

Republic of the Gambia
National Water and Electricity Company
(NAWEC)



Funded by
Agence Française de Développement



Water Supply Project in the Greater Banjul Area (WASIB)

Consulting services for Design of the Medium-term component,
Works supervision of the Short-term & Medium-term components,
Capacity reinforcement, Technical assistance and support to the PMU

Contract no. NAWEC/WASIB/TA/CON/001/2022

Environmental and Social Impact Assessment study for the “Drillings Works” stage of the WASIB Project (D-2-10a)

Antea Group

Understanding today.
Improving tomorrow.

Project Number: INTP210071
D-2-10a: ESIA – WASIB “Drillings Works” – June 25, 2025

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Republic of the Gambia

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	18/07/2025			Additional clarifications brought to the text following meeting with AFD on 17/07/2025 – ANNEX 5 to be completed by documents from NAWEC
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Index

Executive Summary.....	12
1. Introduction and background	18
1.1. Proposed project overview and rationale	18
1.2. ESIA scope	18
1.3. Purpose and objectives of ESIA study	19
1.4. Methodological approach for the ESIA	19
1.5. ESIA report structure	20
2. Institutional and legal framework.....	21
2.1. National policies and legal framework.....	21
2.2. Institutional framework.....	23
2.3. Environmental and social safeguard of the WB.....	24
2.4. AFD's environmental and social framework	24
3. Project description	27
3.1. Drillings work overview	27
3.2. Location of drilling sites	27
3.2.1. Geological and hydrogeological context.....	28
3.2.2. Borehole siting	30
3.3. Specific description of the affected boreholes sites in the Greater Banjul Area	34
3.3.1. Brikama Borehole.....	35
3.3.2. Serrekunda Borehole	36
3.3.3. Sukuta boreholes	37
3.3.4. Sifoe new field (with 10 boreholes to be drilled).....	38
3.3.5. Airport Boreholes.....	39
3.4. Worksite organization	39
3.4.1. Working areas and road access.....	39
3.4.2. Organization.....	40
3.5. Technical description of the work.....	40
3.5.1. Shallow Sand Aquifer (SSA) boreholes (Continental terminal)	40
3.5.2. Deep Sand Aquifer (DSA) boreholes	46
4. Environmental and social baseline situation	50
4.1. Data gathering	50
4.2. Physical environment	50
4.2.1. Geology	50
4.2.2. Climate and climate change.....	50
4.2.3. Groundwater characteristics.....	51
4.3. Biological Environment	52
4.3.1. Local context	53
4.3.2. The Sifoe Forest	55
4.3.3. Biological investigation of the proposed drilling sites in Sifoe Forest.....	61
4.3.4. Biological investigations of the proposed drilling sites – Airport.....	72
4.3.5. Maastrichtian DSA Serekunda (GPS: -16.68169975 - 13.4364996).....	74

