

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)

OF THE

THE GAMBIA WATER AND SANITATION PROJECT (P513113)

DRAFT

AUGUST 2026

CONTENTS

LIST OF TABLES	7
LIST OF FIGURES	9
ABBREVIATIONS	10
EXECUTIVE SUMMARY	12
Objectives of the ESIA study	12
Methodology for the ESIA	13
Project location.....	14
Project components	15
The institutional framework.....	16
CHAPTER 1: INTRODUCTION AND BACKGROUND	29
1.1 Rationale for the ESIA.....	29
1.2 Objectives of the ESIA study	30
1.3 Methodology for the ESIA	30
1.4: Project location.....	31
CHAPTER 2: PROJECT DESCRIPTION.....	33
2.1 Project components	33
2.1.1 Water production and ancillary works.....	34
2.1.2 Water treatment system.....	34
2.1.3 Water storage and ancillary works.....	36
2.1.4 Water transmission system	37
2.1.5 Backup power supply using diesel generators.....	37
2.1.6 Water distribution system	37
2.1.7 Telemetric and SCADA control system.....	37
2.1.8 Construction of MV lines to connect 4 boreholes to WTP.....	38
2.2 Summary of project activities	39
2.2.1 Pipe laying - transmission and distribution	41
2.2.2 Backfilling and compaction of excavated trenches.....	42
2.3 Assessment of project alternatives.....	42
2.3.1 Technology alternatives	42
2.3.2 “No Project Development Option”	43
CHAPTER 3 DESCRIPTION OF BASELINE CONDITIONS	43
3.1 Information gaps	44
3.2 Land use/land cover	44

3.3	Climate	45
3.3.1	Rainfall.....	45
3.3.2	Temperature	47
3.4	Groundwater – potential for contamination.....	48
3.4.1	Soil type	48
	Figure 3.6: Soil type of project area	49
3.4.2	Lithology	49
3.4.3	Soil quality assessment	50
3.4.4	Aquifer productivity	53
3.5	Hydrology	53
	Surface water.....	53
	Groundwater resources	54
3.6	Topography.....	55
3.7	The biotic environment	55
	The flora	56
	The fauna	57
	The avi-fauna	58
	Flora along pipeline corridors	58
3.8	Biological investigations of proposed borehole and WTP sites within the FFP	59
	Borehole 1 (Coordinates 1466927 - 326306)	60
	Borehole 2 (Coordinates 1467514-325511)	61
	Borehole 3 (Coordinates 1467514-325511)	61
	Borehole 4 (Coordinates 1468625 – 323839).....	62
	The Furuya Water Treatment Plant site (Coordinates 1466400 – 325020)	63
3.9	Human and Socio-economic Environment	64
	Demography and population of the peripheral communities	64
	Chance finds and cultural heritage and archaeology	64
	Disadvantaged and vulnerable groups.....	64
	Access to water services	67
	Modes of subsistence and daily chores in the project’s area of influence	68
	Agriculture and farming of crops and livestock.....	68
	Fishing activities.....	69
	Waste management.....	69

3.10	Main stakes and risks of the project	69
CHAPTER 4: RELEVANT LEGAL AND INSTITUTIONAL FRAMEWORK		71
4.1	National and international policy, and legal framework	71
4.1.1	Relevant national policies	71
4.1.2	Relevant national legislation	73
4.1.3	Relevant international conventions signed/ratified by The Gambia	74
4.1.4	Relevant World Bank Environmental and Social Standards	74
4.1.5	The institutional framework	75
4.1.6	Institutional analysis	77
4.1.7	Management of GWASAP'S ESIA	77
CHAPTER 5: CONSULTATIONS AND PUBLIC PARTICIPATION		78
5.1.	Objectives of stakeholder engagement	78
5.2.	Stakeholder engagement strategy	78
5.3	Stakeholder analysis and identification	79
5.4.	The consultation process	80
5.4.1	Institutional consultations	80
Fig. 5.1: Consultation with Director of Forestry Fig 5.2: Consultation with Kembujeh with Alkali		81
5.4.2.	Consultations with stakeholder communities	82
5.4.3	Stakeholders' opinions about the project	82
CHAPTER 6: ANALYSIS OF POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS		84
6.1	Impact Analysis – biophysical environment	84
6.1.1	Methodology	84
6.1.2	Identification of VECs	85
6.1.3	Defining the spatial boundaries for assessment	86
6.1.4	Defining the temporal boundaries	86
6.1.5	Identification of impacts	86
6.2.	Cumulative Impacts	87
6.2.1	Impact prediction	87
6.2.2	Impact evaluation	87
6.3	Description of impacts	89
6.3.1	Identified impacts	89
6.3.2	Predicted levels of the direct impacts	89
6.3.3	Significance of the impacts	90

6.3.4 Mitigation of the impacts	91
6.4 Description of identified impacts and proposed management measures during construction	93
6.4.1 Potential Positive Project impacts	93
6.4.2 Potential Negative Impacts on the Abiotic Environment During Construction ...	94
6.4.3 Potential Negative Impacts on the Biological Environment during Construction	99
6.4.4 Potential Impacts on the Socioeconomic Environment During Construction	100
6.5 Description of the identified impacts and proposed management measures during operation	104
6.5.1 Potential Negative Impacts on the Abiotic Environment during Operation	104
6.5.2 Potential Negative Impacts on the Biological Environment during Operation ..	105
6.5.3 Potential Impacts on the Socioeconomic Environment During Operation	105
6.6 Description of the impacts during project decommissioning	107
CHAPTER 7: THE ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)	108
7.1 ESMP Matrix specific to Water Production Activities	122
7.2 ESMP Matrix specific to the Water Treatment Plant	123
7.3 ESMP Matrix Specific to the Water Transmission and Distribution Activities	124
CHAPTER 8: THE GRIEVANCE RESOLUTION MECHANISM (GRM)	126
8.1 Types of potential complaints	126
8.2 Structure of the GRM	126
8.3 The complaints/grievances register	130
8.4 Record-keeping	131
8.5 Capacity building of the GRC members	131
8.6 Periodic review and documentation of lessons learned	131
8.7 Grievances at contractor level	131
8.8 Budget for implementation of GRM	132
CHAPTER 9: IMPLEMENTATION ARRANGEMENTS	133
9.1 Institutional arrangements for safeguards implementation	133
CHAPTER 10: MONITORING AND REPORTING OF ESMP IMPLEMENTATION	135
10.1 Monitoring	135
10.2 Reporting	135
10.3 Environmental audit	135
10.4 Stakeholder capacity building measures	136
10.5 Budget for implementation of the ESMP	148

CHAPTER 11: CONCLUSIONS	149
APPENDICES.....	150
Appendix 2.1: Decommissioning Action Plan	150
Appendix 3.1: Chance Find Procedures	151
Appendix 3.2: Soil sampling methodology	152
Appendix 3.3: Procedures for soil sample analysis	154
Appendix 5.1: Brikama Gidda Forest Consultation meeting with Farmers.....	155
Appendix 5.1B: Kembujeh Consultation meeting with Farmers	157
Appendix 5.1C: Mandina Baa Consultation meeting with Farmers	159
Appendix 5.1D: Department of Forestry Consultation meeting	161
Appendix 5.1E: Consultation with National Environment Agency (NEA).....	163
Appendix 8.1: Company Code of Conduct.....	165
Appendix 8.2: Manager’s Code of Conduct	173
Appendix 8.3: Individual Code of Conduct	177

LIST OF TABLES

Table 2.1: Project components of the GWASAP
Table 2.2: Proposed project phases and major activities
Table 3.1: Land use land cover in size
Table 3.2: Properties of Acrisols
Table 3.3: Results of physicochemical analysis of soil samples from different location
Table 3.4: Plant species recorded in the FFP and their IUCN status
Table 3.5: Mammalian fauna in the FFP
Table 3.6: Avifauna recorded in the FFP
Table 3.7: Fruit trees found along proposed pipeline corridors
Table 3.8: Inventory of trees recorded at the BH1 and their IUCN status
Table 3.9: Inventory of trees recorded at the BH2 and their IUCN status
Table 3.10: Inventory of trees recorded at the BH3 and their IUCN status
Table 3.11: Inventory of trees recorded at the BH4 and their IUCN status
Table 3.12: Inventory of trees recorded at the proposed WTP and their IUCN status
Table 3.13: Population of the communities surrounding the project ¹
Table 4.1: Relevant national policies
Table 4.2: Relevant national legislation
Table 4.3: Relevant international conventions signed/ratified by The Gambia
Table 4.4: List of World Bank ESSs and their relationship with GWASAP
Table 4.5: Stakeholder responsibility matrix
Table 5.1: Stakeholder identification and analysis matrix
Table 6.1: Expected sources of project's potential impacts
Table 6.2: Valued environmental components
Table 6.3: Generic impact identification matrix
Table 6.4: Numerical values representing the minimum and maximum possibilities ²
Table 6.5: Impact significance
Table 6.6: Identified impacts
Table 6.7: Predicted levels of the direct impacts
Table 6.8: Impact significance
Table 6.9: Potential dust emission magnitude for construction
Table 6.10: Sensitivity of the area to dust soiling effects on people and property
Table 6.11: Risks of dust impacts
Table 6.12: Point source noise attenuation
Table 7.1 : ESMP Matrix for General Construction and Operation Measures
Table 7.2 : ESMP Matrix specific to Water Production Activities
Table 7.3 ESMP Matrix specific to the Water Treatment Plant
Table 8.1: Operational procedure of the GRM: transmission and registration of complaints
Table 8.2: Acknowledgment of receipt of complaints
Table 8.3: Handling complaints and feedback
Table 8.4: Archiving of complaints
Table 8.5: Monitoring and evaluation
Table 8.6: The complaints/grievance register
Table 8.7: Operational budget for the GRM process
Table 10.1: Cost estimates for environmental audit
Table 10.2: Capacity building budget
Table 10.3: Monitoring plan for the ESMP implementation

¹ Calculation of the population is based on the GABoS EXP projection for 12 years (2013 to 2025). Since the 2024 Population results are not yet published and if published, the data will be revised accordingly.

² The values were considered in the reverse order for positive impacts

Table 10.4: Estimated budget for the GWASAP ESMP implementation

DRAFT

LIST OF FIGURES

- Figure 1.1: Location of the FFP
- Figure 1.2: Proposed location of the boreholes
- Figure 1.3: Waste dump in the fringes of the Park and the surrounding development
- Figure 2.1: An aeration facility at one of NAWEC's treatment plants
- Figure 2.2: Chlorine bottles fitted on pipes at a NAWEC water treatment plant
- Figure 2.3: A ground reservoir
- Figure 2.4: Pumping infrastructure at a NAWEC facility
- Figure 3.1: Current land use and land cover of the general project area
- Figure 3.2: Long-term average rainfall over the country by weather station
- Figure 3.3: Distribution monthly mean rainfall over the 'Yundum' weather station
- Figure 3.4: Climatology of temperature over the country
- Figure 3.5 Distribution of monthly mean surface temperature over the 'Yundum' weather station
- Figure 3.6: Soil type of project area
- Figure 3.7: Lithology of project area
- Figure 3.8: Aquifer productivity of project area
- Figure 3.9: Topography of project area
- Figure 3.10: *Tectona grandis* stand in the FFP
- Figure 3.11: The *gmelina arborea*
- Figure 3.12: Dense shrub and understory layer of *Combretum micranthum*
- Figure 3.13: A mango tree within communities
- Figure 3.14: Lime tree along potential line routes
- Figure 3.15: Breakdown of the various categories of vulnerable groups within the project area.
- Figure 3.16 Typical private borehole water tank
- Figure 3.17: A public water point provided by NGO
- Figure 3.18 A loaded donkey cart with plastic containers filled with water
- Figure 3.19: Waste disposal methods within the project area
- Figure 5.1: Consultation with Director of Forestry
- Figure 5.2: Consultation with Kembujeh with Alkali
- Figure 5.3 Consulting with famers at Brikama Gidda
- Figure 5.4: Consultations at Mandinaba
- Figure 6.1: Planned locations of boreholes and WTP
- Figure 6.2: Vegetation survey transects
- Figure 6.3: Proposed borehole locations and road improvement

ABBREVIATIONS

AOI	Area of Influence
CBD	Convention on Biological Diversity
CCD	Convention to Combat Desertification
DOF	Department of Forestry
DPPH	Department of Physical Planning and Housing
DPWM	Department of Parks and Wildlife Management
DSA	Deep Sandstone Aquifer
DWR	Department of Water Resources
EIA	Environmental Impact Assessment
ESHS	Environmental, Social, Health and Safety
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESS	Environmental Safeguards Specialist
ET	Elevated Tank
FFP	Furuya Forest Park
FWTP	Furuya Water Treatment Plant
GBA	Greater Banjul Area
GBOS	Gambia Bureau of Statistics
GBV	Gender-Based Violence
GEAP	Gambia Environment Action Plan
GIS	Geographic Information System
GoTG	Government of The Gambia
GPS	Global Positioning System
GRM	Grievance Redress Mechanism
IFC	International Finance Corporation
IUCN	International Union for Conservation of Nature
LAA	Local Assessment Area
MOPE	Ministry of Petroleum and Energy
NAWEC	National Water and Electricity Company
NEA	National Environment Agency
NEMA	National Environment Management Act, 1994
OE	Owner's Engineer
OHS	Occupational Health and Safety
PC	Project Coordinator
PDA	Project Development Area
PE	Power Engineer
PSC	Project Steering Committee
RAP	Resettlement Action Plan
SAI	Social Area of Influence
SEA	Sexual Exploitation and Abuse
SH	Sexual Harassment
SSA	Shallow Sand Aquifer
SSS	Social Safeguards Specialist
STD	Sexually Transmitted Diseases

STI	Sexually Transmitted Infections
TAC	Technical Advisory Committee
ToR	Terms of Reference
UNFCCC	United Nations Convention on Climate Change
VAC	Violence Against Children
VEC	Valued Ecosystem Component
WASIB	Water Supply Project in the Greater Banjul Area
WB	World Bank
WB	World Bank
WCR	West Coast Region

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EXECUTIVE SUMMARY

This is the Environmental and Social Impact Assessment (ESIA) for The Gambia Water and Sanitation Project (GWASAP), a World Bank-funded initiative, which seeks to address the persistent deficit in water and sanitation services across the Greater Banjul Area (GBA) and surrounding towns.

The GWASAP, is a strategic intervention to address the persistent deficit in water and sanitation services across the GBA, and it aligns with the Government of The Gambia's (GoTG) sectoral reform agenda to strengthen the National Water and Electricity Company (NAWEC). The Company currently produces approximately 147,000 m³ of water daily against a peak demand of 252,000 m³/day (resulting in a shortfall of 105,000 m³/day). This deficit is projected to increase due to climate change-induced droughts and rising demand. NAWEC also faces non-revenue water (NRW) losses of about 45%, primarily from physical leakages and commercial inefficiencies.

Complementary projects financed by the European Investment Bank (EIB), French Development Agency (AFD), Saudi Fund for Development (SFD), and European Union (EU) are underway to expand production capacity, modernize transmission and distribution networks, and develop a 2030–2050 Urban Water and Sanitation Master Plan. Parallel programs are advancing groundwater resource assessments, hydraulic modeling, wastewater and groundwater management plans, and energy efficiency measures to reduce carbon emissions - all integrating climate resilience.

Despite ongoing efforts, further investment is required to extend water distribution networks, rehabilitate aging infrastructure, and establish Pilot District Metered Areas (DMAs) to reduce losses and strengthen NAWEC's operational and financial sustainability. The GWASAP will implement selected recommendations from prior sector studies, including the development of new sustainable water sources. In particular, the project will tap into the deep Maastrichtian transboundary aquifer, establish its management mechanism, and construct a 24,000 m³/day water treatment plant within Furuya Forest Park in Brikama East.

To expand service coverage to underserved communities, the project will also construct a 1,500 m³ storage reservoir. These interventions form the basis of this ESIA, which assesses potential environmental and social impacts and proposes mitigation measures to ensure compliance with World Bank safeguards and national regulatory frameworks.

Rationale for the ESIA

An ESIA report needs to be developed because it is a requirement of the National Environment Management Act, (NEMA) of 1994, the EIA Guidelines and Procedures (1999), and the EIA Regulations (2014), which require impact assessment studies to be conducted prior to development activities that are likely to have adverse environmental and social impacts. The GWASAP falls under Schedule A of the NEMA; "Projects to be considered for EIA, large-scale development of water infrastructure.

In addition, the World Bank's (WB) Environmental and Social Standard 1 (ESS1) -the umbrella standard, requiring borrowers to assess and manage risks across all other ESSs,-requires assessment and management of environmental and social risks of Bank-supported projects. These standards cover areas ranging from risk assessment and labor conditions to biodiversity, resettlement, and stakeholder engagement. Table below lists the Banks' different Standards indicating which of them have been triggered by GWASAP. In view of the above, GWASAP requires development of an ESIA report before any activity commences.

Objectives of the ESIA study

The overall objective of this ESIA study is to ensure that environmental considerations are considered during decision making for environmental sustainability. Specific objectives of the ESIA are to:

- identify, evaluate, and mitigate potential environmental and social risks and impacts of the proposed project activities;
- examine ways to prevent, minimize, mitigate, or offset/compensate for adverse environmental and social impacts, and to enhance positive impacts, describe the baseline conditions for future reference;
- provide platforms for public consultation and participation regarding the Project;
- maintain credibility of the Project developers and funders.

To guide implementation of the ESIA, an accompanying ESMP will be included to manage the specific risks and impacts, identify responsibilities for mitigating these impacts, monitoring arrangements, timing of the mitigation actions, and estimated costs.

Methodology for the ESIA

The following approach was used to develop this report:

Literature review

This consisted of the review of relevant national policies and legislation, World Bank's Social Standards, GAWSAP-related documents, relevant international conventions and treaties to which The Gambia is a Party, reports of similar studies, academic research studies, technical/government publications, and meteorological data of the project area.

The legislation and policies reviewed have guided the ESIA study to identify the legal scope of the process and ensure that issues highlighted are given due consideration during the study. For example, policies have described areas to protect such as historical sites, and gazetted forest parks. Therefore, special attention was given during the study since the project location is within the Furuya Forest Park. The reviewed legislation also highlighted areas to consider during the study, such as the need for community consultation; the need to ensure that women and vulnerable groups are included.

In addition to the above, an extensive review was carried out of data from a variety of sources, including a selection of features derived from appropriate secondary spatial datasets collected by different national sectoral institutions, maintained in a GIS database.

Field visits and community consultations

Extensive field visits were carried out to the project site and peripheral communities (within a 5km radius of the Furuya Forest Park) including Mandinaba, Kembujeh, and Brikama Gidda (the community close by the Park). Community consultations were undertaken using mainly unstructured methods; these included group discussions, and individual (one-to-one) meetings to:

- discuss the project with project beneficiaries and other stakeholders regarding its potential positive and negative impacts;
- provide information about the project, and to acquire key social information, including schools, health and other social facilities along within the project's area of influence;

- facilitate inclusive participation of community members on the project so that they can voice their concerns and views about the design, project impacts, and to ask questions;
- highlight potential roles and responsibilities of the various stakeholders, including community members; their expected roles and responsibilities during including community-level monitoring of ESMP implementation, which is one way of enhancing their participation and promote sustainability in the project
- understand community dynamics, relations, and broader social and economic context of the communities viz-a-viz the possible impacts of this project

The visits provided the Consultant with the opportunity to analyze possible pipeline transmission line routings, and possible construction methodologies in order to reduce the negative environmental and social impacts. The field visits also allowed the study to:

- define, locate and precise the borders/limits of the Project areas of influence;
- assess the current state of the environment;
- identify the activities of residents of peripheral communities likely to be affected by the Project;

Data Collection

Data collection and analyses of supplementary primary data obtained from field surveys (using GPS technology) was carried out. In addition, existing secondary datasets (including topographic data, settlements data, forests, and protected areas, etc.) that are hosted by other national institutions were analyzed. These institutions included the Department of Lands and Surveys, Gambia Bureau of Statistics (GBOS), Department of Forestry (DOF), Department of Parks and Wildlife Management (DPWM), etc.

Data Analysis

The datasets were arranged into feature-based GIS layers that can be used as and when required for analyses, and/or presentation.

Key stakeholder interviews and consultations

Consultations were held with the Project Implementation Unit (PIU) and relevant staff of the NAWEC as well as other relevant national institutions such as the National Environment Agency (NEA), Department of Water Resources (DWR), Department of Forestry (DoF), Office of the Regional Governor in Brikama, and the Department of Parks and Wildlife Management (DPWM) community level stakeholders and project location areas of Mandinaba, Kembujeh and Brikama Gidda. The meetings with partner institutions were undertaken to discuss their respective policy and legal mandates as they relate to the Project. This has enabled the definition of their potential roles and responsibilities in the implementation of the ESMP. See Chapter 5 for summary of comments and views from the consultations.

Project location

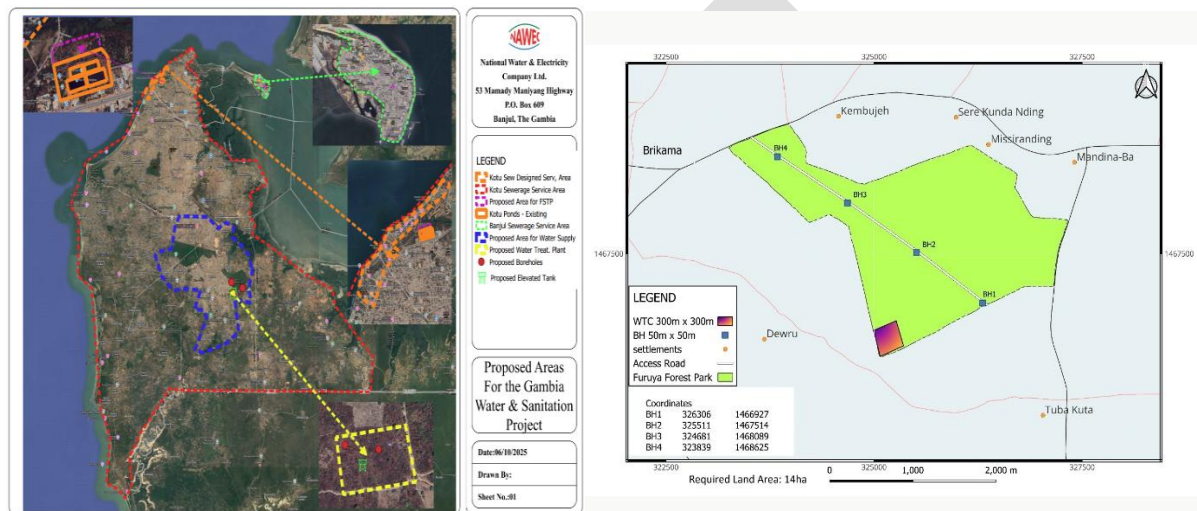
The Project will be located within the Furuya Forest Park (FFP) in the West Coast Region (WCR), about 4km south of Brikama city center, just off the South Bank Road (the country's main highway) on coordinates 13°16'6"N, 16°36'31"W. It covers approximately 405 hectares and was established in 1954 as a plantation forest dominated by *Gmelina arborea*.

The Park is classified under the IUCN Category IV, which focuses on habitat and species management, i.e. managed to conserve specific species or habitats. This IUCN Category's primary goal is to ensure

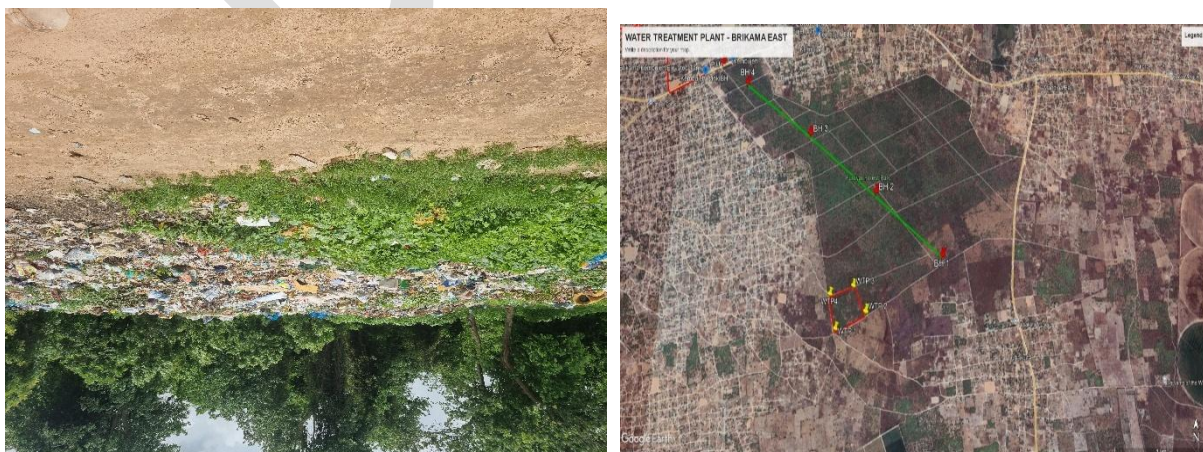
the survival of particular species or the preservation of unique habitats. In this case, the Park's tree species comprises mainly the gmelina (*Gmelina arborea*). The understory is dominated by shrubs and grass, which grow up to 2 meters during the wet season (June to October) and die back during the dry season.

Overview of project area and sites for planned water and sanitation investments in GBA

The proposed boreholes (BH1–BH4) and the water treatment plant (WTP) are located within the Forest Park (see Figures below). They will be interconnected by transmission lines that feed into the wider distribution network serving Brikama East and neighboring towns. The Park lies at the edge of Brikama's rapidly expanding settlement to the west, bordered on the east by the main trunk road to Senegal and to the south by the South Bank Road corridor. The Figures illustrate the park's boundaries and its surrounding communities.



Available information on the Park remains limited, underscoring the need for further investigation into its specific ecological characteristics. Given its age, the forest has likely undergone various ecological changes and now faces challenges linked to environmental neglect, including deforestation. Human activities such as firewood collection and the expansion of waste dump sites along its fringes and near the main highway are contributing to ongoing disturbance. Despite these pressures, the Park continues to support diverse flora and fauna, including mammals, birds, and invertebrates, which are described in the sections below.



Waste dump in the fringes of the Park and the surrounding developProject components

The project components of GAWSAP are indicated in Table below.

Project components of the GWASAP

SUMMARY OF SCOPE OF WORKS			SITE
1	Water production and ancillary works		
	Supply and installation of new pumps		FFP
	Construction of fences		All borehole sites and FWTP
	Construction of 4 new well fields (including 1 Maastrichtian)		FFP
	Construction of MV lines		FFP
2	Water treatment system		
	Construction of new water treatment plant/ aeration-storage reservoir		FFP
	Introduce water treatment plant chlorination system by calcium hypochlorite		FFP
3	Water storage and ancillary works		
	Construction of storage/ground reservoir		FFP
4	Water transmission system		
	Construct 2.5 kilometers of raw water mains		From boreholes to FWTP
	Construct 3.3 kilometers of clear water transmission lines		From FWTP to Kembujeh ET
	Provide backup power supply using diesel generators		FWTP
5	Water distribution system		
	Build 50 kilometers of distribution mains		Within the peripheral communities
6	Telemetric control system		
	Introduce SCADA system to improve operational and energy efficiency, enable real-time monitoring and control		FWTP

The institutional framework

This section outlines the core institutions with various implementation and regulatory responsibilities that are relevant to the Project ESIA and ESMP.

Stakeholder Responsibility Matrix

Stakeholder	Key responsibilities	Accountability focus	Level of intervention
NEA	Approvals, permits, compliance monitoring, enforcement of NEMA 1994, coordination with EIA Working Group	Ensure legal/regulatory compliance; oversee audits and reporting	All phases of the project from planning and design to the construction and operation
NAWEC (Water Division/PIU)	Implement ESMP, submit reports to NEA WB, manage grievance	Operational compliance; safeguard implementation; timely reporting	All phases of the project from planning and design to the

Stakeholder	Key responsibilities	Accountability focus	Level of intervention
	mechanism, ensure contractor compliance		construction and operation
DOF	Responsible for the maintenance and development of forest resources in The Gambia.	Advises on forest boundaries relative to the project activities and monitors encroachment onto the protected Forests and impact on other forest trees within the Project Area of Influence	Preconstruction, construction, and operation phases
DPWM	Responsible for the maintenance and development of national parks and reserves	Advises on the control and management of wildlife, including birds, that are habitat within the project area	Preconstruction, construction, and operation phases
DWR	Regulates and manages the sustainable utilization of water resources, coordinate related policies	Relevant in water quality management and control of water resources	During preconstruction, construction, and operation phases
MoPE	Provide oversight through PIU, coordinate safeguards, ensure integration of ESMP into contracts	Institutional coordination; safeguard clauses in procurement	As necessary during all phases of the Project
Contractors and Supervising Engineer	Implement mitigation measures, monitor workforce activities, report incidents, manage site-level safeguards	Day-to-day compliance; pollution control; occupational safety	All phases of the project from planning and design to the construction and operation
World Bank	Independent monitoring, review safeguard reports, provide technical assistance for non-compliance	Donor safeguard compliance; ensure corrective actions	All phases of the project from planning and design to the construction and operation
Regional Technical Advisory Committee (Governor's Office)	Local oversight, community engagement, grievance resolution support	Ensure community concerns are addressed; strengthen local participation	As necessary during all phases of the Project
Local Communities and Affected Persons	Participate in consultations, report grievances, engage in monitoring activities	Provide feedback on impacts; ensure cultural/social values are respected	All phases of the project from planning and design to the construction and operation
National Social Protection Agency.			

Stakeholder	Key responsibilities	Accountability focus	Level of intervention
Role, accountability and level of intervention.			

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Monitoring plan for the ESMP implementation

Activity / Subproject	Outputs of measures to be monitored	Responsibility for measures	Monitoring Period	Monitoring Frequency	Responsibility for monitoring	Monitoring Indicators	Monitoring Budget (\$US)
PRE-CONSTRUCTION AND CONSTRUCTION PHASES							
All subproject components under the General ESMP	General risks and impacts managed	GWASAP ESS & SSS	Before and during works	Monthly	Director of Water Division / Coordinator for the GWASAP/PIU	- Monthly monitoring reports - Incident reports as necessary	2,000 x 24mths = 48,000 (routine site inspections)
	Air pollution prevented and effects minimized	Contractor	During works	Monthly	GWASAP ESS & SSS / NEA / Owner's Engineer	Ambient air quality test results are within standards of the <i>Environmental Quality Standards Regulations</i>	15,000.00
	Forests and vegetation protected	Contractors	During the works	Daily	OE; communities	- Number of reports from community members on forest related complaints. - Community trained on the use of the GRM to report project-related complaints.	Part of budget for inspections.
				Monthly	ESS; DoF	- Number of illegal tree-felling related to the project from the Department of Forestry (DoF), workers, community, or any other. - Check records of tree felling by the contractor to clear sites.	
	Wildlife protected	Contractors	During the works	Daily	OE; communities	- Number of reports from community members on wildlife related complaints. - Community trained on the use of the GRM to report project-related complaints.	Part of budget for inspections.

Activity / Subproject	Outputs of measures to be monitored	Responsibility for measures	Monitoring Period	Monitoring Frequency	Responsibility for monitoring	Monitoring Indicators	Monitoring Budget (\$US)
				Monthly	ESS; DPWM	Number of reports of hunting and killings that are related to the project from the DPWM, workers, community, or any other source.	Part of budget for inspections.
	Soil protected from erosion and flooding	Contractor	During works	Monthly	GWASAP ESS/NEA/OE	100% of excavated sites with topsoil reserved for post construction landscaping 100% of excavated sites levelled	Part of the budget for inspection visits
	Visually pleasing landscapes	Contractor	During works	Monthly	GWASAP ESS/NEA/OE	- No of project related waste dumps around worksites - No. of sites vegetated as part of the project	Part of the budget for inspection visits
	Waste managed appropriately	Contractor	Before and during works	Monthly	GWASAP ESS/NEA/OE	- No. of waste dumps on and around worksites - Waste management plans developed and implemented - No. of reports/complaints on waste management issues	Part of the budget for inspection visits
	Stakeholders engaged and participated in the process	Contractor / PIU	During works	Monthly	GWASAP ESS/NEA/OE	- No. of public sensitization programmes - No. of complaints relating to the Project	Part of the budget for inspections
	Local employment and technology transfer promoted	Contractor	During works	Monthly	GWASAP ESS/NEA/OE	% of workforce from local communities	Part of the budget for inspection visits
	Protection from public health and safety risks	Contractor	During works	Monthly	GWASAP ESS/NEA/OE	- No. of public incidents related to the project activities - No. of reports on works during nighttime - No. of complaints on GBV, SEA/H, VAC	Part of the budget for inspection visits

Activity / Subproject	Outputs of measures to be monitored	Responsibility for measures	Monitoring Period	Monitoring Frequency	Responsibility for monitoring	Monitoring Indicators	Monitoring Budget (\$US)
	Protection from occupational health and safety risks	Contractor	During works	Monthly	GWASAP ESS/NEA/OE	- No. of work-related accidents % of workers found using PPE - Availability of first aid kits - No. of staff training recorded - No. of staff-related complaints on GBV, SEA/H, VAC	Part of the budget for inspection visits
	Grievances addressed	Grievance Resolution Committee	Before and during works	Quarterly	GWASAP ESS/NEA	% of complaints addressed	10,000.00
	Vulnerable individuals and groups benefit and participate in the project	NAWEC Public Relations; GWASAP PIU/NEA	Before works	Weekly before works	GWASAP PIU/NEA	- No. of complaints on GBV, SEA/H, VAC % of interviewed project affected persons aware of the GRM	Part of the GR monitoring budget & part of the budget for inspection visits.
	Protection of any Chance Finds	Contractors	Before the works (during review of C-ESMP) and during the works	Daily	GWASAP's ESS/NEA/	- C-ESMP includes procedure for Chance Finds - Percentage of workers interviewed with knowledge of the Chance Finds Procedures	Part of the budget for inspection visits
Additional measures specific to activities / sites during construction							
Water Production	All land outside NAWEC property regularized.	NAWEC Legal Team	Before the works	Monthly	GWASAP ESS/NEA/	All the land documents for the Project well sites recorded.	Part of the budget for inspection visits
	Siting of boreholes 'technically' justified.	Project Design Team	During design phase	Monthly	NAWEC Directors of Water Division & Projects and Planning	% of wells located in sites without reports of technical assessment. - No of community sensitization programmes on the Project.	Part of the budget for inspection visits

Activity / Subproject	Outputs of measures to be monitored	Responsibility for measures	Monitoring Period	Monitoring Frequency	Responsibility for monitoring	Monitoring Indicators	Monitoring Budget (\$US)
	Drilling techniques and materials justified to prevent related risks.	Contractor	Before and during the works	Daily	OE (daily) With reports to the Director of Water Division	• % of drilling staff aware of measures to prevent soil and water pollution. • Drilling sites • No of drill sites with water logging during visits. • No. of public incidents related to the project activities	As part of contractor's budget and routine monitoring budget
	Workers on the construction of the MV Line protected against related health and safety risks	Contractor	During works	Daily	OE (daily) GWASAP ESS/SSS/NEA/ (at least twice during the planned installation period)	• No. of work-related accidents • % of workers found using PPE • Availability of first aid kits • No. of staff training recorded on safety	Part of the budget for inspection visits
	Chlorine and materials with chlorine properly managed.	Contractor	Before and during the works	Daily	OE (daily) GWASAP ESS/NEA/OE (at least once during the planned period for replacement of the old chlorine system)	• Records of specific training of workers on chlorine management. • Evidence of chlorine related waste on or around the site.	
Water Storage	Workers on the construction of the WTP protected against related safety risks of working at heights.	Contractor	During works	Daily Monthly	OE (daily) GWASAP ESS/NEA/OE	• No. of work-related accidents • % of workers found using PPE • Availability of first aid kits • No. of staff training recorded on safety • % of workers qualified for their roles • Daily toolbox talks confirmed	Part of the budget for inspection visits

Activity / Subproject	Outputs of measures to be monitored	Responsibility for measures	Monitoring Period	Monitoring Frequency	Responsibility for monitoring	Monitoring Indicators	Monitoring Budget (\$US)
	The public is duly informed of water service interruptions.	Operators of the Water Division in collaboration with Head of Public Relations; Contractor	During the works	Weekly	Director of Water Division	• % of complaints on water scarcity during the works. • % of public notifications made against number of service disruptions.	
Transmission & Distribution	Communities educated and protected from cumulative impacts along the same corridors.	NAWEC Head of Public Relations, and the Projects and Planning Departments; Contractor	Before works; During works	Monthly; Daily	Director of Water Division; GWASAP ESS/NEA/OE	• No of community consultation and sensitization of reducing cumulative impacts. • No of consultative meetings with relevant authorities for possible harmonization of activities.	Part of the budget for inspection visits
	Public protected from open pits and ponding of water.	Contractor	During the works	Daily Monthly	GWASAP ESS/NEA/OE	• No. of failed site inspections. • No. of public notices/warnings in place. • Reports and evidence of water logging caused by the works.	
	The public is duly informed of water service interruptions.	Operators of the Water Division in collaboration with Head of Public Relations; Contractor	During the works	Weekly	Director of Water Division	• % of complaints on water scarcity during the works. • % of public notifications made against number of service disruptions.	
	Groundwater protected from contamination	Contractor	During the works	Daily Monthly	GWASAP ESS/NEA/OE	• No. of works sites with wastes indiscriminately dumped. • No. of burst pipes left unattended.	
SUBTOTAL FOR MONITORING DURING CONSTRUCTION							73,000.00
OPERATION PHASE							

Activity / Subproject	Outputs of measures to be monitored	Responsibility for measures	Monitoring Period	Monitoring Frequency	Responsibility for monitoring	Monitoring Indicators	Monitoring Budget (\$US)
All subproject components under the General ESMP	Water services improved	Coordinated by NAWEC Director of Water Division	Initially before operations; Periodically during operations	Once Annually	NAWEC Board of Directors / NAWEC Projects and Planning Director	• Relevant standards, plans and guidelines developed or updated • No. of staff training on the job and on E&S safeguards.	NAWEC's annual operational budget.
	Grievances addressed	GRC	Long-term during operation	Quarterly	SSS	• No. of public outreach activities to prevent grievances. • % of complaints addressed	
	Forest and trees protected during operation and maintenance works	NAWEC staff responsible for operations and maintenance;	During operations;	Daily	NAWEC safeguards team; communities	• Number of reports from community members on forests and wildlife related complaints. • Community trained on the use of the GRM to report complaints.	
		Contractors	During maintenance works	Annually	DoF; DPWM; NEA	• Number of reports on hunting / killings of wildlife and forest degradation.	
	Protection from public health and safety risks	NAWEC staff responsible for the operating facilities	Periodically during long-term operation	Annually	NAWEC Safeguards Team	• No. of community accidents related to the operation of the water facilities • No. of complaints on GBV, SEA/H, VAC • % of the public interviewed who are aware of the GRM • Records of health and safety training of employees • Records of public information and sensitization	
	Protection from occupational health and safety risks	NAWEC staff responsible for the operating facilities;	Periodically during long-term operation	Quarterly	NAWEC Water Division	• No. of work-related accidents • % of workers found using PPE • Availability of first aid kits • Availability of emergency plans and equipment	

Activity / Subproject	Outputs of measures to be monitored	Responsibility for measures	Monitoring Period	Monitoring Frequency	Responsibility for monitoring	Monitoring Indicators	Monitoring Budget (\$US)
		NAWEC Human Resources Department (E&S Safeguards team) Maintenance Contractors	During maintenance		Department of Labour	• No. of staff training recorded • No. of complaints on GBV, SEA/H, VAC, worker GRM. • % of workers interviewed who are aware of NAWEC’s Gender Policy	
	Waste managed appropriately	NAWEC staff responsible for the operating facilities; NAWEC maintenance team; Maintenance Contractors	Periodically during long-term operation	Quarterly Annually	NAWEC Water Division / NAWEC Safeguards Team NEA	• No. of waste dumps on and around sites • Waste management plans developed • No. of reports/complaints on waste management issues • Existence of staff / visitor awareness and warning signs on waste control	
ADDITIONAL MEASURES SPECIFIC TO ACTIVITIES / SITES DURING OPERATION							
Water Production	Impacts associated with excessive water abstraction mitigated	NAWEC Water Technicians; NAWEC Public Relations Department	During operation	Annually	Director of Water Division	• SCADA system functional • No. of public engagement programmes • GR registers evaluated	NAWEC’s annual operational budget.
	Sites and infrastructure	Operators of the various water facilities	During operation	Annually	Director of Water Division	• Number of reports on vandalism of water systems • % sites found not to be secured during routine inspections	

Activity / Subproject	Outputs of measures to be monitored	Responsibility for measures	Monitoring Period	Monitoring Frequency	Responsibility for monitoring	Monitoring Indicators	Monitoring Budget (\$US)
	protected from vandalism						
Water treatment	Mutual understanding between the Army and NAWEC	Head of the Water Treatment Plant in Sifoe; NAWEC head of public relations	During operation	Annually	Director of Water Division	- Number of consultations held per year - Number of complaints and relative resolutions from the treatment plant and vice versa.	
	Hazardous chemicals, including chlorine and calcium hypochlorite, properly managed	NAWEC staff responsible for operating the facilities; NAWEC maintenance team; Maintenance Contractors	During operation Maintenance	Annually As necessary	Director of Water Division	- Ensure that Hazardous Material Management Plan is in place and implemented. - Check records for incidents involving hazardous chemicals	
Water storage	Worker safety protected, specifically during works at heights	NAWEC Department of Human Resources	During operations and maintenance	Quarterly	Director Water Division; NAWEC Safeguards Team	- assess qualification of workers - check for availability and use of PPE	
Water transmission and distribution	Protection of public health and safety	NAWEC operators of the water transmission network. Contractors	During operation	Annually At time of maintenance works	Director of Water Division	- No. of manholes that are not covered - Site inspection to assess risks, including restriction of access - Warning notices in place - Reports / evidence of flooding caused by maintenance works.	

Activity / Subproject	Outputs of measures to be monitored	Responsibility for measures	Monitoring Period	Monitoring Frequency	Responsibility for monitoring	Monitoring Indicators	Monitoring Budget (\$US)
	Risks associated with community taps mitigated	NAWEC Safeguards Team	Before and during operations	Before start of operations then annually during operations	Director of Water Division	- No. of sensitization programmes carried out % communities with agreed set rules for operation of the taps	

The proposed budget for implementation of the ESMP is US\$268,000.00 (two hundred and sixty-eight thousand US Dollars) as indicated in Table below.

Estimated budget for the GWASAP ESMP implementation

No	Activity	Time frame	Budget (US\$)
1	Implementation of ESMP measures including public sensitization and activities	During Project implementation (before and during works)	40,000.00
2	Capacity enhancement programme	(1 session for 6 communities)	18,000.00
		Other relevant stakeholders during implementation	40,000.00
3	2 Specialists (Env/Soc Safeguards)	During project implementation (before and during works)	40,000.00
4	Monitoring (PIU Safeguards)	Project implementation period	73,000.00
5	Budget for the GRM process	Project implementation period	19,000.00
6	Environmental and Social Audits	Annually during project implementation	38,000.00
7	NEA/NSPA (EIA Working Group)	Bi-annually	xx
TOTAL			268,000.00

CHAPTER 1: INTRODUCTION AND BACKGROUND

This is the Environmental and Social Impact Assessment (ESIA) for The Gambia Water and Sanitation Project (GWASAP), a World Bank-funded initiative, which seeks to address the persistent deficit in water and sanitation services across the Greater Banjul Area (GBA) and surrounding towns.

The GWASAP, is a strategic intervention to address the persistent deficit in water and sanitation services across the GBA, and it aligns with the Government of The Gambia's (GoTG) sectoral reform agenda to strengthen the National Water and Electricity Company (NAWEC). The Company currently produces approximately 147,000 m³ of water daily against a peak demand of 252,000 m³/day (resulting in a shortfall of 105,000 m³/day). This deficit is projected to increase due to climate change-induced droughts and rising demand. NAWEC also faces non-revenue water (NRW) losses of about 45%, primarily from physical leakages and commercial inefficiencies.

Complementary projects financed by the European Investment Bank (EIB), French Development Agency (AFD), Saudi Fund for Development (SFD), and European Union (EU) are underway to expand production capacity, modernize transmission and distribution networks, and develop a 2030–2050 Urban Water and Sanitation Master Plan. Parallel programs are advancing groundwater resource assessments, hydraulic modeling, wastewater and groundwater management plans, and energy efficiency measures to reduce carbon emissions - all integrating climate resilience.

