretary,
Ministry of Water and Environment,
Directorate of Water Development,
Rural Water Supply and Sanitation Department,
Plot 3-7, Kabalega Crescent, Luzira,
P. O. BOX 20026, Kampala, Uganda
E-mail: nmalizah@yahoo.com

NEMA House
Plot 17,19 & 21, Jinja Road.
P.O.Box 22255, Kampala, UGANDA.

Tel: 256-414- 251064, 251065, 251068
342758, 342759, 342717

Fax: 256-414-257521 / 232680

E-mail: info@nemaug.org

Website: www.nemaug.org

REVIEW OF THE SCOPING REPORT AND TERMS OF REFERENCE PERTAINING TO THE PROPOSED LARGE SOLAR-POWERED PIPED WATER SUPPLY SYSTEMS AND SANITATION FACILITIES IN LOMUNGA, LOBE, AWOBA, NYORI-LODONGA, GOBORO AND RODO RURAL GROWTH CENTRES IN YUMBE DISTRICT

This is in reference to the Terms of Reference (**EIATOR10493**) for carrying out the Environmental and Social Impact Assessment (ESIA) for the above-mentioned project, which was submitted to this Authority on 31st May, 2023, for review and approval. This Authority has finalized the review and grants formal APPROVAL of the said TOR.

Please note that the approval of the TORs DOES NOT grant permission to start implementing any of the proposed project activities. This is not a Certificate of approval.

In addition, you are advised to consider the key aspects below during the conduct of the environmental impact study and the preparation of the ESIA report.

- i. Ensure that the project description is comprehensive for each of the project components, including the designs of the different project components, in addition, clearly indicate the chemicals that will be used in the water supply system and how these will be stored, handled and associated waste disposed of.
- ii. Undertake geotechnical and hydrogeological investigations of the proposed project sites/water sources so as to inform the design and construction of the Water Supply and Sanitation System.
- iii. Carry out comprehensive consultations with all the relevant stakeholders including Yumbe District Local Government, Directorate of Water Resources Management, and the local community in the neighborhood of the proposed project sites. The views of the stakeholders consulted should be well documented/ addressed and lists of persons consulted appended in the EIA report.

- iv. Ensure that the relevant local government departments including, the Environment, water, Physical Planning and the Engineering departments, are consulted and concerns that may arise taken into account and incorporated in the design, construction and operation of the project.
- v. Study the land tenure and identify potential project affected persons/properties at the proposed sites. Propose plans for land acquisition and/or compensation where required, including resettlement action plans, where applicable.
- vi. Provide current baseline information of the project sites, the associated project components and their neighborhood, accurate GPS coordinates clearly indicating the boundaries of the project sites and the associated components and images/maps of the project sites.
- vii. Provide site specific baseline information. In particular, assess site baseline soils and air quality taking into account key parameters relevant to the nature of the project. Append the results of the analysis from an accredited laboratory to the ESIA report.

Carry out an evaluation of all the negative impacts associated with the proposed Lomunga, Lobe, Awoba, Nyori-Lodonga Goboro and Rodo RGC Water Supply and Sanitation System and provide detailed mitigation and environmental management and monitoring plans that relate to the identified environmental impacts from the proposed project sites. In particular, the following issues should be comprehensively assessed and appropriate mitigation actions provided in the ESIA.

- a. Potential waste streams from the construction and operation of the Piped Water Supply and Sanitation System and management of such waste, as well as measures for preventing pollution of the environment and degradation of any sensitive ecosystems that may be within the vicinity of the project sites;
 - b. Occupational health and safety issues likely to arise from the operation of the factory.
- viii. Provide a clear and legible copy of the site layout plan (preferably on A-3 sized paper) showing the equipment, clear boundaries of the project sites and the associated components in relation to its environs.
 - ix. Include in the ESIA report comprehensive analysis of alternative /options to selected project location, design and technology among others.
 - x. Append to the ESIA report authentic copies of land ownership and acquisition documents.

PK

- xi. Indicate the project cost of the project and append a certificate of valuation issued by a qualified and registered valuer in accordance with the provisions of Schedule 5, 3(f) of the National Environment (Environmental and Social Assessment) Regulations, 2020.
- xii. Provide evidence of payments of the 30% ESIA fees as required under regulation 49 (2) of the National Environment (Environmental and Social Assessment) Regulations, 2020.

Note that only registered Environmental practitioners including the team leader should be contracted to carry out the ESIA for the proposed project.

This is therefore, to recommend that you carry out the ESIA study for the proposed Lomunga, Lobe, Awoba, Nyori-Lodonga Goboro and Rodo RGC Water Supply and Sanitation System incorporating the guidance provided above.

We look forward to your cooperation and receipt of copies of the ESIA report for proposed further consideration.



Waiswa-Anold Ayazika
FOR: EXECUTIVE DIRECTOR

Appendix B: Water Quality Test Certificate

MAKERERE UNIVERSITY
DEPARTMENT OF CIVIL ENGINEERING
PUBLIC HEALTH AND ENVIRONMENTAL ENGINEERING LABORATORY
 E-mail: rxulaba@cstat.mak.ac.ug
 Tel: 041-4543152

CERTIFICATE OF ANALYSIS - WATER QUALITY

CLIENT: Kagga and Partners

PROJECT: Consultancy Services for Feasibility Study, Detailed Engineering Design and Construction Supervision of Solar Powered Piped Water Supply Systems and Sanitation Facilities in Refugee Settlements and Host Districts in West Nile and Northern Uganda-Yumbe

Parameters	Sampling date: 6 th - 8 th July 2023		Delivery date: 11 th July 2023		Date of analysis: 11 th -13 th July 2023		Uganda portable standards*	
	Sample ID 1	2	3	4	5	6		7
pH	7.57	7.87	7.44	7.90	7.29	7.40	7.81	6.5-8.5
EC (µS/cm)	618	453	705	493	511	705	582	1500
Apparent colour (Pico)	0	0	60	0	75	60	55	0
Turbidity (FAU)	0	0	0	0	4	6	0	5
Total suspended solids (mg/L)	nd	nd	7	nd	13	10	3	Not detected
Total Dissolved solids (mg/L)	450	348	492	378	418	552	462	390
Chlorides (mg/L)	3.8	1.4	2.5	1.6	1.4	2.5	1.1	0.1
Nitrates (mg/L)	0.37	0.09	0.11	nd	0.39	0.36	nd	0.19
Sulphates (mg/L)	3.0	11.0	1.0	0.3	2.3	0.5	4.2	0.6
Total Alkalinity (mg/L)	390	275	500	320	360	430	370	370
Total Hardness (mg/L)	109	147	221	180	197	200	206	209
Fluorides (mg/L)	0.34	0.50	0.23	0.15	0.28	0.32	0.55	0.18
Ammonia (mg/L)	nd	nd	nd	nd	nd	nd	nd	0.5
Total Iron (mg/L)	0.31	0.32	0.90	0.17	0.97	0.77	0.85	0.44
Sodium (mg/L)	50.8	50.2	50.6	47.8	80.7	50.9	60.3	70.4
Calcium (mg/L)	10.8	20.2	29.8	22.1	12.8	14.1	16.0	25.1