4.3.6.	Maastrichtian DSA Brikama (GPS: --16.65649986 13.28969955)	74
4.3.7.	The Salaji Forest Park	75
4.3.8.	Conclusion and recommendations	80
4.4.	Socioeconomic environment	80
4.4.1.	Population growth and Distribution	80
4.4.2.	Health.....	81
4.4.3.	Access To Water	81
4.4.4.	Domestic Sewage	81
4.4.5.	Disadvantaged and Vulnerable Groups.....	81
4.4.6.	Gender Considerations and Gender-Based Violence (GBV).....	82
4.4.7.	Violence Against Children (VAC)	82
5.	Assessment of potential impacts and mitigation.....	84
5.1.	Impact assessment methodology	84
5.1.1.	Approach.....	84
5.1.2.	Impact intensity rating	85
5.1.3.	Impact importance rating	86
5.1.4.	Identification of mitigation measures.....	87
5.2.	Definition of Areas of Influence (Aoi)	88
5.3.	Anticipated benefits from the project.....	94
5.4.	Impacts and mitigation related to construction stage.....	94
5.4.1.	Impact on physical and biological environment	94
5.4.2.	Impact on the biological environment and mitigation	97
5.4.3.	Impact on socioeconomical environment.....	100
5.5.	Impacts in the operation phase of the works.....	107
5.6.	Summary of the mitigation measure during drilling phases.....	107
6.	Environmental and Social Management Plan	109
6.1.	Objectives of The ESMP	109
6.2.	ESMP Implementation and Monitoring Arrangements	109
6.2.1.	Roles and Responsibilities for ESMP Implementation	109
6.2.2.	Institutional Training and Sensitization.....	112
6.2.3.	Monitoring	113
6.2.4.	Reporting	116
6.2.5.	Environmental Auditing	116
6.2.6.	Budget for Implementation of the ESMP.....	116
6.3.	Matrix on the Mitigation of the Identified Potential Negative Impacts.....	117
7.	Stakeholder mapping and engagement.....	127
7.1.	STAKEHOLDER IDENTIFICATION AND ANALYSIS	127
7.2.	Methodology	127
7.3.	Affected Parties	128
7.4.	Disadvantaged and Vulnerable Groups.....	128
7.5.	Summary of project stakeholder needs	129
7.6.	STAKEHOLDER ENGAGEMENT PLAN (SEP).....	130
7.6.1.	Purpose and Timing of Stakeholder Engagement Plan	130
7.6.2.	Proposed strategy for consultation	130
7.6.3.	Proposed strategy to incorporate the view of vulnerable groups	131

7.6.4.	Reporting back to stakeholders	131
7.6.5.	Information on public engagement activities undertaken by the Project will be conveyed to the stakeholders through publication of the reports on the project website, social media, WASIB office etc. Communication plan	131
7.7.	Resources and Responsibilities for implementing stakeholder engagement activities.....	132
7.7.1.	Resources	132
7.7.2.	Management functions and responsibilities for managing the Stakeholder Engagement Plan..	132
7.7.3.	Institutional consultations	132
7.7.4.	Consultations with stakeholder communities	133
7.7.5.	Stakeholders' opinions about the project.....	134
8.	Grievance Mechanism	135
8.1.	Purpose	135
8.2.	Resources and Responsibilities for Implementing Stakeholder Engagement Activities	136
8.2.1.	Human Resources and Implementation	136
8.2.2.	Management Functions and Responsibilities	136
8.3.	Roles and responsibilities	136
8.4.	Objectives.....	137
8.5.	Community Level Grievance Mechanism	138
8.6.	Project Level Grievance Mechanism	138
8.7.	Procedures	139
8.8.	Procedures for management of SEA/SH-related complaints	140
8.8.1.	Step I: Uptake.....	140
8.8.2.	Step II: Sort and process	140
8.8.3.	Step III: Acknowledge receipt	141
8.8.4.	Step IV: Verification process	141
8.8.5.	Step V: Monitor and evaluate	141
8.8.6.	Step VI: Feedback to involved parties	141
9.	Conclusion	143
	Bibliography	144

List of Annexes

- Annex 1. Code of Conduct for implementing ESHS and OHS Standards Preventing Gender Based Violence and Violence Against Children**
- Annex 2. Potential Procedures for Addressing GBV and VAC**
- Annex 3. Chance Find Procedures**
- Annex 4. Grievance Logbook excluding SEA/SH cases**
- Annex 5. Land acquisition documents**
- Annex 6. MoU between NAWEC/DOF**

List of Acronyms

AFD	Agence Française de Développement (French Development Agency)
DHS	Department of Health and Safety
DoF	Department of Forestry
DWR	Department of Water Resources
EIB	European Investment Bank
ESHS	Environmental, Social Health and Safety
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
FS	Feasibility Study
GBA	Greater Banjul Area
GBoS	Gambian Bureau of Statistics
GBV	Gender-Based Violence
GERMP	Gambia Electricity Restoration and Modernization Project (World-Bank)
LGA	Local Government Area
NAWEC	National Water and Electricity Company
NEA	National Environment Agency
NRA	National Roads Authority
MOH	Ministry of Health
MoLRG	Ministry of Lands and Regional Government
MoYS	Ministry of Youth and Sport
OHS	Occupational Health and Safety
OIC	Organisation of Islamic Cooperation
PMU	Project Management Unit
PURA	Public Utility Regulation Authority
Rep	Representative
SEA	Sexual Exploitation and Abuse
SH	Sexual Harassment
VAC	Violence Against Children
WASIB	Water Supply Project in the Greater Banjul Area
WB	World Bank
WTP	Water Treatment Plant