Despite ongoing efforts, further investment is required to extend water distribution networks, rehabilitate aging infrastructure, and establish Pilot District Metered Areas (DMAs) to reduce losses and strengthen NAWEC's operational and financial sustainability. The GWASAP will implement selected recommendations from prior sector studies, including the development of new sustainable water sources. In particular, the project will tap into the deep Maastrichtian transboundary aquifer, establish its management mechanism, and construct a 24,000 m³/day water treatment plant within Furuya Forest Park in Brikama East.

To expand service coverage to underserved communities, the project will also construct a 1,500 m³ storage reservoir. These interventions form the basis of this ESIA, which assesses potential environmental and social impacts and proposes mitigation measures to ensure compliance with World Bank safeguards and national regulatory frameworks.

1.1 Rationale for the ESIA

An ESIA report needs to be developed because it is a requirement of the National Environment Management Act, (NEMA) of 1994, the EIA Guidelines and Procedures (1999), and the EIA Regulations (2014), which require impact assessment studies to be conducted prior to development activities that are likely to have adverse environmental and social impacts. The GWASAP falls under Schedule A of the NEMA; "Projects to be considered for EIA, large-scale development of water infrastructure."

In addition, the World Bank's (WB) Environmental and Social Standard 1 (ESS1) -the umbrella standard, requiring borrowers to assess and manage risks across all other ESSs, requires assessment and management of environmental and social risks of Bank-supported projects. These standards cover areas ranging from risk assessment and labor conditions to biodiversity, resettlement, and stakeholder engagement. Table 4.4 below lists the Bank's different Standards indicating which of them have been triggered by GWASAP. In view of the above, GWASAP requires development of an ESIA report before any activity commences.

1.2 Objectives of the ESIA study

The overall objective of this ESIA study is to ensure that environmental considerations are considered during decision making for environmental sustainability. Specific objectives of the ESIA are to:

- identify, evaluate, and mitigate potential environmental and social risks and impacts of the proposed project activities;
- examine ways to prevent, minimize, mitigate, or offset/compensate for adverse environmental and social impacts, and to enhance positive impacts, describe the baseline conditions for future reference;
- provide platforms for public consultation and participation regarding the Project;
- maintain credibility of the Project developers and funders.

To guide implementation of the ESIA, an accompanying ESMP will be included to manage the specific risks and impacts, identify responsibilities for mitigating these impacts, monitoring arrangements, timing of the mitigation actions, and estimated costs.

1.3 Methodology for the ESIA

The following approach was used to develop this report:

Literature review

This consisted of the review of relevant national policies and legislation, World Bank's Social Standards, GAWSAP-related documents, relevant international conventions and treaties to which The Gambia is a Party, reports of similar studies, academic research studies, technical/government publications, and meteorological data of the project area.

The legislation and policies reviewed have guided the ESIA study to identify the legal scope of the process and ensure that issues highlighted are given due consideration during the study. For example, policies have described areas to protect, such as historical sites, and gazetted forest parks. Therefore, special attention was given during the study since the project location is within the Furuya Forest Park. The reviewed legislation also highlighted areas to consider during the study, such as the need for community consultation; the need to ensure that women and vulnerable groups are included.

In addition to the above, an extensive review was carried out of data from a variety of sources, including a selection of features derived from appropriate secondary spatial datasets collected by different national sectoral institutions, maintained in a GIS database.

Field visits and community consultations

Extensive field visits were carried out to the project site and peripheral communities (within a 5km radius of the Furuya Forest Park) including Mandinaba, Kembujeh, and Brikama Gidda (the community close by the Park). Community consultations were undertaken using mainly unstructured methods; these included group discussions and individual (one-to-one) meetings to:

- discuss the project with project beneficiaries and other stakeholders regarding its potential positive and negative impacts;

- provide information about the project, and to acquire key social information, including schools, health and other social facilities within the project's area of influence;
- facilitate inclusive participation of community members on the project so that they can voice their concerns and views about the design, project impacts, and to ask questions;
- highlight potential roles and responsibilities of the various stakeholders, including community members; their expected roles and responsibilities, including community-level monitoring of ESMP implementation, which is one way of enhancing their participation and promote sustainability in the project
- understand community dynamics, relations, and broader social and economic context of the communities viz-a-viz the possible impacts of this project

The visits provided the Consultant with the opportunity to analyze possible pipeline transmission line routings, and possible construction methodologies in order to reduce the negative environmental and social impacts. The field visits also allowed the study to:

- define, locate and precise the borders/limits of the Project areas of influence;
- assess the current state of the environment;
- identify the activities of residents of peripheral communities likely to be affected by the Project;

Data Collection

Data collection and analyses of supplementary primary data obtained from field surveys (using GPS technology) was carried out. In addition, existing secondary datasets (including topographic data, settlements data, forests, and protected areas, etc.) that are hosted by other national institutions were analyzed. These institutions included the Department of Lands and Surveys, Gambia Bureau of Statistics (GBOS), Department of Forestry (DOF), Department of Parks and Wildlife Management (DPWM), etc.

Data Analysis

The datasets were arranged into feature-based GIS layers that can be used as and when required for analyses, and/or presentation.

Key stakeholder interviews and consultations

Consultations were held with the Project Implementation Unit (PIU) and relevant staff of the NAWEC as well as other relevant national institutions such as the National Environment Agency (NEA), Department of Water Resources (DWR), Department of Forestry (DoF), Office of the Regional Governor in Brikama, and the Department of Parks and Wildlife Management (DPWM). The meetings with partner institutions were undertaken to discuss their respective policy and legal mandates as they relate to the Project. This has enabled the definition of their potential roles and responsibilities in the implementation of the ESMP. See Chapter 5 for summary of comments and views from the consultations.

1.4: Project location

The Project will be located within the Furuya Forest Park (FFP) in the West Coast Region (WCR), about 4km south of Brikama city center, just off the South Bank Road (the country's main highway) on coordinates 13°16'6"N, 16°36'31"W. It covers approximately 405 hectares and was established in 1954 as a plantation forest dominated by *Gmelina arborea*.

The Park is classified under the IUCN Category IV, which focuses on habitat and species management, i.e. managed to conserve specific species or habitats. This IUCN Category's primary goal is to ensure the survival of particular species or the preservation of unique habitats. In this case, the Park's tree species comprises mainly the gmelina (*Gmelina arborea*). The understory is dominated by shrubs and grass, which grow up to 2 meters during the wet season (June to October) and die back during the dry season.

- **Overview of project area and sites for planned water and sanitation investments in GBA**

The proposed boreholes (BH1–BH4) and the water treatment plant (WTP) are located within the Forest Park (Figures 1.1 and 1.2). They will be interconnected by transmission lines that feed into the wider distribution network serving Brikama East and neighboring towns. The Park lies at the edge of Brikama's rapidly expanding settlement to the west, bordered on the east by the main trunk road to Senegal and to the south by the South Bank Road corridor. Figures 1.1 and 1.2 illustrate the park's boundaries and its surrounding communities.

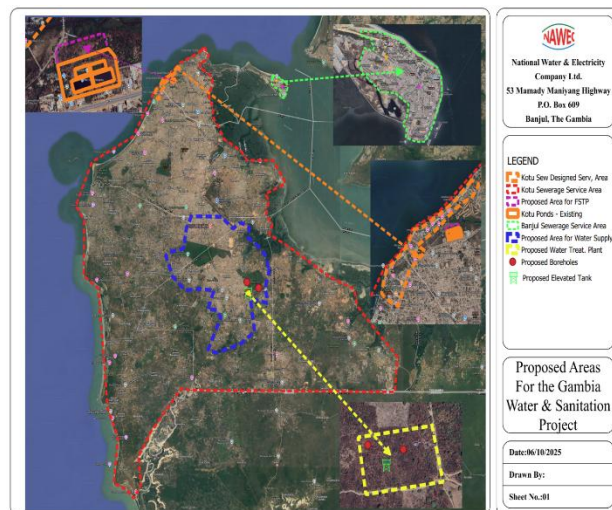


Figure 1.1: Location of the FFP

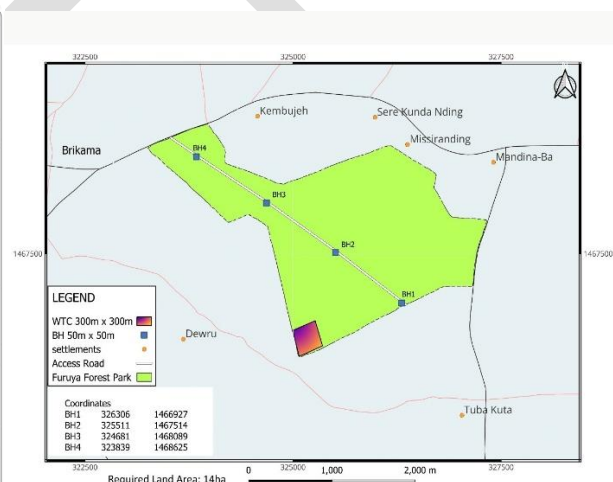


Figure 1.2: Proposed location of the boreholes

Available information on the Park remains limited, underscoring the need for further investigation into its specific ecological characteristics. Given its age, the forest has likely undergone various ecological changes and now faces challenges linked to environmental neglect, including deforestation. Human activities such as firewood collection and the expansion of waste dump sites along its fringes and near the main highway are contributing to ongoing disturbance. Despite these pressures, the Park continues to support diverse flora and fauna, including mammals, birds, and invertebrates, which are described in the sections below.



Figure 1.3: Waste dump in the fringes of the Park and the surrounding development

CHAPTER 2: PROJECT DESCRIPTION

2.1 Project components

The project components of GAW SAP are indicted in Table 2.1 below.

Table 2.1: Project components of the GWASAP

SUMMARY OF SCOPE OF WORKS			SITE
1	Water production and ancillary works		
	Supply and installation of new pumps		FFP
	Construction of fences		All borehole sites and FWTP
	Construction of 4 new well fields (including 1 Maastrichtian)		FFP
	Construction of MV lines		FFP
2	Water treatment system		
	Construction of new water treatment plant/ aeration-storage reservoir		FFP
	Introduce water treatment plant chlorination system by calcium hypochlorite		FFP
3	Water storage and ancillary works		
	Construction of storage/ground reservoir		FFP
4	Water transmission system		
	Construct 2.5 kilometers of raw water mains		From boreholes to FWTP
	Construct 3.3 kilometers of clear water transmission lines		From FWTP to Kembujeh ET
	Provide backup power supply using diesel generators		FWTP
5	Water distribution system		

	Build 50 kilometers of distribution mains	Within the peripheral communities
6	Telemetric control system	
	Introduce SCADA system to improve operational and energy efficiency, enable real-time monitoring and control	FWTP

2.1.1 Water production and ancillary works

Water production for the GBA is mainly from underground sources, which currently produces approximately 147,000 m³/day against a peak demand of 252,000 m³/day (resulting in a shortfall of 105,000 m³/day). This deficit is projected to increase due to climate change-induced droughts and rising demand. NAWEC also faces non-revenue water (NRW) losses of about 45%, primarily from physical leakages and commercial inefficiencies.

GWASAP will contribute towards achieving this output by developing three new sub-shallow boreholes and one deep (Maastrichtian) borehole within the FFP. Drilling into the deep sand aquifer (DSA) will in the long-term, mitigate the expected accelerating sea level rise as a result of climate change, which puts current shallow boreholes at risk of increased salinization due to saline intrusion. It is anticipated that NAWEC's production capacity will increase by approximately 24,000 cubic meters per day, representing a 17% increase in the current production capacity for the GBA. This will create 6,000 new household connections and provide access to safe drinking water to about 60,000 people in East Brikama.

2.1.2 Water treatment system

NAWEC's treatment process combines physical (aeration, sedimentation, filtration) and chemical (coagulation, chlorination) methods to ensure safe, potable water. The raw water that is abstracted from the boreholes is aerated prior to pH correction and disinfection with chlorine, stored in the reservoirs, before the clear water is pumped to the elevated tanks (ETs) located in strategic areas from where the water is distributed into homes and businesses. Essentially, the treatment process will be as follows:

Aeration

Aeration is the process of introducing air into the raw water drawn from the boreholes to improve its quality. NAWEC currently employs surface aeration, which involves agitating the water surface using fountains. This technique enhances the exchange of gases between water and air, thereby increasing dissolved oxygen levels while removing undesirable gases such as carbon dioxide, methane, and hydrogen sulfide. It helps reduce water acidity by expelling carbon dioxide and raising the pH to the optimal range of 6.5–8.5, improving its chemical stability and corrosion resistance. The process also decreases the concentration of volatile organic compounds (VOCs), resulting in better taste and odor. Overall, aeration serves as a critical first step in NAWEC's treatment process, because it ensures that groundwater is properly conditioned before subsequent purification stages. Figure 2.1 shows two of the eight aeration towers in one of NAWEC's water treatment facilities.



Figure 2.1: An aeration facility at one of NAWEC's treatment plants

Chlorination

NAWEC utilizes chlorine (a widely adopted disinfectant in water supply systems) to ensure water safety and maintain quality throughout the distribution network. The primary function of chlorination is to eliminate harmful microorganisms, including bacteria, viruses, and parasites, thereby preventing waterborne diseases such as cholera and typhoid. Chlorine also oxidizes certain impurities, notably iron and manganese, facilitating their removal during subsequent treatment stages. This stage is critical in NAWEC's treatment process; it ensures that water delivered to consumers meets both national drinking water standards and World Health Organization (WHO) guidelines for microbial safety and residual chlorine levels.

Beyond disinfection, chlorine improves water aesthetics by reducing unpleasant tastes and odors caused by organic matter or microbial activity. Importantly, it leaves a residual concentration in the water, typically maintained at 1 mg/L, which protects against recontamination during storage and distribution.

Figure 2.2 shows chlorine tanks fitted to the supply lines leading to the dosing meter, which regulates chlorine injection. A chlorine analyzer and automated dosing system continuously monitor and adjust the chlorine feed rate to maintain the required residual level. After chlorination, the treated water flows into clear-water reservoirs such as in (Figure 2.3) for temporary storage before being pumped to the elevated tanks (ETs) for distribution.



Figure 2.2: Chlorine bottles fitted on pipes at a NAWEC water treatment plant

In addition to expanding treatment capacity, the project anticipates upgrading the existing chlorination system by introducing calcium hypochlorite as the primary disinfectant. Calcium hypochlorite is a powerful and reliable agent, available in powdered or granulated form, with the advantage of a long shelf life that makes it well-suited for sustained water treatment operations. When dissolved in water, it releases chlorine, which effectively oxidizes and neutralizes harmful microorganisms, including bacteria, viruses, and parasites. This ensures that treated water is safe for consumption and use, while also improving taste and odor by reducing organic contaminants.

2.1.3 Water storage and ancillary works

Under GWASAP, a new water treatment plant with a capacity of 24,000 m³ per day, and a 1,500 m³ storage reservoir (illustrated in Figure 2.3) will be constructed at the FFP; Figure 2.4 depicts a network of pumps currently in use at a NAWEC installation.



Figure 2.3: A ground reservoir



Figure 2.4: Pumping infrastructure at a NAWEC facility

Currently, there are 27 water storage facilities such as elevated tanks (ETs), and 13 ground reservoirs in the GBA. As indicated in Table 2.1 above, the project will construct a storage/ground reservoir at the proposed WTP

2.1.4 Water transmission system

The proposed water transmission lines within the FFP are the “raw water” transmission pipelines, the “clear water” transmission lines and the distribution system. The “raw water” transmission lines will link the boreholes to the proposed treatment plant. After treatment and chlorination, the water is carried via the “clear water” pipelines to the existing ETs from where it is carried through the distribution network to the consumers. Total length of the proposed raw water transmission lines is 2.5km and that of the “clear water” is 3.3km and the pipe diameters ranging between 300 and 450 mm.

2.1.5 Backup power supply using diesel generators

Reliable electricity is essential for the continuous operation of the boreholes, pumps, treatment units, and monitoring systems at the new FFP WTP. Given the frequent power interruptions in The Gambia, the project will provide diesel generators as backup power supply. The installation of diesel generators at FFP is therefore justified as a risk mitigation measure to guarantee service reliability; their role is to ensure that water production and distribution continue seamlessly, even during grid failures, until more sustainable energy options can be integrated.

2.1.6 Water distribution system

The produced water will be conveyed to surrounding neighborhoods through approximately 50km of distribution mains (secondary PVC 160) and a tertiary network (PVC 90 and 110) to be laid within the communities. From these networks, individual compounds and residences will be able to connect directly to their households. This expansion will enable the establishment of about 6,000 new household connections, thereby providing safe drinking water access to an estimated 60,000 people in East Brikama and other surrounding communities such as Kembujeh, Mandinaba and Brikama Gidda. The extension into previously underserved areas will significantly improve household-level access, reduce reliance on unsafe water sources, and enhance public health outcomes across the region.

2.1.7 Telemetric and SCADA control system

As part of GWASAP, a telemetric and monitoring system will be installed for the new well field and one ground reservoir at FFP. This system will be central to managing both the production and distribution of water from the boreholes. Using sensors placed at strategic points in the network, it will collect data on water levels, flow rates, pressure, and quality. The information will then be transmitted to a central control system for analysis.

At the core of this setup is a Supervisory Control and Data Acquisition (SCADA) platform. SCADA will process the incoming data and provide operators with a comprehensive, real-time overview of the entire water network. This includes the ability to detect leaks, monitor performance, and automate key processes. Together, the telemetric system and SCADA will enhance operational efficiency, reduce costs, and ensure the reliability of water services delivered to communities.

2.1.8 Construction of MV lines to connect 4 boreholes to WTP

Medium Voltage (MV) transmission lines will be constructed within the FFP, between the three shallow boreholes and the one Maastrichtian borehole and the WTP. All the poles will be located within the FFP, and excavating to host the poles usually in a straight line within 100m of one and other. It is anticipated that the source of the power will be from existing nearby powerlines, particularly along the highway between Brikama and Kembujeh. Indeed, the proposed location of borehole 4 (BH-4) is very close to the existing MV line along the main highway. Their construction will involve the following:

Phase 1: pre-construction phase

Preliminary works:

- serving land/space for storage of materials and equipment;
- identification of quarries for mining of gravel (wash stones);
- land clearing and preparation of the corridor including access roads;
- transportation of equipment and tools to the site;
- identification of water supply points for civil works and related activities;
- preliminary line surveys.

Phase 2: Construction and installation of equipment

Preliminary activities:

Final field survey detail engineering works for review and approval by client and consultant

Pole spotting surveys

Transportation of poles, cables cross arms, insulator, and other line hardware

Physical works activities

- Excavation of pole foundations;
- Erection of poles fitted and dressed in the required cross arms and hardware fixtures;
- Mounting of pulleys on the poles and related fixtures for stringing and conductor alignment;
- Earthing cable connection to the poles (earth cable buried with the concrete).

Testing and commissioning

- Testing of the line with voltage through voltage injection or from the primary substation;
- Switching of the line from source and observation of the performance of existing installation on the line;
- Testing of the line continuity and insulation with meggering equipment and devices.

Phase 3: Equipment operation and maintenance

Operation and maintenance:

- Operational activities such as, switching arrangement planned and unplanned maintenances, installation of new equipment and demand-side management;
- Trimming of trees, branches that have re-grown towards the conductors;
- Periodic inspection and maintenance of fixture and hardware materials;
- Clearing sites of vegetation that have re-grown within the corridor.

2.2 Summary of project activities

The major project implementation activities will essentially entail civil engineering works which will be implemented in three (3) phases, pre-construction, construction and operation phases as summarized in Table 2.2 below.

Table 2.2: Proposed project phases and major activities

Project phase	Activity	Description
Pre-project	Site clearing	Prior to the commencement of the proposed project, vegetation that falls within the working areas will be cleared. There will be extensive vegetation clearing to allow for civil works within the proposed WTP area (2.25ha), and the 4 borehole sites (0.25ha each = 1ha). Construction of fences/gates within the immediate protection zones of the boreholes/WTP in operation in order to prevent any vandalism In addition, areas around the project sites will be cleared of vegetation to allow for access; mobilization of trucks, vehicles and other equipment. Construction of pipelines within most of the brown areas (pipeline corridors within the settlements) will not create loss of vegetation since these are essentially urban areas and largely devoid of vegetation. Construction of both transmission and distribution pipelines within the villages of Brikama Gidda, Kembujeh, etc. will lead to destruction of fruit trees located along village roads. Trenching and excavation along relatively narrow streets and roads in densely populated areas will create potential dangers and hazard to people whose residences and businesses will be restricted by the trenches.
	Mobilization to site	Vehicles, machinery, equipment and materials needed for the implementation of the project will be mobilized to sites before commencement of project.
	Installation of site structures and facilities	Installation of prefabricated shelters at appropriate area within the WTP and some locations along the transmission and distribution pipeline routes to serve as workers' camp, site

		offices, storage facilities, on-site medical facilities and sanitary facilities. In addition, there will be provisions for workshop and domestic waste containers for different classes of waste including scrap metals and waste oils. All wastes will be managed through the implementation of a waste management plan (to be included in the C-ESMP). Workshop, domestic and sanitary waste will be removed from site daily by waste contractor approved by NEA who shall dispose the waste at an approved designated location. Waste handling and disposal records shall be kept on site and provided at the request of regulatory authorities such as NEA.
	Demolition/ Dismantling of existing structures	Activities will include the design and build/demolish/replacement of the WTP, including foundations
Construction	Earth works	Construction of new WTP at FFP will need concrete mixing for reinforced concrete (for base, footings, ground slabs, column and beams as well as reservoir walls).
		Construction of guard houses, generator houses, administration buildings, residential buildings, chlorine dosing buildings, pump houses, borehole houses, etc. • drilling of new boreholes. • fencing, paving and landscaping.
	Pipe laying works	There will be excavation of trenches along the pipeline corridors where pipes and other auxiliary structures will be placed. • excavation and trenching for laying of transmission and distribution pipelines. • Excavation for auxiliary structures such as valve chambers, concrete blocks etc.; and • Construction of concrete chambers, stools and thrust blocks to support and protect pipes.
	Metal works	Connection and welding of prefabricated pipes including inlet pipes, outlet pipes, drain and overflow pipes.
	Electrical works	Power Supply including • Power supply provision for source and high-lift pumping unit. • Power supply systems for minor system components such as chemical mixing and dosing unit etc. • Power supply for building facilities lighting • Installation of generator with provision of fuel tank
	Test and commissioning	Filling the reservoir with water and testing the integrity of the structures and walls and commissioning of the facility.

Operation	Normal operation of facilities	Normal operational activities may include: • Pumping raw water from boreholes around the WTP for treatment, water, storage and transmitting to other elevated tanks for storage and onward distribution to residents. • Monitoring of minimum and maximum water levels. • Monitoring occurrence of overflows and spilling. • Monitoring chlorine residue build-up in reservoir. • Monitoring of the distribution system including water demand and pressure.
	Maintenance of water supply facilities	Routine maintenance activities may include: • Testing the integrity of water reservoirs, foundations, base and other ancillary structures. • Lubricating pipe appurtenances on a quarterly basis • Pressure testing to ensure there are no leakages, valve regulation, pipeline monitoring etc. • Repairing concrete deterioration and cracks (reservoir foundation/base and reservoir wall). • Draining and cleaning of reservoirs
Decommissioning	Excavation of pipes; dismantling of structures such as WTP; Evacuation of all pipes and debris; site reclamation	The operation life span of this project is anticipated to be at least 50 years. It is highly unlikely that the facilities will be decommissioned and abandoned as infrastructure of this nature is usually upgraded or rehabilitated to continue to function optimally for as long as possible. However, Appendix 2.1 outlines procedure to follow in the event of a policy to decommission the infrastructure in the future.

2.2.1 Pipe laying - transmission and distribution

Excavation and trenching

There will be excavation of trenches along all the identified corridors to host both transmission and distribution pipelines and other auxiliary structures. Specifically, excavation works will consist of the following:

- Excavation for trenches for pipe laying;
- Excavation for auxiliary structures such as air valve chambers, washout valve, isolation valve and flow meter chambers.

Pipe laying works

The pipe laying works under GWASAP will primarily involve the installation of water transmission and distribution pipelines along community road corridors. The system will include DN400 ductile iron pipes and smaller diameters ranging from DN300 to DN200, complemented by PVC 160 for secondary distribution and PVC 90 and 110 for tertiary networks. To ensure operational efficiency, accessories such as air valves, washout valves, isolation valves, and flow meter chambers will be strategically installed at designated points along the network.

In communities where road corridors are narrow—sometimes no more than six meters wide—pipe installation will necessarily require excavation through the middle of the road. In areas with wider corridors, laying pipes along the roadside may affect private assets such as fruit trees, vegetable gardens, and orchard fences. Notably, **orange and mango trees** commonly line village roads and may be impacted.

Regardless of location, trenches will be carefully prepared to ensure proper bedding. The bottom of each trench will be trimmed and leveled so that pipes rest uniformly on a smooth, plain bed, allowing them to be laid at their full length and on the required grade. This approach ensures structural stability, minimizes leakage risks, and prolongs the lifespan of the distribution system.

2.2.2 Backfilling and compaction of excavated trenches

This activity will consist of backfilling the trenches after the pipes and auxiliaries have been laid. It is recommended that all suitable excavated materials be re-used as fill as much as possible, and unsuitable excavated materials be replaced with suitable materials for desired compaction.

All unwanted materials are to be taken away by lorry after completion of work to be disposed of at a location to be approved by the NEA. All excavations shall be backfilled to the level of the original ground surfaces. Backfilling operations shall follow the laying of the pipes as closely as possible. During backfilling, the positions of all joints and auxiliary structures shall be clearly marked for easy accessibility especially for replacement and maintenance. All backfilling in pipe trenches will be thoroughly manually compacted with rammer.

2.3 Assessment of project alternatives

This section examines the range of project alternatives considered in the design and implementation of GWASAP, focusing on technical, environmental, and social dimensions. The analysis includes the “no-project” scenario, alternative sites, technologies, and operational approaches, with the aim of identifying options that minimize adverse impacts while maximizing socio-economic benefits. This ensures that the selected option represents the most sustainable and cost-effective solution, consistent with national development priorities, safeguard requirements, and community needs.

2.3.1 Technology alternatives

Pipe laying alternatives

To achieve water transmission and distribution, the following options were considered:

- **Pipe laying by trenching**

This involves the installation of pipes by excavating trenches along the proposed pipeline routes. It is expected that excavation will mainly be with the use of excavators and other similar heavy equipment. This approach is not necessarily the cheapest of all the options and its use may have considerable short-term negative socio-economic impacts such as involuntary resettlement, temporary loss of income due to lost man-hours, lack of access to business space (in cases where business premises are affected by the need to resettle).

The use of human labor is available especially in areas where local youths can be hired to dig the trenches where the large machines and excavators will not have room to maneuver. This method will create local employment opportunities.

- **Location of the proposed boreholes**

Discussed in detail under Chapter 6, the issue of fragmentation of the FFP needs to be addressed here too. To avoid the fragmentation of the park the proposed borehole locations should be changed, particularly given that when constructed they will be linked by an access road to allow vehicular movement. The road would permanently fragment the forest, creating openings that increase vulnerability to encroachment by surrounding populations. Such fragmentation not only disrupts ecological integrity but also accelerates human pressures on forest resources.

On the western edge of the forest, this risk is already evident: the area has effectively become a waste disposal corridor for the nearby residences in Brikama Gidda, with at least four large dump sites observed along this boundary. This pattern of unmanaged waste dumping highlights the likelihood that further fragmentation will intensify degradation, undermining both the ecological and social value of the forest.

In this regard it is recommended to relocate the boreholes from the middle of the forest to the eastern fringes along the Tubakuta/Mandinaba road (which has already been degraded anyway).

2.3.2 “No Project Development Option”

This option assumes the status quo is maintained, and the GWASAP is not implemented. The adoption of this option will imply that the envisaged environmental, socioeconomic and health benefits of the project will not be realized.

With the projected population increase in the GBA into 2050, a lack of development of new water supply infrastructure could hamper socioeconomic development. Residents could experience an increase in water-borne diseases from consumption of contaminated water, and other economic costs from lost time for women and children in search of clean water and/or treatment.

The “No Project Development Scenario” was therefore discounted on the basis that adequate supply of clean water is a necessity for population health and socioeconomic growth. Project implementation, on the other hand, will ensure reliability of supply to existing users and extension of water supply to people in areas without water who have been yearning for potable water. The people in these areas will begin to enjoy in earnest the numerous environmental, social, economic and health benefits of the project.

CHAPTER 3 DESCRIPTION OF BASELINE CONDITIONS

General baseline conditions – land use/land cover and the abiotic environment

The baseline assessment of land use, land cover, and the abiotic environment provide essential context for understanding the ecological and physical setting in which GWASAP will be implemented. This section describes the prevailing land use patterns, including agricultural activities, forest cover, settlements, as well as the abiotic components such as geology, soils, hydrology, and climate. Establishing the baseline conditions is critical for identifying potential project impacts, guiding mitigation measures, and ensuring that environmental and social safeguards are tailored to the specific characteristics of the project area.

3.1 Information gaps

The current environmental setting needs to be described, and measurements, where necessary, taken within the projects area of influence, in this case the LAA³. However, as explained in the next section, the LAA cannot be fully defined at this point due to limited information about the project. In this regard, the descriptions herein are more related to the *Furuya* forest as center of project activity and not the wider LAA. Additionally, baseline *noise* and *air* quality levels could not be measured for lack of equipment; therefore, these are not described.

3.2 Land use/land cover

It is understood that the project is intended to increase the water supply within the communities in Brikama East, and more specifically the communities around the immediate vicinity of the Furuya Forest Park. Moreover, the main water supply facilities (boreholes and WTP) are located inside the forest. In this regard, and in the absence of knowledge about the full extent of the water supply, the baseline land use/land cover (lulc) was defined as within 1-5km of the boundary of the Forest. A generalized *classification schema* was used for the current/baseline LULC map in Figure 3.1 with further details in Table 3.1.

- *Vegetation*, representing continuous vegetation cover in the FFP.
- *Farms/Orchards*, representing largely cashew farms, rain-fed crops and commercial farms dominated by vegetables.
- *Visible encroachment*, representing parts of the forest that are clearly taken for other uses, like football fields, or with large scale, and continuous, vegetation removal.
- *Residential*, referring to human dwellings and associated facilities like schools and public areas, among others.

As indicated in Table 3.1, residential areas are the largest within 1-5km of the main project site with an estimated size of over 3000ha. While the forest seems to be largely intact, the threat of increased encroachment from the current 8% of the forest's area is very high. For example, waste dumping inside the forest was observed to be on a very large scale by the population and even business. In essence, the project's final design should take this into considering ensuring, at least, that the project does not contribute to the threat. Figure 3.1 illustrates the current land use within 1 km of the Park

Table 3.1: Land use land cover in size

Land use land cover	Estimated area (ha)
Vegetation	447
Farms/orchard	225
Visible encroachment	34
Residential	3,338

³ Local Area of Assessment

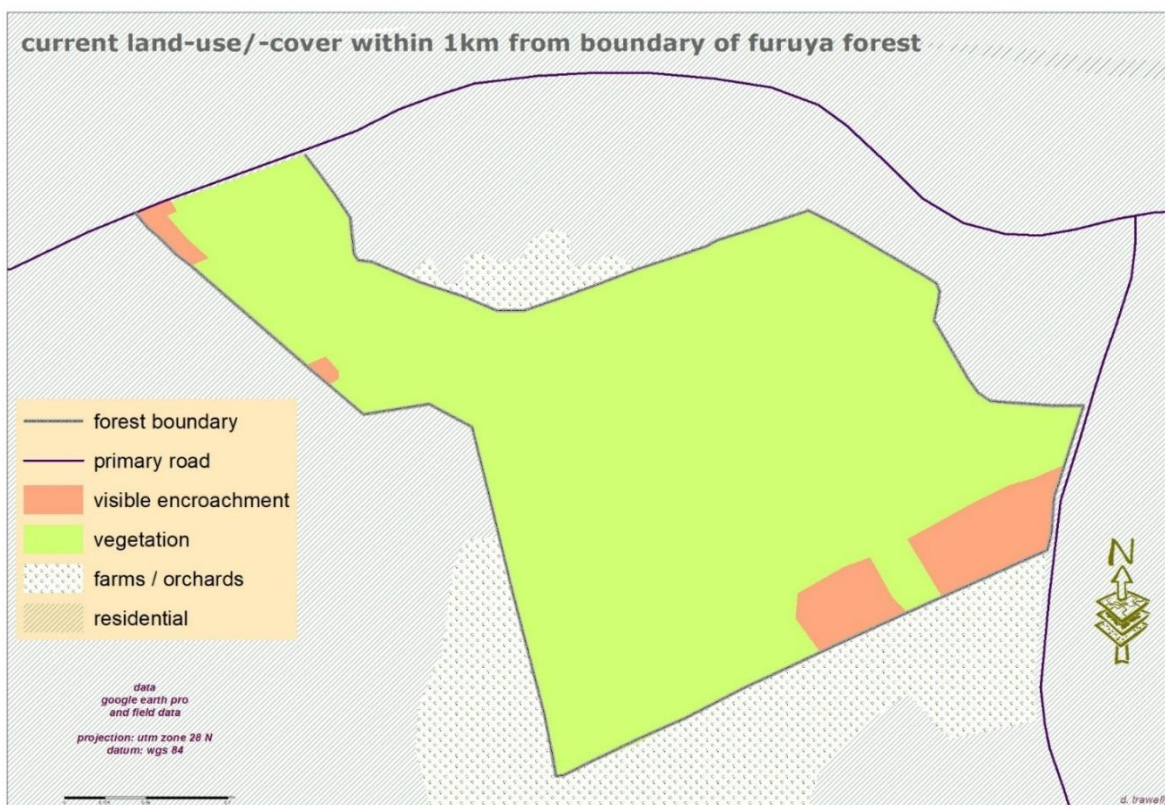


Figure 3.1: Current land use and land cover of the general project area

3.3 Climate

The climate of the Gambia is largely a matter of changes in temperature and rainfall. These changes are recorded by ten (10) weather stations across the country. The climate of the project area (Furuya and surroundings) is observed by the 'Yundum' weather station as described below for rainfall and temperature.

3.3.1 Rainfall

The climatology of rainfall (i.e., annual rainfall averaged over a thirty-year period) is shown in Figure 3.2 for all the ten stations for the climate normal of 1991 – 2020. As by this figure, the project area is among places in the country that receive the highest annual rainfall, close to 1000mm. The monthly distribution of average rainfall is shown in Figure 3.3 for the 'Yundum' station; as it is generally the case across the rest of the country, the rainy season in the project area is largely late June to early October. This monthly distribution is particularly useful for the project, which is expected to involve extensive trenching for pipe networks; with this information, this is best performed in October to December when the soil will still be fairly drenched and easy to trench.

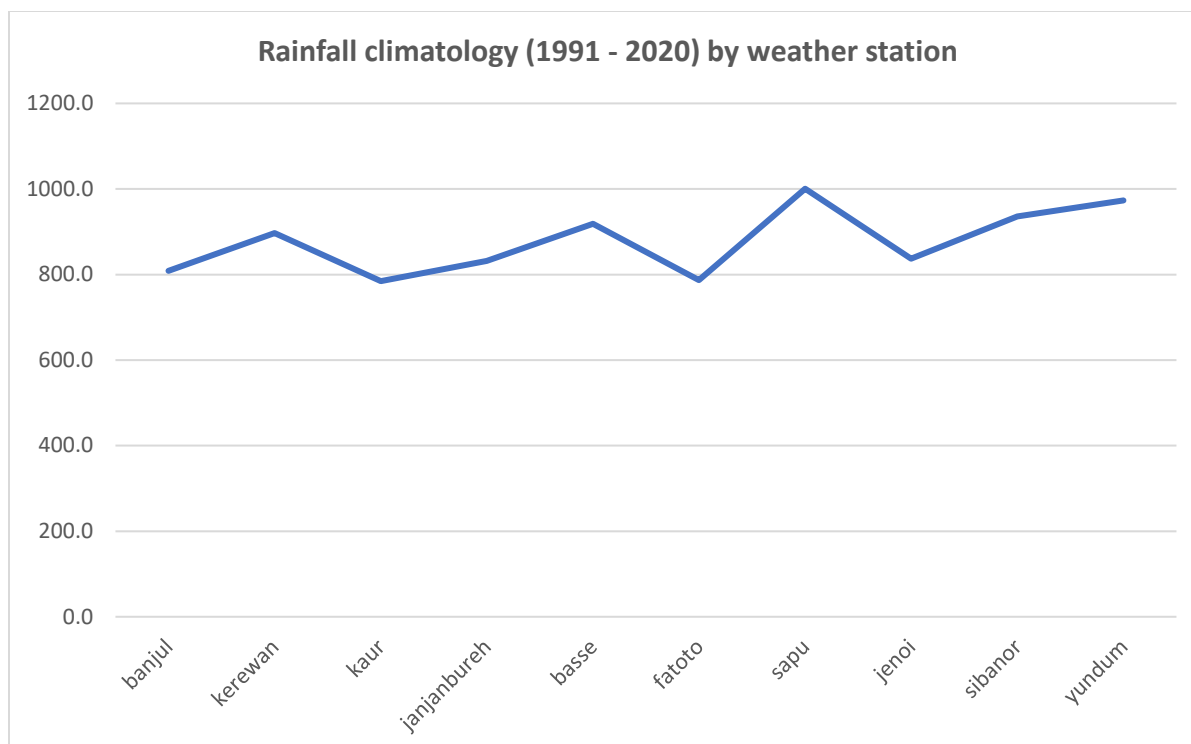


Figure 3.2: Long-term average rainfall over the country by weather station

Source: Department of Water Resources

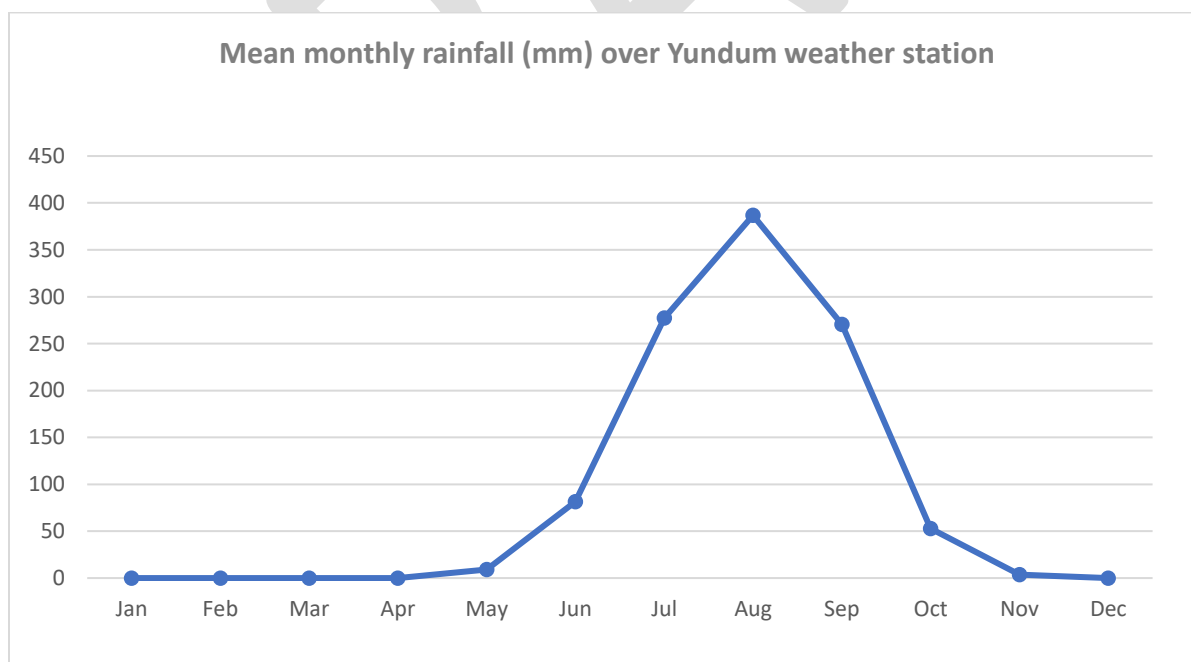


Figure 3.3: Distribution monthly mean rainfall over the 'Yundum' weather station

Source: Department of Water Resources

3.3.2 Temperature

The climatology temperature is given in Figure 3.4 for the whole country; the distribution of monthly mean temperature at the 'Yundum' weather station is given in Figure 3.5. As per Figure 3.5, the project area, represented by the 'Yundum' station is among the coolest areas in the country with annual temperatures around 27°C.

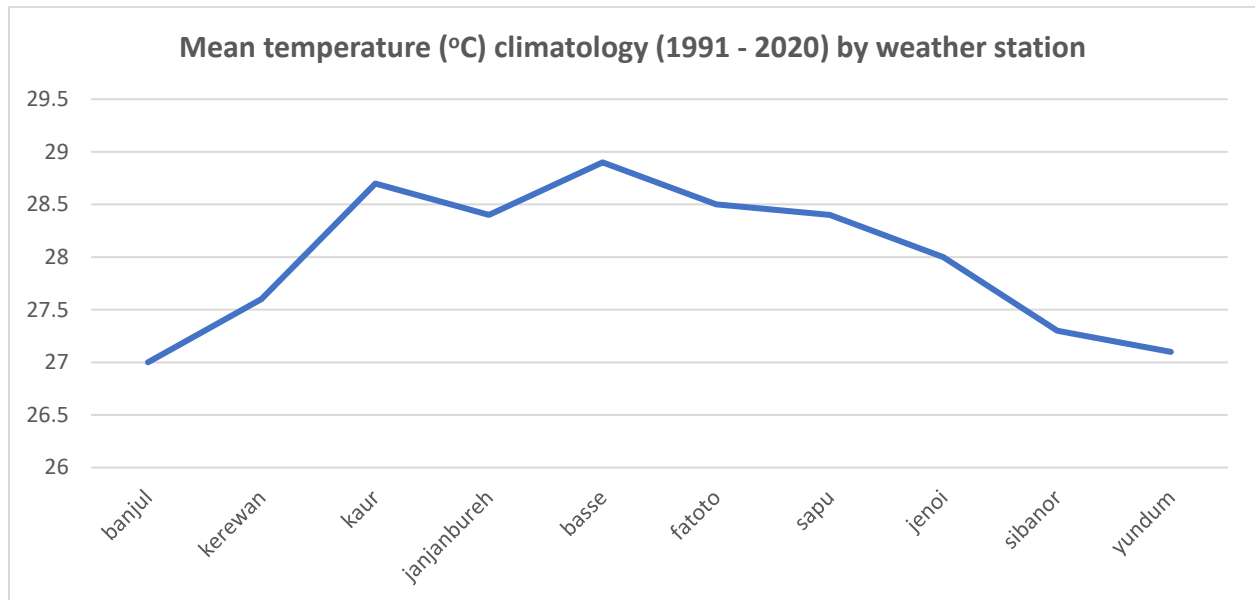


Figure 3.4: Climatology of temperature over the country

Source: *Department of Water Resources*

The distribution of monthly mean temperature over the project area shows that the coolest months are November to February. Considering the distribution of monthly rainfall, the extensive trenching cited above, and which is usually labor-intensive, is best done in November and December, when the soil is still soaked and temperatures at the minimum.