Page 1 of 3

Parameters	Sample ID	Drachia 1	Oriajin 2	Maru Buli buli village 3	Ajujinga 4	Ndesia BH Nyori 5	Lumunga 6	Rodo 7	Malanga 8	Uganda portable standards*
Magnesium (mg/L)		20.0	23.5	35.7	30.2	40.2	40.0	40.3	35.6	100
Manganese (mg/L)		nd	nd	nd	nd	nd	nd	nd	nd	0.1
Copper (mg/L)		0.83	0.50	0.63	0.67	0.68	0.92	0.72	0.60	1.0
Zinc (mg/L)		27.05	20.70	12.01	10.41	15.45	20.25	19.89	23.43	5
Lead (mg/L)		nd	nd	nd	nd	nd	nd	nd	nd	0.01
Mercury (mg/L)		nd	nd	nd	nd	nd	nd	nd	nd	0.001
Arsenic (mg/L)		nd	nd	nd	nd	nd	nd	nd	nd	0.01
Cadmium (mg/L)		nd	nd	nd	0.012	0.011	0.011	0.015	0.013	0.003
Aluminium (mg/L)		0.16	0.09	0.08	0.06	0.03	0.19	0.46	0.11	0.2
COD (mg/L)		27	nd	nd	1	nd	30	25	nd	ns

*Uganda National Bureau of Standards-Uganda Potable Water Specification (US EAS 12:2014; ICS 13.060.20); ns- not specified; nd-not detected; Detection limit for Nitrates, Ammonia, Manganese, Lead, Mercury, Arsenic, Cadmium and COD is 0.015mg/L, 0.008mg/L, 0.01mg/L, 0.01mg/L, 0.01mg/L, 0.01mg/L and 10mg/L respectively.

Commentary

National drinking water standards are used to assess the potability of the sampled water from the different borehole locations. All the tested parameters of the sampled locations (except Total Suspended Solids, Total Iron, Zinc and Cadmium, cells in grey highlight) comply with national drinking water standards for treated water where specified. This compliance implies that no health risks or aesthetic problems are envisaged with the water with regard to these parameters when used for drinking. Sampled boreholes 1, 2, 4 and 8 were with clear water without any suspended solids observed while the rest of the samples were with unclear water and visible suspended solids (except for sample 7). That this is the case likely explains the levels of suspended solids, apparent colour as well as turbidity measured in the water drawn from these boreholes.

The sampled water except sample 4, is with high iron levels (>0.3mg/L). Presence of iron at levels >0.3mg/l is associated with discolouration of water (brown), deposits in the water and staining of laundry. The presence of iron, may lead to the accumulation of deposits in the distribution system. It is probable that the source of iron in the sampled waters is either the soils through which the water flows or soils with the catchment of these water sources. However, on observation, none of the samples exhibited this brown colour suggesting that the measured iron levels as well as the suspended solids are with minimal impact on the aesthetics of these waters.

All the sources were with high zinc levels above the recommended values (>5mg/L). Zinc can be introduced into water naturally by erosion of minerals from rocks and soil, since zinc ores are only slightly soluble in water. Zinc is only dissolved at relatively low concentrations. High natural levels of zinc in water are usually associated with higher concentrations of other metals such as lead and cadmium (in this case, we observe relatively high levels of Cadmium in some of the sampled sources 4-8).

Zinc is an essential nutrient for body growth and development. However, drinking water containing high levels of zinc (> 5mg/L) can lead to stomach cramps, nausea and vomiting. Exposure to low levels of cadmium in water over time may build up cadmium in the kidneys and cause kidney disease and fragile bones. Cadmium is considered a cancer-causing agent.

High Aluminum levels beyond the recommended values were measured in sample 7. Aluminum is the most abundant metal and the third most abundant element in the earth's crust. Aluminum is also present in air, water, and many foods. Aluminum enters environmental media naturally through the weathering of rocks and minerals. Anthropogenic releases are in the form of air emissions, waste water effluents, and solid waste primarily associated with industrial processes, such as aluminum production. Health effects of Aluminum include diseases of the nervous system.


Checked by: Robinah N. Kulabako (PhD)
In-charge PHEE lab



Appendix C: Consultation Minutes and Attendance Lists

Appendix C (1): Minutes with Yumbe district officials

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR LARGE SOLAR-POWERED PIPED WATER SUPPLY SYSTEMS AND SANITATION FACILITIES IN YUMBE DISTRICT.	
Minutes of meeting held with the District officials at Yumbe District Headquarters.	
MEETING DATE:	3 rd July 2023
START TIME:	10:15 am
END TIME:	10:55 am
VENUE:	District Headquarters
MEMBERS PRESENT:	DISTRICT STAFF
	<ol style="list-style-type: none"> 1. Asiku Abdul Mutalib – LCV 2. Hajji Cox Sempebwa – D/CAO 3. Ayiman Abdul – Ass. DWO 4. Andama K Abdu – Ass. DWO-Mobilization 5. Edema Habib Sebbi – DEO 6. Ramadan Noah – DPP 7. Bint Gadaffi – SCDO
	INTERFACE CONSULTING LTD
	<ol style="list-style-type: none"> 1. Moses Oluca 2. Olivia Ashaba Ahebwa 3. Martin Kasoozi 4. Wycliff Ogello 5. Rasheedah Agero 6. Denis Kato 7. Osbert Nuwahereza
AGENDA	<ul style="list-style-type: none"> – Opening prayer – Introductions – Welcome remarks from the LC V Chairperson – Presentation by the consultant