Figures List

Figure 1 : WASIB Drilling site location.	28
Figure 2 : Geological cross section Est-West in the Gambia (Dr Gassama)	29
Figure 3 : Satellite view of the SSA BH location in Kity	31
Figure 4 :Satellite view of the SSA airport BH location	32
Figure 5 : Satellite view of the DSA borehole location in Serrekunda WTP.....	33
Figure 6 : Satellite view of the DSA borehole location in Brikama WTP	33
Figure 7 : Satellite view of the DSA boreholes location in Sukuta WTP.....	33
Figure 8 : Map of the WASIB boreholes in GBA.....	34
Figure 9 : Map of Brikama borehole.....	35
Figure 10 : Map of Serrekunda borehole.....	36
Figure 11 : Map of Sukuta boreholes.....	37
Figure 12 : Map of the 10 boreholes of Sifoe	38
Figure 13 : Map of Airport Boreholes	39
Figure 14 : Step by step methodology for well final design.....	41
Figure 15: Structuring of IUCN categories (source IUCN Red List Categories and Criteria. Version 3.1).....	55
Figure 16 : The extend of the Sifoe Forest (source: Google map)	56
Figure 17 : Location of the borehole sites within the Sifoe Forest.....	57
Figure 18 : Marks of harvested tree back (note the bark removed)	58
Figure 19 : Typical vegetation of the forest.....	58
Figure 20 : Stands of palm trees	58
Figure 21 : The Guinea Plum.....	58
Figure 22 : Rich under storey and climbers	61
Figure 23 : Vegetation structure of Borehole site BHF7	62
Figure 24 : Vegetation structure of site BHF6.....	63
Figure 25 : Sign Board of The Real Estate Operating in the Area	64
Figure 26 : Cleared Area 207m away from the Center of Bore Site 4.....	64
Figure 27 : Estate development in the neighborhood of Borehole BHF10.....	64
Figure 28 : Vegetation structure of Borehole BHF5 site	65
Figure 29 : Vegetation structure of BHF2	66
Figure 30 : Start of construction on borehole BHF9 site	68
Figure 31 : Clear Felling where Borehole BHF9 is located	68
Figure 32 : Wooden fence post and cashew plants Established cashew trees in Site BHF3	68
Figure 33 : Kaya senegalensis in plot BHF4 - The vegetation structure in BHF4.....	70
Figure 34 : Palm wine tapping and climbers at Borehole BHF12.....	71
Figure 35 : Overview of BHF12 vegetation structure and an access road.....	72
Figure 36 : Vegetation structure of SSA BH Airport 2 Replacement (new location).....	73
Figure 37 : Vegetation structure of SSA BH Airport 3	74
Figure 38 : Grounds of the BWTP covered with grass and short palm trees.....	75
Figure 39 : Lush stand of rhun palms and the dominant under storey - Combretum micranthum	77

Figure 40 : The fringes of the park along the road used as waste dump.....	77
Figure 41 : Juvenile rhun palm stand and Cola Cordifolia tree (DBH 86cm) within the plot.....	79
Figure 42 : Impact importance rating system.....	86
Figure 43 : Airport drilling sites - Areas of influence	89
Figure 44 : Brikama drilling site - Areas of influence	90
Figure 45 : Sifoe drilling sites - Areas of influence.....	91
Figure 46 : Serrekunda drilling site.....	92
Figure 47 : Sukuta drilling sites - Areas of influence	93
Figure 48 : Consultation with officials of NEA and Forestry Department in Brikama (WCR)	133
Figure 49 : Consulting with Governor	133
Figure 50 : WCR - Meeting the Director General - NRA.....	133
Figure 51 : Consulting roadside auto mechanics in Brikama city	134
Figure 52 : Meeting at Nyofeleh	134
Figure 53 : Community meeting at Sifoe	134
Figure 54 : The GM process	142