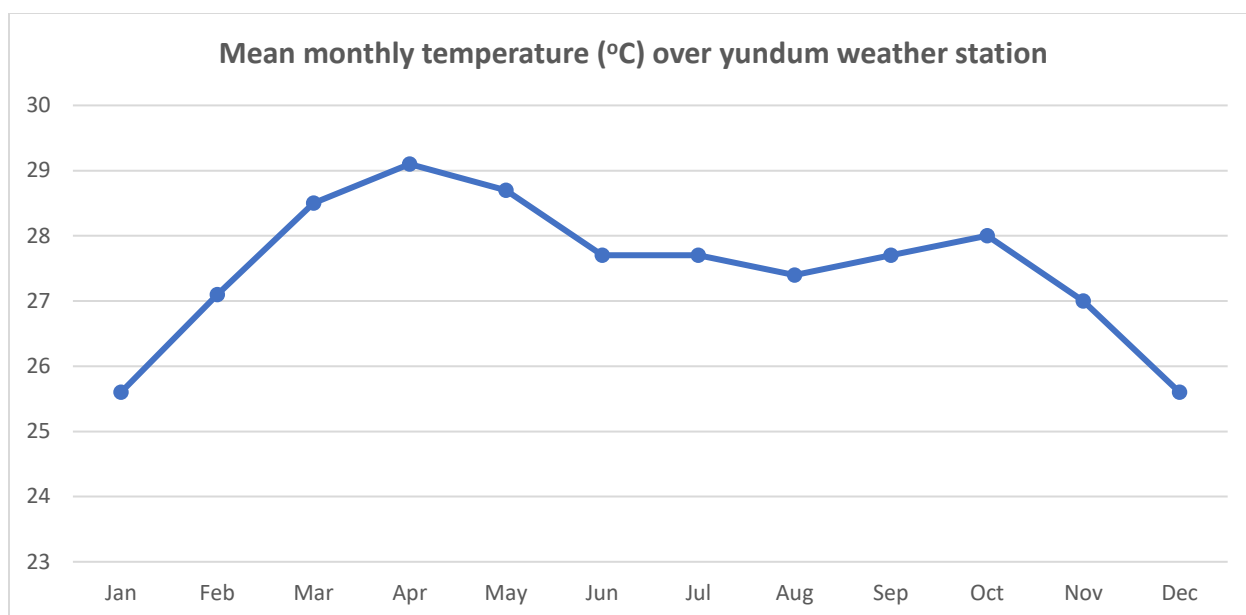


Figure 3.5 Distribution of monthly mean surface temperature over the ‘Yundum’ weather station

Source: Department of Water Resources

3.4 Groundwater – potential for contamination

In order to fully understand the potential of contaminating the groundwater system, it is important to understand the soil and relevant hydrogeological elements of the area as described below.

3.4.1 Soil type

The type of soil is one of the most critical factors in siting boreholes. It provides information relevant for not the drilling method but also casing requirements, hence prevention of well collapse. The soil association for the project area is presented in Figure 3.6 below. The area is dominantly *acrisols*, which are described as having an organic sub surface starting within 100cm to 200cm of the soil surface. They are also said to have less than 50% base saturation in the major part between 25cm and 100cm; in other words, they have low fertility levels and not very suitable for production. The physical and hydrological characteristics of these soils, which are of interest to this study, are summarised in Table 3.2 below.

Table 3.2: Properties of acrisols⁴

Characteristic	Summary
Hydrological	Porous surface under vegetation cover that transform to a hard crust when the protective cover is removed. In other words, they have low structural stability when exposed because the crusty surface does not allow for sufficient infiltration leading surface runoff
Physical	Highly weathered soils, meaning, among others that they largely resist compaction and allow water to move freely

⁴ https://www.isric.org/sites/default/files/major_soils_of_the_world/set6/ac/acrisol.pdf



Figure 3.6: Soil type of project area

Source: HWSD by FAO

3.4.2 Lithology

Lithology is basically the characteristics of the solid bed rock that underlies the soil, such as its mineral composition and texture. Therefore, it provides valuable information on the permeability rock hence the ease of contaminating the groundwater system. The lithology of the project area is dominantly sandstone and clay as in Figure 3.7 below. Sandstone is known to be naturally porous with interconnected spaces between its grains, making it a natural reservoir for groundwater. Clay, on the other hand, has low porosity with high water retention capacity. In essence, the lithology in the area can best be described as partly consolidated, hence some degree of permeability.



Figure 3.7: Lithology of project area

Source: WHYMAP/ECOWAS, 2022

3.4.3 Soil quality assessment

The rationale for testing soil quality was to evaluate potential contamination risks to groundwater and treated water supplies, particularly at the proposed borehole drilling sites and the proposed water treatment plant. Contaminated soils can leach chemicals or waste into the aquifer, affecting water quality. Soil samples were therefore collected from the four proposed well heads and the WTP site, at two depths (0-20 cm and 20-50 cm). The sampling methodology is detailed in Appendix 3.2, and the results of physical and chemical analyses are presented in Table 3.3.

Soil anions

Analysis of common soil anions - nitrate (NO_3^-), sulfate (SO_4^{2-}), and chloride (Cl^-)-shows values within permissible limits:

- Nitrate: 12.6 – 26.7 mg/L
- Sulfate: 6.0–11mg/L (well below WHO limit of 500 mg/L)
- Chloride: 16 - 37mg/L (below WHO limit of 200 mg/L)

These levels indicate generally safe conditions for plant growth and groundwater quality. However, elevated copper (Cu) concentrations were detected, exceeding WHO standards.

Heavy metals

Heavy metals analyzed include magnesium (Mg), potassium (K), sodium (Na), copper (Cu), iron (Fe), mercury (Hg), lead (Pb), and manganese (Mn). Most values were within WHO limits, except for copper, which ranged from 0.03 – 5.71mg/L across two locations (above the 2 mg/L limit). Excess copper can cause gastrointestinal discomfort, and treatment processes must address this issue.

Manganese (Mn)

Manganese levels were significantly above the WHO guideline of 0.4 mg/L. Lateritic and sandy soils in the WCR are naturally rich in iron and manganese oxides, which can dissolve into groundwater. Excess manganese poses health risks, including neurological effects, and operational challenges such as clogging of distribution systems. Chlorination ensures microbial safety but does not remove manganese, leaving chemical contamination unaddressed.

Overall, soil quality analysis indicates acceptable levels of most anions and heavy metals, but elevated copper and manganese present notable risks. These contaminants require targeted mitigation measures in the ESMP to safeguard groundwater quality and public health.

Table 3.3: Results of physicochemical analysis of soil samples from different location

Analysis of soil samples from nutrient content in distill water																
	Coordinates			pH	EC	TDS	TEMP	SAL	Na+	K ⁺	Ca ²⁺	Cl ⁻	Mg ²⁺	Alkalinity	Hardness	Turb
Borehole	Latitude	Longitude	Depth		mS/cm				mg/l	mg/l	mg/l	mg/l	mg/l	HCO3-	CaCO3	(NTU)
1	1466927	326306	0-20cm	6.11	205.00	128.0	27.3	0.09	4.2	30.1	7.8	32	5.9	27.1	43.70	180
1	1466927	326306	20-50cm	6.22	135.00	84.00	27.2	0.06	3.8	27.2	7.5	25	5.7	26.4	42.10	197
2	1467514	325511	0-20cm	6.04	214.00	133.00	27.5	0.1	3.2	17.8	5.6	23	3.7	28.6	29.20	210
2	1467514	325511	20-50cm	5.98	226.00	140.00	27.4	0.1	4.1	19.4	8.1	18	7.5	26.9	51.00	136
3	1468089	324681	0-20cm	5.87	241.00	150.00	27.3	0.11	4.3	24.1	7.6	35	6.6	27.6	46.10	184
3	1468089	324681	20-50cm	5.82	251.00	156.00	27.3	0.11	4.9	26.1	7.9	37	7.1	27.6	48.90	234
4	1468625	323839	0-20cm	5.79	93.00	58.00	27.0	0.04	1.6	1.0	1.5	16	0.9	25.9	7.44	114
4	1468625	323839	20-50cm	5.88	173.00	108.00	27.1	0.08	3.6	34.0	6.9	26	5.2	27.6	38.60	131
5 WTP	1466400	325020	0-20cm	5.88	164.00	102.00	26.4	0.07	3.8	33.2	6.4	23	5.0	26.8	36.50	96.9
5 WTP	1466400	325020	20-50cm	5.92	129.0	80.0	27.3	0.06	2.70	28.4	5.4	21.0	3.7	25.1	28.70	221
WHO LIMITS				6.5 - 8.5		NS			<200	NS	NS	>250	NS	NS		<5 NTU

	Coordinates												
	Latitude	Longitude	NO ₃	NO ₂	F ⁻	SO ₄ ²⁻	Cu	Fe	Mn	As	Hg	Pb	PO ₄
			NO ₃ ⁻ - N mg/l	NO ₂ ⁻ - N mg/l	F ⁻ mg/l	SO ₄ ²⁻ mg/l	Cu ⁺² mg/l	Fe ^{+2/3} mg/l	(Mn+2/l)	(mg AS+/l)	Hg mg/l	pb FCmg/l	PO ₄ ⁻³ mg/l
1	1466927	326306	23.4	0.784	0.17	8	0.03	0.23	33.1	0.000	0.02	0.005	4.76
1	1466927	326306	19.5	0.692	0.15	7	0.07	0.22	30.1	0.001	0.03	0.001	3.55
2	1467514	325511	21.5	0.223	0.14	6	4	0.20	22.8	0.000	0.001	0.000	2.77
2	1467514	325511	26.7	0.800	0.18	10	5.01	0.34	41.2	0.000	0.001	0.001	4.41
3	1468089	324681	26.7	0.800	0.18	10	5.01	0.34	41.2	0.000	0.001	0.001	4.41
3	1468089	324681	24.7	0.187	0.20	11	5.71	0.20	45.3	0.000	0.003	0.001	5.01
4	1468625	323839	12.6	0.230	0.11	8	1.66	0.14	7.9	0.000	0.000	0.001	1.33
4	1468625	323839	18.4	0.600	0.14	6	0.08	0.19	30.4	0.001	0.003	0.008	3.72
5	1466400	325020	17.3	0.226	0.16	10	1.45	0.16	31.7	0.001	0.002	0.000	3.01
5	1466400	325020	16.1	0.068	0.14	9	1.23	0.20	19.6	0.00	0.001	0.000	2.85
WHO LIMITS			50.0	NS	1.5	500	2	0.3	0.4	000.6	0.006	0.01	NS

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3.4.4 Aquifer productivity

This knowledge is particularly important for assessing the risk of potential pollution. Highly productive aquifers, with high permeability and volumes of water, are known to naturally dilute pollutants to safer levels. The productivity of the project area is described as 'high' as in Figure 3.8 below, giving it the said natural cleansing ability. However, they are also known to spread pollutants across large distances.

In conclusion, with the downside of spreading pollutants far and wide as well as the soil type, lithology and productivity all pointing towards high permeability, hence potentially easy contamination of the groundwater system in the area, it is important that a comprehensive soil examination is done for the area with the intention of avoiding any potential pollution of the system. These tests are described in the next subsection.



Figure 3.8: Aquifer productivity of project area

Source: WHYMAP & ECOWAS, 2022

3.5 Hydrology

Surface water

The project's area of influence consists of surface hydrology that include the Atlantic Ocean nearby and several other water bodies including the following:

- **River Gambia**

The River Gambia get its source from the Fouta Djallon Highlands in Guinea. It flows northwest through Senegal, then west through The Gambia before emptying into the Atlantic Ocean. Some of the tributaries/creeks in the western part of the country flow very close to the proposed water treatment plant. These include the Lamin creek which is less than 20km from the proposed treatment plant.

- **The Allahein River**

The Allahein River is a small coastal river on the extreme northern part of the WCR. It originates from its source in the Casamance Region of southern Senegal from where it flows westward before emptying into the Atlantic Ocean near the coastal town of Kartong.

Although not a very large river, the Allahein is significant for fishing, rice cultivation (along permanent swamps on both sides of the river) as well as serving as a boundary between The Gambia and southern Senegal. It is about 45 km long whilst its southern banks are less than 10 kilometres from the proposed FWTP as it flows towards the Atlantic Ocean.

- **Tanji River**

The Tanji River has its source from a small inland catchment area in Kombo South and flows west-wards toward the Atlantic Ocean where it enters it through the Tanji Bird Reserve. The mouth of the river (within the Tanji Bird Reserve) is located in an area of great importance for bird watching as it is an important eco-tourism area. The area is also useful for traditional fishing, and is one of the most famous wildlife sites in the country.

- **Run-offs or storm water**

Another surface water source is the run-off and storm water during the rainy season which runs into tributaries and adjacent fields. Water pipe construction in waterlogged/swampy areas, or along pathways of storm water could potentially impact domestic water supply in the area.

Groundwater resources

Nationally, there are two main groundwater sources in The Gambia, namely, the Shallow Sand Aquifer (SSA) and the Deep Sandstone Aquifer (DSA).

i) The Shallow Sand Aquifer (SSA) system

The Shallow Sand Aquifer (SSA), which extends across The Gambia and much of Senegal, serves as a vital source of water supply throughout the country. Formed during the Mio-Pliocene age, this aquifer system lies at depths ranging from approximately 15 to 120 meters below ground level. Within The Gambia, the SSA is subdivided into two distinct units: the Upper Phreatic Aquifer and the Lower Semi-confined Aquifer, separated by a clay-silt aquitard. On average, the SSA is composed of medium to coarse sand, making it a reliable groundwater reservoir for domestic and agricultural use.

The Upper Phreatic Aquifer: All hand-dug wells and some shallow boreholes in the country feed from the Upper Phreatic Aquifer. This aquifer comprises mainly fine to medium grained quartz sands with intercalations of silt and clay. The relatively thin aquifer (with a thickness of 1 and 20m) occurs at depths between 10 and 30m. The hydraulic characteristics of the phreatic aquifer are very variable. Transmissivity values range from 50 to 300 m²/day. Hydraulic conductivity ranges from about 10 to 30m/day.

The Lower semi-confined Aquifer: The majority of boreholes in The Gambia tap the semi-confined aquifer, which consists mainly of yellow-white fine- to medium-grained sands. The aquifer depth varies between 10 and 50m below ground level. The groundwater level is generally found at depth between 10 to 20m. Groundwater generally flows from south to north. The transmissivity values range from 100 m²/day to over 750 m²/day. The hydraulic conductivity ranges from 5 to 20 m/day.

ii) The Deep Sandstone Aquifer (DSA) system

The Deep Sandstone Aquifer (DSA), is composed of Palaeocene and Maastrichtian sandstones; it underlies the whole of The Gambia and a large part of Senegal. It is confined by a 200m to 300m thick sequence of mainly clays and marls. The groundwater in this aquifer moves from SE to NW; it is of fossil origin and 4,000 to 40,000 years old.

3.6 Topography

As in many parts of the country, the topography within the general Brikama East area is generally flat and low-lying with an average altitude of approximately 28m above sea level. Similarly, the proposed project site (the FFP), has an approximate elevation of about 30m above mean sea level with an overall relief estimated to be less than 10m from the lowest and highest points. A generalised estimated elevation profile within the forest park would indicate an average altitude range of between a minimum of 28m to a maximum of 36m above sea level. This trend indicates a gentle rise of less than 6m from west to east indicating average slopes of less than 1%. Along this corridor in particular, slight to severe erosions occur during rainy seasons creating gullies running along Peri-urban streets in a north-west direction.

Elevation and derived slope maps of the western part of The Gambia – including the overall project AOI are given in Figure 3.9 below; the maximum elevation of 36m is indicative of a generally very low elevation. The slope is also, overall flat with an average of than 1%. In essence, the topography of the project can be largely described as generally flat and low-lying.

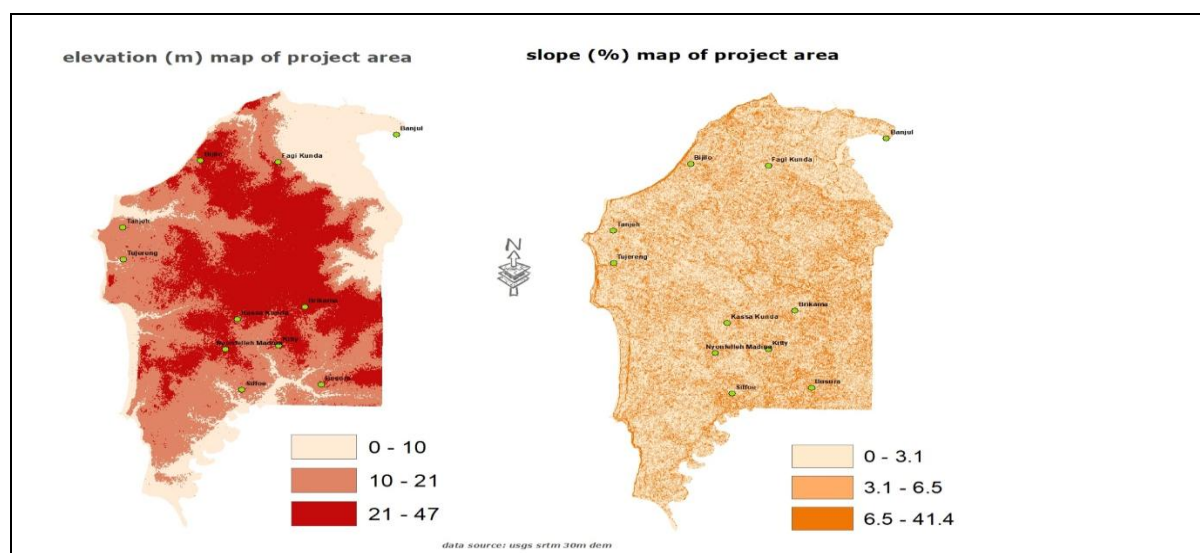


Figure 3.9: Topography of project area

All activities related to the WTP will be implemented within the proposed 150m x 150m area, and the 50m x 50m area for each of the four boreholes; these areas, in addition to the public streets/roads that will host the pipelines, are government-owned. Whilst the FFP is a gazetted state-owned forest that will host these facilities, other project activities will impact private lands and properties; these lands are customary land held under the State Lands Act (as Deemed Leases). For this reason, land use in these areas is mainly residential, commercial, with social amenities such as schools, health facilities etc.

Generally, the pipeline networks will run through predominantly very narrow neighbourhood streets with physical structures (including compound fences and parts of dwelling houses) built very close to the alignment of the proposed transmission corridors particularly within built-up settlements. However, outside residential neighbourhoods, the land use is mainly agricultural including in some areas, cattle rearing/grazing.

3.7 The biotic environment

This section describes the biotic environment of the proposed project area. Specifically, this is within the FFP, which essentially is the only part of the project footprint that has not been transformed to

residential land use. It is unlike the sites to host the pipelines, which have been transformed into densely populated areas devoid of any natural vegetation. The biodiversity baseline of these corridors has been entirely transformed to residential land use with no natural vegetation (except weeds and some sages).

FFP, like the other 65 Forest Parks across The Gambia, was established to preserve and protect national forest biodiversity. Forests play a vital role in maintaining ecological balance by supporting processes such as pollination, seed dispersal, and nutrient cycling. Specifically, the FFP was created to safeguard the unique plantation ecosystem dominated by *Gmelina arborea*, ensuring its propagation and long-term sustainability.

As with all the national parks, the DOF bears responsibility for ensuring that they are managed sustainably. In several parks, DOF is implementing replanting programs of indigenous tree species within amenity belts (buffer zones), both to protect the *gmelina* plantations and to restore dwindling native forest cover.

Within this ecological and management framework in the FFP, five project components are proposed for construction: one water treatment plant (150m × 150m), one Maastrichtian borehole, and three shallow boreholes (each within a 50m × 50m area). The following section provides an assessment of the areas identified to host these boreholes.

The flora

The Park is primarily composed of *Gmelina arborea*, a fast-growing species widely utilized for timber and furniture production. Complementing this dominant canopy are healthy stands of teak (*Tectona grandis*) and dense shrub and understory layer, notably characterized by *Combretum micranthum* (commonly known as Kinkeliba or Opium-antidote). This species contributes significantly to the ecological diversity of the Park.

Table 3.4 below outlines the range of vegetation found within and around the Park, along with their respective status under the IUCN Red List. Figures 3.10, 3.11, and 3.12 provide visual examples of representative vegetation types within the Park.



Fig.3.10: *Tectona grandis* stand in the FFP



Fig. 3.11: The *gmelina arborea*



Figure 3.12: Dense shrub and understory layer of *Combretum micranthum*

Table 3.4: Plant species recorded in the FFP and their IUCN status

No	Common English name	Scientific name	National conservation status	IUCN Red List
1	Gmelina	<i>Gmelina arborea</i>	Yes	LC
2	West African Laburnum	<i>Cassia sieberiana</i>	No	LC
3	Sicklebush	<i>Dichrostachys glomerata</i>	No	LC
4	Teak	<i>Tectona grandis</i>	No	
5	African locust bean	<i>Parkia biglobosa</i>	No	LC
6	Senegal Saba (Kaba)	<i>Saba senegalensis</i>	No	LC
7	Apple-ring acacia	<i>Faidherbia albida</i>	No	LC
8	Silver Terminalia (Wolo)	<i>Terminalia glaucescence</i>	No	LC
9	Kinkeliba	<i>Combretum micranthum</i>	No	LC
10	African rosewood	<i>Pterocarpus erinaceus</i>	Yes	T S
11	Guinea gumvine(folay)	<i>Landolphia heudelafii</i>	No	NA
12	Senegal Tea Plant	<i>Guiera senegalensis</i>	No	L.C
13	African Rosewood	<i>Pterocarpus erinaceus</i>	No	L.C

Source:

L.C = Least Concern; EN = Endangered; NA = Not Assessed

The fauna

No published data about the fauna are available for this area. However, it is home to several small mammals, reptiles. Table 3.5 shows the various mammalian species that are found in the Park.

Table 3.5: Mammalian fauna in the FFP

No	Common English Name	Scientific Name	National conservation status	IUCN Red List
1	Fruit bat	<i>L. anagoleis smithii</i>	No	NL
4	Gambia mongoose	<i>Mungos gambianus</i>	No	LC

3	Sun squirrel	<i>Heliosciurus</i>	No	LC
4	Cane rat	<i>Thryonomys swinderianus</i>	No	LC
5	Gambian giant rat	<i>Cricetomys gambianus</i>	No	LC
6	Hare	<i>Lepus saxatilis</i>	No	NL
7	Nile monitor	<i>Varanus. niloticus</i>	No	NL
8	Skinless gecko	<i>Geckolepis megalepis</i>	No	LC
9	African bush snake	<i>Philothamnus semivariegatus</i>	No	LC

NB: N L - Least Concern; L C - Not Listed

The avi-fauna

Some of the recorded species are the Black-necked Weaver, Senegal coucal, African Grey Hornbill, Tawny-flanked Prinia, etc. See Table 3.6 for more of the observed species.

Table 3.6: Avifauna recorded in the FFP

No	Common English name	Scientific Name	National Conservation Status	IUCN Red List
1	Black-necked Weaver	<i>Ploceus nigricolli</i>	No	L C
2	Senegal Coucal	<i>Centropus senegalensis</i>	No	L C
3	African mourning dove	<i>Streptopelia decipiens</i>	No	L C
4	Little egret	<i>Egretta garzetta</i>	No	L C
5	Pied crow	<i>Corvus Albus</i>	No	L C
6	Red eyed dove	<i>Streptopelia Semitorquata</i>	No	L C
7	Beautiful Sun Bird	<i>Nectarinia Pulchella</i>	No	L C
8	Little bee-eater	<i>Merops Pusillus</i>	No	L C
9	Black-billed Wood-dove	<i>Turtur abyssinicus</i>	No	L C

Source:

NB: L.C - Least Concern; N L – Not Listed

Flora along pipeline corridors

Within the project's sphere of influence, the flora outside forested areas includes fruit trees planted along potential pipeline routes, either lining road corridors, within private compounds, or cultivated as orchards protected by fencing against stray animals. In many cases, fruit trees (particularly mango and orange) are planted in close proximity to roads, while community women's vegetable gardens and private orchards are situated near pipeline corridors; these trees and gardens are potentially vulnerable to damage or removal during trenching activities.



Figure 3.13: A mango tree within communities



Figure 3.14: Lime tree along potential line routes

In communities such as Mandinaba, Kembujeh, etc., fruit trees (including lemons, limes, oranges, and mangoes) are commonly found along village roads. Figures 3.13 and 3.14 above illustrate examples of mango and lime trees located along potential distribution routes. Other fruit trees identified along the proposed line corridors in Table 3.7 are of considerable importance to local households; they serve as a source of supplementary food, and in some cases, harvested fruits are sold in local markets, providing families with additional income.

Table 3.7: Fruit trees found along proposed pipeline corridors

No	Common English name	Scientific name	National conservation status	Source of identification		IUCN Red List
				During field visit	Biblio. research	
1	Mango	<i>Mangifera indica</i>	No	X		LC
2	Cashew	<i>A. occidentale</i>	No	X		LC
3	Orange	<i>Citrus sinensis</i>	No	X		LC
4	Kaba	<i>Saba Senegalensis</i>	no	X		LC
5	Papaya	<i>Carica Papaya</i>	No	X		LC
6	Lime	<i>Citrus aurantiifolia</i>	No	X		LC
7	Banana	<i>Musa balbisiana</i>	No	X		LC
8	Guava	<i>Psidium guajava</i>	No	X		LC

Source: SD Focus Ltd, 2025

Beyond their economic and nutritional value, the trees also offer shade and spaces for family and individual relaxation. Consequently, any felling or uprooting of these trees during pipeline construction could deprive households of both food security and livelihood opportunities.

3.8 Biological investigations of proposed borehole and WTP sites within the FFP

The biological assessment examined habitats of ecological significance within the proposed WTP site and four borehole locations. A complete census was conducted in each 50m × 50m plot, ensuring a 100% inventory of flora and fauna within the defined drilling boundaries.

Where tree species listed under the IUCN Red List were found within the plots, their GPS coordinates were taken for identification to inform conservation and management strategies during project implementation. However, regarding faunal species some of which are highly mobile and move in the forest at some point to find food, water, shelter, mates, escape predators, etc. the animal's presence is merely noted. Thus, in the tables below, the plant and animal species recorded are indicated as either through field observations by the biologists or through bibliographic sources.

- **Flora Survey:**
 - Overall species composition and structure were documented.
 - All trees with a diameter at breast height (DBH) ≥ 10 cm were measured for both diameter and height.
 - Tree species listed under the IUCN Red List were geo-referenced using GPS to inform conservation and management strategies during project implementation.
- **Fauna Survey:**
 - Direct and indirect observation methods were employed.
 - Trails were walked between 10 a.m. and 3 p.m., recording mammals observed.
 - Indirect evidence such as tracks, fecal droppings, feathers, and other signs was collected and identified.
 - Within each 50m $\times$ 50m plot, the entire area was systematically walked to record bird and animal species.
 - Given the mobility of fauna, presence was noted rather than quantified.
- **Data Sources:**
 - Species records were compiled from both field observations and bibliographic references.

This approach ensured a comprehensive baseline of flora and fauna at the drilling sites, supporting both ecological safeguards and project compliance requirements.

Borehole 1 (Coordinates 1466927 - 326306)

BH1 is located within a *Tectona grandis* (teak) plantation stand. The site is mainly dominated by teak, although natural regeneration and other plant species were also observed. Six teak trees meeting the assessment measurement threshold were recorded. Their diameters ranged from 20 to 32 cm, while their heights ranged from 2.5 to 5 m. See Table 3.8

Table 3.8: Inventory of trees recorded at the BH1 and their IUCN status

No	Common English name	Scientific name	National conservation status	IUCN Red List
1	Teak	<i>Tectona grandis</i>	No	LC
2	Teak	<i>Tectona grandis</i>	No	LC
3	Teak	<i>Tectona grandis</i>	No	LC
4	Teak	<i>Tectona grandis</i>	No	LC
5	Teak	<i>Tectona grandis</i>	No	LC
6	Teak	<i>Tectona grandis</i>	No	LC
7	African Copaiba Balsam Tree	<i>Danielia oliveri</i>	No	LC
8	Senegal Tea Plant	<i>Guiera senegalensis</i>	No	LC
9	Kinkeliba	<i>Combretum micranthum</i>	No	LC

10	Guinea Gumvine	<i>Landolphia heudelotii</i>	No	LC
11	African Rosewood	<i>Pterocarpus erinaceus</i>	No	EN

LC= Least Concern; EN = Endangered

Borehole 2 (Coordinates 1467514-325511)

BH2 is located in a relatively open part of the forest with few big trees. Two *Gmelina arborea* (Malino) trees meeting the assessment measurement threshold were recorded, with diameters of 23.5 cm and 20 cm and heights of 4.5 m and 12.5 m, respectively. The site also contains shrubs and natural regeneration, including *Daniellia oliveri*, *Guiera senegalensis*, *Tectona grandis*, *Combretum micranthum*, *Chlorophora regia*, and *Landolphia*. Table 3.9 below lists the species found within the area earmarked for Borehole 2.

Table 3.9: Inventory of trees recorded at the BH2 and their IUCN status

No	Common English name	Scientific name	National conservation status	IUCN Red List
1	Gmelina	<i>Gmelina arborea</i>	No	L.C
2	Gmelina	<i>Gmelina arborea</i>	No	L.C
3	African Copaiba Balsam Tree	<i>Daniellia oliveri</i>	No	LC
4	Senegal Tea Plant	<i>Guiera senegalensis</i>	No	LC
5	Teak	<i>Tectona grandis</i>	No	L.C
6	Kinkeliba	<i>Combretum micranthum</i>	No	L.C
7	African Iroko	<i>Chlorophora regia</i>	No	VU
8	African Rubber Vine	<i>Landolphia</i>	No	L.C

L.C = Least Concern; Vul = Vulnerable

Borehole 3 (Coordinates 1467514-325511)

BH3 is located within a relatively closed stand of *Gmelina arborea*. Ten *Gmelina* trees meeting the assessment threshold were recorded, with diameters ranging from 20 to 25.2 cm and heights between 3.5 and 5 m. The site also exhibits abundant natural regeneration of *Gmelina*. Additional species observed include:

- *Daniellia oliveri*
- *Saba senegalensis*
- *Azadirachta indica*
- *Vitex doniana*
- *Anacardium occidentale*

The presence of strong natural regeneration should be carefully considered when finalizing the location and footprint of the proposed borehole infrastructure, to minimize ecological disturbance and support sustainable site management. Table 3.10 below list the species composition in Borehole 3.

Table 3.10: Inventory of trees recorded at the BH3 and their IUCN status

No	Common English name	Scientific name	National conservation status	IUCN Red List
1	Gmelina	<i>Gmelina aborea</i>	No	L.C
2	Gmelina	<i>Gmelina aborea</i>	No	L.C
3	Gmelina	<i>Gmelina aborea</i>	No	LC
4	Gmelina	<i>Gmelina aborea</i>	No	LC
5	Gmelina	<i>Gmelina aborea</i>	No	L.C
6	Gmelina	<i>Gmelina aborea</i>	No	L.C
7	Gmelina	<i>Gmelina aborea</i>	No	L.C
8	Gmelina	<i>Gmelina aborea</i>	No	L.C
9	Gmelina	<i>Gmelina aborea</i>	No	LC
10	Gmelina	<i>Gmelina aborea</i>	No	LC
11	African Copaiba Balsam Tree	<i>Danielia oliveri</i>	No	L.C
12	African Cherry Orange	<i>Saba senegalensis</i>	No	L.C
13	Neem Tree	<i>Azadirachta indica</i>	No	L.C
14	Black Plum	<i>Vitex doniana</i>	No	L.C
15	Cashew tree	<i>Anacardium occidentale</i>	No	LC

L.C = Least Concern

Borehole 4 (Coordinates 1468625 – 323839)

BH4 is also located within a *Gmelina arborea* stand, with natural regeneration and a number of *Gmelina* saplings present. Four *Gmelina* trees and one *Ficus capensis* were recorded. The *Gmelina* trees had diameters ranging from 20 to 21 cm and heights ranging from 4 to 6 m. The *Ficus* tree had a diameter of 47 cm and a height of 5 m. Table 3.11 lists the species recorded.

The site has considerable climber vegetation, which makes movement through the area difficult. Other species recorded included *Danielia oliveri*, *Saba senegalensis*, *Landolphia heudelotii*, *Combretum micranthum*, *Spondias mombin*. Table 3.11 provides a detailed listing of the species recorded.

Table 3.11: Inventory of trees recorded at the BH4 and their IUCN status

No	Common English name	Scientific name	National conservation status	IUCN Red List
1	Gmelina	<i>Gmelina aborea</i>	No	L.C
2	Gmelina	<i>Gmelina aborea</i>	No	L.C
3	Gmelina	<i>Gmelina aborea</i>	No	LC
4	Gmelina	<i>Gmelina aborea</i>	No	LC
5	Cape Fig	<i>Ficus capensis</i>	No	L.C
6	African Copaiba Balsam Tree	<i>Danielia oliveri</i>	No	L.C
7	African Cherry Orange	<i>Saba senegalensis</i>	No	L.C

8	Guinea Gumvine	<i>Landolphia heudelotii</i>	No	L.C
9	Kinkeliba	<i>Combretum micranthum</i>	No	L.C
10	African Hog Plum	<i>Spondias mombin.</i>	No	L.C

The Furuya Water Treatment Plant site (Coordinates 1466400 – 325020)

The proposed WTP covers an area of 150m × 150m. The area is relatively open, with scattered trees and dense shrubs and natural regeneration on the northern portion of it whilst, almost the other half, the northern part is currently encroached and cultivated with groundnut.

Vegetation within the regeneration and shrubs include *Combretum*, *Tectona grandis*, *Azadirachta indica*, *Cassia sieberiana*, *Acacia albida*, *Guiera senegalensis*, *Eucalyptus camaldulensis*, *Elaeis guineensis*, *Cola cordifolia*, *Securidaca longepedunculata*, *Piliostigma thonningii* and *Annona senegalensis*. Part of the proposed area is currently under cultivation by farmers, groundnut. Table 3.12 provides a detailed listing of the species recorded.

Table 3.12: Inventory of trees recorded at the proposed WTP and their IUCN status

No	Common English name	Scientific name	National conservation status	Coordinates	IUCN Red List
1	Cashew	<i>Anacardium occidentale</i>	No		L.C
2	Cashew	<i>Anacardium occidentale</i>	No		L.C
3	Cashew	<i>Anacardium occidentale</i>	No		L.C
4	Cashew	<i>Anacardium occidentale</i>	No		L.C
5	African Mahogany	<i>Khaya senegalensis</i>	Yes	1466462 - 0325044	VUL
6	Cashew	<i>Anacardium occidentale</i>	No		L.C
7	Camel's Foot Tree	<i>Piliostigma thonningii</i>	No		L.C
8	Large-leaved Terminalia	<i>Terminalia microptera</i>	No		L.C
9	Wild Cola	<i>Cola cordifolia</i>	No		LC
10	African Locust Bean Tree	<i>Parkia biglobosa</i>	No		L.C
11	Cashew	<i>Anacardium occidentale</i>	No		LC
12	Cashew	<i>Anacardium occidentale</i>	No		L.C
13	Cashew	<i>Anacardium occidentale</i>	No		L.C
14	Cashew	<i>Anacardium occidentale</i>	No		L.C
15	Cashew	<i>Anacardium occidentale</i>	No		L.C
16	Kinkeliba	<i>Combretum micranthum</i>	No		L.C
17	Teak	<i>Tectona grandis</i>	No		L.C
18	Neem Tree	<i>Azadirachta indica</i>	No		L.C
19	African Senna	<i>Cassia sieberiana</i>	No		LC
20	Winter Thorn	<i>Acacia albida</i>	No		L.C
21	Senegal Tea Plant	<i>Guiera senegalensis</i>	No		LC
22	River Red Gum	<i>Eucalyptus camaldulensis</i>	No		L.C

23	African Oil Palm	<i>Elaeis guineensis</i>	No		L.C
24	Wild Cola	<i>Cola cordifolia</i>	No		L.C
25	Violet Tree	<i>Securidaca longepedunculata</i>	No		L>C
26	Camel's Foot Tree	<i>Piliostigma thonningii</i>	No		L.C
27	African Custard Apple	<i>Annona senegalensis</i>	No		L.C

L.C. = Least Concern; VU = Vulnerable

3.9 Human and Socio-economic Environment

Demography and population of the peripheral communities

Table 3.13 below shows the population of the communities around the FFP; the 2013 census expanded data up to 2025, indicates that the total population of the communities surrounding the project area is 41,511 (21,171 female), while the average population density of Brikama LGA which includes these communities is estimated at 625 km². The total number of households within these communities is 4,267.

Table 3.13: Population of the communities surrounding the project⁵

Communities	# of Households	Population		
		Male	Female	Total
Brikama Gidda	2477	9909	10313	20,222
Kembujeh	956	6052	6300	12,352
Mandina Baa	437	2090	2175	4265
Sere Kunda Nding	82	548	571	1119
Misiranding	27	123	128	251
Tuba Kuta	260	1492	1553	3045
Dewru	28	126	131	257
Total	4,267	20,340	21,171	41,511

Source: data from GBOS EXP to 2025

Chance finds and cultural heritage and archaeology

Community consultations revealed that there are no sensitive cultural/heritage sites in and around the FFP, and that none of the surrounding communities' infrastructure are located within a 500-meter radius of cultural, historical, and archaeological sites. Nonetheless, there may be possibilities of finding cultural heritage by chance, particularly during drilling of boreholes, digging trenches and construction of water treatment plant, etc. These may be disturbed or lost due to lack of capacity to manage cultural heritage discovered by chance. Should that happen, Appendix 3.1 will be used to address it.

Disadvantaged and vulnerable groups

Applying GBoS 2024⁶ percentages of disadvantage and vulnerable people, most of the population within the project target communities consist of 51% women, 40.8% under 15 years/children, 36%

⁵ Calculation of the population is based on the GABoS EXP projection for 12 years (2013 to 2025). Since the 2024 Population results are not yet published and if published, the data will be revised accordingly.

⁶ The Gambia 2024 Population and Housing Census

youth, 3% of elderly above 65 years, and people with disability stood at 7.9%⁷. However, these categories of people remain disadvantaged and more vulnerable to poverty and other socio-economic inequalities. Most of the youth lack adequate skills, capital, and security to access financial services.

Furthermore, most of the youth and women in the project area are involved in small income generating activities such as farming, petty trading, car washing, brick/block making, etc. Some of these livelihood activities may be located along the water pipe network routes.

In addition, some of the women are also engaged in petty trading within and around community markets, popular road junctions selling food, vegetables and fruits among others. There is a need for the project not to exacerbate such vulnerabilities. Figure 3.15 Shows the breakdown of the various categories of vulnerable groups within the project area.

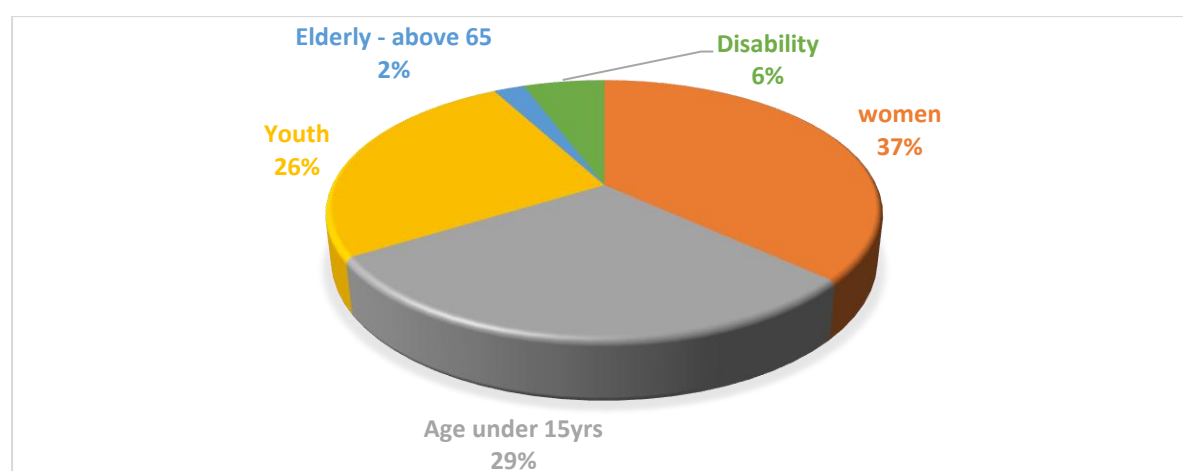


Figure 3.15: Breakdown of the various categories of vulnerable groups within the project area.

Source: SDF, 2025

Gender and gender-based violence (GBV) and Violence against children (VAC)

Based on entrenched social belief and practice of water collection been assigned to women and girls, is regarded as a source of conflict and gender-based violence. Women and children bear the responsibility of ensuring availability of water, and for which reason they spend number of hours fetching water form source.

Despite the above challenges, the project is expected to have numerous positive impacts on women and children, by reducing time spent looking for water. It is for this reason that the GOTG (Government of The Gambia) ensures that the World Bank ESF Good Practice Note (GPN) “Addressing Gender-Based Violence” is taken care of by all projects. The GPN is structured around the following three key steps that cover project preparation, implementation and operations:

1. assess and isolate risks of Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH), including social induced factors and capacity to handle it. Ideally, this would be done during project preparation, with the understanding that SEA/SH risk assessment is a continuous process and should take place throughout the project life cycle as it can occur at any moment;
2. address the risks by identifying and implementing appropriate SEA/SH risk mitigation and monitoring measures;

⁷ <https://www.disabilitydatainitiative.org/country-briefs/gm/>

3. respond to any reported GBV allegations, whether related to the project or not.

GWASAP ensuring adoption of the above principles is critical, since potential impacts of sexual and GBV incidents prevalence in the country stands at 75 % (UNFPA 2020). The GPN recognizes that projects involving civil works may increase the risk of GBV, including SEA/SH and Violence Against Children (VAC), which can be exercised in different ways by a range of perpetrators involved in the implementation of projects. The project should include effective monitoring and evaluation, and to establish an operational grievance redress mechanism that meet the WB's requirements on SEA/SH and VAC. Also, to allow reporting on allegations that are project-related and to ensure continuous case follow-up monitoring.

Access of the population to education

Access to education in the project target communities involves a mix of local institutional presence, growing municipal tuition support and general infrastructure development support. The project target communities, hosts major educational centers including nursery schools, basic cycle schools, madrasas and several secondary options like Kabafita and Kinderdorf Bottrop.

The Brikama Area Council⁸ has stepped up students' educational access by funding multi-million-dalasi tuition assistance packages for university and professional institute students (such as the Management Development Institute, University of the Gambia, etc.). Similarly, scholarships are also provided to needy students by MRC Holland and they also support in building new class rooms. Data from GBoS demographic surveys indicate that roughly half of women and youth in and around Brikama town including the project target communities, have attained secondary or higher education, outpacing many deeply rural local government areas.

Access to security services

Access to security services for the population in Brikama East relies primarily on the regional presence of the Gambia Police Force (GPF) and the Police Intervention Unit (PIU), which conduct periodic tactical patrols, checkpoints, and joint security operations across the area to address public safety needs. The regional command coordinates regular night patrols and vehicle checkpoints targeting crime hotspots in Brikama and surrounding areas. Operations involve collaboration between the police and auxiliary security bodies to maintain visible community safety. Rapid population growth in the area stretches local law enforcement and rapid response capabilities. Residents often report longer emergency response times due to unpaved access roads and a vast geographic area to cover.

Access to health

Access to health by the project target population of Kembujeh, Mandinaba, Touba Kuta and Brikama Gidda etc., heavily relies on major health facilities like the Brikama Health Centre, specialised local clinics, and periodic community outreach initiative. Brikama Health Centre, being the main referral and general healthcare facility for these communities, offers maternal care, infant welfare and general out-patient treatments. While BAFROW clinic, located in Mandinaba, is a specialised clinic that provides family medicine, maternal care, internal medicine and reproductive health service for members of these communities. In addition, communities' afar of these facilities also benefit from localized primary outreach programs, mobile medical missions, or travel outward to Mandinaba BAFROW clinic and Brikama Health Centre for comprehensive diagnosis and treatment or for other structured clinical support.

⁸<https://www.facebook.com/zoomtvgm/posts/chairman-yanks-darboe-leads-council-in-supporting-students-educationthe-brikama-/761423229969792/>

Access to water services

GBA's water services from NAWEC are mainly derived from underground sources, production estimated around 110,000m³/day from 72 boreholes spread across the area. From its existing four water treatment plants, the treated water is transported through clean water pipes to 29 elevated water tanks located across the area.

Generally, water consumers experience disruption of water supply daily, enjoying not more than four to five hours of continuous water supply. Some parts do not have any services from NAWEC, and those people who can afford it have resorted to drilling boreholes in the properties to satisfy their water needs, often erecting overhead tanks for storage. **Figure 3.16** shows the type of private water tanks prevalent within the area. In addition, in some areas water is provided to the communities by philanthropic organizations. **Figure 3.17** shows a public water point provided by a private NGO in one community, and **Figure 3.18** shows how some residents fetch and transport water in plastic containers.