	<ul style="list-style-type: none"> - Concerns raised and recommendations - Closing remarks from the Deputy CAO 	
	DISCUSSION	RESPONSE
M/01	Opening prayer	
	An opening prayer was said by Ms Rasheeda Agero.	
M/02	Introductions	
	All members present for the meeting introduced themselves.	
M/03	Welcome remarks from the LCV Chairperson	
	<ol style="list-style-type: none"> 1. The Chairperson welcomed the consultants 2. The Chairperson expressed that he was happy that the consultants were finally on the ground because he had expected them one and a half months ago and that he was happy to help where needed. 3. The Chairperson mentioned that Yumbe has a very big challenge with water consumption. He added that Yumbe's safe water coverage is 50% when the national safe water coverage is approaching 70%. This means Yumbe is short by 20%, particularly in villages where they are hosting refugees. The last census conducted in 2014, indicated that the population was at 400,000 and currently the projected population is approximately 750,000 with an approximate population of refugees at 240,000. The average population in other districts is approximately 200,000 and this is an indicator that Yumbe has a very big host community population, and this population influx presents challenges. 4. He mentioned that Yumbe is extremely grateful to the government particularly, MWE because if you look at the district, having 6 water systems is something they appreciate. 5. We are looking at providing safe water for the people. 6. He welcomed the consultants and mentioned that the assistant DWO in charge of mobilization, Andama K Abdul had mobilized communities and was aware of our visit and expectant. 7. He mentioned the concern of the delivery timeframe for the proposed project as the drilling works of the boreholes started in 2018 (5 years ago) and according to him, not much has been done as he would expect to see contractors now on the different sites. 8. He advised the consultant to work closely with the team on the ground for guidance on the geographical establishments of the proposed location of the project components for example reservoir locations because they have a better understanding of the area. 	<p>The consultant explained that the process takes time as we have to incorporate the social issues and environmental impacts in the proposed so that the design consultant can come up with final designs with the least possible impacts to the project area.</p>
M/04	Presentation by the consultant	
	Moses Oluka, the Team Leader of the ESIA assignment gave a	

	<p>brief description of the Environmental and Social Impact Assessment (ESIA) Resettlement Action Plan (RAP) And Source Protection Plans (SPP) for Large Solar Powered Piped Water Supply Systems and Sanitation Facilities in Yumbe District project. He explained that:</p> <ol style="list-style-type: none"> 1. The project is proposed to take place in 6 RGCs of Goboro, Lomunga, Nyori, Lobe, Awoba and Rodo in 5 sub-counties of Kochi, Bijo, Lodonga, Lobe Town Council and Kei respectively where Piped water systems will be put in place. 2. The objective of the consultant's visit is to carry out the Environmental Social Impact Assessment (ESIA) and produce a draft ESIA for the 6 RGCs by the end of July. 3. The prepared draft ESIA will be submitted to NEMA and will also be incorporated in the draft design drawings to aid in informing the final design drawings, which shall be submitted and thereafter the contractor shall be procured to start on the construction works. 	
M/05	Concerns raised and recommendations	
	<ol style="list-style-type: none"> 1. The need for the teams to work closely with local officials as they have a better understanding of the project area. 	Noted.
	<ol style="list-style-type: none"> 2. The a need to move with the district representative to the proposed project areas so that the communities to relate readily to the project. 	Noted
M/06	Closing remarks from the Deputy CAO	
	<ol style="list-style-type: none"> 1. The concern for Nyori RGC in Lodonga S/C, the proposed design needs to be harmonized. He recommended the consultant review the proposed project components to make sure it's within the scope of works of the project. Nyori's concern is still pending. 	Noted
	<ol style="list-style-type: none"> 2. Mobilization of community sensitization meetings should be done through the Community Development Officers (CDOs) at the different sub-counties. 	Noted



Ministry of Water and Environment (MWE)
Large solar-powered piped water supply & Sanitation
Environmental and Social Impact Assessment (ESIA)

INTERFACE

STAKEHOLDER CONSULTATIONS

DISTRICT: YUMBE

DATE: 3-07-23

VENUE: YUMBE DISTRICT HEADQUARTERS

TIME: 10:15 - 10:55

No.	Name	Organization	Designation	Telephone contact/Email	Signature
1.	RASHIEDAH AGERO	Interface	Environmentalist	0772017329 agerorash@gmail.com	[Signature]
2.	Olivia Ashaba Ahebwa	Interface Consulting	Environmental Eng	074533280	[Signature]
3.	Martin Zacozi	Interface	Geospatial	0782997284	[Signature]
4.	Andama K. Azdu	TDLC	Advisor	0782658630	[Signature]
5.	Ayiman Abdul	TDLG	DWO	0785568245	[Signature]
6.	BINI GADAFI	TDLG	SCDO	0988127028	[Signature]
7.	YOUSUF KATO	Interface CE	Environmentalist	078742262	[Signature]
8.	Nuwahereza Debat	Interface Consulting	Landuse expert	0775104708	[Signature]
9.	Gallo Mute	"	Environ. Mgmt	0782636120	[Signature]
10.	DR COX Sem Rebwu (Hij)	Yumbe DLG	DCAO	0772501641	[Signature]
11.	WIDYIA HABIB SEBBI	YDLG	DFO	0786560536	[Signature]
12.	ASIKU ABDUL MUTALIB	TDLG	LCS	0772826235	[Signature]
13.	Rahmatul Nohi	TDLG	DPP	0785719192	[Signature]
14.	Oluka Mose	Interface	Interface Team leader	077205209	[Signature]