Fig.3.16 Typical private borehole water tank **Fig. 3.17: A public water point provided by NGO**
Source: SDF 2025



Figure 3.18 A loaded donkey cart with plastic containers filled with water
Source: SDF 2025

Sources of water and water related illness

Malaria tops the list followed by diarrhoea as the most common water related disease reported by communities during consultations with them. Contributing factors related to the prevalence of these diseases is associated with poor drainage systems, indiscriminate waste dumping and overflowing septic or standing water in local markets and along the roads within the settlements, creates breeding environments for water related vectors and pathogen (Awon V.O. Dec. 18, 20259).

Other studies also revealed that public pipe borne water, in and around Brikama, are at risks of contamination. Since the distribution pipes network are subjected to bursting and leaking, which easily lead to water flooding of the affected area, resulting to draining stagnant water back into the pipes, thus introducing contaminants (S. Camara et al June 2023)¹⁰

Access to electricity

Communities access to electricity is mainly via transmission lines tied to grater NAWEC Brikama/Kotu power infrastructure or from the regional OMVG power interconnection. In recent years the government has worked to scale electricity coverage in these communities through regional projects funded by World Bank and AfDB. Through these initiatives has reduced electricity meter connection fees for the beneficiary households. However, findings during stakeholder consultations, revealed that some part of Kembujeh, Gidda, Mandinaba, etc. are without electricity because the electricity distribution network has not covered the entire area of these communities and those who can afford, rely on solar power. Furthermore, households connected often face peak-hour load shedding and supply instability.

Access of the population to telephone services

Access to telephone services by the residents in the area is mainly through mobile networks provided by major national operators like Africell, QCell, Comiun and Gamcel. While overall national mobile penetration exceeds 100%, these communities among others in the WCR experience intermittent network drops or weaker 3G/4G signals compared to Brikama town. Also, they face limited fixed-line infrastructure (Gamtel), and heavy reliance on mobile cellular voice and basic data¹¹.

On the other hand, it is common for families in these settlements to share mobile devices or own multiple SIM cards on different networks to optimize call costs and signal reliability. Access to reliable power for charging phones remains a hurdle especially for members of households without electricity, often solved via local solar-charging kiosks. While voice and SMS are widespread, high-speed mobile internet access is constrained by device affordability and network capacity upgrades in some of these communities.

Modes of subsistence and daily chores in the project's area of influence

Agriculture and farming of crops and livestock

Community consultations revealed that the project target communities serve as vital agricultural and trading extension of Brikama town. Smallholder farmers in these communities focus heavily on cultivation of staple crops like groundnuts/peanuts and rice as major crops, alongside cereals like millet, maize, beans, fruit trees like cashews, mango and oranges. Vegetables are mainly grown by women in groups gardens to produce crops like tomatoes, onions, okra, eggplant and peppers etc. While men mostly cultivate mangoes, citrus fruits, cashew among others to complement seasonal field farming.

⁹ <https://aquamaya.org/top-6-challenges-to-safe-water-in-rural-gambia/>

¹⁰ Publication of the Faculty of Public Health, College of Medicine, University of Ibadan, Nigeria. (All rights reserved © 2023)

¹¹ <https://datareportal.com/reports/digital-2023-gambia>

Livestock rearing in the project area, focuses on raising ruminants like cattle, sheep and goats, alongside backyard poultry. The area utilizes central trading hubs like Brikama Daral/livestock market for sale of their livestock products.

Fishing activities

Fishing in the area is mainly on small-scale at seasonal streams and nearby tributaries of the River Gambia. Some of the residents are engaged in artisanal and subsistence fishing, using handlines, small nets and traps to catch tilapia and catfish for daily food and to sell surplus to the local consumers.

Waste management

Waste management in the project area faces severe challenges with illegal dumping and limited official collection services, although the regional council is working to expand waste collection coverage. Due to a lack of regular door-to-door collection services, some residents often dump domestic waste in forests (as along the fringes of the FFP) and uninhabited spaces, while others pay waste collectors, bury, burn and some adopts more than one of these practices.

On the other hand, Sustainable Development Focus (SDF) study (2025)¹², revealed that waste disposal methods within the project area manifest in different waste management practices. The study shows that 48% of the respondents pay waste collectors, 44% burn, 8% bury, and 1% does practice both burning and burying. See figure 3.19 below for details.

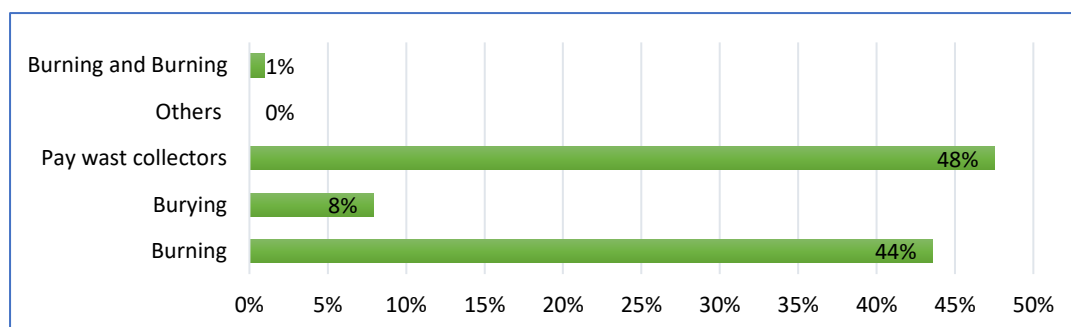


Figure 3.19: Waste disposal methods within the project area

Source: Sustainable Development Focus, 2025

3.10 Main stakes and risks of the project

The development and implementation of the project will inevitably involve certain risks. Most of these are anticipated to be moderate, with a smaller number classified as high. Importantly, the project will not be implemented in isolation; it will be carried out through existing institutional structures and with the support of experienced partners who have previously managed water transmission and distribution projects funded by multilateral agencies such as the World Bank. This experience provides a valuable learning curve that will strengthen the PIU and its contractors in applying effective risk mitigation measures. The key risks identified are outlined below and further summarized in **Table 4.??**

Political and governance risks

This risk is assessed as high. As a state-owned enterprise (SOE), NAWEC remains exposed to political and governance challenges that could affect project implementation. While such risks in The Gambia continue to be elevated, the Government has taken steps to mitigate them through the introduction

¹² Please note study cover part of Kembujeh, Gidda among others.

of a fiscal stabilization program and reform measures aimed at strengthening institutional arrangements, enhancing transparency, and improving accountability in public sector procedures. These reforms also encourage greater private sector participation in the water sector.

In addition, the GoTG has established a permanent committee tasked with advancing NAWEC's unbundling roadmap and overseeing the creation of a new Water Company. The committee is expected to propose sector reform options that will help reduce political and governance risks, thereby supporting the long-term sustainability of the project.

Macroeconomic risks

Macroeconomic risks are assessed as high. Large-scale investments in infrastructure and human capital are essential to unlock The Gambia's economic growth potential; however, if these investments fail to generate the expected returns, they could result in unsustainable debt levels.

To mitigate these risks, the GoTG, with the support of development partners, is pursuing a proactive strategy that includes debt restructuring, fiscal discipline, and reduced reliance on domestic financing, while maintaining a flexible exchange rate regime. In parallel, the Government is implementing reforms in the public sector, rationalizing agencies, and advancing ongoing reforms of SOEs, which remain a significant source of fiscal risk. Additional measures include streamlining the civil service and security forces, guided by findings from recently completed audits.

Sector strategies and policies risk

This risk is rated as substantial. GWASAP builds on the results achieved by the Gambia Electricity Restoration and Modernization Project (GERMP), which ended on December 31, 2025. GWASAP aims to strengthen confidence in long-term engagement within the water sector. Sector strategies and policies related risks are expected to be mitigated through several key actions: (i) the execution of NAWEC's unbundling roadmap; (ii) the implementation of proposed Performance-Based Contracts (PBCs) that will clarify the new water company's legal status and development prospects for accountability and sustainability; and (iii) the execution of recommendations from the current sector Master Plan exercise, along with the development of a comprehensive sector program that addresses the issue of institutional fragmentation in the sector.

Technical design of project risk

This is assessed as low. The project will use well-established technologies in the water and sanitation sector and there will be no complex construction that may result in operational challenges. The proposed project will support technical training and capacity building for NAWEC's Water Business Unit on installation and operation and maintenance of these systems.

Institutional capacity for implementation and sustainability risk

This is assessed as moderate. The project will implement activities with the support of an existing high-performing PIU. The water business activities are well understood by the water business unit of NAWEC. However, strong support from technical firms and contractors will be engaged for engineering design, civil works execution for water and sanitation infrastructure, and quality control.

Throughout the entire project implementation period, the PIU will maintain dedicated staff in key functions, including procurement, safeguards, and financial management. There will also be a continuous capacity-building program for both the PIU and NAWEC staff focused on procurement and safeguards, along with close supervision of safeguard aspects. Furthermore, a change management process will be established to promote the sustainability of reforms.

Fiduciary risk

This is assessed as moderate. Despite NAWEC's efforts to implement the GERMP, along with other initiatives funded by bilateral and multilateral development partners, there is still a need to strengthen the existing PIU to ensure the smooth and effective execution of planned activities.

To achieve this, the PIU will continue to be staffed with personnel focused on managing fiduciary aspects. During the implementation phase, it will also receive additional support from World Bank staff and individual consultants to assist with procurement and financial management.

Environmental and social risks

This rated as substantial. The activities supported by the project may pose environmental and social impacts during implementation, particularly related to civil works, potential resettlement, occupational health and safety, community health and safety, and pollution of water, soil, and air. These risks and impacts should be effectively managed through the application of ESMP mitigation measures. Comprehensive instruments will be prepared and monitored to address these concerns. The PIU will have environmental and social safeguard specialists on staff. If necessary, international consultants will provide additional support in these areas.

CHAPTER 4: RELEVANT LEGAL AND INSTITUTIONAL FRAMEWORK

The effective implementation of GWASAP requires alignment with the national legal and regulatory framework as well as institutional mandates governing environmental and social safeguards. This section outlines the key policies, laws and regulations applicable to GWASAP, including those related to environmental protection, forestry, water resources, land use, and cultural heritage.

It also examines the roles and responsibilities of institutions such as the NEA, DWR, DOF, and other relevant agencies in ensuring compliance. Thus, the framework provides the foundation for assessing project impacts, guiding mitigation measures, and ensuring adherence to both national requirements and international standards such as the Bank's environmental and social standards.

4.1 National and international policy, and legal framework

4.1.1 Relevant national policies

Table 4.1 outlines the national policies relevant to the project, and identifies the institutions responsible for their implementation.

Table 4.1: Relevant national policies

Policy	Brief description	Implementing institution	Relevance to GWASAP
Gambia Environment Action Plan, GEAP (2021-2030)	The Gambia's principal environmental and natural resources policy with the overall aim of promoting integrated environment and natural resources management.	NEA	Provides guidance to all development plans and projects in environmental planning and natural resources management
The Recovery Focused National Development	The principal national Plan that provides the overall direction and	Office of the Vice President	This Project will contribute to achieving one of the NDP's

Plan, RF-NDP (2023-2027)	priority areas for development in The Gambia.		strategic outcomes (5.3) of promoting sustainable environmental and natural resources management, enhanced climate action and disaster risk reduction.
National Water Policy (2006)	Establishment of a manageable and inclusive water resources framework based on the integrated water resources management roadmap and principles.	DWR	The project is implemented in line with objectives of the Policy
National Climate Change Policy (2016 – 2025)	The framework for managing climate risks, building institutions, capacities, and opportunities for climate-resilient projects	MECCNAR	Water sources, water system infrastructure and sites may be affected by the impacts of climate change such as flooding and erosion
The National Health Policy (2012-2020)	Protects public and environmental health	Department of Health Services	Health and safety issues must be considered during all phases of the Project to protect workers and the public
Gambia National Gender and Women Empowerment Policy (2010–2020)	To mainstream gender in national and sectoral planning and programming to ensure equity and equality	Ministry of Gender, Children and Social Welfare	The project study and implementation phases will ensure gender issues are included. Project implementation will benefit both men and women
Forestry Policy (2010–2019)	The Forestry Policy forms the pillar for the promotion of participatory forest management. It promotes state and community forest development and management	Department of Forestry	The Furuya Forest Park will host the WTP and the proposed new well fields (4 boreholes).
The National Biodiversity Strategy	The NBSAP covers the conservation and sustainable use of	DPWM	Wildlife within the project sites should be protected from

and Action Plan (NBSAP), 2015	biodiversity in the national parks and wildlife reserves; it also protects ex-situ biological diversity in various parts of the country		activities of the GWASAP
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4.1.2 Relevant national legislation

The legislative framework relevant to the implementation of this Project's ESIA is indicated in Table 4.2 below:

Table 4.2: Relevant national legislation

Legislation	Year	Responsible institution	Relevance to GWASAP
National Environment Management Act (NEMA)	1994	NEA	Establishes the legal basis for environmental protection, ESIA requirements, and compliance monitoring
Environmental Impact Assessment Regulations	2014	NEA	Regulations require all Projects to undergo an EIA procedure
Lands (Regions) Act	1945	DLS	Act regulates tenure and administration in Provincial Gambia; district authorities to manage for local communities based on customary law
State Lands Act	1990	DLS	The State Lands Act governs land in State Lands Areas
Land Acquisition and Compensation Act (LACA)	1991	DLS	Act makes provision for the acquisition of land for public purposes and for the payment of compensation for such land
The Forest Act	2018	DOF	Governs forest conservation, management of protected areas, and regulation of resource use in forest parks
Biodiversity and Wildlife Act	2003	DPWM	Protects biodiversity and regulates activities in protected areas, relevant for Furuya Forest Park
Physical Planning and Development Control Act	1991	DPPH	Regulates land use planning, zoning, and development approvals for infrastructure projects
Public Health Act	1990	MOH	Ensures water supply and sanitation projects meet public health standards.
National Council for Arts and Culture Act	2003	NCAC	Provides protection for cultural heritage and archaeological sites; underpins Chance Finds procedures

Labour Act	2023	MOTIE	Governs labor standards, occupational health and safety, and workers' rights during construction
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4.1.3 Relevant international conventions signed/ratified by The Gambia

Table 4.3 below shows the various international treaties/conventions to which Gambia is a Party.

Table 4.3: Relevant international conventions signed/ratified by The Gambia

Convention/Treaty	Year Ratified	Responsible Institution	Relevance to GWASAP
Convention on Biological Diversity (CBD)	1994	DPWM	Promotes biodiversity conservation, sustainable use of natural resources, and equitable benefit-sharing.
United Nations Framework Convention on Climate Change (UNFCCC)	1994	DWR	Guides climate resilience, adaptation, and mitigation measures in project design.
Ramsar Convention on Wetlands	1996	DPWM	Protects wetlands of international importance, relevant aquifer recharge zones.
Convention to Combat Desertification (UNCCD)	1996	DOF	Addresses land degradation and promote sustainable land management, critical for forest park conservation.
Stockholm Convention on Persistent Organic Pollutants (POPs)	2003	NEA	Controls hazardous chemicals and pollutants, relevant for waste management and water quality safeguards.
ILO Conventions (Core Labour Standards)	Various	MOTIE	Ensures fair labor practices, occupational health and safety, and protection of workers during construction.
World Heritage Convention (UNESCO)	1987	NCAC	Protects cultural and archaeological heritage, underpinning Chance Finds procedures under ESS8.

4.1.4 Relevant World Bank Environmental and Social Standards

The GWASAP is supported by the World Bank and therefore must comply with the Bank's environmental and social framework (ESF), which sets out mandatory requirements for managing the project's environmental and social risks. Table 4.4 provides the standards and their relationship with GWASAP.

Table 4.4: List of World Bank ESSs and their relationship with GWASAP

ESS	Title	Triggered	Rationale
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ESS1	Assessment and management of environmental and social risks and impacts	Yes	Core requirement; project involves construction, water abstraction, and infrastructure with potential environmental and social impacts
ESS2	Labor and Working Conditions	Yes	Construction and operation will involve contracted workers; occupational health and safety measures required
ESS3	Resource efficiency and pollution prevention and management	Yes	Water abstraction, treatment processes, and energy use require efficiency measures and pollution control
ESS4	Community Health and Safety	Yes	Construction of transmission and water distribution infrastructure, may affect community safety and health
ESS5	Land acquisition, restrictions on land use, and involuntary resettlement	Potential	Land-take and resettlement issues may occur during pipeline construction; risk of displacement or restriction of access to economic assets
ESS6	Biodiversity conservation and sustainable management of living natural resources	Yes	The water treatment plant and borehole sites are within Furuya Forest Park; biodiversity impacts must be assessed and mitigated
ESS7	Indigenous peoples/sub-Saharan African historically underserved traditional local communities	No	No Indigenous Peoples or underserved traditional communities identified in project area
ESS8	Cultural heritage	Potential	Chance finds during excavation; cultural heritage procedures must be in place.
ESS9	Financial intermediaries	No	Not applicable; project is directly financed and implemented
ESS10	Stakeholder engagement and information disclosure	Yes	Continuous engagement with communities, NAWEC, ministries, and relevant stakeholders including donors is required

4.1.5 The institutional framework

This section outlines the core institutions with various implementation and regulatory responsibilities that are relevant to the Project ESIA and ESMP as listed in Table 4.5.

Table 4.5: Stakeholder responsibility matrix

Stakeholder	Key responsibilities	Accountability focus	Level of intervention
NEA	Approvals, permits, compliance monitoring, enforcement of NEMA 1994, coordination with EIA Working Group	Ensure legal/regulatory compliance; oversee audits and reporting	All phases of the project from planning and design to the construction and operation
NAWEC (Water Division/PIU)	Implement ESMP, submit reports to NEA WB, manage grievance	Operational compliance; safeguard	All phases of the project from planning and design to the

Stakeholder	Key responsibilities	Accountability focus	Level of intervention
	mechanism, ensure contractor compliance	implementation; timely reporting	construction and operation
DOF	Responsible for the maintenance and development of forest resources in The Gambia.	Advises on forest boundaries relative to the project activities and monitors encroachment onto the protected Forests and impact on other forest trees within the Project Area of Influence	Preconstruction, construction, and operation phases
DPWM	Responsible for the maintenance and development of national parks and reserves	Advises on the control and management of wildlife, including birds, that are habitat within the project area	Preconstruction, construction, and operation phases
DWR	Regulates and manages the sustainable utilization of water resources, coordinate related policies	Relevant in water quality management and control of water resources	During preconstruction, construction, and operation phases
MoPE	Provide oversight through PIU, coordinate safeguards, ensure integration of ESMP into contracts	Institutional coordination; safeguard clauses in procurement	As necessary during all phases of the Project
Contractors and Supervising Engineer	Implement mitigation measures, monitor workforce activities, report incidents, manage site-level safeguards	Day-to-day compliance; pollution control; occupational safety	All phases of the project from planning and design to the construction and operation
World Bank	Independent monitoring, review safeguard reports, provide technical assistance for non-compliance	Donor safeguard compliance; ensure corrective actions	All phases of the project from planning and design to the construction and operation
Regional Technical Advisory Committee (Governor's Office)	Local oversight, community engagement, grievance resolution support	Ensure community concerns are addressed; strengthen local participation	As necessary during all phases of the Project
Local Communities and Affected Persons	Participate in consultations, report grievances, engage in monitoring activities	Provide feedback on impacts; ensure cultural/social values are respected	All phases of the project from planning and design to the construction and operation
National Social Protection Agency			

4.1.6 Institutional analysis

The institutions outlined in Table 4.5 above, in addition to members of the EIA Working Group, have some understanding of environmental and social management, and the need for their respective participation in the ESMP implementation due to their institutional mandates. However, apart from the NEA with experts and experience in environmental management, the other institutions will require programmes to enhance their capacity in E&S safeguards, including the need to highlight their roles and expectations when it comes to the implementation and monitoring of the ESMP.

NAWEC, in particular, has over the last few years, built capacity in the area of environmental and social impact assessment having coordinated electricity projects funded by multilateral institutions such as the WB-funded Gambia Electricity Restoration and Modernization Project (GERMP), and the African Development Bank (AfDB) -funded Gambia Electricity Access Project (GEAP) and Gambia Electricity System Rehabilitation and Expansion Project (GESREP), etc. Safeguards Specialists have been trained under these Projects.

More importantly, during the consultations in developing this report, it was apparent that the current staffing of the Water Division at NAWEC needs to be strengthened in both numbers and specialists; the current staff needs to be trained in environmental management. In addition, at least 2 Specialists (one Environmental and one Social Safeguards), and one Officer in the area of Occupational Health and Safety need to be trained to support the Division.

4.1.7 Management of GWASAP'S ESIA

Under the NEMA 1994, the GWASAP is classified among projects legally required to undertake environmental assessments, as its activities are expected to generate environmental and social risks during both construction and operation. These risks include potential land acquisition, pollution during works, clearing of forest vegetation and impacts on wildlife, changes in water quality and quantity, and risks to worker and public health and safety. The impacts and risks identified in this study will be managed through the implementation of the ESMP.

The draft ESIA report will be submitted to the NEA for review and stakeholder validation. Upon satisfactory completion of reviews and revisions, the NEA's Executive Director will issue a Certificate of Environmental Approval in accordance with Section 11 of the EIA Regulations.

As required by NEMA (1994), the EIA Regulations, and international best practice such as the World Bank's ESS10, the final ESIA report will be publicly disclosed. Once Approval is granted, NAWEC, through the PIU, will be responsible for applying the relevant conditions during project implementation, with support from stakeholders identified in the ESMP, including contractors. The detailed implementation arrangements for environmental compliance are presented in Chapter 9.

CHAPTER 5: CONSULTATIONS AND PUBLIC PARTICIPATION

This section presents the outcome of the stakeholder consultations, and the approach that was adopted. Consultations and public participation formed a central component of the ESIA process, ensuring that the perspectives, concerns, and aspirations of stakeholders were fully integrated into project planning.

The process included community meetings and face-to-face engagements with key staff of institutions, through which stakeholders shared local and indigenous, technical and policy information with the consultant, and who, in turn listened to their views and allowed them to talk freely. In line with the Bank's ESS10 the process was an inclusive, transparent, and must be an ongoing engagement process throughout the project cycle. It emphasizes early disclosure of information, meaningful consultation, grievance mechanisms, and special attention to vulnerable groups. Thus, the process was transparent and encouraged a high degree of stakeholder participation to minimize environmental and social risks.

5.1. Objectives of stakeholder engagement

- To uphold the legal requirements for public consultation during an Environmental and Social Impact Assessment (ESIA).
- Explain what the project will do, why the protected forest was chosen, and how the water treatment plant will work.
- To understand how land excavation or laying pipes might disrupt water and traffic flow, cut down trees as well as disturbance of the forest ecosystem.
- Use community feedback to select the least impact routes to lay the pipelines.
- Ensure the plant does not reduce the water supply or quality of nearby local wells that the villagers rely on.
- Identify if any local groups use the forest for farming, gathering wood, hunting medicinal herb sourcing, or sacred traditions, and find ways to protect those uses.
- Answer community questions about construction noise, traffic, and plant operations.
- Address worries and rumors early so that people feel heard and respected.
- Help government regulators make fair decisions based on both technical data and public opinion.
- Build practical plans to fix, reduce, or offset any unavoidable harm to the forest ecosystem.
- Give people a reliable way to report problems or complaints during and after construction of the water treatment plant and boreholes.

5.2. Stakeholder engagement strategy

The engagement strategy deployed in the conduct of the ESIA included identifying affected groups early, sharing clear project plans, and holding open public meetings to balance vital water needs with forest conservation. These steps ensure locals and experts share their views on the proposed project.

Key groups involved in the engagement

- People living near the proposed project site who may face noise, traffic, or water changes.
- Individuals who would potentially lose land, crop access, or resources from the forest.
- Government officials, such as Local Councils, NEA, DWR and DOF among others.

Core engagement steps taken included

- Listing of all groups who use, own, or protect the forest.
- Chart out how the water plant will impact each of the stakeholder's daily life and livelihoods.
- Information disclosure: sharing clear project facts, plant designs, and likely impacts.
- Public meetings: open forums with locals to discuss benefits, fears and ideas.

- Grievance redress: setting up ways for people to ask questions or report problems during the project execution process.

5.3 Stakeholder analysis and identification

The stakeholder analysis and identification matrix utilized included role allocations, identifying interests, and engagement strategies, and the influence the respective stakeholders wield in decision-making and implementation of the Project.

The analysis and identification process acknowledged that it is possible for an agency, organization or a group to have the dominant influence over formulation of a policy but at the same time have less practical impact when compared to other stakeholders who have no knowledge of the regulations and information about the project, but nevertheless control day to day events or actions that affect the project. Such groups included community members, for example, in Brikama Gidda, Kembujeh, Touba Kuta, Misiranding, Serekundanding, Mandinaba, etc. the communities closest to the proposed project site.

In addition, through an extensive literature review, a list of stakeholders was drawn (see Table 5.1), some of who were contacted through visits, phone/WhatsApp calls or emails. The categories of stakeholders in this Project include national regulatory institutions, peripheral and beneficiary communities and project affected groups with varying ranges of influences and interests as identified below.

Table 5.1: Stakeholder identification and analysis matrix

Stakeholder category	Specific stakeholder / institution	Role and interest in the Project	Level of influence	Level of impact / interest	Recommended engagement strategy
Regulatory Lead	National Environment Agency (NEA)	Oversees ESIA compliance, approval of scoping/TOR, and issuance of environmental clearance.	High	High	Formal consultations, joint site inspections, and ESIA report review and validation workshops.
Resource Manager	Department of Forestry (DoF)	Co-manages protected forest integrity, biodiversity offsets, formulation and implementation of specific institutional MoUs/agreements.	High	High	Direct bilateral meetings, participatory boundary mapping, and joint monitoring protocols.
Project Proponent	NAWEC (National Water and Electricity Company)	Project developer responsible for funding, constructing, and operating the water treatment plant.	High	High	Lead coordinator for disclosure sessions, management responses, and mitigation tracking.
Local Government	Area Councils / Local Regional Authorities	Local administrative governance, land allocation feedback,	Medium	Medium	Consultation meetings and local council briefings.

		and community integration.			
Local Communities	Fringe communities near the FFP	Dependent on forest for non-timber forest products, firewood, or microclimate; recipients of clean water.	Low to Medium	High	Focus group discussions, local language notices, and grievance redress mechanism (GRM) setup.
Environmental NGOs	Local and international conservation watchdogs	Concerned with loss of flora/fauna, habitat fragmentation, and precedent of de-gazetting forest reserves	Medium	High	Public hearings, transparent impact disclosure, and independent panel reviews.
Public Sector Institution on Social Protection and GM	National Social Protection Agency				

5.4. The consultation process

As part of the ESIA process, a series of stakeholder consultations were conducted between 30th July and 5th August, 2026. The objective was to consult with the peripheral communities to the Project since appropriate and adequate consultations ensure smooth project implementation and guarantee the sustainability of the project during operation. The process involved information dissemination and interaction, and has allowed the affected populations to raise issues that should be considered before, during and after the project establishment.

5.4.1 Institutional consultations

Consultations were held with national institutions such as the DOF, NEA, NAWEC PIU, while similar consultations are planned with the Brikama Area Council (BAC), the local government area hosting the Project. The consultation process adopted with these institutions included a mix of approaches including face to face meeting, virtual telephone or WhatsApp call meetings. Appendix 5.1F provides the lists of participants at the consultative meetings with the various stakeholders.



5.1: Consultation with Director of Forestry



Fig 5.2: Consultation with Kembujeh with Alkali

Fig.

5.4.2. Consultations with stakeholder communities

Residents, traditional leaders (Alkalo), and Community-Based Organizations like the Village Development Committees (VDC) in the neighborhood settlements around the FFP. Meetings and focus group discussions were held with nearby residents, vulnerable groups (including women youth, children, etc.), farmers, and some of the local business owners to gather feedback, address concerns about land and resource use and to document minutes for the final ESIA report.



5.3: Consulting with famers at Brikama Gidda **Fig. 5.4: Consultations at Mandinaba**

5.4.3 Stakeholders' opinions about the project

Key issues raised/comments

- Local communities raised concern over their reliance on the FFP for non-timber products such as medicinal plants, firewood, and wild fruits like *Kabaa*, *Folai*, etc., and clearing a portion of forest land allocated to the project, will reduce their availability.
- Mitigation and compensation: Stakeholders requested a reforestation offset programme (compensatory tree planting elsewhere) and local employment prioritization during construction of project facilities
- Heavy machinery traffic and open excavation sites pose risks to local vehicular traffic, pedestrians and children and as a result, leaving pipeline trenches open for a long period is very concerning to them.
- Local representatives emphasized that the NAWEC should guarantee reliable supply connections to the settlements surrounding the facility at an affordable cost or at reduced cost so that poor households can also have access to reliable portable water as compensation for sinking boreholes and establishment of water treatment plant in their neighborhood.
- Fear of reduction/loss of monthly revenue collected by some of the VDCs (i.e., Mandinaba etc.), from members of their community who access locally produced water from taps connected to the communal supply system.
- Community members, particularly the youth, have requested that the project provide short-term employment opportunities during construction and longer-term jobs once the plants

become operational. Such engagement would generate significant social benefits, including improved living standards, youth empowerment, and employment creation. It would also foster skills transfer and capacity building, strengthen community relations, and stimulate long-term economic growth through the circulation of income earned by local employees within the surrounding neighborhoods.

- The project may usher in a more sustainable groundwater use due its expansion of water supply to the population in its target area, which may contribute to a reduction of the proliferation of boreholes in the project area.
- Communities considered WhatsApp as their preferred medium of communicating with them since they will be able to listen to WhatsApp audios at more suitable times. Use of community FM radios in Mandinaba and Brikama town, came next in their preferred medium of sharing information with them. While some the individuals (village heads, members of VDC, etc.) direct telephone calls and emails will be also useful.
- All stakeholders consulted expressed unanimous appreciation and strong support for the Project, particularly in anticipation of improved access to clean and safe drinking water. They emphasized that water is fundamental to life and highlighted the expected positive impacts on public health. Stakeholders also noted that improved water availability would ease the burden on women by reducing the time and effort spent fetching water. In addition, the Project is expected to enhance livelihoods by enabling households to provide water for small ruminants and other economic activities. Reflecting this value, communities indicated their willingness to pay for NAWEC-supplied water.

Agreed Action Points

- NAWEC committed to minimizing the construction footprint to preserve maximum forest cover.
- Compensatory replanting scheme will be coordinated directly with the Department of Forestry.
- Regular stakeholder liaison committees will remain active through the construction and operational of the project.
- Department of Forestry committed to development and implementation of a vegetation restoration and forest protection surveillance plan.

CHAPTER 6: ANALYSIS OF POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS

This chapter presents a systematic analysis of the potential environmental and social impacts associated with the GWASAP during both construction and operational phases. It identifies and evaluates the likely adverse and beneficial effects of project activities on land use, biodiversity, water resources, air quality, and the socio-economic environment. The analysis considers the scale, duration, and significance of impacts, while also highlighting cumulative and indirect effects. The findings provide the basis for developing targeted mitigation measures and management strategies outlined in the Environmental and Social Management Plan (ESMP), ensuring that risks are minimized and opportunities for positive outcomes are maximized.

6.1 Impact Analysis – biophysical environment

6.1.1 Methodology

- **Identifying sources of potential project impacts**

The only known information about the design of the project is the location of the four boreholes and a WTP inside the FFP; the details of specific works such as the nature of boundary walls around the boreholes and the WTP are not known. Other important information such as the paths of planned clean water transmission lines are not also known. However, Table 6.1 below provides sources of project's impacts as per the Consultant's experience with the assessment of very similar water supply projects.

Table 6.1: Expected sources of project's potential impacts

Phase	Activity	Expected source(s) of impact
Construction	Drilling, and securing, boreholes	Use of heavy machinery in drilling rigs
		Use of heavy machinery for improving access to site
		Use of heavy machinery for site clearance and land levelling
		Removal of vegetation for access road as well as for security of boreholes and accessories, estimated at 3ha at least
	Construction of WTP	Use of heavy machinery for site clearance and land levelling
		Use of heavy machinery for concrete formation
		Use of heavy vehicles for transporting materials to site
		Removal of at least 3ha of vegetation for accessories of the WTP and a security fence
	Excavation of trenches for transmission of raw water from boreholes to WTP	Use of heavy machinery for digging of trenches
		opened trenches
		Removal of vegetation along the paths
	Excavation of trenches for transmission of clear water from WTP to elevated tank/existing pipelines in close proximity to the FFP	Use of heavy machinery for digging of trenches
		opened trenches
		Soil mounds along trenches
	Excavation of trenches for distribution networks within communities	Possible use of heavy machinery for digging of trenches
		Opened trenches
		Soil mounds along trenches
		Possible disposal of used oil

Phase	Activity	Expected source(s) of impact
Operations	Operations and maintenance of WTP	Energy consumption for processes
		Use of chemicals
		Accidental release of untreated water
		Sludge disposal
	Chlorination of clear water	disposal of used containers
		Potential for disinfection byproducts such as haloacetic acids and trihalomethanes
	Operation and maintenance of overhead water storage tanks	Energy consumption for filling of tanks
		Water leaks and spills
		Physical presence of tank (e.g., aesthetics)
		Use of the tank (e.g., improved water quality, improved water management, water security etc.)
	Clear water supply	Availability of clean water in homes
		Availability of clean water in businesses
		Availability of clean water schools and other public places
		Leaking pipes

6.1.2 Identification of VECs

The Valued Ecosystem Components (VECs)¹³ are components of the environment that are expected to be impacted by project activities as well as considered important, for various reasons, by different stakeholders including the general public. In assessing the impacts of the project, the VECs, if applicable, should be defined across the entire environment spectrum (i.e., *abiotic/physical, biological, social, economic, cultural/heritage*). As provided in Table 6.1 above, the project's potential impacts, during construction, are mainly expected from the use of heavy machinery, removal of vegetation and open trenches that pose a threat to both wildlife and people. The impacts from heavy vehicles/machinery are mainly expected from above-normal ambient noise levels, which is important for residents near the forest; it is also important for conservationists as it is expected to cause disturbance to wildlife in the forest. This makes ambient environmental quality a key VEC. Table 6.2 below provides additional VECs for both construction and operations phases.

Table 6.2: Valued environmental components

Environmental Component	Environmental subcomponent	VEC
Abiotic/Physical	Atmosphere	Ambient environmental quality
Biological	Vegetation and terrestrial wildlife	Habitat (FFP)
Socioeconomic	Daily life	Access to clean water
		Improved health
	Economic	SMEs boom
		Employment
		Leaking pipes
		Waste management (e.g., used chlorine bottles) during operations

¹³ Ideally, they should be defined during scoping so that they are clearly defined in the terms of reference

6.1.3 Defining the spatial boundaries for assessment

Impact assessment requires that the Project Development Area (PDA)¹⁴, and the Local Area of Assessment (LAA)¹⁵, be defined as boundaries for the potential impacts of the project on the biophysical environment; it also requires that the Social Area of Influence (SAI)¹⁶ be defined for the socioeconomic impacts. However, the focus of this section is on environmental impacts; hence, only the PDA and LAA.

1. **Project Development Area:** this is the immediate environment of the project, and supporting, activities. In essence, it is the physical space across which project, and related, activities are certain to cause physical disturbance during the construction, and operational, phases in particular. In this case, it includes, at least, the following:
 - a. the FFP as location of boreholes and the WTP, hence main center of project activity;
 - b. the quarries that will supply earth materials for works at the boreholes and WTP;
 - c. the route(s) linking the quarries to the forest;
 - d. the paths for the clean water transmission lines from the WTP to the communities

At this point, only the locations of the boreholes and WTP are known; the project has not identified the paths for the clear water transmission lines. It has not identified quarries for sourcing of said materials, meaning the said routes cannot be equally identified. Therefore, the PDA cannot be fully defined and is thus limited to the FFP.

2. **Local Assessment Area:** the maximum area within which project impacts on biophysical environment can be predicted, or measured, with a good degree of accuracy and confidence; it encompasses the PDA. Again, with the missing information listed above, under PDA, the LAA could only be defined with respect to the forest. With the impacts of vegetation removal expected to be confined within the forest, the LAA was defined by the expected noise levels from heavy vehicles/equipment. The recommended noise level in residential areas is 55 dBA. A study¹⁷ has determined that noise from construction equipment will attenuate to this level at approximately 2000m from the source; therefore, the LAA was defined as radius of 2000m from the edge of the forest.

6.1.4 Defining the temporal boundaries

It is agreed that the potential negative impacts of GWASAP are largely expected to come from the construction phase; that the operational/occupational phase will largely be positive. The project is not expected to have a decommissioning phase in that the installed infrastructure/facilities are expected to be perpetual with continuous maintenance and improvement. Therefore, the impacts were assessed for only the construction and operations/occupational, phases.

6.1.5 Identification of impacts

- **Direct and Indirect Impacts**

The direct impacts were identified with an impact identification matrix that defines cause-and-effect relationships between project activities and the VECs. A generic layout of the matrix is given in Table 6.3 below as an example. Using expert opinion, and familiarity with similar projects, the matrix allowed the identification of the direct impacts that could result from the interaction of an activity with a VEC; then for each direct impact, the most obvious indirect impact, if any, was also agreed through expert

¹⁴ Project Development Area

¹⁵ Local Area of Assessment

¹⁶ Social Area of Influence

¹⁷ <https://www.nrc.gov/docs/ml1225/ml12250a723.pdf>

opinion such that the matrix allowed for entry of both types of impact as well as the impact directions i.e. whether positive or negative.

Table 6.3: Generic impact identification matrix

Activity	Impact type	Valued Environmental Components				
		VEC-1		VEC-2		Etc.
		Positive impact	Negative impact	Positive impact	Negative impact	
Activity 1	Direct					
	Indirect (if any)					
Activity 2	Direct					
	Indirect (if any)					
Etc.						

6.2. Cumulative Impacts

According to the IFC's handbook on '*Cumulative Impact Assessment & Management...*', cumulative impacts are those that result from the successive, incremental, and/or combined effects of a development, added to other existing, planned, and/or reasonably anticipated future ones. By this definition, the main objective of Cumulative Impact Assessment (CIA) can be described as the assessment of the potential impacts of a proposed development overtime within the context of other planned, ongoing or past developments. It is understood that there is another water supply project, WASIB, which is currently being assessed; that WASIB could share overhead water tanks with this project, making the potential for cumulative impacts very high. To establish this possibility requires knowing the actual LAA for both projects such that cumulative impacts will be assessed. As mentioned above, the LAA could not be defined in this case; the LAA for WASIB is not also known. Therefore, cumulative impact assessment was not performed.

6.2.1 Impact prediction

Impact prediction determines how much the selected characteristics of the potential impacts will change as a result of the GWASAP. The three impact qualities described below were chosen to be the most relevant in this assessment.

- Magnitude referring to the absolute or relative change in size or value, of a VEC; example, the area of habitat that will be lost.
- Spatial extent referring to the zone of influence of the impact.
- Duration referring to the period the impact will cover.

The predictions were largely based on professional judgement based on similar studies.

6.2.2 Impact evaluation

Methods for evaluating the significance of impacts, positive and negative, should be guided by criteria based on the characteristics of the impacts. As per the International Association for Impact Assessment (IAIA) guidelines, these characteristics should consider both the physical (e.g., magnitude) and importance (e.g., ecological, cultural, economic etc.) characteristics of the impact. As indicated above, the main physical variables considered in the assessment are magnitude, spatial extent and duration; the likelihood of the impact, referring to the possibility of the impact occurring as predicted was additionally considered. The importance of an impact was established by representing each physical attribute with a range of theoretical numerical values representing the minimum and maximum

possibilities for each impact in terms of scale of impact. The values assigned in this case are in Table 6.4 below as per IAIA guidelines and other references.

Table 6.4: Numerical values representing the minimum and maximum possibilities¹⁸

Attribute	Numerical value	Description
Magnitude	1	None/negligible
	2	Minor
	4	Low
	6	Moderate
	8	High
	10	Very high/uncertain/don't know
Spatial extent	1	Site-specific (PDA)
	2	Local (LAA)
	3	Regional (RAA)
	4	National
	5	International
Duration	1	Transient
	2	Temporary (0 – 1 year)
	3	Medium-term (5 – 15 years)
	4	Long-term
	5	Permanent
Likelihood	0	None
	1	Improbable (< 5%)
	2	Low probability (5% - 40%)
	3	Medium probability (40% to 60%)
	4	High probability (60% - 90%)
	5	Definite (impact will certainly occur)

With a value assigned to each variable for each impact, a significance point (SP) was then quantitatively assigned to each impact using the widely used formula below.

$$SP = (\text{magnitude} + \text{spatial extent} + \text{duration}) \times \text{likelihood}$$

The maximum SP that can be reached with this formula is 100. The importance, translated to significance, was defined separately for the positive and negative impacts using the ranges in Table 6.5 below; these ranges were assigned by expert opinion.

Table 6.5: Impact significance

Impact direction	Range	Description
Negative	>75 (very high significance (critical))	Immediate, and high value, physical interventions required to reduce risks
	50 – 75 (high significance (severe))	Highly prioritised, and high value, measures required to reduce risks
	25 – 49 (moderate significance)	Important but does not pose serious threats because impact stops with activity; temporary measures will be required.

¹⁸ The values were considered in the reverse order for positive impacts

Impact direction	Range	Description
	< 25 (negligible/mild/low)	No form intervention of required; impact will be absorbed by the environment
Positive	=< 49	Not significant
	50 - 100	Significant

6.3 Description of impacts

6.3.1 Identified impacts

The VECs identified with the biophysical environment are ambient environmental quality that is expected to be negatively affected by reduced air quality and increased noise levels. The other VEC is the FFP itself as a habitat. The identified impacts are summarised below in Table 6.6.

Table 6.6: Identified impacts

VEC	Source of impact	Direct effect	Indirect effect
Ambient environmental quality	Dust and smoke, particularly from use of heavy machinery during removal of vegetation and land leveling works	Reduced air quality from particulates – dust and smoke	Health risk to population
	Continuous heavy machinery use, particularly during construction of the WTP	Noise pollution	Disturbance of both population and wildlife in the forest
Furuya forest (habitat)	Removal of vegetation for boreholes, WTP and access road	Fragmentation of the forest	Habitat loss, loss of biodiversity etc.

6.3.2 Predicted levels of the direct impacts

The impact characteristics considered for the prediction were magnitude, spatial extent and duration. These are explained in Table 6.7 below for the identified impacts.

Table 6.7: Predicted levels of the direct impacts

Impact	Characteristic	Predicted level	Explanation
reduced ambient environmental quality (particulate matter)	magnitude	1 (none/negligible)	baseline air quality values (air quality index) could not be measured as explained above, which meant actual prediction could not be made. However, the works and vegetation removal are largely enclosed by trees that would largely contain the dust; water browsing is also a known practice done during such works as a generation control measure. Not the least of reasons is that the most sensitive receptors, i.e., residential areas, are at a considerable distance from the planned locations of the facilities such that any dust generation, expected to be

Impact	Characteristic	Predicted level	Explanation
			very low in the first place, will essentially have no effect on people around the forest.
	Spatial extent	1 (Site-specific / PDA)	As explained under <i>magnitude</i> , the locations of the facilities are largely contained by vegetation; this means the dust/smoke will be largely site-specific, especially with the expected use of water browsing.
	Duration	1 (Transient)	1 ha is expected to be cleared for the four boreholes (1ha), the WTP (2.25ha) and access to boreholes (3ha); relatively, this is a small area that could be done in a single day with only one heavy machine; thus, with some of the control measures cited above, the dust/smoke can only last as the works.
	Likelihood	1 (Improbable)	Particulate matter is sure to be generated but the likelihood of reaching disturbing levels does not exist
Fragmentation of FFP	Magnitude	10 (Very high/uncertain/unknown)	The magnitude of the fragmentation needs to be described within the context of its impacts on associated wildlife; this is Unknown as it was not possible to conduct a detailed survey of the wildlife in the forest. In essence, assigning the highest possible value is per consideration of the precautionary principle.
	Spatial extent	1 (Site-specific/PDA)	The removal of vegetation will be limited to the area required for each borehole (0.25ha per borehole) as well as the WTP (2.25ha).
	Duration	5 (Permanent)	The removal of vegetation will be permanent as the protective fences and associated facilities are permanent installations as well.
	Likelihood	5 (Definite)	The fragmentation of the forest is an inherent part of the project that is certain to have an unknown impact on wildlife.