Appendix C (2): Minutes with District Water Officials

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR LARGE SOLAR-POWERED PIPED WATER SUPPLY SYSTEMS AND SANITATION FACILITIES IN YUMBE DISTRICT. Minutes of meeting held with the District Water Officials at Yumbe District Headquarters.		
MEETING DATE:	3 rd July 2023	
START TIME:	11:05 am	
END TIME:	12:10 pm	
VENUE:	District Headquarters (Water offices)	
MEMBERS PRESENT:	DISTRICT STAFF	
	8. Magara Bernald – DWO 9. Ayiman Abdul – Ass. DWO 10. Andama K Abdu – Ass. DWO-Mobilization 11. Anule Twahiri Ajaga – DHO	
	INTERFACE CONSULTING LTD	
	8. Moses Oluka 9. Olivia Ashaba Ahebwa 10. Wycliff Ogello 11. Rasheedah Agero 12. Denis Kato 13. Osbert Nuwahereza	
AGENDA	<ul style="list-style-type: none"> - Introductions - Welcome remarks from the DWO - Presentation by the consultant - Concerns and recommendations raised 	
	DISCUSSION	RESPONSE
M/01	Introductions	
	All members present for the meeting introduced themselves.	
M/02	Welcome remarks from the DWO	
	9. The DWO welcomed the consultants 10. The DWO expressed that he was happy that the consultants were on the ground to continue with the processes for the construction of the solar piped water supply systems.	
M/03	Presentation by the consultant	
	Moses Oluka, the Team Leader of the ESIA assignment gave a brief description of the Environmental and Social Impact Assessment (ESIA), Resettlement Action Plan (RAP) and Source Protection Plans (SPP) for Large Solar Powered Piped Water Supply Systems and Sanitation Facilities in Yumbe District project. He explained that: <ul style="list-style-type: none"> 4. The project is proposed to take place in 6 RGCs of Goboro, Lomunga, Nyori, Lobe, Awoba and Rodo in 5 sub-counties of Kochi, Bijo, Lodonga, Lobe Town Council and Kei respectively where Piped water 	

	<p>systems will be put in place.</p> <p>5. The objective of the consultant's visit is to carry out the Environmental Social Impact Assessment (ESIA) and produce a draft ESIA for the 6 RGCs by the end of July.</p> <p>6. The prepared draft ESIA will be submitted to NEMA and will also be incorporated in the draft design drawings to aid in informing the final design drawings, which shall be submitted and thereafter the contractor shall be procured to start on the construction works.</p> <p>7. The consultant discussed the different schematic drawings for each RGC with the DWO. The DWO pointed out the different challenges in the 6 RGCs and offered some recommendations.</p>	
M/04	Concerns raised and recommendations	
	<p>3. He suggested the different villages in the RGCs where community meetings could be held.</p>	Noted.
	<p>4. The a need to move with the district representative to the proposed project areas so that the communities to relate readily to the project.</p>	Noted
	<p>5. There is a challenge with Nyori RGC as the neighbouring boundary administration of Kuru is already in preparation to upgrade their already constructed system, the DWO was proposing the joining of the two systems into 1 system and had requested a meeting with the Umbrella but is still waiting for feedback on that.</p>	Consultant shall have a meeting with MWE and Umbrella about the matter.
	<p>6. The DWO noted that two boreholes had been drilled in Lomunga with production volumes of 21m³ and 100m³. He suggested that both boreholes be designed for and further proposed for the 100m³ to be considered for the town council as the population is more and will continue to increase compared to that of Lomunga RGC, 21m³ to be considered for the Lomunga RGC.</p>	The consultant shall have a meeting with MWE about the suggestion.



Ministry of Water and Environment (MWE)
Large solar-powered piped water supply & Sanitation
Environmental and Social Impact Assessment (ESIA)

INTERFACE
PROJECT

STAKEHOLDER CONSULTATIONS

Meeting with District Water Officials.

DISTRICT: YUMBE

DATE: 3-07-23

VENUE: YUMBE DISTRICT HEADQUARTERS

TIME: 10:05

No.	Name	Organization	Designation	Telephone contact/Email	Signature
1.	Andama. K. Abdu	YDLC	Asst. m	0782658630	
2.	MARARA BERNARD	YDLC	DWD	0776548358	
3.	ANULE TWAHIRI AJAGA	YDLC	For DHO	0782632520	
4.	Aquman Abdul	YDLC	KAWD -waters	078558245	
5.	Oluka Moses	Interface	Team leader	0774205205	
6.	Olivia Achaba Aheba	Interface	Environmental Eng	0704533280	Olivia.
7.	Nwawheraza Oseft	Interface	Land use expert	0775104708	
8.	DEKIS KATO	Interface	ESIA Practitioner	0773742262	
9.	Rashiedah Ayoo	Interface	ESIA proc. Coord	0772019329	
10.	OGULLO KILITE	"	"	079263112	
11.					
12.					
13.					

Appendix C (3): Minutes with Office of the Prime Minister (OPM)

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR LARGE SOLAR-POWERED PIPED WATER SUPPLY SYSTEMS AND SANITATION FACILITIES IN YUMBE DISTRICT.		
Minutes of meeting held with the OPM in BidiBidi.		
MEETING DATE:	6 th July 2023	
START TIME:	5:00 pm	
END TIME:	6:00 pm	
VENUE:	OPM Offices	
MEMBERS PRESENT:	OFFICE OF THE PRIME MINISTER	
	1. Wilson – Deputy Commandant	
	INTERFACE CONSULTING LTD	
	1. Olivia Ashaba Ahebwa 2. Denis Kato	
	DISCUSSION	RESPONSE
M/01	Presentation by the consultant	
	<p>The consultant gave a brief description of the Environmental and Social Impact Assessment (ESIA) Resettlement Action Plan (RAP) and Source Protection Plans (SPP) for Large Solar Powered Piped Water Supply Systems and Sanitation Facilities in Yumbe District project. He explained that:</p> <ol style="list-style-type: none"> 8. The project is proposed to take place in 6 RGCs of Goboro, Lomunga, Nyori, Lobe, Awoba and Rodo in 5 sub-counties of Kochi, Bijo, Lodonga, Lobe Town Council and Kei respectively where Piped water systems will be put in place. 9. The objective of the consultant’s visit is to carry out the Environmental Social Impact Assessment (ESIA) and produce a draft ESIA for the RGCs by the end of July. 10. The prepared draft ESIA will be submitted to NEMA and will also be incorporated in the draft design drawings to aid in informing the final design drawings, which shall be submitted and thereafter the contractor shall be procured to start on the construction works. 	
M/02	Concerns raised and recommendations	
	7. He recommended that all unskilled labour jobs be for the communities (don’t expect labour imports) unless for technical works where the skills are lacking in the communities. This will aid in building a good relationship with the host communities and also feel a sense of ownership of the project.	Noted.
	8. The consultant should have a better understanding of the landowners because the land here is generally community-owned. He advised the consultant to work	Noted.