6.3.3 Significance of the impacts

The **SP** for each impact as per the formula above and the significance range, as by Table 6.7 above, are given in Table 6.8 below.

Table 6.8: Impact significance

Impact	Significance point	Significance range
Reduced ambient environment quality (particulate matter pollution)	3	<25
Reduced ambient environment quality (noise pollution)	3	<25
Fragmentation of FFP	80	>75

In essence, any change in the current quality of the ambient environment as a result of the project is expected to be negligible. It needs to be emphasised that this is based on the belief that the project will have inherent measures like water browsing for control of dust during construction; that construction works, and vehicle movement, will be limited to the day time.

On the other hand, fragmentation of the forest is of critical importance such that its avoidance should be sought in the first place. This is the subject of the next sub-subsection.

6.3.4 Mitigation of the impacts

As concluded above, the expected noise and particulate matter generation by the project are expected to be negligible and would require no mitigation. In the case of the fragmentation, it is most preferred to avoid it totally as said above, requiring that the boreholes, in particular, are relocated. The planned locations of the boreholes and the WTP is given in Figure 6.1 below. Additionally, the four boreholes will be linked by an access road for vehicles. Therefore, this first major reason for the need to relocate the boreholes is that the planned road will, effectively, permanently fragment the forest; this has strong tendency to open up the forest to serious encroachment by the surrounding populations, especially for waste dumping which was observed to be rampant even at the current state of the forest.

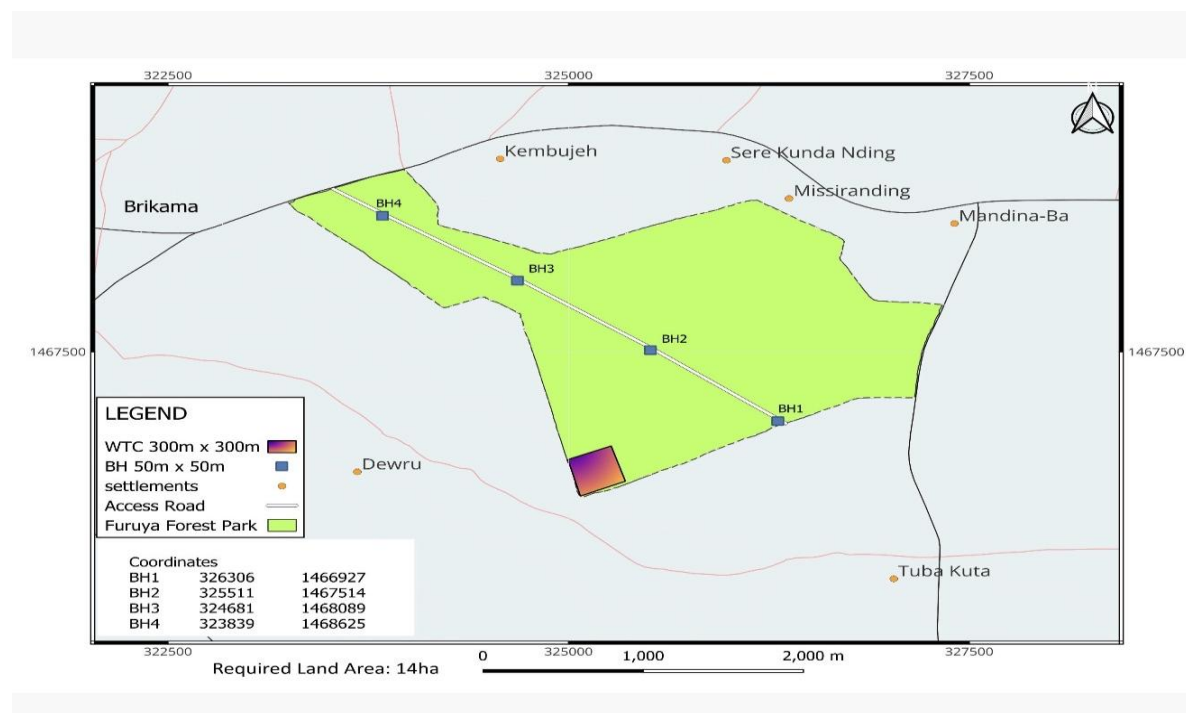


Figure 6.1: Planned locations of boreholes and WTP

Source: Project document

The implication of this fragmentation on wildlife is another major reason; this cannot be ascertained at this point for lack of information, hence the need to apply the *precautionary principle* and avoid any fragmentation. Not the least of the major reasons is the overall existence of the forest. FFP is a plantation forest, primarily for Gmelina (*Gmelina arborea*). Therefore, it goes without doubt that the long-term existence of the forest largely depends on the regeneration of the plant as well the existence of saplings to naturally replace the adult trees that are occasionally removed for timber. In other words, any large-scale removal of regenerations, and saplings, of the tree should be avoided.

In order to have an idea about the status of saplings, and regenerations, a sampled survey was performed using existing paths in the forest as transects that cover a larger part of the forest; see Figure 6.2 below and Appendix 6.1 for the *survey protocol*. The total length of transects surveyed was 7.2km with a transect width of 50m; the space identified for each of the five facilities (four boreholes and WTP) were also surveyed, hence a total area 46ha (~459,532m²) was surveyed. FFP's size is estimated at 467, which means at least 10% of the forest was surveyed. By the cited Figure 6.2, this means the juvenile plants are abundantly scattered in at least 10% of the forest, including the sites identified for the facilities; this figure is certain to increase if a larger area was surveyed. In essence, it can be concluded that the planned locations of the facilities will lead a large removal of the juvenile *Gmelina arborea*, putting the long-term survivability of the forest at risk.

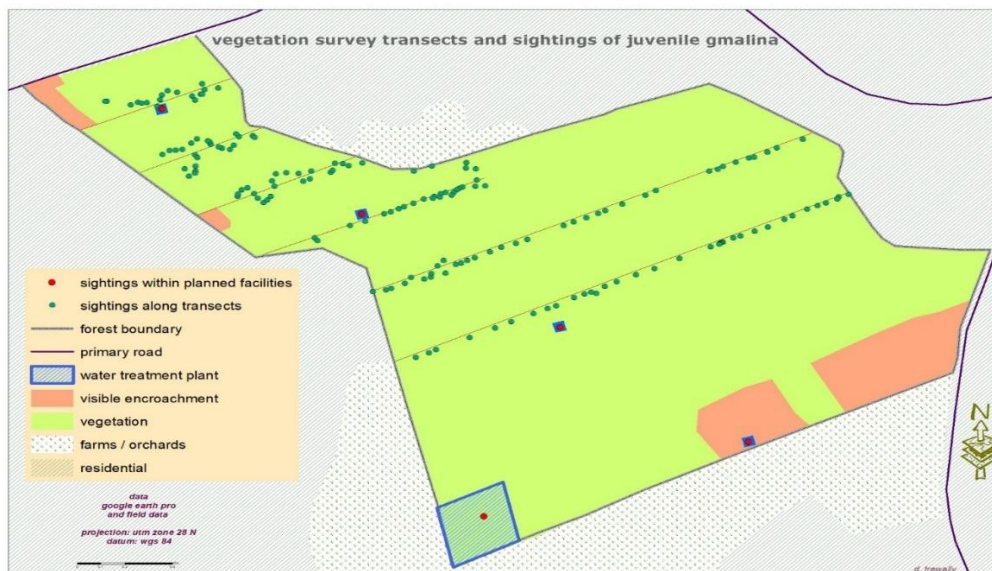


Figure 6.2: Vegetation survey transects

Finally, it is inarguable that the topmost priorities of the project should include the long-term protection, and sustainable conservation of the forest; this will not be achieved with the planned locations in view of some of the key reasons given above. In this regard, it is strongly recommended that the planned design, in terms of the locations of the boreholes, be change to the proposal in Figure 6.3 below. In this proposal, the boreholes are placed along the edge of the forest, with *borehole 1* remaining as planned. The proposed locations are either in partly degraded areas or littered with waste dumps, which means there will be little removal of vegetation.

It is also proposed that the project standardises part of the road that runs along the entire edge of the forest; in this case, along the *eastern* and *southern* edge as shown in the Figure 6.4. It is strongly believed that these modifications in the design will not only avoid the fragmentation but strongly contribute to controlling encroachment into the forest, hence contributing to the its long-term conservation efforts.

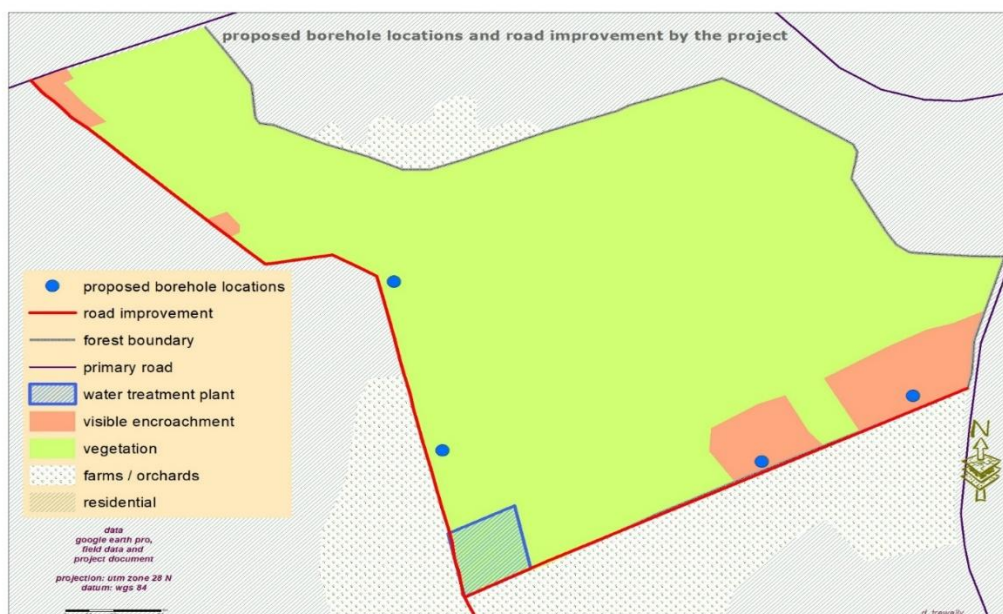


Figure 6.3: Proposed borehole locations and road improvement

6.4 Description of identified impacts and proposed management measures during construction

This section provides description of the predicted impacts and the significance of each, during the preconstruction and construction phases. Corresponding management measures have also been proposed to mitigate and enhance the negative and positive impacts respectively.

6.4.1 Potential Positive Project impacts

The production, treatment and transmission of water shall directly improve accessibility and reliability with secondary benefits on livelihood, health, agriculture and other associated socioeconomic development. Major positive outcomes of the Project include:

6.4.1.1 Income generation from employment

During the preconstruction and construction phase, temporary employment will be created with direct positive impacts on livelihoods resulting from income generation.

Skilled workers will be employed to carry out activities such as technical planning, architectural and construction works, whilst less skilled labour will be needed for land clearing and other manual support. Where the expertise is readily available at the community levels, particularly the youth workforce, skills transfer and development is expected.

Additionally, local women commonly target project workers by selling food and drinks near worksites, thus, increasing income generation during the works.

Enhancement measures

The Project will ensure that both men and women are given the same employment opportunities without any impediments in the way of the vulnerable, including women and youth. The Project shall promote local employment as far as reasonably possible.

6.4.1.2 Improved livelihood

The Project will increase access and quality of water, significantly improving livelihoods through better health from the utilization of fresh and wholesome water, prevention of disputes that result from competition for water, and increased income from economic activities such as food processing and car washing. The time and effort saved from the need to previously move around for water collection can be utilized for other achievements.

Enhancement measures

Develop the management and administration of the new National Water Company, through operational policies and procedures, including relevant staff training, to promote sustainability of the water supply system. The beneficiaries shall also be educated on efficient use.

6.4.2 Potential Negative Impacts on the Abiotic Environment During Construction

6.4.2.1 Ambient air quality (particulates)

The Project has the potential of changing ambient air quality from the use of heavy machinery during the construction phase; the potential is highest and mainly significant during the construction of the transmission and distribution networks that are expected to involve an extended use of such machinery and within built-up settlements.

The site preparation for the treatment plant will require fairly considerable grading that has potential to particularly release dust and carbon monoxide particulates into the immediate environment. The significance of the said construction phase impact was assessed on guidelines by the IAQM¹⁹ for construction dust and particulates; this was chosen due to the inadequacy of the measured baseline air quality parameters as earlier mentioned. This method determines the risk of impacts from construction works looking at, among others, proximity of sensitive receptors in the area (humans and ecosystems) and the potential magnitude of the emissions. The guidelines provide four different types of construction activities: *demolition*, *earthworks*, *construction*, and *trackout*.

The works at the Furuya Water Treatment Plant (FWTP), boreholes and access can best be described as small-scale construction activities for which the potential dust emission magnitude is presented in Table 6.9.

Table 6.9: Potential dust emission magnitude for construction

Activity	Large	Medium	Small
Construction	Total building volume >100,000m ³ , on site concrete batching, sandblasting.	Total building volume 25,000m ³ to 100,000m ³ , potentially dusty construction material (e.g. concrete), on site concrete batching.	Total building volume <25,000m ³ , construction material with low potential for dust release (e.g. metal cladding or timber).

Source: IAQM, 2016

The emphasis, in terms of magnitude of the impact, was placed on proximity of the sensitive receptors to source. Thus, the routes of the 50 kilometres of distribution mains and 3.3 kilometres of fresh water transmission lines in near proximity to people and property was assessed to be high as presented in Table 6.10.

¹⁹ Institute of Air Quality Management, UK

Table 6.10: Sensitivity of the area to dust soiling effects on people and property

Receptor sensitivity	Number of receptors	Distance from source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10 to 100	High	Medium	Low	Low
	1 to 10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

The effect of *spatial extent* of the impact is only significant for the transmission corridors (along inhabited areas), with potential moderate impact in terms of magnitude. Therefore, by the guidelines' risk definitions for construction works in Table 6.11, below, the project's potential impact of '*alteration of air quality*' was assessed to be '*high risk*'.

Table 6.11: Risks of dust impacts

Receptor sensitivity	Dust emission magnitude		
	Large	Medium	Small
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
low	Low risk	Low risk	Negligible risk

Source: IAQM, 2016

Mitigation

Vehicles transporting earth materials must be covered to prevent flying debris and dust, and the burning of cleared and construction waste is prohibited.

Personal protective gear to prevent dust-related health problems and dust nuisances will be provided to workers, whilst access to worksites by the public will be prohibited by placing appropriate signs and barriers, in addition to community sensitization on health and safety during works. Communities will also be educated on the GRM should they have complaints or want more information about the Project.

Monitoring will be carried out with emission standards prescribed in the Environmental Quality, Permitting and Discharge Regulations are not exceeded.

6.4.2.2 Ambient noise levels

Noise pollution from the project is expected to come mainly from the use of heavy equipment, repetitive manual pounding and the presence of work teams.

The potential impact of noise nuisance is assessed on the excavation of trenches for water transmission and distribution lines, use of concrete mixers and related works requiring heavy machinery. The impact was assessed as a *point source noise*, using studies/guidelines by the USDOT²⁰ that have determined that the average maximum noise levels at 15 meters from the heavy equipment that includes excavators, graders and concrete mixer trucks range from 73 to 101 dBA.

²⁰ United States Department of Transport, <https://www.nrc.gov/docs/ml1225/ml12250a723.pdf>

The studies also found out that the standard reduction for *point source noise* is 6 dB per doubling of distance from source; this is demonstrated in Table 6.12 below using the worst-case scenario of 101 dBA, up to the point where the acceptable limit of 55 dBA, as per IFC's EHS Guidelines (2007), is reached.

Table 6.12: Point source noise attenuation

Distance from source (meters)	Point source (- 6 dB)
15	101 dBA
30	95 dBA
60	89 dBA
120	83 dBA
240	77 dBA
480	71 dBA
960	65 dBA
1,920	59 dBA
3,840	53 dBA

As analysed above, the acceptable limit of 55 dBA is only reached at a distance of more than 2km from the noise source. Therefore, even where the work is expected during the day where less noise nuisance is expected compared to the nighttime with less background noise, it is concluded that the Project's potential impact of '*disturbing noise levels*' will be significant during works on the transmission and distribution networks. The Project has no significant potential for noise pollution during works on the boreholes and clean water treatment plant (all within the Furuya Forest) and during the operations phase.

Mitigation

Noise and vibration nuisance generated by equipment, workers and work activities shall be managed by ensuring that the schedule of construction works run only during daylight hours (8am to 6pm) when background noise is equally more prominent. Workers and affected communities where the transmission lines will run, shall also be educated and informed on the expectations and need for protection or avoidance during such periods. PPE like earplugs, earmuffs and canal caps to reduce sound should be available to protect workers from noise. The affected communities will be sensitized on the GRM and the possibility to seek information and lodge complaints relating to the Project.

6.4.2.3 Geological

The Project's potential impacts on geology under the works are expected to arise primarily from trench excavation for transmission and distribution pipelines, as well as site preparation works for the FWTP and associated infrastructure.

The VECs identified in relation to geology are:

- Structural stability of geological formations
- Groundwater quality
- Water table levels

Accordingly, the potential impacts considered are:

- Alteration of stability of formations
- Groundwater contamination

- Localised interaction with the water table during excavation

The Project area is predominantly sedimentary, characterized by sandstone and clay as described in the baseline section. Given the absence of volcanic history or tectonic instability in the region, the geological setting is considered stable.

Alteration of stability of formations

The potential impact of “alteration of stability of formations” is associated mainly with trench excavation activities along transmission and distribution corridors and limited excavation works at the FWTP site.

Trench depths are relatively shallow and confined to near-surface materials. No deep excavation into consolidated bedrock formations is anticipated. Given the predominantly sandy and partly consolidated nature of the formations, excavation activities are not expected to generate significant vibration or destabilization of geological structures.

Therefore, the likelihood of significant alteration of geological stability is considered low.

Groundwater contamination through impact on geology

Construction activities may temporarily expose subsurface layers during land clearing and preparation. However, the Project activities will not include the use of drilling fluids, chemical additives, or injection processes that could directly affect deeper geological formations. Therefore, the potential for groundwater contamination, arising directly from geological disturbance by the Project, is considered low.

Any contamination risk would be associated primarily with accidental spills of fuels or lubricants during construction activities, which is addressed under the soil contamination section.

Water table interaction

Excavation of trenches may locally intercept groundwater where the water table is high, particularly during the rainy season. However, given the linear nature and depth of excavation works, no significant or permanent alteration of groundwater levels is anticipated from the works.

Mitigation

Through implementation of appropriate construction practices and supervision, geological impacts are expected to remain insignificant. To ensure that geological stability and groundwater integrity are maintained during construction, the following measures will be implemented:

- Excavation works will follow approved engineering and geotechnical specifications;
- Fuelling and maintenance of construction equipment will be conducted in designated areas for containment of potential spills and leaks to prevent contamination of the subsurface formations;
- Construction personnel will be trained in good environmental and engineering practices to minimize disturbance of geological layers.

6.4.2.4 Soil

The VECs of concern in this case are soil surface and soil edaphic factors with concern for potential contamination of the soil surface and alteration of edaphic factors respectively.

The potential for contamination of the soil surface is primarily associated with accidental fuel and oil spills during construction. This may arise from the use of construction vehicles and equipment such as excavators, graders, and transport trucks, as well as from the improper handling or temporary storage

of lubricants and other hydrocarbons. The Project is not expected to transport or store fuels and oils in large quantities, thus, the probability of major spills contaminating the soil is negligible.

The Project's potential '*alteration of edaphic factors*' is expected from the trampling effect of heavy vehicles during site clearance, grading and excavation activities in particular.

These activities are limited to spatial extent and duration. It is a general knowledge that any significant alteration of any edaphic factor (e.g., texture, structure, aeration, pH & organic matter content) will only come from extensive, and continuous use, of heavy equipment; this is not expected in the case of the identified activities that can be completed in few hours, considering the size of direct area of influence.

Therefore, considering these factors, it was assessed that the project's potential impact of 'alteration of edaphic factors' will be negligible as far as the Project is concerned.

Given the flat topography of the Project area and the temporary nature of excavation works, significant and long-term alteration of soil structure or edaphic characteristics is not anticipated. Disturbed soils will be reinstated following backfilling of trenches.

Therefore, it is concluded that the Project's potential impacts on soil, in terms of both contamination and alteration of edaphic factors, are expected to be minor and localized.

Mitigation

Storage, transportation, and disposal of hazardous and non-hazardous waste will be properly managed to prevent spills and soil pollution. Refuelling and maintenance activities will be undertaken at designated locations, and temporary storage of fuels or lubricants, where necessary, will include appropriate containment measures.

Construction workers and relevant staff will be trained in spill prevention and response procedures to ensure immediate containment in the event of accidental releases. Any contaminated soil or materials will be removed from the site and disposed of at authorized facilities.

Excavated soil will be reused for backfilling wherever feasible in order to maintain a balanced cut-and-fill approach. Temporary stockpiles will be managed to reduce erosion risk and reinstated promptly after completion of works. Disturbed areas will be restored to their original condition as far as practicable.

All contractors and subcontractors will be required to report environmental incidents. Such incidents will be subject to investigation, corrective action, and preventive measures as needed. These requirements will be incorporated into the Contractor's Environmental and Social Management Plan (C-ESMP), including an Emergency Preparedness and Response Plan addressing potential hazardous material spills during construction.

6.4.2.5 Aesthetics

The Project's potential impacts on aesthetics during the construction phase are expected from the temporary stockpiles of soil and pipes during the excavation of the pipelines, especially within the settlements. The soil mounds are usually used as backfill and levelled after the works to ensure it blends with the landscape and prevents erosion. Machinery and equipment may also be left in different locations, particularly where there is a breakdown. These impacts have low potential to significantly change the landscape, especially considering their temporary nature.

Mitigation

Promote good housekeeping rules to ensure that work sites are organized and safe. All excavations and piles of earth materials that have been made during the works and not used must be levelled in order to return the sites similar to its surroundings. All excess and waste materials will be removed

from the work sites for appropriate management. Work sites must be cleared after all construction activities.

6.4.3 Potential Negative Impacts on the Biological Environment during Construction

6.4.3.1 Risks of deforestation

The risk of deforestation is assessed as high as most of the Project activities (FWTP, the four boreholes and access roads to the boreholes, transmission lines) are proposed within the Furuya Forest. The vegetation, described in the baseline section, must be cleared for the infrastructural works. The distribution lines are not expected to cause any significant loss of forest trees.

With the construction of roads within the Furuya Forest to access the boreholes, this will open up the Forest to illegal exploitation, dumping of waste and further encroachment. Therefore, the Project will cause significant loss of forest trees within an ecological protected area.

Mitigation

The risks of accidental forest fires, uncontrolled vegetation clearing, waste dumping, and inappropriate use of vegetated areas as work camps will be mitigated through strict site management procedures and worker awareness programs. Construction personnel will be educated on the importance of protecting forest resources and natural habitats, including clear prohibitions against setting fires, and clearing vegetation beyond the approved footprint.

The establishment of worker camps, material storage areas, or equipment parking zones within the Furuya Forested will be strictly controlled. All temporary facilities will be located within approved and already disturbed areas.

Disciplinary measures will apply in cases of non-compliance, in accordance with the Contractor's Code of Conduct and C-ESMP. Workers will be encouraged to report suspected violations, and an anonymous reporting mechanism will be made available through the labour Grievance Mechanism (GM).

As earlier discussed, relocation of the boreholes is recommended to avoid unnecessary fragmentation of the Furuya Forest.

Waste generated during construction will be properly collected, stored, and disposed of at authorized sites. Dumping of waste in vegetated or forested areas will be strictly prohibited.

6.4.3.2 Risk to loss and disturbance of wildlife

The Furuya Forest supports a diversity of wildlife as described in the baseline section, serving as an important site for both habitat and feeding. Therefore, the ecological value and potential disturbance of the Forest by the Project activities is assessed to be medium risk as removal of forest trees will directly affect habitat and biodiversity loss.

Developing access roads within the Forest for the borehole sites will also open the area to potential illegal exploitation such as the hunting of wildlife.

Mitigation

Vegetation clearance will be strictly limited to the minimum footprint required for trench excavation and pipeline installation. Hunting, trapping, harming, or consuming wildlife by workers will be strictly prohibited.

In collaboration with the Department of Forestry, reforestation and monitoring will be undertaken to ensure that restoration measures are effective.

6.4.4 Potential Impacts on the Socioeconomic Environment During Construction

6.4.4.1 Employment and income generation

The Project's workforce requirements during pre-construction and construction are expected to result in temporary local economic benefits through wages and small-scale service demand. These benefits are particularly relevant in communities adjacent to work sites, where short-term earnings can support household expenditure and resilience.

The socio-economic significance of this impact depends on (i) the extent to which local labour is engaged, (ii) the balance between skilled and unskilled roles, and (iii) the fairness and accessibility of recruitment processes. While skilled positions may be filled from outside the immediate area, the Project is expected to create opportunities for local unskilled and semi-skilled labour (e.g., site preparation, basic construction support, guarding), which can be especially beneficial to unemployed or underemployed youth. Participation in Project works may also provide transferable experience (technical, work discipline, health and safety practices, teamwork), improving employability beyond the Project duration.

Indirect income effects may also occur through small informal commerce around work sites (e.g., food and drink vending), an activity frequently undertaken by women, thereby generating temporary supplementary income.

Enhancement measures

To maximize the benefits and reduce exclusion risks, the Contractor will apply transparent and fair recruitment procedures, provide equal opportunity for women and men, and avoid discriminatory barriers to women's participation (e.g., through appropriate job information channels and fair selection criteria). Targeted measures for vulnerable groups—including women, persons with disabilities, and the elderly—will be integrated into the ESMP. Where practicable, the Project will encourage local hiring for suitable roles and ensure workers are employed under conditions consistent with applicable labour requirements.

6.4.4.2 Risks to public health and safety

During construction, the public is at risk of hazards such as trenches, long pipes, hazardous construction materials, increased traffic, and large machinery. Children are particularly at increased risk of accidents, considering the habit of playing around worksites that are novel to the locality (on the stockpiles of earth materials, inside water pipes awaiting installation and parked heavy equipment). Children, elderly and disabled people will face challenges crossing trenches. Exposure to these hazards may lead to injury, permanent disabilities, or loss of lives.

The risk of spreading communicable diseases to community members from workers and vice versa, is always present irrespective of the duration of the project activity; this risk increases with the importation of workers to communities. The communicable diseases of most concern, especially during the construction phase, are sexually transmitted diseases (STDs). There is also the risk of child labor with children from communities.

Less significant impacts may occur as a result of temporary nuisance from localized dust, vibration, and noise generation during the works.

As most of the Project activities are within the Furuy Forest, the potential risks to public health and safety are mainly significant during construction of the distribution lines, where communities are present.

Mitigation measures

The Project will ensure the affected communities are protected from hazards at worksites by enforcing the prohibition of access; providing updated information to communities on the works, preventive

measures and education on the GRM; ensuring materials, waste and equipment are secured; and cordoning and proving warning signs.

Through the C-ESMPs, the contractors shall ensure effective risk reduction and management by implementing procedures for specific works (including maximum duration for uncovered trenches, child labour, and traffic control, etc.), hiring local people for unskilled work, training of employees on health and safety, monitoring diseases, ensuring workers understand and sign codes of conduct, including the prevention of GBV, VAC, SEA/SH.

6.4.4.3 Risks to occupational health and safety

Significant risks to worker health and safety during preparation and construction activities include attacks by wildlife in remote areas, falls from heights, falls into excavated trenches, injury from machinery and equipment.

Other issues of importance to worker health and safety during construction include risks and hazards associated with hazardous chemicals, noise and vibration, air emissions, diseases, and personal conflicts. Work related stress including long working hours, work under extreme heat from the sun, lack of sanitation and rest services may significantly contribute to accidents contributed by voluntary or involuntary human error, improper use of PPEs or non-availability of quality PPEs.

Mitigation

The contractors shall ensure effective risk reduction and management by implementing the approved C-ESMPs that include procedures for safe work activities, training of employees on health, safety and the worker GRM, the need for provision and training on the use of personal protective equipment, education and signature of workers on codes of conduct, including the prevention of GBV, VAC, SEA/SH. Sanctions for violations shall be highlighted and enforced.

When working along roads, good signage and demarcation will be put in place to alert that work is ongoing and the restricted speed limits.

All records of incidents at construction sites and any related off site, shall be maintained and documented by the contractor with corrective actions taken. Major incidents and accidents shall be brought to the attention of the Contractor Project Manager and to NAWEC within one business day after occurrence.

Prior to agreeing with the Contractor, OHS clauses should be incorporated in the proposals, and also in the contract and clearly spelled out in the minutes of the negotiations. The budget for environmental and social mitigation measures should be clearly indicated and taken into consideration by the future Contractor to ensure resources are available.

6.4.4.4 Negative impacts from GBV, SEA/H and VAC

Women, elderly, people with disabilities and children are vulnerable to exploitation and abuse during the land preparation and construction phases. Workers are in the habit of seeking food, drinks and sanitation facilities in residences within project areas, thus, have opportunities to be in contact with vulnerable groups of people. Sometimes, imported workers are also better off than community members and as a result, may willingly or not, behave in patronizing ways.

Children may be found playing within work sites, employed on the works, or merely asked to carry out errands by workers. Both women and children are at risk of being abused verbally, physically, or sexually, in addition to the risk of worksite accidents. During the Project implementation, relevant information is provided to the affected and interested stakeholders. Disadvantaged and vulnerable groups may also be at risk of being left out during the process of stakeholder consultations due to

reasons related to the inability to freely participate without support or intentional omission by male-headed households.

All these risks may lead to conflict, loss of dignity and confidence, physical and psychosocial distress, lack of access to project benefits or appropriate compensation, morbidity, and mortality. The risk is assessed as high considering that communities will be at risk during construction of the distribution lines.

Mitigation

The Contractor intends to recruit construction workforce locally to the extent possible and make compulsory, the signing of the *Contractor's and other employees' Codes of Conduct* which includes the behaviour of workers on site and off the worksites, prohibits unauthorized and illegal substance use, and addresses the prevention of communicable diseases. Furthermore, *Codes of Conduct* for the prevention of GBV, VAC, and SEA/H will be implemented outlining prohibited behaviours and applicable sanctions, including regular monitoring and raising awareness on the Codes of Conduct. Procedures to safely and effectively manage SEA/SH will be included in the grievance mechanism.

Children will not be employed or allowed to participate in project work and shall be prohibited from the works sites. Women will be given equal employment opportunities to those of men, without any impediments placed in their way

NAWEC shall ensure that adherence to the codes of conduct for GBV, SEA/H, VAC are included in bidding documents for contractors.

The GRM specific to GBV, SEA/H, VAC cases should be prepared and implemented with all the required training and sensitization for both workers and the affected communities. Actions that are not tolerated, the sanctions to be applied for violations, and the different redress avenues for the victims shall be clearly identified.

7.2.3.5 Involuntary resettlement and loss of livelihood

Use of the Furuya Forest for the Project will cause loss of forest trees, potential obstruction of access and consequential loss of income and livelihood.

Communities would have temporary reduction of access to forest produce and products such as fruits, leaves, bark, stem and roots used as food (loss of usufruct), for economic returns and as medicine. However, given the large expanse of the forested areas left undisturbed by the Project, and the limited footprint of the Project (14ha) in this regard, the communities will continue to have access to non-wood forest products within the same locality. Thus, long-term livelihood impacts were assessed as limited and manageable under the mitigation measures.

Although the proposed distribution lines follow public roads, certain impacts may arise, including:

- Temporary obstruction of access to residential or commercial premises during trench excavation;
- Temporary disruption of small roadside businesses and temporary reduction of income for informal vendors;
- Damage to private property (fences, kiosks, driveways) if not properly managed;
- Loss of trees or small assets located within the right-of-way;
- Community grievances arising from the Project activities.

All affected persons, including informal users and economically affected individuals, must be identified, consulted, and, where relevant, compensated prior to the commencement of works. This will be confirmed once the design for the routing is confirmed.

Mitigation

Proposed land outside NAWEC property shall be clearly demarcated, and ownership status verified and formalized, where required, prior to the commencement of works. Alignment of transmission corridors will, as far as practicable, follow existing road reserves and public rights-of-way in order to minimize land acquisition and displacement risks.

A Resettlement Action Plan (RAP) shall be developed and implemented by NAWEC in accordance with applicable national legislation and international environmental and social standards. The RAP will assess and address potential involuntary resettlement, loss of property, temporary displacement, restriction of access, and any related loss of income or livelihood. Where relevant, the RAP process shall include:

- Identification and census of Project Affected Persons (PAPs), including individuals with customary or usufruct rights;
- Socio-economic surveys to establish baseline conditions;
- Asset inventory and valuation;
- Compensation at replacement cost for affected assets;
- Livelihood restoration measures where economic displacement occurs;
- Payment of compensation prior to the commencement of civil works.

In areas where trenching works may temporarily obstruct access to residences, businesses, or public facilities, temporary access management measures shall be implemented. Contractors will provide advance notice of construction schedules and maintain safe pedestrian and vehicular access wherever feasible. Temporary business disruption will be minimized through phased works and rapid reinstatement of affected areas.

A functional and accessible GRM shall be maintained throughout the Project lifecycle to ensure complaints are addressed in a timely and transparent manner.

At this point, it can be confirmed that there will be loss of forest trees, therefore, in collaboration with the DoF, NAWEC will ensure that the existing Memorandum of Understanding (MoU) covers trees affected by this Project. The necessary assessment and valuation will be carried out and restoration planting measures implemented in consultation with the DoF.

7.2.3.6 Impacts on sites of cultural and historical significance

Based on the Project information, cultural or religious sites of significance have not been identified to be impacted by activities of Project.

Notwithstanding, during the excavations for the pipes and other construction works, there is a possibility of finding archaeological items by chance. These may be disturbed or lost due to lack of knowledge in managing cultural heritage that has been accidentally discovered.

Mitigation

This Project ESMP includes the procedures to apply on chance finds and shall be adopted in the C-ESMP. Workers will be educated on the potential of finding valuable heritage artefacts and the Chance Finds Procedures to follow.

The relevant parties of the discovery will be informed, if and when they occur.

6.5 Description of the identified impacts and proposed management measures during operation

This section provides a description of the potential impacts during the operations phase of the Project. Corresponding management measures to mitigate or enhance the identified impacts are also discussed.

6.5.1 Potential Negative Impacts on the Abiotic Environment during Operation

6.5.1.1 Risk of chemical contaminations

During operation, soil and ground water pollution may be caused by seepage from nearby waste dumping, contaminated rainwater runoff, and spillage or leakage of hazardous materials. This may result in negative health effects and disruption in water supply during appropriate treatment.

Prolonged exposure to heavy metals and other contaminants may result in neurological, gastrointestinal, and developmental effects, especially among children. Additionally, acidic water can impair the effectiveness of chlorine disinfection, increasing vulnerability to microbial contamination. Over time, consumption of such water may also contribute to dental erosion and reduce overall acceptability due to taste and appearance.

Chemicals from the FWTP may include expired chemicals and hazardous byproducts from the processes. E-wastes, including laptops, printers and other IT wastes contain hazardous substances like lead, mercury, cadmium, and could leach into groundwater threatening water quality.

Mitigation

NAWEC will ensure precise dosing using pH meters and dosing pumps to avoid overcorrection and secondary effects by using automated pH balancing systems.

Specific education of workers will be provided on the management of hazardous chemicals such as Calcium Hypochlorite and Chlorine, including handling, usage, storage and disposal of empty containers.

Burning waste is prohibited; waste from all operational activities shall be appropriately managed and securely stored pending final disposal. Any spillage from handling hazardous materials shall be immediately contained, and the contaminated soil removed from the site for suitable treatment and disposal. The NEA shall be notified of the necessary advice and technical support in major spill cleanups.

Staff will be trained on implementation of the Emergency Preparedness and Response Plan and the operators specifically trained in procedures to prevent spills and personal contact with hazardous materials. Storage shall be provided in designated areas that have secondary containment and only handled by trained, authorized staff.

7.3.1.2 Impacts from waste generation

Insignificant quantity of domestic waste such as food, paper, disused furniture, gardening waste, packaging materials and other non-hazardous waste shall be produced during operation of FWTP. However, more significant quantities and types of waste shall be produced during maintenance of works from all the infrastructures of the water systems where worn-out parts and materials are replaced. These may haphazardly be dumped, polluting the soil and air quality.

Mitigation

Wastes produced during operation shall be managed in line with national laws and the Waste Management Plan to include the promotion of waste identification, classification, quantification and segregation; hazardous versus non-hazardous wastes. The National Water Company shall develop an

internal information, supervision and monitoring system to ensure waste reduction and proper management.

7.3.1.3 Air pollution during maintenance works

Localized, temporary air pollution from dust, exhaust, and other air emissions may occur during maintenance of works and can cause nuisance to operators and communities where the works are carried out. However, it is planned that measures will be taken to reduce the impact further, thus, the project has low significant potential for ambient air pollution during the operation phase.

Mitigation

Sites of civil works during repair and maintenance will be contained to prevent unauthorized access and exposure to air pollutants. Masks for the protection of workers during periodic maintenance of works shall be provided, and burning of all types of wastes from operational activities prohibited.

7.3.1.4 Noise and vibration nuisance

During operation noise and vibration will be produced by workers, machinery, maintenance work activities, and housekeeping services. Repetitive throbbing noise may be produced from the movement of water, and continuous running of equipment, including pumps and aeration systems. The effect is assessed as insignificant considering the fact that these activities are located within the Forest with limited receptors.

Mitigation

Noise-generating equipment and machinery shall comply with regulatory standards, and earplugs provided to workers exposed to continuous noise emissions. Maintenance works during the operation must be carried out between 8am and 6pm to reduce noise and vibration nuisance. Notwithstanding, only emergency repair works shall be carried out during nighttime.

6.5.2 Potential Negative Impacts on the Biological Environment during Operation

7.3.2.1 Impacts on biodiversity during maintenance operations

Loss of forest trees during maintenance works, periodically or during ad hoc repairs, may also lead to loss of wildlife or disruption of shelter and access to food that was being received from the vegetation. This will be insignificant as the sites would have already been cleared off trees during construction. Low risk on biodiversity may, however, be present where workers are imported during maintenance and increase the risk of fires or exploitation during this period.

Mitigation

Workers must be educated on the need to protect the Furuya Forest and be prohibited from setting fires in and around the forests with effective disciplinary measures applied for violations.

Hunting and killing of wildlife by workers are prohibited and disciplinary measures shall be taken.

6.5.3 Potential Impacts on the Socioeconomic Environment During Operation

6.5.3.1 Increased access to water

Implementation of the Project will increase and improve the public water production and supply systems in the GBA, leading to increased accessibility to quality water. It will significantly improve quality of life and health from the utilization of domestic portable water, prevention of conflict resulting from water disputes, and huge reduction in the time and energy previously spent on trying to access water.

Enhancement measures

Build on the administration, management and operational policies of the National Water Company, including relevant staff training, to promote sustainability of the water supply system.

6.5.3.2 Risks to occupational health and safety

Significant risks to worker health and safety during operation include falls from heights, injury from machinery and equipment. Another issue of importance to worker health and safety during operation include risks and hazards associated with hazardous chemicals. These chemicals utilized during routine project operation of the FWTP may result in ill health from uncontrolled exposure, and risks of fires or explosions. Calcium hypochlorite will be used as a disinfectant in the treatment of raw water, and direct contact with it can lead to blisters, pain, and long-term tissue damage. It can cause severe burns to the skin and eyes, and inhalation of dust or fumes may irritate the respiratory tract.

Noise and vibration, air emissions, diseases, and personal conflicts are other issues that will be important to take note of during operation.

Mitigation

The contractors to carry out maintenance or repair works shall ensure effective risk reduction and management that include procedures for safe work activities, training of employees on health, safety and the worker GRM, the need for provision and training on the use of personal protective equipment, education and signature of workers on codes of conduct, including the prevention of GBV, VAC, SEA/SH. Sanctions for violations shall be highlighted and enforced.

As these chemicals are highly reactive, all personnel handling the hazardous materials must wear gloves, safety goggles, and dust mask or respirators to protect the skin, eyes, and respiratory tract. Specialized education of workers will be provided on the safety guidelines for working at heights, and the management of hazardous chemicals such as calcium hypochlorite and chlorine. Where NAWEC staff are used to carrying out such works, the same will apply.

When working along roads, clear and visible signage should be erected to protect workers, reducing the speed of vehicles.

All records of incidents at construction sites and any related off site, shall be maintained and documented by the contractor with corrective actions taken.

6.5.3.3 Risks to public health and safety

During operation and in particular during maintenance works, the public is at risk of hazards such as trenches, long pipes, hazardous construction materials, increased traffic, and large machinery. Children are particularly at an increased risk of accidents. Exposure to these hazards may lead to injury, permanent disabilities, or loss of lives.

The risk of spreading communicable diseases to community members from workers and vice versa, is always present irrespective of the duration of the project activity; this risk increases with the importation of workers to communities.

Less significant impacts may occur as a result of temporary nuisance from localized dust, vibration, and noise generation during land clearance and works.

Mitigation

NAWEC will ensure the affected communities are protected from hazards at maintenance worksites by enforcing the prohibition of access; providing updated information to communities on the works,

preventive measures and GRM; ensuring materials, waste and equipment are secured; and cordoning and proving warning signs.

If used, the contractors shall ensure effective risk reduction and management by implementing procedures for specific works (including maximum duration for uncovered trenches, traffic control, etc.), training of employees on health and safety, monitoring diseases, ensuring workers understand and sign codes of conduct, including the prevention of GBV, VAC, SEA/SH.

6.5.3.4 Climate related risks

The water infrastructure developed by the Porject will be vulnerable to climate-related risks such as strong winds, storms, and flooding from excessive rains. These risks may lead to environmental impacts including air, soil, and ground water pollution from contaminated runoff and uncontrolled dispersion of waste. Both hazardous and non-hazardous waste will result from such incidents associated with public health risks and environmental pollution. Flooding may affect the quality of water produced whilst other structures risk destruction by strong winds and storms.

Other impacts of social relevance include loss of property and lives, loss of access or difficulty accessing corridors along potentially affected roads, disruptions in water supplies and consequently the deterioration of the health of beneficiaries due to reduced, or lack of clean water.

Mitigation

As these are natural risks that cannot be prevented by the Project, weather proofing construction will be considered, in addition to institutional coordination mechanisms and operational planning that will ensure risk assessment, reduction of hazards, emergency preparedness, response and recovery.

At the planning stage, appropriate designs, siting of boreholes (distant from potential contaminants) and materials of relevant specifications will be identified to withstand extreme weather conditions, including the necessary elevations and accompanying drainage systems.

Staff will be trained to understand the risks, identification and reduction of hazards, and the emergency plan in case of incidents. These include housekeeping rules to ensure hazardous materials are stored according to the procedures, access is controlled to only authorized persons, and waste (including obsolete stock and empty containers of chemicals) are managed according to the WMP with the use of personal protective equipment.

NAWEC shall also develop emergency preparedness plans for disasters and staff trained in implementing the procedures.

6.6 Description of the impacts during project decommissioning

For decommissioning of any component of the water infrastructure beyond the duration of the Project, specific ESMPs will be developed when the time comes in the future, as required.

CHAPTER 7: THE ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

7.1 Overview of the ESMP

The ESMP is an integral part of this ESIA, as it translates the findings into actionable, measurable, and monitorable management measures to be implemented throughout the Project for sustainability.

It is designed to:

- Avoid adverse environmental and social impacts where feasible, and minimise impacts where avoidance is not possible (mitigation hierarchy).
- Define clear roles and responsibilities for implementation, supervision, and regulatory oversight.
- Provide monitoring indicators, frequency, and reporting lines to verify performance and enable adaptive management.
- Establish corrective action mechanisms where non-compliance or unanticipated impacts occur.
- Ensure that stakeholder engagement and the Project's grievance mechanism are functional and responsive throughout implementation.

The ESMP presented in the following matrices provide the operational measures required to manage the environmental and social risks and impacts identified in the assessment. The indicative ESMP budget covers mitigation, monitoring, supervision, and management measures and should be read together with the financing arrangements defined under contractor agreements, GWASAP Component 4 budget, NAWEC operational budgets, and the standalone RAP budget where applicable. The RAP will cover compensation, livelihood restoration, consultation, disclosure, and RAP monitoring measures in accordance with ESS5.

The implementation arrangements for the ESMP are described in Chapter 9, which defines the institutional roles and responsibilities for implementation and supervision. The monitoring and reporting requirements are presented in Chapter 10, which sets out the indicators, reporting procedures, and applicable audit arrangements. The grievance procedures applicable to the ESMP implementation are presented in Chapter 8, which establishes the Project Grievance Redress Mechanism for affected communities and workers. Taken together, these instruments provide the complete environmental and social management plan for the GWASAP.

7.1 ESMP Matrix for General Construction and Operation Measures

Environmental and Social (E&S) Impact / Issue	Mitigation or Enhancement Measures	Responsible for Measures	Monitoring and Verification	Responsible for monitoring	Monitoring timeframe / frequency	Mitigation Budget (\$)	Monitoring Budget (\$)
GENERAL ENVIRONMENTAL AND SOCIAL MANAGEMENT SYSTEM							
System to manage, control and monitor E&S risks	1. Coordinate the implementation and monitoring of this ESMP, including the GRM.	GWASAP Project Safeguards Team	a) Carry out routine inspections b) Implement the monitoring component of the ESMP c) Analyse the Project Grievance Register	GWASAP Project Coordinator; National Environment Agency (NEA)	Monthly	25,000 (operations of the GRC)	40,000 (inspections by the Project E&S safeguards team)
	2. Agreements with Contractors will include relevant E&S safeguard clauses	GWASAP (Project Procurement Specialists)	Review contracts for compliance	GWASAP Project (Coordinator & safeguards team)	Before the signing of all contracts	-	-
DURING PRE-CONSTRUCTION AND CONSTRUCTION							
Contractors' plans for E&S Safeguards							
E&S systems to prevent and manage impacts during works	Develop and implement C-ESMPs	Contractors	a) Carry out routine worksite visits on compliance b) Evaluate E&S issues in the Contractor's reports	Project Safeguards Team; Contract ENGINEER	Weekly	To be included in Contractor's Bill of Quantities (BOQ)	-
	Maintain a Worker Grievance Register	Contractors	Evaluate the Grievance Register of the Contractors	(Social Safeguards Specialist) Contract ENGINEER	Monthly; Weekly, during work activities	-	-
Project sites, Land acquisition and Involuntary Resettlement							
Land ownership conflict	Regularize the ownership/land use rights of all proposed land outside NAWEC Property; i.e. the Furuya Forest	NAWEC Planning and Legal Departments	Land use and ownership regularized	Project Coordinator and Safeguards Team	Before works	-	-
Impact on property (destruction of structures and loss of trees)	Develop and implement a RAP	NAWEC	RAP fully implemented	Project Coordinator and Safeguards Team	Before works	-	-
Temporary displacement or loss of income	Include temporary displacement and any loss of income or livelihood in the RAP assessment	NAWEC	RAP fully implemented	Project Coordinator and Safeguards Team	Before works	-	-
Impact on natural resources during land clearance and construction							
Loss of vegetation and forests trees (risk of forest fires, deforestation, dumping of waste, use of forested area as a work camp)	1. Workers must be educated on the need to protect the forests and avoid feeding wildlife intentionally or leaving food as waste. 2. Workers must be prohibited from setting fires in and around the forests; effective disciplinary measures must be applied. 3. Construction waste must never be temporarily stored or permanently dumped in any forested area. 4. No heavy vehicles, equipment, materials, and any item related to the works be stored outside the Project's footprint.	Contractors	As part of the MoU between NAWEC and the Department of Forestry a) Number of illegal tree-felling related to the Project from the Department of Forestry (DoF), workers, community, or any other. b) Check records of tree felling by the contractor to clear the site for the treatment plant, boreholes and access roads.	DoF, NEA, Project Environmental Safeguards Specialist – ESS Contract ENGINEER	Monthly, during work activities Weekly, during work activities	-	-

Environmental and Social (E&S) Impact / Issue	Mitigation or Enhancement Measures	Responsible for Measures	Monitoring and Verification	Responsible for monitoring	Monitoring timeframe / frequency	Mitigation Budget (\$)	Monitoring Budget (\$)
	5. All employees are encouraged to report suspected acts of forest destruction by fellow workers and will be given an anonymous medium to communicate such observations.						
	The community shall act as a collective neighbourhood watchdog to monitor and report illegal logging, burning or other illegal deforestation activities related to the Project.	Community	a) Number of reports from community members on forest related complaints. b) Community trained on the use of the GRM to report project-related complaints.	DoF, NEA & Project Environmental Safeguards Specialist (ESS) Contract ENGINEER	Monthly, during work activities Weekly, during work activities		
Impacts on wildlife (loss of life, disturbance of shelter and foodsources)	1. Hunting and killing of wildlife by workers are prohibited and disciplinary measures will be applied. 2. All employees will be well trained and constantly sensitized and will also be encouraged to report suspected acts of hunting and killing of wildlife by fellow workers, and will be given an anonymous medium to send in such observations.	Contractors	Number of reports of hunting and killings that are related to the Project from the Department of Parks and Wildlife Management (DPWM), workers, community, or any other source	DPWM, NEA, Project ESS Contract ENGINEER	Monthly, during work activities Weekly, during work activities	-	-
	3. Monitor and report hunting or killing of wildlife.	Community	a) Number of reports from the community expressing impacts on wildlife. b) Community trained on the use of the GRM to report project-related complaints.	DPWM, NEA, Project ESS Contract ENGINEER	Monthly, during work activities Weekly, during work activities	-	-
Impact on the physical environment during land clearance and construction							
Noise and vibration nuisance generated by equipment, workers and work activities.	1. Schedule construction works during daylight hours only (8am to 6pm). 2. Educate workers to limit construction and equipment noise levels within regulated standards. 3. Maintenance of vehicles, equipment and machinery shall be regular and to the satisfaction of the Project Supervisor in order to maintain minimum noise levels.	Contractors	1. Training of workers, including drivers, to raise awareness on noise control. 2. Check the maintenance results of heavy vehicles. 3. Site inspections to check compliance of construction site practices.	Project ESS, NEA Contract ENGINEER	Monthly, during work activities Weekly, during work activities	-	-
Exhaust emissions from construction vehicles and equipment	1. The construction equipment and vehicles will be maintained regularly to keep them in good working condition to minimize exhaust emissions caused by poor performance. 2. Engines of the equipment/heavy vehicles will be prevented from idling and running unnecessarily.	Contractors	A) Check records for training of workers and drivers to raise awareness B) Routine inspections to check site practices c) Evaluate the Grievance registers of the Contractor	Project (ESS); Contract ENGINEER	Monthly; Weekly, during work activities	-	-
Dust and smoke from clearing and construction activities	1. Vehicles transporting earth materials must be covered to prevent flying debris and dust. 2. Burning of cleared and construction waste is prohibited. 3. Prohibit access to worksites by the public by placing appropriate signs and	Contractors	a) Check records of training of workers to raise awareness on control of air pollution. b) Routine inspections to check site practiced for compliance.	Project (ESS); Contract ENGINEER	Monthly; Weekly, during work activities	-	-

Environmental and Social (E&S) Impact / Issue	Mitigation or Enhancement Measures	Responsible for Measures	Monitoring and Verification	Responsible for monitoring	Monitoring timeframe / frequency	Mitigation Budget (\$)	Monitoring Budget (\$)
	barriers in addition to community sensitization on health and safety during works. 4. Provide workers with personal protection gear to prevent dust-related health problems and dust nuisances; 5. Emission standards prescribed in the Environmental Quality, Permitting and Discharge Regulations must not be exceeded.		c) Evaluate the Grievance registers of the Contractor.				
Landscape and aesthetics	1. Encourage good housekeeping rules to ensure that work sites are organized. 2. All excavations and piles of earth materials that have been made during the works and not used must be levelled in order to return the sites similar to its surroundings. 3. All equipment and heavy vehicles must be parked securely at identified sites at the end of each workday. 4. All excess and waste materials will be removed from the work sites for appropriate management. Work sites must be cleared after all construction activities.	Contractors	a) Note poor work practices during interviews on standard procedures b) Check site practices against mitigation measures c) Any evidence of improper waste management	Project (ESS); Contract ENGINEER	Monthly; Weekly, during work activities	-	-
Protection of soils and ground water therein (from leaks, spills)	1. Storage, transportation and disposal of hazardous and non-hazardous waste will be properly managed. 2. Construction workers and relevant staff will be trained on spill response and prevention measures. 3. Any spillages from handling fuel and other hazardous liquids will be immediately contained on site and the contaminated soil and material removed from the site for treatment and disposal. 4. Spoil and other surplus material arising from the work which is classed as “acceptable fill” shall, wherever practicable, be recovered and used in the construction work. 5. All contractors and subcontractors will be required to report any incidents and these will be subject to investigation and remedial action; preventive actions will be taken as needed. 6. Appropriate spill response kits, including absorbent materials, will be present on site. These will be kept in designated areas with specific instructions	Contractors	a) Check that all waste and excess materials are appropriately disposed and recorded. b) Check staff supervision plans and training records. c) Periodic inspections of the site and construction activities. d) Ensure that appropriate emergency response plan and equipment including spill response materials are in place. e) Review records of incidents during the works.	Project (ESS); Contract ENGINEER	Monthly; Weekly, during work activities		

Environmental and Social (E&S) Impact / Issue	Mitigation or Enhancement Measures	Responsible for Measures	Monitoring and Verification	Responsible for monitoring	Monitoring timeframe / frequency	Mitigation Budget (\$)	Monitoring Budget (\$)
	for their use. Site staff will be trained on the use of spill kits. 7. An Emergency Preparedness and Response Plan will provide for mitigation of spills from hazardous materials during construction.						
Materials Supply							
Sand, gravel and other construction materials	1. Aggregates and materials will be sourced from suppliers operating with valid environmental and other permits and licenses. 2. Recycled materials and materials certified as “green” and low carbon will be used whenever possible. 3. Materials used are part of the Leadership in Energy and Environmental Design (LEED) sustainability certification to improve efficiency in the use of energy, water and other resources.	Contractors	a) Inspect supplier records b) Sustainability certified materials used	Project (ESS); Contract ENGINEER	Monthly; Weekly, during work activities	-	-
Waste Management							
Waste generation and management	1. Set an internal supervision and monitoring system to promote waste reduction and management. 2. A construction waste management plan will be developed as part of the C-ESMP to manage all wastes. 3. Burning of cleared and construction waste is prohibited. 4. Ensure waste management is incorporated in agreements with the contractors. 5. . Clean waste such as wrappings shall be made available for reuse.	Contractor	a) Evaluate the implementation of the WMP b) Periodic inspections of the site to ensure that all wastes are separately collected, segregated, labelled and stored in designated areas awaiting reuse or disposal c) Check disposal records of all types of wastes, including contaminated soils d) Check training records of staff and awareness through interviews.	Project (ESS); Contract ENGINEER	Monthly; Weekly, during work activities	-	-
Labour Management							
Management of health and safety of workers – <i>general</i>	1. All applicable national health and safety legislation and international regulations will be followed. 2. Health and safety hazards and risks of each activity during construction will be identified, followed by the appropriate mitigation measures. 3. Identify experienced staff for the coordination and monitoring of health and safety. 4. Provide the necessary personal protective equipment, including training on its use (safety helmets, goggles, masks, gloves, boots) 5. All relevant safety training requirements will be detailed in the C-ESMP, including education on the GRM and their roles in the ESMP implementation.	Contractors	a) Worker Grievance Mechanism to be evaluated in terms of workers’ feedback b) On-site verification of implementation of the health and safety measures in the C-ESMP c) Trainings carried out before and during commencement of works d) Interview workers and inspect site records on the prevention and management of incidents.	Project (ESS); Contract ENGINEER	Monthly Weekly, during work activities	-	-

Environmental and Social (E&S) Impact / Issue	Mitigation or Enhancement Measures	Responsible for Measures	Monitoring and Verification	Responsible for monitoring	Monitoring timeframe / frequency	Mitigation Budget (\$)	Monitoring Budget (\$)
	6. Unskilled workers must be supervised at all times. 7. Codes of Conduct for the prevention of GBV, VAC, SEA/SH outlining prohibited behaviours and applicable sanctions, will be implemented, including regular monitoring and awareness-raising of the Codes of Conduct. 8. Educate workers on interpersonal relationship management among workers and between workers and community members. 9. Always record and report incidents in which issues were addressed in order to create lessons learned and thereby prevent recurrence.						
Worker Occupational Health and Safety – <i>fires and emergencies</i>	1. All employees will be trained on health and safety issues. 2. Provide fire extinguishers and first-aid kits, including training on their use. 3. All medical emergency procedures will be included in the <i>Emergency Preparedness and Response Plan (EPRP)</i> before the works.	Contractors	a) Check implementation of training programs for workers b) Number of incidents reported/recorded c) EPRP developed and workers trained on its procedures, including fire safety and evacuation d) Fire extinguishers and medical kits readily accessible.	Project (ESS and SSS); (Contract ENGINEER)	Monthly Weekly, during work activities	-	-
Worker Occupational Health and Safety – equipment use and hazardous materials	1. All hazardous materials will be stored in designated areas that have secondary containment and handled with care by authorized staff to prevent spills. 2. Only trained and qualified operators are allowed to run specialized equipment	Contractors	a) Check reports on the monitoring of the inspection and maintenance of equipment. b) Number of incidents reported/recorded. c) Check qualification and experience of operators on site.	Project (ESS & ESS); (Contract ENGINEER)	Monthly Weekly, during work activities	-	-
Worker Human Resource Development	Contractors are required to comply with the Codes of Conduct and all worker safety ordinances.	Contractors	Monitor compliance of the Contractor with Codes of Conduct.	Project (ESS and SSS); (Contract ENGINEER)	Monthly Weekly, during work activities	-	-
Record of accidents	1. All incidents and accidents shall be brought to the attention of the Contract Supervisors, and to the GWASAP Project Coordinator within one business day they occur. 2. All records of accidents or any mishap at construction sites shall be maintained and documented regularly by the contractor.	Contractors	a) Undertake a response visit within 24 hours of receiving the report b) Number of incidents reported/recorded c) Check implementation of recommendations that followed any previous incident.	Project (ESS); (Contract ENGINEER)	Monthly Weekly, during work activities	-	-
Labour Engagement and Disclosure							
Worker strikes and Union action on work stoppage	1. Comply with the Labour Act of 2023. 2. Labor management plan will be part of the C-ESMP.	Contractors	a) Check worker grievance records and resolutions, particularly in terms of progress, follow-up, and updates. b) Interview workers to ascertain work conditions.	Project (ESS and SSS); (Contract ENGINEER)	Monthly	-	-

Environmental and Social (E&S) Impact / Issue	Mitigation or Enhancement Measures	Responsible for Measures	Monitoring and Verification	Responsible for monitoring	Monitoring timeframe / frequency	Mitigation Budget (\$)	Monitoring Budget (\$)
	3. Employees shall not work more than 40 hours per week (maximum 8 hours per day). The employees will have an additional break of 1 hour each workday. The duration of rest between working days shall not be less than 12 hours. 4. Develop and implement a Worker Grievance Mechanism as part of the C-ESMP to ensure a transparent and informed information-sharing channel for all workers.				Weekly, during work activities		
Community Engagement and Disclosure							
Transparency around project status and sharing of alerts and updates	1. Regular communication of project information to all stakeholders and the general public through an updated Stakeholder Engagement Plan (SEP). 2. Provide prior public notification on water supply disruptions necessary during works. 3. Maintain the NAWEC GRM program. 4. Sensitize the public on the GRM.	NAWEC Public Relations; GWASAP Safeguards Team	a) Monitor the SEP implementation b) Check grievance records and resolutions c) Meetings and inspection visits of the Grievance Redress Committee (GRC)	Project Coordinator (Contract ENGINEER)	Before and during the works as per the SEP	5,000 (public engagement)	-
	Notify the Alkalolu and Village Development Committees of the commencement of work.	Contractors	d) Affected community informed of the scheduled works before commencement.	PROJECT (Contract ENGINEER)	During first visit when works commence	-	-
Community Health, Safety and Security							
Exposure to hazardous situations at the construction site (open pits, heavy equipment, materials etc.)	1. Protect the community from physical, chemical, or other hazards associated with sites under construction. 2. Prohibit access to the work sites by unauthorized personnel at all times.	Contractors	a) Site inspection to assess risks, including restriction of access b) Public notices in place	PROJECT (Contract ENGINEER)	Weekly, during work activities	-	-
Movement of workers and work-related vehicles (particularly along narrow roads).	1. All employees are to be trained on health and safety. 2. The C-ESMP shall include management of construction traffic. 3. Workers shall not be transported in overcrowded vehicles together with equipment.	Contractors	a) Monitor complaints procedure feedback b) Interview workers to ascertain compliance	Project (Contract ENGINEER)	Weekly, during work activities	-	-
Inappropriate worker behaviour (GBV, SEA/SH, VAC)	1. The Contractor intends to recruit construction workforce locally to the extent possible. 2. <i>Contractors Code of Conduct</i> covers workforce behaviour on and off the jobsite, prohibits unauthorized and illegal substance use, and addresses the prevention of communicable diseases. 3. <i>Codes of Conduct</i> for the prevention of GBV, VAC, SEA/SH will be implemented outlining prohibited behaviours and applicable sanctions, including regular monitoring and awareness-raising of the Codes of Conduct.	Contractors	a) Evaluate reports of inappropriate behavior b) Check grievance records and resolutions c) Monitor the updated Contractors risk register	PROJECT (SSS); (Contract ENGINEER)	Weekly, during work activities	-	-

Environmental and Social (E&S) Impact / Issue	Mitigation or Enhancement Measures	Responsible for Measures	Monitoring and Verification	Responsible for monitoring	Monitoring timeframe / frequency	Mitigation Budget (\$)	Monitoring Budget (\$)
	4. Procedures to safely handle SEA/SH will be included in the grievance mechanism. 5. Children will not be employed or allowed to participate in project work. 6. Women will be given project employment opportunities equal to those of men, without any impediments placed in their way.						
	7. Ensure that education and adherence to codes of conduct for GBV, SEA/SH, VAC are included in bidding documents for contractors.	GWASAP (procurement specialists)	Contract documents include the relevant codes of conduct	Project Coordinator and SSS	Before contracts are signed	-	-
Contagious diseases	1. The Contractor intends to recruit construction workforce locally to the extent possible, particularly unskilled labor. 2. Carry out active monitoring of workers (screening, testing and evaluation of medical records) to take timely action through isolation, treatment and education to prevent spread. 3. Initiate sensitization and education programs for workers on the dangers of sexually transmitted diseases and preventive measures against them. 4. Provide necessary protective gear such as masks and condoms.	Contractors	a) Percent of workforce sourced locally b) Interview workers on health screening c) Protection provided and used d) Number of workers who are out sick at one time	Project (Contract ENGINEER)	Weekly, during work activities	-	-
Culture, history, archaeology							
Loss of chance finds particularly during land preparation	1. The C-ESMP will include the procedures on chance finds. 2. Educate workers on the potential of finding valuable heritage artefacts and the Chance Finds Procedures. 3. Inform the relevant parties of the Chance Finds if and when they occur.	Contractors	a) C-ESMP includes procedure for Chance Finds b) Percentage of workers interviewed with knowledge of the Chance Finds Procedures	Project ESS (Contract ENGINEER)	Before C-ESMP is approved; Weekly during the works	-	-
Subtotal during construction						30,000.00	
DURING OPERATION							
Environmental and Social Management System (ESMS)							
System to manage, control and monitor E&S risks during operation	1. Implement mitigation and monitoring measures listed in this ESMP for the operations phase.	Implemented by heads/officers of the various units of the Water Division.	a) Conduct site inspections for compliance b) Inspect relevant records c) Evaluate the complaints, received and resolved.	Coordinated and monitored by the Director of Water Division; NEA	Stated under the specific measures	Stated under the specific measures	Should be budgeted under NAWEC's main operational account
	2. Build on the administration, management and operation policies of the NAWEC/National Water Company.	Director of Water Division / Head of National Water Company	a) Specific standards, manuals of procedures, and management plans developed/updated before operation b) On-the-job staff training for all operations and maintenance works	NAWEC Projects and Planning Directors	Quarterly	As part of Component 4 of the Project	-

Environmental and Social (E&S) Impact / Issue	Mitigation or Enhancement Measures	Responsible for Measures	Monitoring and Verification	Responsible for monitoring	Monitoring timeframe / frequency	Mitigation Budget (\$)	Monitoring Budget (\$)
			c) Periodic staff training provided on procedures and expectations of the ESMP during operations				
	4. Maintain GRM and Grievance Registers	NAWEC Customer Care / Public Relations Unit / Project SSS	Evaluate the Grievance Register for issues and outcomes related to the project.	Director of Water Division / Head of National Water Company	Quarterly	-	-
Impact on natural resources during operation							
Impacts on wildlife during operation and maintenance activities (loss of life and disruption of shelter and access to food)	1.Hunting and killing of wildlife by workers are prohibited and disciplinary measures must be taken. 2.Killing is prohibited; where wildlife invasion becomes a nuisance at the FWTP, advice must be sought from the DPWM. 3.Workers must be educated on the need to protect the forests and avoid feeding wildlife.	NAWEC staff responsible for operations and maintenance; contractors responsible for maintenance works.	a) Number of reports on hunting and killings from the Department of Parks and Wildlife Management (DPWM), workers, community, or any other source. b) Number of NAWEC staff training and informative meetings that include relevant laws, protection and preservation of wildlife.	NAWEC; DPWM; NEA	Quarterly	-	-
	4. The communities shall act as a collective neighbourhood watchdog.	Communities	a) Number of reports from the community on complaints relating to deforestation, wildlife hunting or killing. b) Community trained on the use of the GRM to report project-related complaints	NAWEC; DPWM; NEA	Quarterly	-	-
Impacts on vegetation during maintenance operations (loss of forest trees)	1.Workers must be educated on the need to protect the Furuya Forest and open forested areas. 2.Workers must be prohibited from setting fires in and around the forests; effective disciplinary measures must be applied. 3. Waste from maintenance activities must never be stored or permanently dumped in any forested area. 4. All employees are encouraged to report suspected acts of forest destruction by fellow workers, and will be given an anonymous medium to communicate such observations.	NAWEC staff responsible for operations and maintenance; contractors responsible for maintenance works.	a) Number of illegal tree-felling related to the project from the Department of Forestry (DoF), workers, community, or any other. b) Staff sensitization on forest protection.	NAWEC; DoF; NEA	Quarterly	-	-
Impact on the physical environment during operations							
Air pollution during maintenance works (dust, smoke and other air emissions)	1. Contain sites of civil works during repair and maintenance. 2. Provide masks for the protection of workers during periodic maintenance works. 3. Burning of waste from operational activities is prohibited.	NAWEC Maintenance team; contractors	a) Number of complaints on air pollution. b) Evidence of air pollution during inspection visits.	NAWEC; NEA	During maintenance works. Periodically during operations	-	-

Environmental and Social (E&S) Impact / Issue	Mitigation or Enhancement Measures	Responsible for Measures	Monitoring and Verification	Responsible for monitoring	Monitoring timeframe / frequency	Mitigation Budget (\$)	Monitoring Budget (\$)
Noise and vibration nuisance (from workers, machinery, maintenance works and housekeeping services)	1. Contain noise-generating equipment and machinery to comply with regulatory standards. 2. Maintenance works during the operation must be carried out between 8am and 6pm to reduce noise and vibration nuisance. Notwithstanding, only emergency repair works shall be carried out during the night. 3. Provide earplugs to workers exposed to continuous high noise levels.	Operations and Maintenance Team	a) Use of machinery with noise silencers and canopies b) Number of noise-related complaints	NAWEC / National Water Company	Routinely, at least quarterly	-	-
Landscape and aesthetics	1. Develop and maintain green areas within project sites. 2. Ensure adequate storage space is provided for spare parts, consumables, reusable materials and waste.	NAWEC staff responsible for operating the various units.	a) Greening of sites is included in design b) Check for evidence of improper waste management c) Evaluate housekeeping for storage of materials and waste	NAWEC / National Water Company	Quarterly	-	-
Soil and ground water contamination (from waste dumping, rainwater runoff, spillage or leakage of hazardous materials)	1. Waste from all operational activities shall be appropriately managed; stored for disposal. 2. Any spillage from handling hazardous materials shall be immediately contained and the contaminated soil removed from the site for suitable treatment and disposal. 3. Appropriate spill response kits will be kept at designated areas with specific instructions and training on their use. 4. In compliance with legislation on discharges to the environment, the relevant authority, such as the NEA, shall be notified for the necessary advice and technical support in a major spill cleanup.	NAWEC staff responsible for operating the facilities.	a) Inspect records of soil contamination b) Relevant staff trained on spill response c) Conduct site inspections to assess future risks and identify evidence of soil pollution d) Carry out routine soil and water analysis to ascertain quality.	NAWEC / National Water Company NEA	Routinely Annually	-	-
Materials Supply							
Sustainable Consumption	1. Operate with energy-efficient facilities and equipment. 2. Materials used are part of the Leadership in Energy and Environmental Design (LEED) sustainability certification to improve efficiency in the use of energy, water and other resources.	Procurement specialists and technicians	a) Monitor energy use reports b) Identification of opportunities for use of recycled materials c) LEED sustainability certification of materials	NAWEC / National Water Company	During the design for repairs, upgrade or maintenance.	-	-
Waste Management and Hazardous Material							

Environmental and Social (E&S) Impact / Issue	Mitigation or Enhancement Measures	Responsible for Measures	Monitoring and Verification	Responsible for monitoring	Monitoring timeframe / frequency	Mitigation Budget (\$)	Monitoring Budget (\$)
Waste Generation and Management (domestic waste such as food, paper, disused furniture, gardening waste, packaging materials and other non-hazardous wastes)	1. Wastes produced during operation shall be managed in line with national laws including the promotion of waste identification, classification, quantification and segregation; hazardous versus non-hazardous wastes. 2. The National Water Company shall develop an internal information, supervision and monitoring system to ensure waste reduction and proper management.	NAWEC staff responsible for operating the facilities; NAWEC maintenance team; Maintenance Contractors	a) Periodic site inspections to ensure that all wastes are securely stored in designated areas awaiting final disposal b) Check relevant training records of staff c) Existence of related staff / visitor awareness and warning notices	NAWEC / National Water Company NEA	Monthly Annually	- -	- -
Wastewater / sewerage	1.All wastewater systems must be fully functional prior to the operation phase, and thereafter maintained. 2. Routine inspection of rainwater drains, particularly before the rainy season	NAWEC staff responsible for operating the facilities; NAWEC maintenance team	Ensure that wastewater systems in the FWTP are functional during inspection.	NAWEC / National Water Company	Routinely, and at least twice a year	-	-
Hazardous materials (chemicals and hazardous wastes)	1.To prevent spills and contact with hazardous materials, storage shall be provided in designated areas that have secondary containment and only handled by trained, authorized staff. 2. All details relative to an inventory, PPE (equipment and training), and handling and storage will be reflected in a Hazardous Material Management Plan according to law.	NAWEC staff responsible for operating the facilities; NAWEC maintenance team; Maintenance Contractors	Ensure that Hazardous Material Management Plan is in place and implemented.	NAWEC / National Water Company NEA	Plan to be developed before operation, then annually Annually	-	-
Occupational Health and Safety and Human Resource Development							
Occupational Health and Safety – general	1. All applicable national health and safety legislation and international regulations will be followed. 2. All employees will be trained on health and safety, emergency preparedness, the GRM and their roles in the implementation of the ESMP 3. NAWEC/National Water Company should adopt and implement a health and safety program that entails: - Effectively identifying and correcting unsafe conditions routinely - Protection of the workers and the public from dangers arising from operational activities	Staff responsible for operating the facilities; NAWEC/Water Company Human Resources Department (E&S Safeguards team)	a) Check relevant staff training records b) Check records of accidents and work-related ill health c) Check that Occupational Health and Safety Management Plan & Emergency Preparedness and Response Plans are being implemented d) Interview workers on the prevention, management and reporting of incidents e) Examine reports of GBV, VAC and SEA/SH f) Assess the <i>Worker Grievance Mechanism</i> based on workers' feedback g) On-site verification of health and safety measures.	NAWEC / National Water Company Department of Labor	Monthly Annually	(training of relevant staff on Health, Safety, Security & Environment, before operations, including GRM) Budget included in training section	-

Environmental and Social (E&S) Impact / Issue	Mitigation or Enhancement Measures	Responsible for Measures	Monitoring and Verification	Responsible for monitoring	Monitoring timeframe / frequency	Mitigation Budget (\$)	Monitoring Budget (\$)
	- Prevention of incidents resulting in injury to workers, the public, or the environment - Provision of fire extinguishers, personal protective equipment, and first-aid kits, and training on how to use them - Reporting of incidents for the review and improvement of safety procedures - Development of an emergency preparedness and response plan and training of staff on the procedures - Implementation of the Codes of Conduct for the prevention of GBV, VAC, SEA/SH outlining prohibited behaviours and applicable sanctions, including regular monitoring and raising awareness on the Codes of Conduct - Inclusion of procedures to safely handle SEA/SH in the GRM						
Worker Occupational Health and Safety – <i>fires, explosions, and emergencies</i>	1. All employees will be trained on health and safety, and supervised on the job. 2. Provide fire extinguishers and first-aid kits, including training on their use. 3. Provide notices on relevant warning and contacts in case of emergency. 4. All medical emergency procedures will be included in the <i>Emergency Preparedness and Response Plan (EPRP)</i> before the works.	NAWEC staff responsible for operating the facilities; NAWEC maintenance team	a) Check implementation of training programs for workers b) Number of fire-related incidents reported / recorded c) EPRP developed and workers trained on its procedures, including fire safety and evacuation d) Services fire extinguishers are readily accessible	NAWEC / National Water Company	Monthly	-	-
<i>Occupational Health and Safety – Response to disasters</i> (disease outbreaks, major fires, floods, political crisis, etc.)	1. Emergency responses related to natural and human-made disasters must be fully functional. 2. Workers will abide by emergency regulations set by the Government of The Gambia in times of disaster; notwithstanding, special permits may be obtained to maintain continuity of water supply services. 3. Staff training, drills and evacuation tests.	NAWEC staff responsible for operating the facilities.	a) Awareness sessions on the relevant Plans b) Regular emergency drills conducted	NAWEC / National Water Company National Disaster Management Agency	Annually During disasters	-	-
Worker Occupational Health and Safety – <i>equipment use and hazardous material</i>	1. All hazardous materials will be stored in designated areas that have secondary containment.	NAWEC staff responsible for operating the facilities	a) Monitor implementation of the relevant Plans b) Check the inspection and maintenance reports of equipment c) Number of incidents reported and recorded	NAWEC / National Water Company NEA	Quarterly Annually	-	-

Environmental and Social (E&S) Impact / Issue	Mitigation or Enhancement Measures	Responsible for Measures	Monitoring and Verification	Responsible for monitoring	Monitoring timeframe / frequency	Mitigation Budget (\$)	Monitoring Budget (\$)
	2. Hazardous materials and specialized equipment shall only be handled by trained and authorized staff. 3. Staff should be trained on detecting and interpreting warnings signs and using safety devices in equipment.		d) Check the qualification of operators.				
Worker Human Resource Development and Labor conditions (hiring practices, discrimination, poor or inadequate facilities etc.)	1. Comply with the Codes of Conduct and all worker safety ordinances. 2. Recruitment procedures, conditions of service, retrenchment, downscaling and other procedures must be in line with NAWEC's policies on human resources, the Labor Act of 2023, the World Bank's ESS2, and International Labor Organization laws. 3. Adequate welfare facilities will be provided for staff. 4. Provisions will be put in place to prevent SEA/SH, GBV and VAC, including the Codes of Conduct for workers in line with relevant laws. 5. Workers must be educated on their rights and the GRM.	NAWEC Department of Human Resources	a) Monitor enforcement and compliance with the Codes of Conduct b) Check internal labor policies against national and international requirements.	NAWEC / National Water Company Department of Labor	Quarterly Annually	-	-
Record of accidents and work-related ill health	1. All records of accidents and work-related ill health shall be maintained and documented. 2. All incidents and accidents shall be brought to the attention of the Head for management in collaboration with the Human Resources Department.	NAWEC staff responsible for operating the facilities; NAWEC maintenance team	a) Evaluate preventative measures put in place to avoid recurrence b) Number of incidents reported/recorded	NAWEC / National Water Company Department of Labor	Quarterly Annually	-	-
Community Engagement and Disclosure							
Public awareness and outreach	1. Maintain internal and external communication. 2. Maintain the NAWEC GRM program; sensitize the public on the GRM. 3. Initiate extensive consultations and sensitization with the communities; highlight role of the community in monitoring and reporting offences. 4. Ensure regular trainings and awareness-building on the Codes of Conducts among all key stakeholders, including the community. 5. Community engagement shall be inclusive and must clearly identify and consult with vulnerable groups to address any specific risks.	Coordinated by the NAWEC Head of Public Relations	a) Check the complaints register b) Number of community outreach plans and programs	NAWEC / National Water Company Grievance Redress Committee	Annually	-	-
Community Health, Safety and Security							

Environmental and Social (E&S) Impact / Issue	Mitigation or Enhancement Measures	Responsible for Measures	Monitoring and Verification	Responsible for monitoring	Monitoring timeframe / frequency	Mitigation Budget (\$)	Monitoring Budget (\$)
Community health, safety and security (general)	1. Codes of Conduct for the prevention of GBV, VAC, SEA/SH will be implemented. 2. Maintain the NAWEC GRM program; sensitize the public on the GRM. 3. Health and safety information shall be displayed at strategic locations, including marking or infrastructure within public access.	Staff responsible for operating the facilities	a) Records of health and safety training of employees b) Records of public information and sensitization c) Check the GRM records	NAWEC / National Water Company	Annually	-	-
Exposure to diseases and other health risks (from communicable diseases, accidental and criminal contaminated of water sources, etc.)	1. Disease risks to the community should be minimized by education and information. 2. Control public access to facilities.	Staff responsible for operating the facilities; Head of Public Relations	a) Workplan includes community engagement b) Evaluation of community risks periodically updated	NAWEC / National Water Company	Annually	-	-
Fire Safety	1. The facility emergency plan shall clearly identify all hazardous zones and display visible warnings. 2. Maintenance of all fire safety systems in proper working order. 3. Organize periodic fire drills. 4. Fire Safety Audits shall be undertaken by qualified professionals.	Staff responsible for operating the facilities; NAWEC maintenance unit; Maintenance contractors	a) Register fire inspections and safety audits b) Records of fires and explosions with risks to the community	NAWEC / National Water Company	Annually	-	-
Security	1.Security provided in a manner that does not jeopardize the community's or the staff's safety. 2.Security personnel will operate within the law.	Supervisors of Private or NAWEC employed security personnel	a) Credentials of security staff b) Training records of security staff c) Reports of security related issues d) Check GRM register	NAWEC / National Water Company	Annually	-	-
Inappropriate behaviour (GBV, SEA/SH, VAC)	1. <i>Codes of Conduct</i> for the prevention of GBV, VAC, SEA/SH will be implemented outlining prohibited behaviours and applicable sanctions, including regular monitoring and awareness-raising of the Codes of Conduct. 2. Procedures to safely handle SEA/SH is included in the GRM. 3. Women shall be given equal employment opportunities as men, without any impediments placed in their way.	E&S Safeguards Team & Department of Human Resources	a) Evaluate reports of inappropriate behavior b) Check grievance records and resolutions c) Public education programs made on GBV, SEA/SH, VAC	NAWEC / National Water Company	Monthly	-	-
Sub-Total During Operation						-	As part of NAWEC's operational budget
DURING DECOMMISSIONING							
The expected risks and impacts are similar to those of the pre-construction and construction during clearing	Upon completion of the construction works, the sites will be cleared off materials and equipment, the soil levelled back to at least near original state and all waste removed for disposal.	Contractors; NAWEC maintenance team	Measures implemented to address the risks / impacts as in the pre- and construction phase	NAWEC / National Water Company	Before and during decommissioning works	-	-

Environmental and Social (E&S) Impact / Issue	Mitigation or Enhancement Measures	Responsible for Measures	Monitoring and Verification	Responsible for monitoring	Monitoring timeframe / frequency	Mitigation Budget (\$)	Monitoring Budget (\$)
of works sites and decommissioning of facilities. (generation of waste; air, soil and water pollution; OHS; public health and safety)	For decommissioning of the facilities in the long term, ESMP shall be developed and implemented in due course.						
Grand total						30,000.00	

7.1 ESMP Matrix specific to Water Production Activities

Additional measures, specific to water production, are presented below:

Environmental and Social (E&S) Impact/Issue	Mitigation or Enhancement Measures	Responsible for Measures	Monitoring and Verification	Responsible for monitoring	Mitigation timeframe	Mitigation Budget (\$)
DURING PRE-CONSTRUCTION & CONSTRUCTION						
Risks from the drilling works <i>(contamination of groundwater; instability of surrounding soils; traffic risks associated with the transportation, storage and use of the elongated drilling machinery; water logging during the works)</i>	1. Staff shall be educated on the prevention of spillage, leakage and disposal of machine oils and fuels. 2. Qualified drilling experts will be utilized In addition to the use of modern drilling techniques based on international best practice and standards. 3. Appropriate casing and grout material will be used to prevent caving of the soil and protect water quality. 4. Public access to worksites is prohibited. 5. Water discharged from the pumping text will be as far as reasonable possible to prevent recontamination 6. Only certified products will be used in the initial well cleaning and disinfection.	Contractor	a) Check housekeeping of the sites for any hazards b) Evaluate drilling methods and machinery	Director of Water Division; Contract Engineer	During the works Before the works	-
Occupational Health and Safety risks relating to the installation of the MV lines	1. Staff shall be trained on safety whilst working at heights and with live electrical lines; precautions shall be in the C-ESMP. 2. The necessary personal protective equipment (PPE) shall be provided.	Contractor	a) Assess qualification of workers b) Check availability and use of PPE c) Check records of toolbox talks carried out before works	ESS & SSS	Before and during the works	-
DURING OPERATION						
Effect of excessive abstraction from sub-shallow wells <i>(Intrusion of saline & other pollutants; lowering of the water table; reduced quantity of water flow in service boreholes; receding soil saturation levels)</i>	1. International standards and guidelines will be considered to manage water quality and quantity. 2. The SCADA controlled system shall be maintained to detect irregularities for the necessary remedial action. 3. Sensitize the public on the management of the water systems and the GRM for possible grievances.	NAWEC Water Technicians;	a) SCADA system functional b) Public engagement programs c) GR registers evaluated	Head of water production	Before and during operation	-

Environmental and Social (E&S) Impact/Issue	Mitigation or Enhancement Measures	Responsible for Measures	Monitoring and Verification	Responsible for monitoring	Mitigation timeframe	Mitigation Budget (\$)
Impacts from theft and vandalism <i>(destruction of infrastructure, pollution of water, disruption of supply)</i>	Secure the sites and infrastructure	Operators of various water facilities	a) Number of reports on vandalism of water systems b) Sites found not to be secured during routine inspections	Head of water production	Constantly during operation	-
Disruption of water supply during maintenance / repair works	Prior public notification of at least 3 days oft planned maintenance works and at start of emergency repairs.	Operators of the Water Division in collaboration with Head of Public Relations	Evaluate timing and notifications against works	Head of water production	Before works	-
Occupational Health and Safety <i>(specifically, from the maintenance of MV lines)</i>	1.Staff shall be trained on safety whilst working at heights and with live electrical lines. 2.The necessary personal protective equipment (PPE) shall be provided.	Department of Human Resources	a) Assess qualification of workers b) Check for availability and use of PPE c) Check records of toolbox talks before works	Head of water production; Safeguards Team	Before any works	-

7.2 ESMP Matrix specific to the Water Treatment Plant

Additional measures, specific to the water treatment plant, are presented below:

Environmental and Social (E&S) Impact/Issue	Mitigation or Enhancement Measures	Responsible for Measures	Monitoring and Verification	Responsible for monitoring	Mitigation timeframe	Mitigation Budget (\$)
During operation						
Hazardous materials <i>(chemicals and hazardous wastes)</i>	3. To prevent spills and contact with hazardous materials, storage shall be provided in designated areas that have secondary containment and only handled by trained, authorized staff. 4. All details relative to an inventory, PPE (equipment and training), and handling and storage will be reflected in a Hazardous Material Management Plan according to law. 5. All empty containers of calcium hypochlorite must be securely stored and labelled pending disposal or return for refilling.	Staff responsible for operating the facilities; NAWEC maintenance team; Maintenance Contractors	a) Ensure that Hazardous Material Management Plan is in place and implemented. b) Check records for incidents involving hazardous chemicals.	Head of water production NEA	Plan to be developed before operation	-
Air pollution during operations and maintenance works <i>(chemical vapors from calcium hypochlorite, dust, smoke and other air emissions)</i>	1. Always ensure adequate ventilation or controlled air extraction. 2. Inspect stores frequently to identify and address any leakages. 3. Train employees on routine procedures for safe management of chemicals and empty containers. 4. Contain sites of civil works during repair and maintenance. 5. Provide masks for the protection of workers during periodic maintenance works. 6. Burning of waste from operational activities is prohibited.	NAWEC Maintenance team; Contractors	a) Number of complaints on air pollution. b) Evidence of air pollution during inspection visits.	Head of water production NEA	During maintenance works. Periodically during operations	-

Environmental and Social (E&S) Impact/Issue	Mitigation or Enhancement Measures	Responsible for Measures	Monitoring and Verification	Responsible for monitoring	Mitigation timeframe	Mitigation Budget (\$)
Worker Occupational Health and Safety (fires, explosions, and emergencies)	5. All employees will be trained on health and safety and supervised on the job. 6. Provide fire extinguishers and first-aid kits, including training on their use. 7. Provide notices on relevant warning and contacts in case of emergency. 8. All medical emergency procedures will be included in the <i>Emergency Preparedness and Response Plan (EPRP)</i> before the works.	Staff responsible for operating the facilities; NAWEC maintenance team	a) Check implementation of training programs for workers b) Number of fire-related incidents reported / recorded a) EPRP developed and workers trained on its procedures, including fire safety and evacuation b) Serviced fire extinguishers are readily accessible	National Water Company Safeguards Team	Periodically before specific works	

7.3 ESMP Matrix Specific to the Water Transmission and Distribution Activities

Additional measures for activities related to the water transmission and distribution systems.

Environmental and Social (E&S) Impact/Issue	Mitigation or Enhancement Measures	Responsible for Measures	Monitoring and Verification	Responsible for monitoring	Mitigation timeframe	Mitigation Budget (\$)
DURING PRE-CONSTRUCTION AND CONSTRUCTION						
Public health and safety (exposure to open pits, heavy equipment / materials, and flooding particularly in residential areas)	1. Protect the community from physical, chemical, or other hazards associated with sites under construction. 2. Always prohibit access to the work sites by unauthorized personnel. 3. Strategic location of inspection chambers and pegs to avoid traffic obstruction. 4. Water discharged during construction shall be contained accordingly.	Contractors	a) Site inspection to assess risks, including restriction of access b) Public notices in place c) Reports/evidence of flooding caused by the works.	Project Safeguards Team (Contract ENGINEER)	Weekly, during work activities	-
Disruption of water supply services (during connection and testing of the new structures)	Prior public notification of at least 3 days for planned works.	Technical supervisor of the works in collaboration with Head of Public Relations; Contractor	Evaluate timing and notifications against works	Head of Water Production	During works	-
Protection of ground water (from exposure of pipes during installation)	1. Storage, transportation and disposal of hazardous and non-hazardous waste will be properly managed. 2. Longterm exposure of pipes shall be prevented through coordination and regulation of water pumping.	Contractors	a) Check that all waste and excess materials are appropriately disposed and recorded. b) Proof of leakages in pipes	ESS; (Contract ENGINEER)	During the works	
DURING OPERATION						

Environmental and Social (E&S) Impact/Issue	Mitigation or Enhancement Measures	Responsible for Measures	Monitoring and Verification	Responsible for monitoring	Mitigation timeframe	Mitigation Budget (\$)
Public health and safety <i>(risk of falls in open inspection chambers; flooding during maintenance)</i>	1.Protect the community from physical, chemical, or other hazards associated with sites under construction. 2. inform the affected communities prior to commencement of works. 3. Inspection chambers will be kept secured. 4.Water discharged during maintenance works shall be contained accordingly.	Contractors; Operators of the water transmission network.	a) Site inspection to assess risks, including restriction of access b) Warning notices in place c) Reports of flooding caused by the works.	National Water Company head of production	During maintenance activities	-

CHAPTER 8: THE GRIEVANCE RESOLUTION MECHANISM (GRM)

This chapter outlines the Project's Grievance Resolution Mechanism (GRM), a structured process through which complaints and grievances related to the Project (raised by members of the public or persons directly affected) will be received, assessed, and addressed in a fair and transparent manner. The GRM is designed to provide a trusted channel for voicing and resolving concerns, thereby preventing escalation that could delay project implementation. It will serve as an effective safeguard to ensure that affected persons' issues are managed promptly and equitably. Importantly, the mechanism will remain operational throughout the entire life of the Project, including the defects liability period, ensuring continuous support for communities and stakeholders.