	<p>closely with the respective LCs who know the landlords of the area and also suggested that they be witnesses in the memorandums of understanding.</p>	
	<p>9. People have been used to using boreholes without paying for the water, and only contribute to water in case of mechanical problems and the water user committees aren't active.</p>	Noted.
	<p>10. Water Mission used to provide water for free. Transitioning from free water to paying for water will be an enormous challenge.</p>	Noted.
	<p>11. The communities have the willingness to pay for the water however, they don't have money because of the low levels of income.</p>	Noted.
	<p>12. He mentioned that maintenance is done by the water mission. Also, they have trained some people on the hand pump in the settlements to undertake some maintenance activities for efficiency. Furthermore, each area is allocated to certain clusters that respond to specified areas assigned to that particular cluster in case of any issues.</p>	Noted.
	<p>13. Sometimes the generator gets mechanical problems creating long queues.</p>	Noted.
	<p>14. Some water-stressed areas like Arewa, and Obekyi couldn't get feasible water sources within the area and this has made people fetch water from long distances and others opt for open unprotected wells.</p>	Noted.
	<p>15. Population influx due to the refugees and nationals resulted in deforestation because they have ended up cutting down trees for charcoal and firewood.</p>	
	<p>16. Reluctancy of individuals to plant trees because they take a long time to grow especially the refugees. Also, the prolonged dry spell affects the anticipated growth rate of the planted trees. More sensitization about tree planting is to be undertaken.</p>	

Appendix C (4): Minutes with Yumbe district officials Consultations with Lobe Town Council officials

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR LARGE SOLAR-POWERED PIPED WATER SUPPLY SYSTEMS AND SANITATION FACILITIES IN YUMBE DISTRICT.
Minutes of meeting held with the Lobe Town Council Officials at the Headquarters.

MEETING DATE:	6 th July 2023
START TIME:	9:45 am
END TIME:	10:55 am
VENUE:	Lobe Town Council Headquarters
MEMBERS PRESENT:	LOBE TOWN COUNCIL OFFICIALS
	INTERFACE CONSULTING LTD
	<ol style="list-style-type: none"> 1. Moses Oluka 2. Olivia Ashaba Ahebwa 3. Martin Kasoozi 4. Wycliff Ogillo 5. Rasheedah Agero 6. Denis Kato 7. Osbert Nuwahereza
AGENDA	<ul style="list-style-type: none"> - Opening prayer - Introductions - Welcome remarks from the Town Clerk - Remarks from CAO's representative - Presentation by the consultant - Concerns and recommendations raised - Closure remarks by LCIII Chairperson

	DISCUSSION	RESPONSE
M/01	Opening prayer	
	An opening prayer was said by the Town Clerk.	
M/02	Introductions	
	All members present for the meeting introduced themselves.	
M/03	Welcome remarks from the Town Clerk	
	<ol style="list-style-type: none"> 11. The Town Clerk mentioned that it has been long overdue for the offset of the project and requested the consultant to undertake all the necessary works for the proper execution of the project. 12. He appreciated the consultant for having engaged the sub-county officials before meeting with the communities on the ground and encouraged the consultant to continue with that culture. 	
M/04	Remarks from the CAO's representative	
	<ol style="list-style-type: none"> 1. The CAO's representative introduced the consultant to undertake the ESIA works and emphasized that the objective of this visit is to identify the social, and environmental impacts and propose mitigation measures for them. 2. He mentioned that all interventions proposed shall reach 	

	the district and issues/concerns raised shall be considered in the ESIA report to be prepared by the consultant.	
M/05	Presentation by the consultant	
	<p>The consultant gave a brief description of the Environmental and Social Impact Assessment (ESIA) Resettlement Action Plan (RAP) And Source Protection Plans (SPP) for Large Solar Powered Piped Water Supply Systems and Sanitation Facilities in Yumbe District project. He explained that:</p> <ol style="list-style-type: none"> 11. The project is proposed to take place in 6 RGCs of Goboro, Lomunga, Nyori, Lobe, Awoba and Rodo in 5 sub-counties of Kochi, Bijo, Lodonga, Lobe Town Council and Kei respectively where Piped water systems will be put in place. 12. The consultant presented the schematic drawing of Lobe RGC showing the proposed transmission and distribution lines and reservoir location. 13. The objective of the consultant's visit is to carry out the Environmental Social Impact Assessment (ESIA) and produce a draft ESIA for the Lobe RGC by the end of July. 14. The prepared draft ESIA will be submitted to NEMA and will also be incorporated in the draft design drawings to aid in informing the final design drawings, which shall be submitted and thereafter the contractor shall be procured to start on the construction works. 	
M/06	Concerns raised and recommendations	
	17. How will the water supply move along the existing boreholes? Will consideration of the side of the road without boreholes be adapted?	The town clerk of Lobe town council is to share a copy of the Physical Community Development Plan with the consultant.
	18. It was also noted that some farming activities are located far from the distribution pipes and the community are interested in having water in their farms.	The design for water supply system was designed with a radius of at least a 2Km network (or as the pressure may permit) is capable of meeting the daily drinking water needs of people therefore farm areas in a radius of more than 2Km will not be supplied with water.
	19. The terrain of Lobe Town Council is a generally hilly area, Will this in any way impact the water supply negatively?	All those aspects have been considered in the designs.
	20. Is it possible for the water supply to be extended to a household at the request of the community member?	Yes, an extension of water supply to the requested household shall be possible however, a small connection fee shall be determined then.
	21. In case a person's land, house, trees and crops are affected, will that person be compensated? Will the proposed reservoir location be compensated for?	Yes, for cases where people's crops, trees and land (reservoir location and access roads where they don't exist) will be affected, valuation of such crops shall be undertaken and the respective people compensated. For the cases of affecting houses, that will be unlikely as the proposed distribution and transmission lines shall be constructed in the road reserves.
	22. Who will be responsible for the management of the	This is unlikely as the distribution and

	pipes? In case a person damages the pipe while digging, who can address the matter?	transmission lines shall be installed along the road reserves. The responsibility of the system will either be the umbrella/water user committees who will charge a small fee for the proper operation and maintenance of the system.
	23. Continuous sensitization of the communities is encouraged throughout the project lifecycle.	Noted
M/07	Closure remarks by LCIII Chairperson	
	The LCIII Chairperson thanked the consultant for their visit and welcomed the project. He further appealed to the consultant for more opportunities to invest in water as the communities need water.	Noted.