8.1 Types of potential complaints

Potential complaints and conflict that may arise due to the project activities will include:

- Complaints about noise nuisance, dust, air pollution, etc., during project implementation ;
- Complaints about project impact on personal properties such as economic trees, structures and places of business;
- Inadequate assistance and related information to the affected persons;
- Persons affected by the project but not identified;
- Complaints in the amount of assistance and rates used, where resettlement is required;
- Delay in disbursement of assistance;
- Sexual exploitation and abuse or sexual harassment (SEA/SH) complaints during project implementation.

8.2 Structure of the GRM

National experience with the GRM process usually consists of three tiers or levels. Thus, in this Project it will also consist of three tiers or levels: (i) local (community level/work site level); (ii) Regional/Project level; (iii) national legal level.

A Grievance Resolution Committee (GRC) will be created at the local (village/community level/work site), where a complaint is made at this level. The Project's (ESS and SSS) will work closely with the aggrieved party to clarify and resolve any misunderstanding that could give rise to conflicts or further complaint. In many cases, the types of grievances at this level often relate to issues of inventories, requests for information, or to activities that have yet to take place, which can be directly addressed by the ESS.

Local communities in The Gambia maintain traditional and cultural grievance redress mechanisms that can be used to resolve disputes at the community level. Through the involvement of elders and traditional leaders - including the head of the village (Alkalo) the imam, selected village elders, and extended family networks - certain disputes may be settled locally without requiring the direct involvement of the Project, contractors, or government representatives. The following can receive grievances from complainants:

1. The head of the community (Alkalo);
2. Chairman of the VDC;
3. The Project's SSS and ESS;
4. Members of the Regional GRC.

The second level is when the dispute cannot be resolved at the village/worksite level; in this case the affected persons will be advised to lodge the complaint to the Regional/GRC (based at the Regional Governor's office in Brikama). The PIU should advise the parties on how, and where to file the complaint.

The Regional/Project GRC will typically comprise both permanent and ad hoc members. The permanent members will include representatives from the following institutions:

- The Permanent Secretary, MoPE;
- GWASAP's SSS serving as Secretary;
- A representative of a non-governmental organization (NGO) operating in the project area;

The ad hoc members comprise:

- The complainant;
- The Alkalo of the community where the complaint comes from;
- Chairman of the VDC;
- One female representative from the relevant community;
- The District Chief/Seyfo of the complainant;
- Representative of a credible NGO in the Region;

The Third Tier is the final level of the three levels designed for the GWASAP; where both traditional and administrative avenues fail to resolve the complaint, the complainant will be advised to seek redress in the law courts as per the Gambian Constitution. The operational procedure of the GRM is summarized in the Table 8.1 below.

Table 8.1: Operational procedure of the GRM: transmission and registration of complaints

Step		Process	Activities/ required action	Number of days required	Stakeholders involved
LEVEL ONE – LOCAL LEVEL: VILLAGE/WORKSITE					
1		Receipt of complaint	Document date of receipt, name of complainant, nature of complain	1 day	Alkalo and traditional elders/VDC Chairman/Complainant Work foreman/ GWASAP SSS
2		Acknowledge receipt of complaint, screen and establish the foundation or merit of the grievance	Visit the site/listen to the complainant/assess the merit	1 day	Work foreman/Alkalo/ GWASAP's SSS /complainant
3		Implement and monitor a redress action	Where complaint is justified, identify and carry out the redress	1-5	Work foreman/ Alkalo/ GWASAP SSS/ complainant
LEVEL TWO: REGIONAL GOVERNOR					
1		Receipt of complaint	Document date of receipt, name of complainant, nature of complaint	1 day	GWASAP SSS/complainant/District Chief/Seyfo/Alkalo/MoPE/NGO
2		Acknowledge receipt of complaint	By letter, email, phone	1-5	SSS of GWASAP/Regional Governor

3		Screen and establish the foundation or merit of the grievance	Visit the site; listen to the complainant/ assess the merit	7-14	GWASAP SSS/complainant/District Chief/Seyfo/Alkalo/MoPE/NGO
4		Implement and monitor a redress action	Where complaint is justified, identify and carry out the redress	21-30 days or at a time specified in writing to the complainant	Governor/SSS of GWASAP to coordinate the implementation of redress action
5		Extra intervention for a dissatisfied scenario	Review the redress steps and conclusions, provide intervention solution	2-4 weeks of receiving status report	SSS of GWASAP and GRC to review and react
LEVEL THREE – LAW COURTS					
7		Judicial adjudication	Take complaint to court of law	No fixed time	Complainant

Table 8.2: Acknowledgment of receipt of complaints

Step	Process	Activities/ required action	Number of days required	Stakeholders involved
LEVEL ONE – LOCAL LEVEL: VILLAGE/WORKSITE				
1	Receipt of complaint	Document date of receipt, name of complainant, nature of complain	1 day	Alkalo/VDC Chairman/Work foreman/ SSS of GWASAP/complainant
LEVEL TWO: REGIONAL GOVERNOR'S OFFICE				
1	Acknowledge receipt of complaint	By letter, email, phone	1-5	Gov./Mayor/SSS of GWASAP
LEVEL THREE: LAW COURTS				
1	Judicial adjudication	Take complaint to court	No fixed time	Complainant

Table 8.3: Handling complaints and feedback

Step	Process	Activities/ required action	Number of days required	Stakeholders involved
LEVEL ONE – LOCAL LEVEL: VILLAGE/WORK SITE				
1	Screen and establish the foundation or merit of the grievance	Visit the site or listen to the complainant and assess the merit	1 day	Work foreman/SSS of GWASAP/ Complainant
2	Implement and monitor a redress action	Where complaint is justified, identify and carry out the redress	1-5	Work foreman/SSS of GWASAP/Complainant
LEVEL TWO: GOVERNOR/MAYOR'S OFFICE				
1	Screen and establish the foundation or merit of the grievance	Visit the site; listen to the complainant/ assess the merit	7-14	GRC members including complainant and his/her representative
2	Implement and monitor a redress action	Where complaint is justified, identify and carry out the redress	21-30 days or at a time specified in	GWASAP SSS to coordinate the

			writing to the complainant	implementation of redress action
3	Extra intervention for a dissatisfied scenario	Review the redress steps and conclusions, provide intervention solution	2-4 weeks of receiving status report	GWASAP's SSS and GRC to review and react
LEVEL THREE: LAW COURTS				
1	Judicial adjudication	Take complaint to court	No fixed time	Complainant

Table 8.4: Archiving of complaints

Step	Process	Activities/ required action	Number of days required	Stakeholders involved
LEVEL ONE – LOCAL LEVEL: VILLAGE/WORK SITE				
1	Receipt of complaint	Document date of receipt, name of complainant, nature of complain	1 day	GWASAP SSS/Work foreman/complainant
LEVEL TWO: REGIONAL GOVERNOR'S OFFICE				
1	Receipt of complaint	Document date of receipt, name of complainant, nature of complain	1 day	GWASAP SSS/
LEVEL THREE – LAW COURTS				
1	Judicial adjudication	Take complaint to court	No fixed time	Complainant

Table 8.5: Monitoring and evaluation

Step	Process	Activities	Number of days required	Stakeholders involved
LEVEL ONE – LOCAL LEVEL: VILLAGE/WORK SITE				
1		Visits to sites/record status of implementation of redress	Continually – at least once per month	GWASAP's/SSS/Complainant/Works Foreman
LEVEL TWO: REGIONAL GOVERNOR'S OFFICE				
1		Visits to sites/record status of implementation of redress, number of complaints made/addressed, etc.	Continually – at least once per month	GWASAP'SSS/SSS/Complainant/GRC members
LEVEL THREE – LAW COURTS				
1	Judicial adjudication	Take complaint to court	No fixed time	Complainant

In its operations:

- The GRC will receive all grievances/complaints and enter them in the Grievance Register.
- Efforts will be made to create awareness about the GRM and GRC to the beneficiaries through use of flyers and pamphlets; daily Newspaper, sensitization meetings, etc.

- The GRC will work according to the time frames indicated in Table 8.1 above to redress grievances/complaints if such grievances/complaints are not redressed during the first meeting.
- The GRC will acknowledge receipt of all grievances/complaints, by registered post, within 1-5 days of receipt.
- The GRC will consider and redress grievances/complaints through public and transparent process in which all those who have lodged their grievances and complaints in order to facilitate transparency and accountability.
- The GRC will communicate its decisions/redress in writing to the complainants within 4 weeks depending on the nature of complaints.
- The GRC decisions are not the final, and the aggrieved and complainants have the right to seek judicial redress if they are not happy with the decisions of the GRC.
- The GWASAP SSS/name, Office address, contact number and email of the authorized officer shall be communicated to all the project affected families. The beneficiaries can register complaints in the following ways:
 - Toll-free telephone hotline;
 - E-mail;
 - Complaint form to be lodged via any of the above channels;
 - Walk-ins may register complaints in a grievance logbook at various easily accessible facilities;
 - By ordinary/registered/speed post addressed to PC of GWASAP SSS.

The GRC will maintain a register of all petitions received with details of date of receipt of the petition, date of hearing and date when it was considered by the Committee, along with the nature of complaint/concern, action taken, and date of communication sent to petitioner. The complainant's concerns will be redressed in four weeks' time and written communication will be sent to the complainant about the decision of the Committee.

8.3 The complaints/grievances register

Below is a template for complaints/grievance register.

Table 8.6: The complaints/grievance register

Field	Details
Serial Number	
Case Number	
Name of Complainant	
Name of Father/Husband	
Gender	☐ Male ☐ Female ☐ Other
Age	
Full Address	
Brief Details of Grievance/Complaint	
List of Documents Attached (if any)	

Details of Previous Grievance/Complaint (if any)	
Date of Receipt of Grievance/Complaint	
Date of Acknowledgment of Grievance/Complaint	

8.4 Record-keeping

The SSS at GWASAP will keep records of grievances received, including contact details of the complainant, the date the complaint was received, the nature of the grievance, agreed corrective actions and the date these were affected and the final outcome. The number of grievances recorded and resolved, and the outcomes will be displayed/disclosed in the GWASAP website, as well as reported in monitoring reports submitted to Bank on a semi-annual basis.

8.5 Capacity building of the GRC members

Given that the GRM process is relatively new in the country and within project settings, capacity of the various stakeholders (including project beneficiaries) in the GRM processes will be enhanced. This lack of capacity was expressed during the consultations, and certain stakeholders expressed the need for more information and capacity building in the management of GRM processes. It is therefore recommended to have the members trained and sensitized on the GRM and GRC.

8.6 Periodic review and documentation of lessons learned

The PIU will periodically review the functioning of the GRM and record information on the effectiveness or otherwise of the mechanism, especially on the Projects' ability to prevent and address grievances.

8.7 Grievances at contractor level

During project implementation, contractors must strictly comply with WHO/World Bank standards on Environmental, Social, Health and Safety (ESHS) and Occupational Health and Safety (OHS), both in the workplace and in their interactions with affected communities.

To support this, Codes of Conduct (Appendices 8.1- 8.3) will be applied to ensure that all GWASAP-related projects meet their ESHS and OHS objectives, and prevent or mitigate risks of SEA/SH and VAC.

Contractors are required to ensure that these Codes of Conduct are signed and adopted by all personnel working on GWASAP projects as they are intended to:

- Raise awareness of ESHS and OHS expectations within the project;
- Establish a shared understanding that SEA/SH and VAC are unacceptable and will not be tolerated;
- Provide a clear system for identifying, responding to, and sanctioning incidents of GBV and VAC.

Three Codes of Conduct will be enforced in GWASAP:

1. Company Code of Conduct – commits the company to addressing GBV and VAC issues;
2. Manager's Code of Conduct – commits managers to implementing both the Company Code and individual codes;

3. Individual Code of Conduct – applies to all project workers, including managers and GWASAP staff.

These Codes of Conduct (Appendix 8.1) will be explained and prominently displayed at work sites. Sensitization campaigns will be conducted regularly - every 12 months for affected communities and monthly for workers. All new workers will receive training on these subjects before commencing work. The contractor's liaison officer will collaborate closely with GWASAP's SSS to present complaints and special cases related to the Codes of Conduct to the GRC.

8.8 Budget for implementation of GRM

To ensure effective implementation of the GRM, the associated cost elements have been identified and consolidated into the budget presented in **Table 8.7**. This budget serves as the financial framework necessary to operationalize the GRM and sustain compliance throughout project execution. It includes costs involved in resolving complaints such as meetings, consultations, communication and reporting/information dissemination. These will be borne by the GWASAP.

Table 8.7: Operational budget for the GRM process

GRM activities	Quantity	Unit cost (US \$)	Total (US \$)
Installation and training of the two levels of the GRC (site level and GWASAP/PIU/Governor's level, including NSPA guidelines).	2 sessions	3,000.00	6,000.00
Information dissemination and sensitization on the GRM	2 sessions	3,000.00	6,000.00
Secretarial costs (for editing complaint forms and reports)	1 per semester x 2	200.00	400.00
Communication costs of the Chairmen of the two GRCs (site level and GRC level)	1 per semester x 2	500.00	1,000.00
Travel, verification and investigation costs	12 months	2,000.00	2,000.00
Provision of Toll-Free number	12 months	300.00	3,600.00
TOTAL			19,000.00

CHAPTER 9: IMPLEMENTATION ARRANGEMENTS

This Chapter will look at the process of implementation of the ESMP developed for the project. It is the result of the review of the literature as well as the outcome of the consultations with the various stakeholders. The successful delivery of GWASAP will depend on well-defined institutional arrangements that clearly assign roles and responsibilities across implementing agencies, contractors, and oversight bodies. These arrangements are designed to ensure effective coordination, compliance with environmental and social safeguards, and transparent communication among stakeholders.

9.1 Institutional arrangements for safeguards implementation

1. The Ministry of Petroleum and Energy (MoPE)

The Ministry of Petroleum and Energy (MoPE) will serve as the implementing agency for GWASAP through its PIU. During the project period, the Project Coordinator (PC) will oversee the coordination and implementation of environmental and social due diligence safeguards, as well as monitoring, evaluation, and disclosure. The PC will be supported by an Environmental Safeguards Specialist (ESS) and a Social Safeguards Specialist (SSS).

The PIU's responsibilities in relation to the ESMP include:

- Working with technical and procurement specialists to ensure that contract documents incorporate environmental and social safeguard clauses, which contractors must fully implement;
- Coordinating internal monitoring and evaluation of ESMP implementation;
- Collaborating with other Ministry projects to manage project-related grievance resolution activities;
- Facilitating project-related activities of partner and collaborating stakeholders, where applicable;
- Coordinating and participating in relevant environmental and social due diligence training;
- Leading public engagement and disclosure activities to ensure transparency and accountability.

At the end of the project period, responsibility for day-to-day operations of the facilities will transition to the Water and Sewerage Division of NAWEC. Operational oversight will be carried out under the supervision of the Division's management and respective departmental heads.

2. National Environment Agency (NEA)

As The Gambia's authority responsible for the coordination of all environmental issues and enforcement of national environmental laws, the NEA is responsible for assessing and issuing Environmental Approval for the project. It is responsible for the overall monitoring of the ESMP implementation in accordance with section 31 of the EIA Regulations, 2014. In this regard, the NEA shall routinely monitor, guide, and audit the progress of the ESMP implementation to ensure compliance.

In addition, NEA shall provide technical support and participate in training and sensitization of stakeholders to enhance their understanding of the environmental and social safeguard requirements.

3. Other stakeholders

Although the implementation of the ESMP will be the overall responsibility of the MoPE, and more specifically, the PIU and the Management of NAWEC Water Division, other stakeholders will also play important technical advisory and regulatory roles. The participation of these partners may need to be initiated by the PIU or NEA as the coordinating, implementing, and oversight bodies, respectively.

Other relevant stakeholders include the Department of Forestry (DOF), Department of Parks and Wildlife Management (DPWM), Department of Water Resources (DWR), Department of Physical Planning and Housing (DPPH), Department of Lands and Surveys (DLS), Department of Labour, Department of Social Welfare, Women's Bureau, NSPA, the WCR Governor's Office, the Alkalolu (traditional heads/community leaders of the project's host communities), and the residents of village communities.

On an ad hoc basis as may be required, other institutions may be called upon for specific support, particularly in various training programs and in preventing and managing complaints and conflicts.

4. Contractors

The construction Contractor has the key role in the implementation of the construction phase of the ESMP, particularly regarding environmental, public and worker protection, and will develop and implement the C-ESMP. The Contractor is responsible for all environmental and social mitigation expenses during construction and shall ensure all its workers. It is essential that during planning, all measures are budgeted for by the contractors.

Where subcontractors are approved, the main Contractor has the responsibility of ensuring that environmental and social safeguard measures are filtered down to the level of the subcontractor, who consequently has equal responsibility to fully abide by the C-ESMP and related laws.

Relevant training shall also be provided by the Contractor for its workers, and the community providing relevant information through the appropriate means, such as the village heads, meetings, posters and signage.

5. Supervising Engineer for the Project

The Supervising Engineer will ensure the integration of the construction phase mitigation measures and environmental and social clauses into the bidding documents; ensure that the Contractors obtain all the necessary approvals and integrate the relevant measures in the work breakdown structure or execution plan.

In collaboration with the PIU, the Supervising Engineer will ensure that contract documents contain environmental and social safeguard clauses spelling out the expectations of Contractors with regards to their mitigation responsibilities. Contractors must fully implement these clauses.

6. The World Bank

During the project implementation period, the Bank will review reports and assess activities to ensure compliance with its *Environmental and Social Risk Management Policy*. Where necessary, actions for timely remediation will be recommended.

CHAPTER 10: MONITORING AND REPORTING OF ESMP IMPLEMENTATION

This section addresses the issues of project monitoring and reporting because effective monitoring and reporting are critical to ensuring that the ESMP is implemented as intended, and that mitigation measures are both efficient and responsive to emerging risks. Monitoring provides continuous oversight of project activities, verifying compliance with safeguard requirements and identifying any deviations that may require corrective or supplementary actions. Reporting, in turn, ensures transparency and accountability by documenting progress, challenges, and remedial measures, while enabling stakeholders (including regulatory authorities, development partners, and affected communities) to remain informed and engaged throughout the project lifecycle.

10.1 Monitoring

Environmental and social monitoring will be undertaken to ensure that mitigation measures outlined in the ESMP and contractual agreements are effectively implemented. Monitoring will also verify that remedial actions are carried out and documented. Where monitoring identifies changes in project activities or new risks at specific sites, alternative or additional mitigation measures will be considered.

Key issues to be monitored include activities previously identified as having significant environmental or socio-economic impacts, together with their corresponding mitigation actions. Routine monitoring may also reveal new issues arising from changes in site conditions, project design, or activities, requiring tailored mitigation responses. Based on the monitoring plan (Table 10.2), environmental and socio-economic parameters will be evaluated against mitigation measures to ensure compliance.

During construction, Contractors will conduct internal monitoring of their employees and activities through the Supervising Engineer. The PIU, supported by the ESS, SSS, and Owner's Engineer, will monitor Contractor compliance. The NEA, with support from the EIA Working Group and other relevant institutions identified in the ESMP, will oversee compliance with national environmental laws.

10.2 Reporting

Reporting on environmental and social safeguards forms part of the overall project reporting requirements and must be integrated with other project components to ensure adequate allocation of financial and human resources. The PC will consolidate relevant information for submission to the Bank, while the NEA will produce internal reports as part of its mandate. Where necessary, NEA or other institutions may formally notify NAWEC of issues requiring remedial action, particularly during emergency incidents.

In accordance with the NEMA 1994, NAWEC is required to prepare and submit annual reports on project compliance with the Act, including ESMP implementation. Throughout the project period, NAWEC will also submit reports to the Bank on the implementation of environmental and social safeguard instruments at the agreed frequency - typically monthly, by the 15th of the month following the reporting period.

10.3 Environmental audit

National requirements stipulate that an environmental audit must be conducted twelve months after commencement of project implementation (see Table 10.1 for cost estimates) and subsequently upon request by NEA, as deemed necessary. This audit will provide an independent assessment of compliance, effectiveness of mitigation measures, and recommendations for corrective actions.

Table 10.1: Cost estimates for environmental audit

Cost category	Description	Cost (USD)
Audit team fees	Professional fees for ESS and SSS, auditors, and support staff	20,000.00
Fieldwork and data collection	Site visits, sampling, surveys, stakeholder consultations, transport, and logistics	8,000.00
Laboratory analysis	Testing of water, soil, and air samples to verify compliance with ESMP standards	5,000.00
Stakeholder engagement	Community meetings, grievance follow-up, translation, and documentation	3,000.00
Reporting and documentation	Preparation of audit report, printing, dissemination, and translation	2,000.00
Total		38,000.00

10.4 Stakeholder capacity building measures

Capacity building for institutions involved in monitoring the implementation of the ESMP is essential to ensure effective safeguards compliance. Particular emphasis will be placed on strengthening the capacities of partner institutions in the general areas of environmental and social management, including ESIA and ESMP processes and compliance requirements.

In addition, selected NAWEC staff (including the ESS, SSS, PC, and other relevant personnel) will undergo training in the prevention and management of GBV SEA/SH and VAC. Furthermore, all stakeholders will be informed and trained on the World Bank's ESSs, which guide the project's safeguards framework. These measures will enhance institutional capacity, promote accountability, and ensure that environmental and social risks are effectively managed throughout project implementation. Table 10.2 summarizes the specific capacity building measures for project stakeholders.

Table 10.2: Capacity building budget

No	Identified activities	Themes	Beneficiary	Budget (US\$)
Institutional capacity, technical skills development and awareness creation				
1	Workshops and meetings to strengthen the human resource capacity to manage ESIA's and ESMPs.	Workforce management and accident risk prevention Implementation and monitoring environmental and social issues at construction sites	ESS, SSS, PC	5,000 x 2 sessions = 10,000.00
2	Capacity building of relevant staff PIU/NAWEC	Understanding of environmental and social safeguard issues	ESS / SSS/NAWEC staff	10,000 x 2 = 20,000

		Understanding of the roles and responsibilities of NAWEC staff in the implementation of the ESMP Workforce management and accident risk prevention Role and functioning of the GRM.		
3	Information/Awareness of the Contractor and company's personnel	Implementation and monitoring of an HSE plan Prevention of construction site accidents and implementation of an emergency evacuation plan Prevention and management of GBV/SEA/SH/VAC, GM Raising awareness about diseases (HIV-AIDS, STI).	Construction Manager Works managers HSE expert Workers	5,000 x 2= 10,000
Public awareness - education, communication and information provision				
4	Beneficiary and community awareness raising campaign	Raising public awareness on project issues (environmental and social issues, GBV, SEA/SH, VAC and GM, Emergency preparedness, etc.) Assessment and prevention of accidents related	Local communities, CSOs/NGOs The general public, especially the communities where the project will be implemented	3,000 x 6 communities x1 = 18,000.00

		to the civil works and the movements of machines/engines Prevention and management of GBV/SEA/SH/VAC, GM Public awareness on diseases (HIV-AIDS/STI)		
TOTAL: Fifty-eight thousand				58,000.00

Table 10.3: Monitoring plan for the ESMP implementation

Activity / Subproject	Outputs of measures to be monitored	Responsibility for measures	Monitoring Period	Monitoring Frequency	Responsibility for monitoring	Monitoring Indicators	Monitoring Budget (\$US)
PRE-CONSTRUCTION AND CONSTRUCTION PHASES							
All subproject components under the General ESMP	General risks and impacts managed	GWASAP ESS & SSS	Before and during works	Monthly	Director of Water Division / Coordinator for the GWASAP/PIU	- Monthly monitoring reports - Incident reports as necessary	2,000 x 24mths = 48,000 (routine site inspections)
	Air pollution prevented and effects minimized	Contractor	During works	Monthly	GWASAP ESS & SSS / NEA / Owner's Engineer	Ambient air quality test results are within standards of the <i>Environmental Quality Standards Regulations</i>	15,000.00
	Forests and vegetation protected	Contractors	During the works	Daily	OE; communities	- Number of reports from community members on forest related complaints. - Community trained on the use of the GRM to report project-related complaints.	Part of budget for inspections.
				Monthly	ESS; DoF	- Number of illegal tree-felling related to the project from the Department of Forestry (DoF), workers, community, or any other. - Check records of tree felling by the contractor to clear sites.	
	Wildlife protected	Contractors	During the works	Daily	OE; communities	- Number of reports from community members on wildlife related complaints. - Community trained on the use of the GRM to report project-related complaints.	Part of budget for inspections.

Activity / Subproject	Outputs of measures to be monitored	Responsibility for measures	Monitoring Period	Monitoring Frequency	Responsibility for monitoring	Monitoring Indicators	Monitoring Budget (\$US)
				Monthly	ESS; DPWM	Number of reports of hunting and killings that are related to the project from the DPWM, workers, community, or any other source.	Part of budget for inspections.
	Soil protected from erosion and flooding	Contractor	During works	Monthly	GWASAP ESS/NEA/OE	100% of excavated sites with topsoil reserved for post construction landscaping 100% of excavated sites levelled	Part of the budget for inspection visits
	Visually pleasing landscapes	Contractor	During works	Monthly	GWASAP ESS/NEA/OE	- No of project related waste dumps around worksites - No. of sites vegetated as part of the project	Part of the budget for inspection visits
	Waste managed appropriately	Contractor	Before and during works	Monthly	GWASAP ESS/NEA/OE	- No. of waste dumps on and around worksites - Waste management plans developed and implemented - No. of reports/complaints on waste management issues	Part of the budget for inspection visits
	Stakeholders engaged and participated in the process	Contractor / PIU	During works	Monthly	GWASAP ESS/NEA/OE	- No. of public sensitization programmes - No. of complaints relating to the Project	Part of the budget for inspections
	Local employment and technology transfer promoted	Contractor	During works	Monthly	GWASAP ESS/NEA/OE	% of workforce from local communities	Part of the budget for inspection visits
	Protection from public health and safety risks	Contractor	During works	Monthly	GWASAP ESS/NEA/OE	- No. of public incidents related to the project activities - No. of reports on works during nighttime - No. of complaints on GBV, SEA/H, VAC	Part of the budget for inspection visits

Activity / Subproject	Outputs of measures to be monitored	Responsibility for measures	Monitoring Period	Monitoring Frequency	Responsibility for monitoring	Monitoring Indicators	Monitoring Budget (\$US)
	Protection from occupational health and safety risks	Contractor	During works	Monthly	GWASAP ESS/NEA/OE	- No. of work-related accidents % of workers found using PPE - Availability of first aid kits - No. of staff training recorded - No. of staff-related complaints on GBV, SEA/H, VAC	Part of the budget for inspection visits
	Grievances addressed	Grievance Resolution Committee	Before and during works	Quarterly	GWASAP ESS/NEA	% of complaints addressed	10,000.00
	Vulnerable individuals and groups benefit and participate in the project	NAWEC Public Relations; GWASAP PIU/NEA	Before works	Weekly before works	GWASAP PIU/NEA	- No. of complaints on GBV, SEA/H, VAC % of interviewed project affected persons aware of the GRM	Part of the GR monitoring budget & part of the budget for inspection visits.
	Protection of any Chance Finds	Contractors	Before the works (during review of C-ESMP) and during the works	Daily	GWASAP's ESS/NEA/	- C-ESMP includes procedure for Chance Finds - Percentage of workers interviewed with knowledge of the Chance Finds Procedures	Part of the budget for inspection visits
Additional measures specific to activities / sites during construction							
Water Production	All land outside NAWEC property regularized.	NAWEC Legal Team	Before the works	Monthly	GWASAP ESS/NEA/	All the land documents for the Project well sites recorded.	Part of the budget for inspection visits
	Siting of boreholes 'technically' justified.	Project Design Team	During design phase	Monthly	NAWEC Directors of Water Division & Projects and Planning	% of wells located in sites without reports of technical assessment. - No of community sensitization programmes on the Project.	Part of the budget for inspection visits

Activity / Subproject	Outputs of measures to be monitored	Responsibility for measures	Monitoring Period	Monitoring Frequency	Responsibility for monitoring	Monitoring Indicators	Monitoring Budget (\$US)
	Drilling techniques and materials justified to prevent related risks.	Contractor	Before and during the works	Daily	OE (daily) With reports to the Director of Water Division	• % of drilling staff aware of measures to prevent soil and water pollution. • Drilling sites • No of drill sites with water logging during visits. • No. of public incidents related to the project activities	As part of contractor's budget and routine monitoring budget
	Workers on the construction of the MV Line protected against related health and safety risks	Contractor	During works	Daily	OE (daily) GWASAP ESS/SSS/NEA/ (at least twice during the planned installation period)	• No. of work-related accidents • % of workers found using PPE • Availability of first aid kits • No. of staff training recorded on safety	Part of the budget for inspection visits
	Chlorine and materials with chlorine properly managed.	Contractor	Before and during the works	Daily	OE (daily) GWASAP ESS/NEA/OE (at least once during the planned period for replacement of the old chlorine system)	• Records of specific training of workers on chlorine management. • Evidence of chlorine related waste on or around the site.	
Water Storage	Workers on the construction of the WTP protected against related safety risks of working at heights.	Contractor	During works	Daily Monthly	OE (daily) GWASAP ESS/NEA/OE	• No. of work-related accidents • % of workers found using PPE • Availability of first aid kits • No. of staff training recorded on safety • % of workers qualified for their roles • Daily toolbox talks confirmed	Part of the budget for inspection visits

Activity / Subproject	Outputs of measures to be monitored	Responsibility for measures	Monitoring Period	Monitoring Frequency	Responsibility for monitoring	Monitoring Indicators	Monitoring Budget (\$US)
	The public is duly informed of water service interruptions.	Operators of the Water Division in collaboration with Head of Public Relations; Contractor	During the works	Weekly	Director of Water Division	• % of complaints on water scarcity during the works. • % of public notifications made against number of service disruptions.	
Transmission & Distribution	Communities educated and protected from cumulative impacts along the same corridors.	NAWEC Head of Public Relations, and the Projects and Planning Departments; Contractor	Before works; During works	Monthly; Daily	Director of Water Division; GWASAP ESS/NEA/OE	• No of community consultation and sensitization of reducing cumulative impacts. • No of consultative meetings with relevant authorities for possible harmonization of activities.	Part of the budget for inspection visits
	Public protected from open pits and ponding of water.	Contractor	During the works	Daily Monthly	GWASAP ESS/NEA/OE	• No. of failed site inspections. • No. of public notices/warnings in place. • Reports and evidence of water logging caused by the works.	
	The public is duly informed of water service interruptions.	Operators of the Water Division in collaboration with Head of Public Relations; Contractor	During the works	Weekly	Director of Water Division	• % of complaints on water scarcity during the works. • % of public notifications made against number of service disruptions.	
	Groundwater protected from contamination	Contractor	During the works	Daily Monthly	GWASAP ESS/NEA/OE	• No. of works sites with wastes indiscriminately dumped. • No. of burst pipes left unattended.	
SUBTOTAL FOR MONITORING DURING CONSTRUCTION							73,000.00
OPERATION PHASE							

Activity / Subproject	Outputs of measures to be monitored	Responsibility for measures	Monitoring Period	Monitoring Frequency	Responsibility for monitoring	Monitoring Indicators	Monitoring Budget (\$US)
All subproject components under the General ESMP	Water services improved	Coordinated by NAWEC Director of Water Division	Initially before operations; Periodically during operations	Once Annually	NAWEC Board of Directors / NAWEC Projects and Planning Director	• Relevant standards, plans and guidelines developed or updated • No. of staff training on the job and on E&S safeguards.	NAWEC's annual operational budget.
	Grievances addressed	GRC	Long-term during operation	Quarterly	SSS	• No. of public outreach activities to prevent grievances. • % of complaints addressed	
	Forest and trees protected during operation and maintenance works	NAWEC staff responsible for operations and maintenance;	During operations;	Daily	NAWEC safeguards team; communities	• Number of reports from community members on forests and wildlife related complaints. • Community trained on the use of the GRM to report complaints.	
		Contractors	During maintenance works	Annually	DoF; DPWM; NEA	• Number of reports on hunting / killings of wildlife and forest degradation.	
	Protection from public health and safety risks	NAWEC staff responsible for the operating facilities	Periodically during long-term operation	Annually	NAWEC Safeguards Team	• No. of community accidents related to the operation of the water facilities • No. of complaints on GBV, SEA/H, VAC • % of the public interviewed who are aware of the GRM • Records of health and safety training of employees • Records of public information and sensitization	
	Protection from occupational health and safety risks	NAWEC staff responsible for the operating facilities;	Periodically during long-term operation	Quarterly	NAAWEC Water Division	• No. of work-related accidents • % of workers found using PPE • Availability of first aid kits • Availability of emergency plans and equipment	

Activity / Subproject	Outputs of measures to be monitored	Responsibility for measures	Monitoring Period	Monitoring Frequency	Responsibility for monitoring	Monitoring Indicators	Monitoring Budget (\$US)
		NAWEC Human Resources Department (E&S Safeguards team)			Department if Labour	- No. of staff training recorded - No. of complaints on GBV, SEA/H, VAC, worker GRM. % of workers interviewed who are aware of NAWEC's Gender Policy	
	Waste managed appropriately	Maintenance Contractors	During maintenance				
		NAWEC staff responsible for the operating facilities;	Periodically during long-term operation	Quarterly	NAWEC Water Division / NAWEC Safeguards Team	- No. of waste dumps on and around sites - Waste management plans developed - No. of reports/complaints on waste management issues - Existence of staff / visitor awareness and warning signs on waste control	
		NAWEC maintenance team;		Annually	NEA		
		Maintenance Contractors					
ADDITIONAL MEASURES SPECIFIC TO ACTIVITIES / SITES DURING OPERATION							
Water Production	Impacts associated with excessive water abstraction mitigated	NAWEC Water Technicians; NAWEC Public Relations Department	During operation	Annually	Director of Water Division	- SCADA system functional - No. of public engagement programmes - GR registers evaluated	NAWEC's annual operational budget.
	Sites and infrastructure	Operators of the various water facilities	During operation	Annually	Director of Water Division	- Number of reports on vandalism of water systems % sites found not to be secured during routine inspections	

Activity / Subproject	Outputs of measures to be monitored	Responsibility for measures	Monitoring Period	Monitoring Frequency	Responsibility for monitoring	Monitoring Indicators	Monitoring Budget (\$US)
	protected from vandalism						
Water treatment	Mutual understanding between the Army and NAWEC	Head of the Water Treatment Plant in Sifoe; NAWEC head of public relations	During operation	Annually	Director of Water Division	- Number of consultations held per year - Number of complaints and relative resolutions from the treatment plant and vice versa.	
	Hazardous chemicals, including chlorine and calcium hypochlorite, properly managed	NAWEC staff responsible for operating the facilities; NAWEC maintenance team; Maintenance Contractors	During operation Maintenance	Annually As necessary	Director of Water Division	- Ensure that Hazardous Material Management Plan is in place and implemented. - Check records for incidents involving hazardous chemicals	
Water storage	Worker safety protected, specifically during works at heights	NAWEC Department of Human Resources	During operations and maintenance	Quarterly	Director Water Division; NAWEC Safeguards Team	- assess qualification of workers - check for availability and use of PPE	
Water transmission and distribution	Protection of public health and safety	NAWEC operators of the water transmission network. Contractors	During operation	Annually At time of maintenance works	Director of Water Division	- No. of manholes that are not covered - Site inspection to assess risks, including restriction of access - Warning notices in place - Reports / evidence of flooding caused by maintenance works.	

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Activity / Subproject	Outputs of measures to be monitored	Responsibility for measures	Monitoring Period	Monitoring Frequency	Responsibility for monitoring	Monitoring Indicators	Monitoring Budget (\$US)
	Risks associated with community taps mitigated	NAWEC Safeguards Team	Before and during operations	Before start of operations then annually during operations	Director of Water Division	- No. of sensitization programmes carried out % communities with agreed set rules for operation of the taps	
TOTAL MONITORING							73,000.00

10.5 Budget for implementation of the ESMP

Adequate budgeting is essential to ensure the effective implementation of the ESMP. The allocation of financial resources provides for the execution of mitigation measures, monitoring activities, reporting requirements, and stakeholder engagement initiatives. A well-structured budget also ensures that contractors, supervising engineers, and oversight institutions have the means to fulfill their responsibilities, while enabling timely remedial actions when unforeseen impacts arise. Integrating ESMP costs into the overall project budget underscores the commitment to environmental sustainability and social accountability, ensuring that safeguards are not treated as ancillary but as core components of project delivery.

Where the Contractor is responsible for implementing any measure, the cost of such activity is expected to form part of the Contractor's fees; thus, the resources for mitigation measures such as personal protective equipment, maintenance of machinery, cost of waste disposal, and other measures should feature as part of the Contractor's scope of work.

During operation, at the end of the project, routine monitoring will be part of the operational budget of NAWEC's Water Division. Other institutions with legal roles for monitoring and enforcement, such as the NEA, DoF and DPWM, shall cover their own expenses for monitoring during the operation phase.

No estimate is given for the decommissioning phase because the facilities are not expected to be decommissioned at the end of the project. NAWEC will source or seek funding for such decommissioning activities when that time comes. The proposed budget for implementation of the ESMP is US\$268,000.00 (two hundred and sixty-eight thousand US Dollars) as indicated in Table 10.4.

Table 10.4: Estimated budget for the GWASAP ESMP implementation

No	Activity	Time frame	Budget (US\$)
1	Implementation of ESMP measures including public sensitization and activities	During Project implementation (before and during works)	40,000.00
2	Capacity enhancement programme	(1 session for 6 communities)	18,000.00
		Other relevant stakeholders during implementation	40,000.00
3	2 Specialists (Env/Soc Safeguards)	During project implementation (before and during works)	40,000.00
4	Monitoring	Project implementation period	73,000.00
5	Budget for the GRM process	Project implementation period	19,000.00
6	Environmental and Social Audits	Annually during project implementation	38,000.00
TOTAL			268,000.00

CHAPTER 11: CONCLUSIONS

The GWASAP will directly enhance access to and reliability of water supply in the Greater Banjul Area (GBA), generating indirect benefits for public health and socioeconomic development. During implementation, temporary employment opportunities—both skilled and unskilled—will contribute to income generation and improved livelihoods. In the longer term, operation and maintenance of the facilities will sustain employment and strengthen service delivery.

At the same time, the Project carries potential adverse impacts on the biophysical environment. These include localized air pollution, risks of groundwater contamination and depletion of the water table, loss of forest resources, disruption of wildlife habitats, soil pollution, and improper waste management. Mismanagement of hazardous chemicals could compound both environmental and social risks.

Social and human impacts may also arise, such as occupational and public health and safety hazards, workplace accidents, communicable diseases, and risks of discrimination, sexual exploitation, harassment, or child labor. Involuntary resettlement, loss of income or property, and land use conflicts may occur if project sites outside NAWEC property are not regularized before implementation.

To address these risks, the Project will comply with national environmental legislation and World Bank safeguard requirements. Implementation will be guided by the Project Environmental and Social Management Plan (ESMP) and the Contractor's ESMP, which will detail mitigation measures for construction activities. These measures will include labor management procedures, worker training, waste handling protocols, traffic management, emission reduction, and protection of groundwater, flora, and fauna. NAWEC will ensure that ESMP obligations are embedded in contractor agreements, with robust monitoring and reporting systems to enforce compliance.

Stakeholder consultation and participation will continue throughout all phases to foster ownership and minimize grievances. Training and sensitization of stakeholders on their roles in ESMP execution will be prioritized.

In conclusion, effective implementation of the ESMP will mitigate identified risks and impacts, ensuring that the Project's benefits outweigh the "no-project" alternative.

APPENDICES

Appendix 2.1: Decommissioning Action Plan

It is unlikely that the infrastructure for GAWSAP will be decommissioned and abandoned due to sustainable need for water and the possibility of upgrade to suite prevailing technological situation and demand. However, if government policy will at any time requires the infrastructure decommissioning in the future, an assessment of the existing infrastructure shall be undertaken, and specific decommissioning requirements shall be determined.

This process shall involve stock taking of existing components of the infrastructure at the time. On completion of the assessment, an appropriate decommissioning plan shall be developed by NAWEC. This Plan shall be approved by the NEA and other relevant regulatory authorities before the commencement of decommissioning activities.

The decommissioning plan shall specify all activities that will be undertaken during the decommissioning and abandonment of the project. A Waste Management Plan (WMP) shall be included adopting the waste hierarchy of reduce, reuse, recycle, recover and dispose. NAWEC shall take advantage of the reuse and recycling opportunities identified for majority of the components of the infrastructure such as water pipes, pumps, valves, generators, electrical equipment, furniture, scraps, etc. while all waste not fit for reuse or recycling shall be evacuated by an approved waste contractor for disposal. NAWEC shall ensure adequate monitoring of waste handling/disposal and shall present waste documentations to NEA upon request. The activities that will be undertaken during decommissioning and abandonment of the project shall include:

- Stakeholder identification and consultation particularly along the pipeline corridors;
- Excavation of pipes as well as dismantling and removal of other components;
- Demolition of buildings and water tanks;
- Evacuation of all pipes from the corridors as well as dismantled materials, debris and waste;
- Site reclamation including ground stabilization, levelling and revegetation.

Significant potential E&S risks and impacts that may arise during the decommissioning phase may include: soil erosion; waste generation; soil and water contamination; loss of employment for operational staff; increased susceptibility of surrounding communities to vector borne and water borne diseases amongst others.

The management actions to avoid or minimize these impacts shall be included in the Decommissioning Plan. Other potential likely impacts which may not have been envisaged at this stage including but not limited to new legislations and changes in site conditions shall also be included.

Appendix 3.1: Chance Find Procedures

This Chance Find Procedure shall be applied in case previously unknown culturally valuable materials are unexpectedly discovered during project implementation:

- In the case of chance find of any material with possible archaeological, historical, paleontological, religious, or other cultural value, all work at and around the find, feature or site must immediately stop;
- The discovery will be clearly demarcated and secured from unauthorized access, and all found remains will be left where they were found. If necessary, artefacts will be protected and measures to stabilize the area will be implemented;
- Notify the PC /PIU of the findings who in turn will immediately notify the National Council for Arts and Culture for the necessary, assessment, recording and determine the next course of action;
- Restart construction and public works only upon authorization of the relevant authorities (the National Council for Arts and Culture under the Ministry of Tourism and Culture);
- Relevant findings will be recorded in the Banks' supervision reports;
- These procedures must be referred to as standard provisions in construction contracts.

Appendix 3.2: Soil sampling methodology

Introduction

The rationale for testing the quality of the soil is to assess the level of potential contamination of the well by chemicals or waste in the soil that could leak into the water table. This is particularly relevant at the borehole drilling sites where contaminated soil could enter the well, or at the sites of reservoirs and contaminating the treated water.

Additionally, the treated water can get contaminated by chemicals or waste when the pipe breaks along the corridor allowing contaminated soil into the pipeline. It is in this regard that soil samples were collected from well heads and along the corridors.

Specifically, samples were collected from the proposed site of the water treatment plant and the sites for the four boreholes.

Methodology

1. Site Description

Soil sampling was conducted at two types of locations within the Project area:

- Pre-determined sampling sites: the five locations proposed to host project facilities. These sites are generally square in shape and range in size from 50m x 50meters (for the boreholes, to 150m x150m for the WTP.

Table 1: Sampling sites and coordinates

#	Location	Latitude (N)	Longitude (W)	Area (m)	Remarks
1	Borehole 1	1466927	326306	50 x 50	
2	Borehole 2	1467514	325511	50 x 50	
3	Borehole 3	1468089	324681	50 x 50	
4	Borehole 4	1468625	323839	50 x 50	
5	WTP	1466400	325020	150 150	

2. Sampling Design

2.1 Sampling at Pre-Determined Sites

- Four subplots were established at each borehole site.
- Each subplot was circular with a radius of 5.64 meters.
- One subplot was placed at the center of the site, while the other three were located 12.2 meters from the center at 120-degree angles to ensure uniform spatial representation (see Figure 1).
- At each subplot, two soil subsamples were collected at two depth intervals:
 - 0-20 cm (topsoil)
 - 20-50 cm (subsoil)

- For each depth interval, the four subsamples were thoroughly mixed to create a composite, from which approximately 750g was taken for analysis.

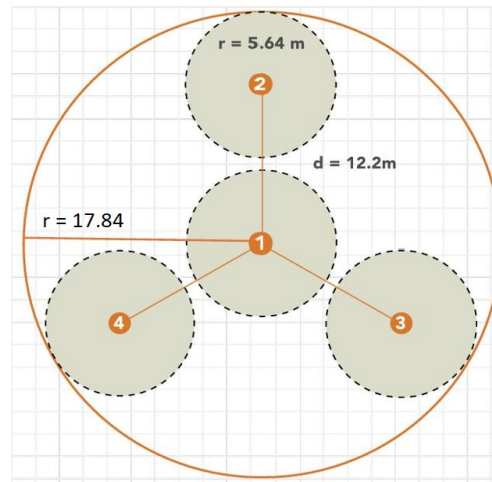


Figure 1: Schematic Layout of the Sampling Subplots (adapted from The ICRAF Land Degradation Surveillance Framework Field Manual)

3. Sample Collection

- Prior to sample collection, loose surface debris was removed from the sampling points.
- Soil samples were extracted using a stainless-steel soil auger to maintain consistent volume and depth.
- Approximately 750 grams of soil were placed in labeled plastic sample bags.
- Each sample bag was labeled with the following information:
 - Site Name
 - Depth Interval
 - Date of Collection
- Soil samples were stored in a cool, dry location immediately after collection for preservation.
- Samples were transported to the lab within two days for analysis.

Appendix 3.3: Procedures for soil sample analysis

1. Take approximately 250 grams of soil sample
2. Place it in an oven safe container (metal or glass) for 24 hours at 225°F / 105 °C.
3. Once the soil is dry, select the soil dilution method 1:2 for further testing

Here is the dilution factor formula:

4. Concentration in dry soil = 1:2 soil dilution sample result multiplied by the dilution factor (x3).

5. Soil sieving

Sieving the soil will help to remove large stones or pieces of organic matter (since it can interfere with weight and dilution factors of soil solution).

To prepare a soil solution using 1:2 dilution method, one needs:

Scale, spatula, cleaning bottle, 2 x plastic beakers, soil extractor solution

6. Take a plastic beaker, place it on the scale and tare the scale (to zero out the weight of the beaker)
7. Using the spatula measure 20 g of soil
8. Add 40 g (ml) deionized water - making total weight of sample (inside the beaker) 60 g for 1:2 dilution
9. Add 5 drops of the soil extractor solution Ammonium Acetate
10. Stir the soil paste obtained for 1 minute and let it rest for 5 minutes
11. Soil solution is now ready to be analyzed

Appendix 5.1: Brikama Gidda Forest Consultation meeting with Farmers

Name of Community: Brikama Gida Forest

Venue: Farm lands adjacent to the FFP

Date: 30/07/2026

Time:13.53pm

Farmers/community members met: 1 female and 3 male

Consultant's team: Momodou A. Cham, Abdoulie Manneh and Ismaila Jarjou

Introduction of the project: The team leader briefed the farmers on the need for the visit, the project activities and likely negative and positive impacts.

The farmers were specifically informed that part of the FFP will be allocated to NAWEC to establish a WTP and four boreholes within the forest. The activity may have impacts on them/the community.

Project brief and potential positive/negative impacts:

Positive Impact: increase in water supply to the population of Brikama East including Gida Forest and they will have clean water for domestic and other use, etc.

Questions: in case if one has a borehole, can he/she access NAWEC water supply

Response – Yes

Negative Impacts: Trenches to be dug may temporarily impact people and vehicles going in and out of compounds, business shops, mechanic workshops, fruits trees, etc. may be negatively impacted. These may trigger RAP since people may lose income and property.

Source of water: 2 of the respondents have open wells, but one of them (the woman) sources water from a neighbor's borehole. Among the 2 with open well, 1 also sources water from a stand tap allocated to him free by a neighbor who has borehole in his compound. The south of Gida Forest is without NAWEC pipe water while northern side has NAWEC water supply.

Willingness to pay for water: Yes, they all responded.

Daily consumption of water: Those doing washing cloths business, need 15/20L/day and may need 4/20L of water/day

Channels to access information: 1st WhatsApp and 2nd radio (FM in Brikama especially Sue Radio)

Livelihoods: Peanuts, Beans, Cashew, fruit trees farming and shops, petty trading

Social and cultural environment: a grave yard is adjacent to the Furayaa Forest in the South

Type of diseases: 1st Malaria, Joints pain for elderly,

Community interaction with the forest: to collect fires wood, wild fruits like “Kabaa, Folai etc”, hunting, wood logging.

Appendix 5.1B: Kembujeh Consultation meeting with Farmers

Name of Community: Kembujeh

Venue: Alkali (Village Chief) Compound

Date: 30/07/2026

Time: 16.00 – 17.08pm

Farmers/community members Present: see attendant list

Consultant's team: Momodou A. Cham, Abdoulie Manneh and Ismaila Jarjou

Introduction of the project: The team leader introduced the subject of the meeting informing the community about the Project and its potential impacts. The representatives of Kembujeh Community were specifically informed that the FFP will host a WTP and four boreholes to be funded by the World Bank, and to be implemented by NAWEC. In addition, they were informed that the activity may have impact on the community. The representatives were encouraged to relay the message to wider the community.

In response, the Alkali expressed his community's appreciation and happiness to receive the information on NAWEC's intension to establish water treatment plant in the FFP. They appealed for NAWEC to speed up the process because they are in need of water since their existing source of water is not sufficient for their needs. Also, to bury the trenches to be dug quickly for the comfort of members of the community.

Project brief and potential positive/negative impacts:

Positive Impact: increase in water supply to the population of Brikama East including Kembujai and they will have clean water for domestic and other use etc.

Negative Impacts: Trenches to be dug may temporarily disrupt traffic of people and vehicles in and out of compounds, business shops, mechanic workshops, compounds, fruits trees/vegetable gardens etc. These may trigger RAP since people may lost income and property.

The boreholes to be dug may affect the water recharge rate of local wells and similar water sources such as private boreholes, etc.

Questions: 1. What benefit will the community get from the GWASAP? Since the NAWEC power station in Brikama is part of Kembujai land area and they don't benefit much from it in terms of accessing adequate electricity supply for the community. **In essence, they request for the community to be prioritised to access NAWEC water before afar communities.**

Response: The request will be relayed to NAWEC through the PIU that the community of Kembujeh has requested to be given high priority in the expanded NAWEC water supply

They appeal for the project to hire community labor especially for pipe digging, which has been taken note of, and will be relayed to NAWEC for consideration.

Will the WTP cause chemical pollution that may affect human and animals.

Response: Calcium hypochlorite is commonly used by NAWEC for chlorination of borehole water. Risks arise mainly from improper handling during dosing (e.g., workers exposed to dust or spills). Communities consuming treated water are safe if chlorine levels are monitored and kept within WHO guidelines. It is expected that NAWEC workers will abide by the ESMP to properly manage the water treatment process.

They also, appealed for reduction of the cost of services connection and the price of water meter. Also, NAWEC to ensure the water meter is located desirably in the beneficiary's compound.

Source of water: Private boreholes, few NAWEC taps, open wells

Willingness to pay for water: Yes

Channels to access information: 1st WhatsApp, 2nd radio, 3rd email, 4th TV

Livelihoods: 1st Rice cultivation, 2nd Peanuts, 3rd Millet, 4th Beans, shopkeeping, 5th petty trading and 6th Formal employment

Social and cultural environment: None

Type of diseases: 1st Malaria, Diabetes/High blood & diarrhoea-very few.

Community interaction with the forest: fire wood, medicine, attract rains, grazing reas for cattle, farming around the forest, collection of wild fruits like "Kabaa, Folai, Mampato"

Appendix 5.1C: Mandina Baa Consultation meeting with Farmers

Name of Community: Mandina Baa

Venue: Alkali Compound

Date: 30/07/2026

Time: 17.50pm

Farmers/community members Present: 7 females and 8 males

Consultant's team present: See attendant list

Introduction of the project: The team leader introduced the subject of the visit and consultation. The representatives of Mandinaba were informed that the FFP will be hosting the planned WTP and four boreholes within the Forest near to their community, and that the process will potentially impact peripheral communities including Mandinaba

Project brief and potential positive/negative impacts:

Positive Impact: increase in water supply to the population of Brikama East including Mandinaba and they will have clean water for domestic and other use, etc.

Negative Impacts: During pipe laying, trenches to be dug may temporarily disrupt vehicular traffic and movement of the people going in and out of compounds, business shops, mechanic workshops, compounds, fruits trees/vegetable gardens, etc.

The boreholes may affect the water recharge rate, or water level of local water sources such as wells/private boreholes, etc.

Questions: will the community get compensation in view of its proximity to the forest? In addition, currently the community has its own community borehole the use of which is paid for by the community members (i.e. the Community derives money for its development projects). This is the only source of income for the community VDC.

The question is "will the arrival of NAWEC's water supply affect the community's existing borehole?"

Response: Coming of NAWEC water supply will not stop use of the community water supply. However, their concern will be communicated to NAWEC authorities for appropriate response on each of their concerns above.

Question: Is NAWEC going to dig trenches from the water tank to distribution network in the community. On the other hand, one of the participants asked, if available local labor be prioritised

Response: NAWEC does award contract of digging of pipe trenches to contractors. Regarding, prioritising of local labor, some participants cautioned that most of the youth don't want to take up trench digging work.

Question: how soon will the NAWEC water supply be available.

Response: Can't tell when NAWEC water supply will be available for community access. However, their request will be communicated to NAWEC for feedback.

Question: who pays for NAWEC water?

Response: whoever sources service connection from the NAWEC water supply system will be responsible to pay for it.

Source of water: 1st community borehole, 2nd private boreholes, & 3rd open wells. Some of the compounds are connected to both private/community boreholes.

Willingness to pay for water: Yes, they will pay for it, if not very expensive. They are also concerned about the higher cost-of-service of connection and water meter. That if expensive, many households might not be able to afford it. Since they pay D300 per tap to access water from community water supply system.

Channels to access information: 1st WhatsApp, 2nd Radio (Kaira FM at Kulor)/GRTS, 3rd Telephone to Alkali/VDC, 4th Community meetings

Livelihoods: 1st Vegetable, 2nd Peanuts, 3rd Corn/Maize, 4th Beans, 5th Cassava,

Social and cultural environment: none

Type of diseases: 1st Malaria (prevalent throughout the year), 2nd Diarrhea

Community interaction with the forest: farming of crops, extract wild fruits like "Kabaa, Folai, Ngosito", fetch fire wood, logs etc.

Appendix 5.1D: Department of Forestry Consultation meeting

Venue: Forestry Director Office

Date: 05/08/2026

Time: 10.30 a.m.

Staff members Present: Salifu Corr – Director, Malang Jassey - Deputy Director, Ebrima Sanneh – Forestry Officer

Consultant's team: Momodou A. Cham, Abdoulie Manneh, Ismaila Jarju

Introduction of the project: The team leader opened the meeting with a brief expose of the Project, including its negative impacts especially on the FFP. He requested clarification regarding the area of the WTP requested by NAWEC, i.e. if indeed a 300m x 300m (9ha area) is what DOF will be carving off the FFP for NAWEC's WTP. This was disputed by Director Corr, and he said 150m x 150m (2.25ha) is what will be allocated to NAWEC, in addition to the four borehole sites (each 50m x 50m = 1ha).

Project brief and potential positive/negative impacts:

Positive Impact: increase in water supply to the population of Brikama East including the peripheral communities to the Park; they will have clean water for domestic and other uses.

Negative Impacts: Allocating 300m x 300m plus the 50m x 50m x 4 boreholes and access road to each of the boreholes, will take substantial area of the FFP, especially given that other parts of the forest are being encroached upon by farmland and fruit trees gardens.

Response/Comments from Forest team:

Disagreed that department of forestry allocated 300m x 300m land area of the forest to the NAWEC. Instead 150m x 150m is allocated to NAWEC for the Treatment Plant.

- The Forestry Department will develop and implement restoration work with support from NAWEC.

Benefits: NAWEC will assist the department with surveillance (Drones etc.)/CCTV cameras to monitor the FFP environment for possible illegal activities

Legal procedures: The DOF has not permanently allocated the 150m x 150m to NAWEC which will be clearly stated in the letter of agreement between NAWEC and DOF, the land can be retrieved if the WTP became defunct.

What is the risk of human encroachment, illegal logging and unauthorized access created by opening new service roads into the forest?

Response: Department recommend to have doors to each of the access roads leading to each of the boreholes and they would not continue beyond each of the boreholes.

Appendix 5.1E: Consultation with National Environment Agency (NEA)

Date: 07/08/2026

Communication medium: via WhatsApp call

Time: 15.15 p.m.

Staff members Present: Lamin Samateh, Senior EIA Officer

Consultant's team: Momodou A. Cham

Briefed Mr. Samateh on the GWASAP, funding source, and planned process to develop the ESIA. This includes the usual consultations with key stakeholders including regulatory and other oversight national institution such as NEA, DWR, DOF, etc.

Relevant national legislation for drilling (Environmental Quality Regulation 1990 and NEMA report, Forestry Act, 2018, etc.), international policies (the Bank's ESS1/ESS10, etc.)

Agreement on the approach and content of the ESIA

Known and understood by consultant

Mr. Samateh reminded the Consultant of the presence of critical infrastructure (such as GAMTEL cables, internet lines, and water pipes) along some of the routes proposed for pipeline corridors. These assets could be adversely affected by trenching and other construction activities. He emphasized that contractors must take these facilities into account during works and that the custodians of such infrastructure should be formally engaged as stakeholders in the project.

Approval and permitting processes

The ESIA process requires the Project Implementation Unit (PIU) to formally write to the National Environment Agency (NEA) to initiate a scoping exercise and obtain guidelines for conducting the assessment. The curriculum vitae of the consultancy firm engaged to carry out the ESIA must be submitted for NEA's review and feedback. The consultancy is then required to prepare and submit a draft ESIA report to NEA for review. Should NEA identify areas requiring improvement, the consultant must address these issues and resubmit the revised draft for validation.

Following validation, the report will be disclosed to the public. In the event of objections to specific project activities - such as trench excavation - NEA will convene a public hearing to consider community concerns and ensure that stakeholder voices are incorporated into the decision-making process.

Possible Q & A

NEA emphasized that trench excavation is likely to cause significant disruptions to traffic, potentially restricting access to essential services in densely populated areas. Safety risks were also highlighted, particularly the danger of children falling into open trenches if they remain unfilled for extended periods. Inadequately buried or poorly compacted trenches may contribute to soil erosion, while wind acting on loose excavated material can generate dust, affecting air quality. Furthermore, the use of substandard materials (such as low-quality pipes and fittings) could result in leakages, leading to long-term public health concerns and undermining the reliability of the water supply system.



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Appendix 5.1F

Appendix 8.1: Company Code of Conduct

Implementing ESHS and OHS Standards

Preventing Gender-Based Violence and Violence against Children

The company is committed to ensuring that the project is implemented in a way that minimizes any negative impacts on the local environment, communities, and its workers. This will be done by respecting the environmental, social, health and safety (ESHS) standards and ensuring that appropriate occupational health and safety (OHS) standards are met. The company is also committed to creating and maintaining an environment in which gender-based violence (GBV) and violence against children (VAC) have no place, and where they will not be tolerated by any employee, subcontractor, supplier, associate, or representative of the company.

Therefore, to ensure that all those engaged in the project are aware of this commitment, the company commits to the following core principles and minimum standards of behavior that will apply to all company employees, associates, and representatives, including subcontractors and suppliers, without exception:

General

4. The company (and therefore all employees, associates, representatives, subcontractors and suppliers) commits to complying with all relevant national laws, rules and regulations.
5. The company commits to fully implementing its “Contractors Environmental and Social Management Plan” (C-ESMP).
6. The company commits to treating women, children (persons younger than 18), and men with respect regardless of race, color, language, religion, political or other opinion, national, ethnic or social origin, property, disability, birth or other status. Acts of GBV and VAC are in violation of this commitment.
7. The company shall ensure that interactions with local community members are done with respect and without discrimination.
8. Demeaning, threatening, harassing, abusive, culturally inappropriate, or sexually provocative language or behavior are prohibited among all company employees, associates, and its representatives, including subcontractors and suppliers.
9. The company will follow all reasonable work instructions (including regarding environmental and social norms).
10. The company will protect and ensure the proper use of property (for example, to prohibit theft, carelessness or waste).

Health and Safety

1. The company will ensure that the project's occupational health and safety (OHS) Management Plan is effectively implemented by company staff, as well as subcontractors and suppliers.
2. The company will ensure that all persons on site wear prescribed and appropriate personal protective equipment, preventing avoidable accidents and reporting conditions or practices that pose a safety hazard or threaten the environment.
3. The company will
 - a. prohibit at all times the use of alcohol during work activities, and
 - b. prohibit at all times the use of narcotics or other substances which can impair one's mental faculties.
4. The company will ensure that adequate sanitation facilities are available on site and at any worker accommodations provided to those working on the project.

Gender-Based Violence and Violence against Children

1. Acts of GBV or VAC constitute gross misconduct and are therefore grounds for sanctions, which may include penalties and/or termination of employment, and if appropriate, referral to the police for further action.
2. All forms of GBV and VAC, including grooming, are unacceptable, regardless of whether they take place at the work site, the work site surroundings, at workers' camps, or within the local community.
 - i. Sexual Harassment—for instance, making unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature, including subtle acts of such behavior—is prohibited.
 - ii. Sexual favors—for instance, making promises or offering favorable treatment dependent on sexual acts, or other forms of humiliating, degrading or exploitative behavior—are prohibited.
3. Sexual contact or activity with children under 18—including through digital media—is prohibited. Mistaken belief regarding the age of a child is not a defense. Consent from the child is also not a defense or excuse.
4. Unless there is full consent¹ by all parties involved in the sexual act, sexual interactions between the company's employees (at any level) and members of the communities surrounding the work place are prohibited. This includes relationships involving the withholding or promise of actual provision of benefit (monetary or nonmonetary) to community members in exchange for sex; such sexual activity is considered "nonconsensual" within the scope of this Code.
5. In addition to company sanctions, legal prosecution of those who commit acts of GBV or VAC will be pursued if appropriate.

6. All employees, including volunteers and subcontractors, are highly encouraged to report suspected or actual acts of GBV and/or VAC by a fellow worker, whether in the same company or not. Reports must be made in accordance with project's GBV and VAC Allegation Procedures.
7. Managers are required to report and act to address suspected or actual acts of GBV and/or VAC because they have a responsibility to uphold company commitments and hold their direct reports accountable.

Implementation

To ensure that the above principles are implemented effectively, the company commits to ensuring that

1. All managers sign the project's 'Manager's Code of Conduct' detailing their responsibilities for implementing the company's commitments and enforcing the standards and responsibilities in the "Individual Code of Conduct."
2. All employees sign the project's "Individual Code of Conduct" confirming their agreement to comply with ESHS and OHS standards and not to engage in activities resulting in GBV or VAC.
3. the Company and Individual Codes of Conduct shall be displayed prominently and in clear view at workers' camps, offices, and in public areas of the workspace. Examples of areas include waiting, rest and lobby areas of sites, canteen areas and health clinics.
4. posted and distributed copies of the Company and Individual Codes of Conduct are translated into the appropriate language of use in the work site areas as well as for any international staff in their native language.
5. An appropriate person is nominated as the company's "Focal Point" for addressing GBV and VAC issues, including representing the company on the GBV and VAC Compliance Team (GCCT), which is comprised of representatives from the client, contractor(s), the supervision consultant, and local service provider(s).
6. An effective GBV and VAC Action Plan is developed in consultation with the GCCT, which includes as a minimum
 - a. **GBV and VAC Allegation Procedure** to report GBV and VAC issues through the project Grievance Redress Mechanism
 - b. **Accountability Measures** to protect the confidentiality of all involved; and,
 - c. **Response Protocol** applicable to GBV and VAC survivors and perpetrators Plan).
7. That the company effectively implements the agreed final GBV and VAC Action Plan, providing feedback to the GCCT for improvements and updates as appropriate.
8. All employees attend an induction training course prior to commencing work on site to ensure they are familiar with the company's commitments to ESHS and OHS standards, and to the project's GBV and VAC Codes of Conduct.

9. All employees attend a mandatory training course once a month for the duration of the contract, starting from the first induction training prior to commencement of work, to reinforce the understanding of the project's ESHS and OHS standards and the GBV and VAC Code of Conduct.

I do hereby acknowledge that I have read the foregoing Company Code of Conduct, and on behalf of the company agree to comply with the standards contained therein. I understand my role and responsibilities to support the project's OHS and ESHS standards, and to prevent and respond to GBV and VAC. I understand that any action inconsistent with this Company Code of Conduct, or failure to act as mandated by this Company Code of Conduct, may result in disciplinary action.

Company name: _____

Signature: _____

Printed Name: _____

Title: _____

Date: _____

4.1.2 MANAGER'S CODE OF CONDUCT

Implementing ESHS and OHS Standards

Preventing Gender-Based Violence and Violence against Children

Managers at all levels have a responsibility to uphold the company's commitment to implementing the ESHS and OHS standards, and preventing and addressing GBV and VAC. This means that managers have an acute responsibility to create and maintain an environment that respects these standards, and prevents GBV and VAC. Managers need to support and promote the implementation of the Company Code of Conduct. To that end, they must adhere to this Manager's Code of Conduct and sign the Individual Code of Conduct. This commits them to supporting the implementation of the CESMP and the OHS Management Plan, and developing systems that facilitate the implementation of the GBV and VAC Action Plan. They need to maintain a safe workplace as well as a GBV-free and VAC-free environment both at the workplace and in the local community. These responsibilities include but are not limited to the following:

Implementation

1. To ensure maximum effectiveness of the Company and Individual Codes of Conduct:
 - i. Prominently displaying the Company and Individual Codes of Conduct in clear view at workers' camps, offices, and in public areas of the work space. Examples of areas include waiting, rest and lobby areas of sites, canteen areas and health clinics.
 - ii. Ensuring that all posted and distributed copies of the Company and Individual Codes of Conduct are translated into the appropriate language of use in the work site areas as well as for any international staff in their native language.
2. Verbally and in writing explain the Company and Individual Codes of Conduct to all staff.
3. Ensure that
 - i. All direct reports sign the Individual Code of Conduct document, including acknowledgment that they have read and agree with it.
 - ii. Staff lists and signed copies of the Individual Code of Conduct are provided to the OHS Manager, and the client.
 - iii. All direct reports participate in training and that staff also participate as outlined below.
 - iv. A mechanism is put in place for staff to
 1. report concerns about ESHS or OHS compliance; and,
 2. confidentially report GBV or VAC incidents through the Grievance Redress Mechanism
 - v. Staff are encouraged to report suspected or actual ESHS, OHS, GBV or VAC issues, emphasizing the staff's responsibility to the Company and the country hosting their employment, and emphasizing the respect for confidentiality.
4. In compliance with applicable laws and to the best of their abilities, prevent perpetrators of sexual

exploitation and abuse from being hired, re-hired or deployed. Use background and criminal reference checks for all employees.

5. Ensure that when engaging in partnership, subcontractor agreements, supplier agreements or other similar agreements, these agreements
 - i. Incorporate the ESHS, OHS, GBV and VAC Codes of Conduct as an attachment.
 - ii. Include the appropriate language requiring such contracting entities and individuals, and their employees and volunteers, to comply with the Individual Codes of Conduct.
 - iii. Expressly state that the failure of those entities or individuals, as appropriate, to ensure compliance with the ESHS and OHS standards, to take preventive measures against GBV and VAC, to investigate allegations thereof, or to take corrective actions when GBV or VAC has occurred, shall constitute grounds for not only sanctions and penalties in accordance with the Individual Codes of Conduct but also termination of agreements to work on or supply the project.
6. Provide support and resources to the GCCT to create and disseminate internal sensitization initiatives through the awareness-raising strategy under the GBV and VAC Action Plan.
7. Ensure that any GBV or VAC issue warranting police action is immediately reported to the police, the client, and the World Bank.
8. Report any suspected or actual acts of GBV and/or VAC, and act on them according to the response protocol, because managers have a responsibility to uphold company commitments and hold their direct reports responsible.
9. Ensure that any major ESHS or OHS incidents immediately are reported to the client and the supervision engineer.

Training

1. The managers are responsible to
 - a. Ensure that the OHS Management Plan is implemented, with suitable training required for all staff, including subcontractors and suppliers; and
 - b. Ensure that staff have a suitable understanding of the CESMP and are trained as appropriate to implement its requirements.
2. All managers are required to attend an induction manager training course prior to commencing work on site to ensure that they are familiar with their roles and responsibilities in upholding the GBV and VAC elements of these Codes of Conduct. This training will be separate from the induction training course required of all employees and will provide managers with the necessary understanding and technical support needed to begin to develop the GBV and VAC Action Plan for addressing GBV and VAC issues.
3. Managers are required to attend and assist with the project-facilitated monthly training courses for all employees. Managers will be required to introduce the trainings and announce the self-

evaluations, including collecting satisfaction surveys to evaluate training experiences and provide advice on improving the effectiveness of the training.

4. Ensure that time is provided during work hours and that staff, prior to commencing work on site, attend the mandatory project-facilitated induction training on
 - a. OHS and ESHS, and
 - b. GBV and VAC as required of all employees.
5. During civil works, ensure that staff attend ongoing OHS and ESHS training as well as the monthly mandatory refresher training course required of all employees to combat any increased risk of GBV and VAC.

Response

1. Managers will be required to take appropriate actions to address any ESHS or OHS incidents.
2. With regard to GBV and VAC:
 - a. Provide input to the GBV and VAC Allegation Procedures and Response Protocol (section 4.7 of the Action Plan) developed by the GCCT ²¹as part of the final cleared GBV and VAC Action Plan.²²
 - b. Once adopted by the Company, managers will uphold the Accountability Measures set forth in the GBV and VAC Action Plan to maintain the confidentiality of all employees who report, or are alleged to have perpetrated, incidences of GBV and VAC (unless a breach of confidentiality is required to protect persons or property from serious harm or is required by law).
 - c. If a manager develops concerns or suspicions regarding any form of GBV or VAC by one of his or her direct reports, or by an employee working for another contractor on the same work site, he or she is required to report the case using the GRM.
 - d. Once a sanction has been determined, the relevant manager is expected to be personally responsible for ensuring that the measure is effectively enforced, within a maximum timeframe of 14 days from the date on which the decision to sanction was made.
 - e. If a manager has a conflict of interest due to personal or familial relationships with the survivor or perpetrator, or both, he or she must notify the respective company and the GCCT. The Company will be required to appoint another manager who does not have a conflict of interest to respond to complaints.
 - f. Managers must ensure that any GBV or VAC issue warranting police action is immediately reported to the police, the client, and the World Bank.

²¹ Grievance, Code of Conduct, and Training is a safeguard tool - essentially the framework of Codes of Conduct and Training that binds contractors, managers, and workers to uphold zero tolerance for GBV and VAC in project implementation.

3. Managers failing to address ESHS or OHS incidents, or failing to report or comply with the GBV and VAC provisions, may be subject to disciplinary measures to be determined and enforced by the company's CEO, Managing Director, or equivalent highest-ranking manager. Those measures may include
 - a. Informal warning.
 - b. Formal warning.
 - c. Additional training.
 - d. Loss of up to one week's salary.
 - e. Suspension of employment (without payment of salary), for a minimum period of 1 month up to a maximum of 6 months.
 - f. Termination of employment.
4. Ultimately, failure to effectively respond to ESHS, OHS, GBV and VAC cases on the work site by the company's managers or CEO may provide grounds for legal action by authorities.

I do hereby acknowledge that I have read the foregoing Manager's Code of Conduct, do agree to comply with the standards contained herein, and understand my roles and responsibilities to prevent and respond to ESHS, OHS, GBV and VAC requirements. I understand that any action inconsistent with this Manager's Code of Conduct, or failure to act as mandated by this Manager's Code of Conduct, may result in disciplinary action against me.

Signature: _____

Printed Name: _____

Title: _____

Date: _____

Appendix 8.2: Manager's Code of Conduct

Implementing ESHS and OHS Standards

Preventing Gender-Based Violence and Violence against Children

Managers at all levels have a responsibility to uphold the company's commitment to implementing the ESHS and OHS standards, and preventing and addressing GBV and VAC. This means that managers have an acute responsibility to create and maintain an environment that respects these standards, and prevents GBV and VAC. Managers need to support and promote the implementation of the Company Code of Conduct. To that end, they must adhere to this Manager's Code of Conduct and sign the Individual Code of Conduct. This commits them to supporting the implementation of the C-ESMP and the OHS Management Plan, and developing systems that facilitate the implementation of the GBV and VAC Action Plan. They need to maintain a safe workplace as well as a GBV-free and VAC-free environment both at the workplace and in the local community. These responsibilities include but are not limited to the following:

Implementation

10. To ensure maximum effectiveness of the Company and Individual Codes of Conduct:
 - i. Prominently displaying the Company and Individual Codes of Conduct in clear view at workers' camps, offices, and in public areas of the work space. Examples of areas include waiting, rest and lobby areas of sites, canteen areas and health clinics.
 - ii. Ensuring that all posted and distributed copies of the Company and Individual Codes of Conduct are translated into the appropriate language of use in the work site areas as well as for any international staff in their native language.
11. Verbally and in writing explain the Company and Individual Codes of Conduct to all staff.
12. Ensure that
 - i. All direct reports sign the Individual Code of Conduct document, including acknowledgment that they have read and agree with it.
 - ii. Staff lists and signed copies of the Individual Code of Conduct are provided to the OHS Manager and the client.
 - iii. All direct reports participate in training and that staff also participate as outlined below.
 - iv. A mechanism is put in place for staff to
 1. report concerns about ESHS or OHS compliance; and,
 2. confidentially report GBV or VAC incidents through the Grievance Redress Mechanism
 - v. Staff are encouraged to report suspected or actual ESHS, OHS, GBV or VAC issues, emphasizing the staff's responsibility to the Company and the country hosting their employment, and emphasizing the respect for confidentiality.

13. In compliance with applicable laws and to the best of their abilities, prevent perpetrators of sexual exploitation and abuse from being hired, re-hired or deployed. Use background and criminal reference checks for all employees.
14. Ensure that when engaging in partnership, subcontractor agreements, supplier agreements or other similar agreements, these agreements
 - i. Incorporate the ESHS, OHS, GBV and VAC Codes of Conduct as an attachment.
 - ii. Include the appropriate language requiring such contracting entities and individuals, and their employees and volunteers, to comply with the Individual Codes of Conduct.
 - iii. Expressly state that the failure of those entities or individuals, as appropriate, to ensure compliance with the ESHS and OHS standards, to take preventive measures against GBV and VAC, to investigate allegations thereof, or to take corrective actions when GBV or VAC has occurred, shall constitute grounds for not only sanctions and penalties in accordance with the Individual Codes of Conduct but also termination of agreements to work on or supply the project.
15. Ensure that any GBV or VAC issue warranting police action is immediately reported to the police, the client, and the WB.
16. Report any suspected or actual acts of GBV and/or VAC, and act on them according to the response protocol, because managers have a responsibility to uphold company commitments and hold their direct reports responsible.
17. Ensure that any major ESHS or OHS incidents immediately are reported to the client and the supervision engineer.

Training

- i. The managers are responsible to
 - a. Ensure that the OHS Management Plan is implemented, with suitable training required for all staff, including subcontractors and suppliers; and
 - b. Ensure that staff have a suitable understanding of the CESMP and are trained as appropriate to implement its requirements.
- ii. All managers are required to attend an induction manager training course prior to commencing work on site to ensure that they are familiar with their roles and responsibilities in upholding the GBV and VAC elements of these Codes of Conduct. This training will be separate from the induction training course required of all employees and will provide managers with the necessary understanding and technical support needed to begin to develop the GBV and VAC Action Plan for addressing GBV and VAC issues.

- iii. Managers are required to attend and assist with the project-facilitated monthly training courses for all employees. Managers will be required to introduce the trainings and announce the self-evaluations, including collecting satisfaction surveys to evaluate training experiences and provide advice on improving the effectiveness of the training.
- iv. Ensure that time is provided during work hours and that staff, prior to commencing work on site, attend the mandatory project-facilitated induction training on OHS and ESHS, and
GBV and VAC as required of all employees.
- v. During civil works, ensure that staff attend ongoing OHS and ESHS training as well as the monthly mandatory refresher training course required of all employees to combat any increased risk of GBV and VAC.

Response

- i. Managers will be required to take appropriate actions to address any ESHS or OHS incidents.

With regard to GBV and VAC:

- ii. Provide input to the GBV and VAC Allegation Procedures and Response Protocol developed by the GCCT as part of the final cleared GBV and VAC Action Plan.
- iii. Once adopted by the Company, managers will uphold the Accountability Measures set forth in the GBV and VAC Action Plan to maintain the confidentiality of all employees who report, or are alleged to have perpetrated, incidences of GBV and VAC (unless a breach of confidentiality is required to protect persons or property from serious harm or is required by law).
- iv. If a manager develops concerns or suspicions regarding any form of GBV or VAC by one of his or her direct reports, or by an employee working for another contractor on the same work site, he or she is required to report the case using the GRM.
- v. Once a sanction has been determined, the relevant manager is expected to be personally responsible for ensuring that the measure is effectively enforced, within a maximum timeframe of 14 days from the date on which the decision to sanction was made.
- vi. If a manager has a conflict of interest due to personal or familial relationships with the survivor or perpetrator, or both, he or she must notify the respective company and the GCCT. The Company will be required to appoint another manager who does not have a conflict of interest to respond to complaints.
- vii. Managers must ensure that any GBV or VAC issue warranting police action is immediately reported to the police, the client, and the World Bank.

1. Managers failing to address ESHS or OHS incidents, or failing to report or comply with the GBV and VAC provisions, may be subject to disciplinary measures to be determined and enforced by the company's CEO, Managing Director, or equivalent highest-ranking manager. Those measures may include
 - a. Informal warning.
 - b. Formal warning.
 - c. Additional training.
 - d. Loss of up to one week's salary.
 - e. Suspension of employment (without payment of salary), for a minimum period of 1 month up to a maximum of 6 months.
 - f. Termination of employment.
2. Ultimately, failure to effectively respond to ESHS, OHS, GBV and VAC cases on the work site by the company's managers or CEO may provide grounds for legal action by authorities.

I do hereby acknowledge that I have read the foregoing Manager's Code of Conduct, do agree to comply with the standards contained herein, and understand my roles and responsibilities to prevent and respond to ESHS, OHS, GBV and VAC requirements. I understand that any action inconsistent with this Manager's Code of Conduct, or failure to act as mandated by this Manager's Code of Conduct, may result in disciplinary action against me.

Signature: _____

Printed Name: _____

Title: _____

Date: _____

Appendix 8.3: Individual Code of Conduct

Implementing ESHS and OHS Standards

Preventing Gender-Based Violence and Violence against Children

I, _____, acknowledge that adhering to environmental, social health and safety (ESHS) standards, upholding the project's occupational health and safety (OHS) requirements, and preventing gender-based violence (GBV) and violence against children (VAC) are important goals.

The company considers that any failure to follow ESHS and OHS standards, or to take part in GBV or VAC activities—be it on the work site, the work site surroundings, at workers' camps, or in the surrounding communities—constitutes an act of gross misconduct and is therefore grounds for sanctions, penalties, or potential termination of employment. Prosecution by the police of those who commit GBV or VAC may be pursued if appropriate.

I agree that while working on the project, I will

1. Attend and actively partake in training courses related to ESHS, OHS, HIV/AIDS, GBV and VAC as requested by my employer.
2. Wear my personal protective equipment at all times when at the work site or engaged in project-related activities.
3. Take all practical steps to implement the contractor's environmental and social management plan (C-ESMP).
4. To the best of my ability do my part in implementing the OHS Management Plan.
5. Adhere to a zero-alcohol policy during work activities, and at all times refrain from the use of narcotics or other substances that can impair mental faculties.
6. Consent to police background checks.
7. Treat women, children (persons under the age of 18), and men with respect regardless of race, color, language, religion, political or other opinion, national, ethnic or social origin, property, disability, birth or other status.
8. Avoid using language or behavior toward women, children or men that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate.
9. Not engage in sexual harassment—for instance, making unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct, of a sexual nature, including subtle acts of such behavior (for example, looking somebody up and down; making kissing, howling or smacking sounds; hanging around somebody; whistling and catcalls; giving personal gifts; making comments about somebody's sex life; and so on).

10. Not engage in sexual favors—for instance, making promises or favorable treatment dependent on their agreeing to perform sexual acts—or other forms of humiliating, degrading or exploitative behavior.
11. Not participate in sexual contact or activity with children—including grooming or contact through digital media. I agree that mistaken belief regarding the age of a child is not a defense, and that consent from the child is also not a defense or an excuse.
12. Refrain from engaging in sexual interactions with any member of the surrounding communities unless there is the full consent by all parties involved. This includes relationships involving the withholding or promise of actual provision of benefit (monetary or non-monetary) to any community member in exchange for sex—such sexual activity being considered “non-consensual” within the scope of this Code.
13. Report through the GRM or to my manager any suspected or actual GBV or VAC, or any breach of this Code of Conduct, by a fellow worker, whether employed by my company or not.

With regard to children under the age of 18:

14. Wherever possible, ensure that another adult is present when working in the proximity of children.
15. Not invite into my home unaccompanied children who are not related to my family, unless they are at immediate risk of injury or in physical danger.
16. Not use any computer, mobile phone, video camera, analog camera, or digital camera or any other medium to exploit or harass children or to access child pornography (see also “Use of children's images for work related purposes” below).
17. Refrain from physical punishment or discipline of children who are not my own children.
18. Refrain from hiring children below the minimum age of 14 for domestic or other labor unless national law specifies a higher age, or which places them at significant risk of injury.
19. Comply with all relevant local legislation, including labor laws, in relation to child labor and World Bank’s safeguard policies on child labor and minimum age.
20. Take appropriate caution when photographing or filming children.

Use of children's images for work-related purposes

When photographing or filming a child for work-related purposes, I must:

21. Before the photographing or filming, assess and endeavor to comply with local traditions or restrictions for reproducing personal images.
22. Before the photographing or filming, obtain informed consent from the child and from a parent or guardian of the child. As part of this, I must explain how the photograph or film will be used.
23. Ensure that any photographs, films, videos and DVDs I take must present the child in a dignified and respectful manner and not in a vulnerable or submissive manner. Children should be adequately clothed and not in poses that could be seen as sexually suggestive.

24. Ensure that images are honest representations of the context and the facts.
25. Ensure that file labels do not reveal identifying information about the child when sending images electronically.

Sanctions

I understand that if I breach this Individual Code of Conduct, my employer will take disciplinary action, which could include:

1. Informal warning.
2. Formal warning.
3. Additional training.
4. Loss of up to one week's salary.
5. Suspension of employment (without payment of salary) for a minimum period of 1 month up to a maximum of 6 months.
6. Termination of employment.
7. A report to the police if warranted.

I understand that it is my responsibility to ensure that the environmental, social, health and safety standards are met; that I will adhere to the occupational health and safety management plan, that I will avoid actions or behaviors that could be construed as GBV or VAC. Any such actions will be a breach this Individual Code of Conduct.

I do hereby acknowledge that I have read the foregoing Individual Code of Conduct, do agree to comply with the standards contained therein, and understand my roles and responsibilities to prevent and respond to ESHS, OHS, GBV and VAC issues. I understand that any action that is inconsistent with this Individual Code of Conduct, or any failure to act as mandated by this Individual Code of Conduct, may result in disciplinary action against me and may affect my ongoing employment.

Signature: _____

Printed Name: _____

Title: _____

Date: _____

Appendix???? : Contract clauses to be included in contractor's agreements

The rules, including specific prohibitions and construction management measures, should be incorporated into all relevant bidding documents, contracts, and work orders.

Prohibitions: The following activities should be prohibited on or near the project site:

- Cutting of trees for any reason outside the approved construction area
- Hunting, fishing, wildlife capture, or plant collection
- Use of unapproved toxic materials
- Disturbance to anything with architectural or historical value
- Setting of fires
- Use of firearms (except authorized security guards)
- Use of alcohol or drugs (except prescribed medicines) by workers
- Employment of children in accordance with international law and the Children's Act.

Construction Management Measures:

Waste Management:

- Minimize the production of waste that must be treated or eliminated.
- Identify and classify the type of waste generated. If hazardous wastes are generated, proper procedures must be taken regarding their storage, collection, transportation and disposal.
- Identify and demarcate disposal areas clearly indicating the specific materials that can be deposited in each.
- Control placement of all construction waste (including earth cuts) to approved disposal sites. Dispose in authorized areas all of garbage, metals, used oils, and excess material generated during construction, incorporating recycling systems and the separation of materials.
- Establish and enforce daily site clean-up procedures, including maintenance of adequate disposal facilities for construction debris.

Maintenance:

- Ensure that all equipment maintenance activities, including oil changes, are conducted within demarcated maintenance areas; never dispose spent oils on the ground, in water courses, drainage canals or in sewer systems.
- Identify, demarcate and enforce the use of within-site access routes to limit impact to site vegetation.

Labour health and safety:

- Place signs and lighting at strategic locations informing community before works starts.
- Conduct safety training for construction workers prior to beginning work.
- Provide personal protective equipment and clothing (goggles, gloves, respirators, dust masks, hard hats, steel-toed boots etc.,) for construction workers and enforce their use.
- During heavy rains or emergencies of any kind, suspend all work.

-
- Safely store hazardous items away from the public.
 - Educate on risks and prevention of STD/STIs
 - Erect Speed bumps and speed limits.
 - Cover up trucks transporting sand and gravel

Community Safety during Construction:

The Contractor's responsibilities include the protection of every person (workers and the public) and nearby property from construction accidents. The Contractor shall be responsible for complying with all national and local safety requirements and any other measures necessary to avoid accidents, including the following:

- Carefully and clearly mark pedestrian-safe access routes.
- If school children are in the vicinity, include traffic safety personnel to direct traffic.
- Keep the public away from construction sites

Nuisance and dust control should include:

- Maintain all construction-related traffic at minimum
- Maintain equipment and machinery to reduce noise
- In sensitive areas (including residential neighbourhoods, health centres, schools) more strict measures may need to be implemented to prevent undesirable noise levels, including controlled working times
- Minimize production of dust and particulate materials at all times, to avoid impacts on surrounding families and businesses
- Spray water as needed on dirt roads, cut areas and soil stockpiles or fill material.
- Apply proper measures to minimize disruptions from vibration or noise coming from construction activities.

Community Relations:

To maintain amicable community relations, the Contractor should:

- Inform the population about construction and work schedules, interruption of services, traffic detour routes as appropriate.
- Avoid construction activities at night or early in the morning.
- Hire to the extent possible workers from the project affected communities.

Chance Find Procedures for Culturally Significant Artefacts:

In case culturally valuable materials are uncovered during excavation:

- Stop work immediately following the discovery of any materials with possible archaeological, historical, paleontological, or other cultural value, announce findings to

project manager and notify the PCU who in turn notifies the National Council for Arts and Culture

- Protect artefacts as well as possible, using plastic covers, and implement measures to stabilize the area, if necessary
- Prevent unauthorized access to the artefacts
- Restart construction works only upon the authorization of the relevant authorities.

Environmental and Social Supervision during Construction

The bidding documents should indicate how compliance with environmental rules and design specifications would be supervised, along with the penalties for noncompliance by contractors or workers. Construction supervision requires oversight of compliance with the ESMP by the contractor or his designated environmental supervisor. If necessary competencies to are needed to adequately monitor the social aspects of this ESMP, the contractor should hire such capacity.

The “*Codes of Conduct and Action Plan for Implementing ESHS and OHS Standards, and Preventing Gender Based Violence (GBV) and Violence Against Children (VAC)*” will also be included in contracts including explicit references for monitoring, enforcement and compliance (as per Annex 7, and its annexes included in this ESIA/ESMP report.

Annex 6: Contract Clauses to be Included in Contractor’s Agreements

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