Ministry of Water and Environment (MWE)
Large solar-powered piped water supply & Sanitation
Environmental and Social Impact Assessment (ESIA)

COMMUNITY SENSITIZATION MEETINGS

DISTRICT: YUMBE
SUB-COUNTY: Lobe Town Council
PARISH:
VILLAGE:

DATE: 6/1
TIME: 9:1
VENUE: 1

No.	Name	Organization	Designation
1.	Olivia Ashaba Aheba	Interface	Environmental
2.	RESKEDAH XGRO	Interface	Environmental
3.	ACIDRI S BORNATCC	LOBE TC	TOWN C
4.	HON TURU MUKWIARI MUNOUGA	LOBE TIC	VICEMAN L-C-12
5.	EZEKE SWAZI 'R.	LOBE TIC	SECRETARY LOBE
6.	ALIRI DOMIILA	LOBE TIC	CEO
-	CIOICA NAZIR	LOBE TIC	TOWN A



Ministry of Water and Environment (MWE)
Large solar-powered piped water supply & Sanitation
Environmental and Social Impact Assessment (ESIA)

COMMUNITY SENSITIZATION MEETINGS

DISTRICT: YUMBE
SUB-COUNTY: Lobe Town Council
PARISH:
VILLAGE:

DATE: 6/1
TIME: 9
VENUE: |

No.	Name	Organization	Designation
1.	BAKOLE ASIRAF	Lobe TIC	SECRETARY
2.	HON TURU MUKWIARI MUNOUGA	LOBE TIC	VICEMAN L-C-12
3.	EZEKE SWAZI RAJAN	LOBE TIC	SECRETARY LOBE
4.	OKWONZIGA SRAZI	LOBE TIC	DAYMAN
5.	CANDRU ZAKIA ISMAIL	LOBE TIC	S.S.A
6.			



Appendix C (5): Minutes with Community at Lobe Trading Center

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR LARGE SOLAR-POWERED PIPED WATER SUPPLY SYSTEMS AND SANITATION FACILITIES IN YUMBE DISTRICT.		
Minutes of Lobe Community Meeting at Lobe Trading Centre		
MEETING DATE:	6 th July 2023	
START TIME:	11:55 am	
END TIME:	1:00 pm	
VENUE:	Lobe trading centre	
MEMBERS PRESENT:	LOBE TOWN COUNCIL OFFICIALS & COMMUNITY MEMBERS	
	INTERFACE CONSULTING LTD	
	1. Moses Oluka	
	2. Olivia Ashaba Ahebwa	
	3. Martin Kasoozi	
AGENDA	<ul style="list-style-type: none"> - Opening prayer - Introductions - Welcome remarks from the CDO - Presentation by the consultant - Concerns and recommendations raised - Closing remarks 	
	DISCUSSION	RESPONSE
M/01	Opening prayer	
	The opening prayer was said by the CDO.	
M/02	Introductions	
	All members present for the meeting introduced themselves.	
M/03	Welcome remarks from the CDO	
	13. The CDO welcomed the consultant and explained to the community the purpose of the consultant's visit and encouraged them to actively participate in the meeting.	
M/04	Presentation by the consultant	
	<p>The consultant gave a brief description of the Environmental and Social Impact Assessment (ESIA) Resettlement Action Plan (RAP) And Source Protection Plans (SPP) for Large Solar Powered Piped Water Supply Systems and Sanitation Facilities in Yumbe District project. He explained that:</p> <ul style="list-style-type: none"> 15. The project is proposed to take place in 6 RGCs of Goboro, Lomunga, Nyori, Lobe, Awoba and Rodo in 5 sub-counties of Kochi, Bijo, Lodonga, Lobe Town Council and Kei respectively where Piped water systems will be put in place. 16. The consultant presented the schematic drawing of Lobe RGC showing the proposed transmission and distribution lines and reservoir locations. 17. The objective of the consultant's visit is to carry 	



	<p>out the Environmental Social Impact Assessment (ESIA) and produce a draft ESIA for the Lobe RGC by the end of July.</p> <p>18. The prepared draft ESIA will be submitted to NEMA and will also be incorporated in the draft design drawings to aid in informing the final design drawings, which shall be submitted and thereafter the contractor shall be procured to start on the construction works.</p>	
M/05	Concerns raised and recommendations	
	<p>24. For cases where crops or trees might be destroyed during the construction of the transmission and distribution lines, will these be compensated for?</p>	<p>Yes, for cases where people's crops or trees will be affected, valuation of such crops shall be undertaken and the respective people compensated. When electricity poles passed through people's land, they were paid for, so why not for water?</p>
	<p>25. Will there be opportunities for the creation of jobs?</p>	<p>Yes, there will be employment opportunities especially unskilled labour as the World Bank dictates that 80% of the jobs be offered to the local communities.</p>
	<p>26. Request for the three proposed reservoir locations to be considered.</p>	<p>The design shall consider only one with the highest water supply capacity to the communities to supply the demand requirements.</p>
	<p>27. The roads of Lobe Town Council aren't demarcated, How will that be handled during implantation?</p>	<p>The town clerk of the Lobe town council is to share a copy of the Physical Community Development Plan with the consultant. The consultant shall see a way forward.</p>
	<p>Is it possible for the water supply to be extended to a household at the request of the community member? Will there be payments made for such an arrangement?</p>	<p>Yes, an extension of water supply to the requested household shall be possible however, a small connection fee shall be determined then.</p>
	<p>28. Will we need to pay for the water?</p>	<p>Yes, there will be a small fee charged for the proper operation and maintenance of the system by the umbrella/water user committees.</p>
M/06	Closing remarks	
	<p>The CDO thanked the consultant for their visit and welcomed the project. He further appealed to the consultant for more opportunities to invest in water as the communities need water.</p>	<p>Noted.</p>



Ministry of Water and Environment (MWE)
Large solar-powered piped water supply & Sanitation
Environmental and Social Impact Assessment (ESIA)

Women

COMMUNITY SENSITIZATION MEETINGS

DISTRICT: YUMBE
SUB-COUNTY: Lobe Town Council
PARISH:
VILLAGE:

DATE: 6
TIME: 4
VENUE:

No.	Name	Organization	Designation
1.	RAKO MAUZU	MARKET VENTUR	
2.	CHANDIRU ZAMUZAMU	MARKET VENTUR	
3.	MAZARAU LELLA	MARKET VENTUR	COUNC
4.	AGUA SAUSA	MARKET VENTUR	
5.	CHANDIRU ZALIA	MARKET VENTUR	SO SOCIAL
6.	OWILU RAHMA	MARKET VENTUR	



Ministry of Water and Environment (MWE)
Large solar-powered piped water supply & Sanitation
Environmental and Social Impact Assessment (ESIA)

COMMUNITY SENSITIZATION MEETINGS

DISTRICT: YUMBE
SUB-COUNTY: Lobe Town Council
PARISH:
VILLAGE: 3

DATE: 6
TIME: 11
VENUE:

No.	Name	Organization	Designation
1.	Olivia Ahaba Ahebwa	Interface	Environment
2.	Martin Kasozi	Interface	Social
3.	ANDRUBA Ahabwa		
4.	ICIZA AMADA Aforogwe		
5.	BUGA GADAFI RAJABU		
6.	AG. SIRALI		



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Environmental and Social Impact Assessment (ESIA)

COMMUNITY SENSITIZATION MEETINGS

DISTRICT: YUMBE
SUB-COUNTY: lobe Town council
PARISH:
VILLAGE:

DATE: ()
TIME: ()
VENUE: ()

No.	Name	Organization	Designa
1.	DRAMANI SWAIBU		
2.	BAKELE ASIBAR	LOBE T/C	SEC P
3.	GADAFI NASURU	LOBE/C	
4.	SMOOTH MUHAMAD	T Lobe T/C	
5.	ISOMARU SHAMADU		



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Environmental and Social Impact Assessment (ESIA)

COMMUNITY SENSITIZATION MEETINGS

DISTRICT: YUMBE
SUB-COUNTY: lobe Town council
PARISH:
VILLAGE:

DATE: ()
TIME: ()
VENUE: ()

No.	Name	Organization	Design
1.	OLIGA MAJID	-	-
2.	ASIKURU FLORENCE	-	-
3.	ONDO KAHASUM	-	-
4.	CANDIRU ZATUNI	-	-
5.	CANDIRU AMANA	-	-
-	AKINNSI TUNSI	-	-



Ministry of Water and Environment (MWE)
Large solar-powered piped water supply & Sanitation
Environmental and Social Impact Assessment (ESIA)

COMMUNITY SENSITIZATION MEETINGS

DISTRICT: YUMBE
SUB-COUNTY: lobe Town council.
PARISH: L
VILLAGE:

DATE: 6
TIME: 1
VENUE:

No.	Name	Organization	Designation
1.	HON TURU MUKUTARI MUNDUGA	LDBE T/C	V/C/A L.C.I
2.	HON CANDIRU ZAKIA ISMAIL	LOBE T/C	SEC SOCIAL
3.	ZUBEIR ABASI	LOBE T/C	L.C.I
4.	EFIKI SWAJI RASAB	LOBE T/C	S.SEC COST URBAN
5.	EFIKI ABASI	" "	" "
6.	AWUGA MOSES	" "	YAKA



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COMMUNITY SENSITIZATION MEETINGS

DISTRICT: YUMBE
SUB-COUNTY: lobe Town council
PARISH:
VILLAGE:

DATE: 6
TIME: 1
VENUE:

No.	Name	Organization	Designation
1.	AMBA RASILLU		
2.	BALCO MAUZU		
3.	MUNDUGA STRAJI	" "	" "
4.	FARUKI MADDI	" "	" "
5.	GIPELE SWAJI B		L.C.I
6.	ALBERT TOTOMENSE	" "	" "



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COMMUNITY SENSITIZATION MEETINGS

DISTRICT: YUMBE
SUB-COUNTY: *labe Town council*
PARISH:
VILLAGE:

DATE: *6th*
TIME: *11*
VENUE: *1*

No.	Name	Organization	Designation
1.	<i>ADILU SABBIR</i>	<i>..</i>	<i>und</i>
2.	<i>DETTOMATI KALIDI</i>	<i>Interface</i>	<i>water</i>
3.	<i>BRASI MAMUKA</i>	<i> </i>	<i>Water</i>
4.	<i>AKIKU TOAH SEBISI</i>	<i>"</i>	<i>"</i>
5.	<i>TARA ALI</i>	<i>"</i>	<i>"</i>
6.	<i>ADILU MAMUKA</i>	<i> </i>	<i> </i>



Ministry of Water and Environment (MWE)
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Environmental and Social Impact Assessment (ESIA)

COMMUNITY SENSITIZATION MEETINGS

DISTRICT: YUMBE
SUB-COUNTY: *labe Town council*
PARISH:
VILLAGE:

DATE: *6th*
TIME: *11*
VENUE: *6*

No.	Name	Organization	Designation
1.	<i>GADAFI SHADIC</i>	<i>"</i>	<i>"</i>
2.	<i>PADUKU MAJID</i>	<i>"</i>	<i>"</i>
3.	<i>ANDRUGA ALIBURU</i>	<i> </i>	<i> </i>
4.	<i>BULIRE MANISU</i>	<i>"</i>	<i>"</i>
5.	<i>IKHUKI ABIBI JUMA</i>	<i>"</i>	<i>"</i>
6.	<i>IGHISIA ALIBURU</i>	<i> </i>	<i> </i>



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Engagement with
COMMUNITY SENSITIZATION MEETINGS

DISTRICT: YUMBE
SUB-COUNTY:
PARISH:
VILLAGE:

DATE: 6th/5
TIME: 2:00
VENUE: 1

No.	Name	Organization	Designation
1.	OPAWOT ALFRED	POLICE LOBE	Inspector
2.	VIZA Mahadi	LOBE HC II	E/Asst
3.	bumu Andrew	Adria P-S	HM
4.	AGAUDU FRED ISIGA	KALABU P/S	SMAN T
5.			
6.			



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Environmental and Social Impact Assessment (ESIA)

COMMUNITY SENSITIZATION MEETINGS

DISTRICT: YUMBE
SUB-COUNTY: Lobe Town Council
PARISH:
VILLAGE:

DATE: 6th
TIME: 4:
VENUE: 1

No.	Name	Organization	Designation
1.	SUBUA IKALISUMU	MARKET VENDOR	
2.	A-11314 ANGOLU	MARKET VENDOR	
3.	IDRAKA RAIMA	MARKET VENDOR	
4.	CHAMBIRU ZATUN	MARKET VENDOR	
5.	WAIBI ZAINABU	MARKET VENDOR	
6.	CHANDIGA ISUMAILE	MARKET VENDOR	



Appendix E: Bill Of Quantities

MINISTRY OF WATER AND ENVIRONMENT
LOBE WATER SUPPLY & SANITATION SYSTEM

ENGINEER'S ESTIMATE

GRAND SUMMARY

BILL NO.	DESCRIPTION	AMOUNT	
		(Ushs)	(USD)
			1USD = UGX 3750
1.0	PRELIMINARIES	423,900,000	113,040
2.0	DRACHIA BOREHOLE	1,248,422,557	332,913
3.0	DRACHIASOLAR	706,134,000	188,302
4.0	TRANSMISSION MAINS -DRACHIA TO URUNGU	1,244,609,700	331,896
5.0	STORAGE RESERVOIR	468,039,700	124,811
6.0	DISTRIBUTION SYSTEM	1,012,969,990	270,125
7.0	OFFICE BLOCK	296,910,831	79,176
8.0	TOILET BLOCKS	1,087,331,603	289,955
9.0	COMPENSATION	72,600,000	19,360
	SUB TOTAL 1	6,560,918,380	1,749,578
	Add 10% Contingencies	656,091,838	174,958
	SUB TOTAL 2	7,217,010,218	1,924,536
	Add 18% VAT	1,299,061,839	346,416
	GRAND TOTAL	8,516,072,058	2,270,953





Appendix F: Social Tools

Focus Group Discussion Guide for Baseline Survey of IWMDP – ESIA for Lobe Rural Growth Centre

Facilitator’s welcome, introduction and instructions to participants

Welcome and thank you for volunteering to take part in this focus group. You have been asked to participate as your point of view is important. I realize you are busy and I appreciate your time.

Introduction: This focus group discussion is designed to assess your current thoughts and feelings regarding the Integrated Water Management and Development Project (IWMDP) to selected Rural Growth Centres in Yumbe District as refugee hosting communities to improve their water supply and sanitation systems. The focus group discussion will take no more than two hours.

Anonymity: I would like to assure you that the discussion will be anonymous. The information collected from this discussion will be kept safely by the Consultants. The transcribed notes of the focus group will contain no information that would allow individual subjects to be linked to specific statements. You should try to answer and comment as accurately and truthfully as possible.

Ground rules

- There are no right or wrong answers
- You do not have to speak in any particular order
- When you do have something to say, please do so. It is important that I obtain the views of each one of you.

Capture the Shared experience:

Guiding questions

1. What kind of visitors do you observe whenever there is an ongoing development project such as a road? (*Probe for the influx of Commercial Sex Workers, job seekers.... food vendors...etc.*) For each category of visitors, what is their impact on the project works and or on the communities/families?



2. What kind of businesses/activities boom with such development projects in the area? (e.g. Bars/alcohol and drug abuse, commercial sex workers...etc.) what impacts do such activities have on the communities, families, project workers, etc?

Access to Public Services and Resources

3. Do women in this community have the same degree of access as men to safe water, sanitation facilities, education, health services etc.? *probe briefly on the differences, more importantly why, probe for the vulnerable women, men and children etc.*
4. Who in the community makes decisions on the allocation of common resources (land, market stalls, shops, etc.)?
5. Can women and other vulnerable groups own land within the catchment area?
6. Differences in men/women accessing and controlling over resources? *Probe for why there are differences.*

Women and land ownership

7. What are the main differences in ownership and control over land between men and women and other social groups?
8. How could you describe women's ownership, access and control over resources such as land, livestock, market stalls, shops etc in this area?

Economic Information

9. What type of work do men and women primarily do in your community, what are the similarities and differences and why? Are there trends of men doing work traditionally done by women and vice-versa?
10. What types of assets (i.e., land, livestock, farming tools, houses, rental property, motorcycles, bicycles, radios, etc) Which specific assets do men and women have access to and control? Why? *Probe for differences between different types of women, e.g., young, old, married, unmarried, formally employed, etc.*
11. Do men and women have the same access to financial services, including credit? Probe, why and possible differences in access to formal/informal sources and trends in the last 5 years.
12. What is the trend in the last 5 years in terms of women's access to assets?

Gender roles

13. What roles do women and men play in this community? Probe for the triple roles of production, reproduction and community work. How do these roles constrain women's participation in other activities?



14. Who is responsible for fetching water for the households? What challenges do they face when fetching water?
15. Please describe the level of work of women in this community. Probe into how much burden and hardship women have with household responsibilities, income generating and other activities.
16. Does the community have mechanisms (customs, laws, practices) in place that support women's rights? What about children's rights, PWDs, Older persons, PLWH, COVID-19 patients/affected persons...

Access to water and sanitation facilities

17. What are the main sources of water in this community?
18. Are the water sources accessible to all? What challenges do you have with the existing sources of water in this community?
19. Do the existing water sources have functional management committees? To what extent are the existing water user committees functional?
20. Are women and youth part of the water user committees? What roles do they play?
21. Who is involved in fetching water at the household level?
22. In case a new water supply system is introduced in the community, are you willing to pay for it? Probe for why if not willing to pay.
23. Does the community have public toilets? If

Decision-making

24. How are decisions taken at home? Probe whether women are involved in making decisions and what decisions they make including fetching water, seeking medical treatment; education, taking out loans, disposing off household property, attending community meetings etc? By men? Why? *Probe for reasons/details*
 - a. Under what circumstances do women make decisions normally made by men? Are there consequences that women face when this happens? Describe. How does the community perceive this?
 - b. Under what circumstances do men make decisions normally made by women? *probe*
 - c. Are there decisions that you only want your spouse to make? Why?

Gender-based violence (Data will be collected from the Uganda Police in the respective Municipalities, from the Women leaders and CDOs).

25. Do women in this community experience any forms of violence? How does the community view violence against women? *Probe to understand the issues, forms, and prevalence and impact, probe for men, children (girls and boys)*



- a. How is this violence dealt with in the community, and why in these ways?
 - b. What are the trends over the last 5 years on Gender-based violence? (increased, decreased, no change). Why?
- 26. How is the situation of HIV/AIDS in this community? (Use the KAP...Are people aware, what are the attitudes, how do they behave? Probe for men, women and youth, and impacts to the project and communities (HMIS data will be collected from the Referral hospital and HCIV)**
- 27. Apart from HIV/AIDS, what other pandemic diseases are known to the communities? How is the pandemic transmitted? What measures are in place to mitigate the spread of the pandemic? What are the people's attitudes towards the pandemic engage as above using KAP approach; Probe for impacts to the project and communities**
- 28. How does the community get information concerning pandemic outbreaks such as COVID-19 and HIV/AIDS?**