Tables List

Table 1 : Relevant National and International Policies and Legal Framework	21
Table 2 : Institutional arrangement for WASIB implementation and monitoring.....	23
Table 3 : World Bank E&S standards	25
Table 4 : Lithological synthesis of the geological formation in the Gambia	29
Table 5 : SSA well design – Casing specifications.....	43
Table 6 : Characteristics of the testing well equipment for one well	43
Table 7 : Recommended list of parameters to be analysed at the end of the CRT	44
Table 8 : Characteristics of the casings and screen used for the well construction (option 1: 8"5/8)	48
Table 9 : Recorded Annual Rainfall in West Coast Region (mm) 2009-2018	51
Table 10 : The Medium-term WASIB borehole locations (including WASIB Drilling works boreholes).....	53
Table 11 : Plant species recorded in the Sifoe Forest and their IUCN status	58
Table 12 : Mammalian fauna in the Sifoe Forest.....	59
Table 13 : Avifauna recorded in the Sifoe Forest	60
Table 14 : F1 - Flora and Fauna recorded at the proposed Borehole BHF11 and their IUCN status	61
Table 15 : F2- Flora and Fauna recorded at the proposed Borehole F2 and their IUCN status (13.04.25)	62
Table 16 : BHF6- Flora recorded at the proposed Borehole BHF6 and their IUCN status (12.04.25)	63
Table 17 : BHF10- Flora recorded at the proposed Borehole BHF10 and their IUCN status (13.04.25).....	64
Table 18 : BHF5- Flora recorded at the proposed Borehole BHF5 and their IUCN status	65
Table 19 : BHF2- Flora recorded at the proposed Borehole BHF2 and their IUCN status (12.04.25).....	66
Table 20 : BHF9 - Flora recorded at the proposed Borehole BHF9 and their IUCN status (12.04.25)	67
Table 21 : BHF3- Flora recorded at the proposed Bore BHF3 and their IUCN status (11.04.25)	69
Table 22 : BHF4: Flora recorded at Borehole BHF4 and their IUCN Red List Status (11.04.25).....	70
Table 23 : BHF12 - Flora and Fauna recorded at the proposed Borehole BHF12 and their IUCN status.....	71
Table 24 : SSA BH Airport 2: Replacement (New location) (13.04.25)	73

Table 25 : SSA BH Airport 3: (13.04.25)	73
Table 26 : Plant species recorded in the Salaji Forest Park and their IUCN status	76
Table 27 : Mammalian fauna in the Salaji Forest Park	77
Table 28 : Avifauna recorded in the Salaji Forest Park	78
Table 29 : The major tree species on the plot with their measurements	79
Table 30 : Summary of impact factors and sensitive components	84
Table 31 : Impact intensity level and criteria	85
Table 32 : Scoring system for impact importance	86
Table 33 : Scoring system for each impact assessment	87
Table 34 : Mitigation Strategy based on the overall impact importance	87
Table 35 : Positive impacts of the project	94
Table 36 : Impact of civil works on topography and erosion during construction phase	95
Table 37 : Impact of civil works and dredging on groundwater during construction phase	96
Table 38 : Impact of civil works on Air quality during construction phase	96
Table 39 : Impact of civil works on vegetation and fauna	98
Table 40 : Impact on land use and community access	100
Table 41 : Impact on workers and communities during construction	101
Table 42 : Impact on Noise and Vibration during construction	102
Table 43 : Impact on Construction Waste	103
Table 44 : Impact on Cultural Heritage	104
Table 45 : Impact related to Public Health and Safety during construction phase	105
Table 46 : Impact on Occupational Health and Safety	105
Table 47 : Mitigation measures proposed for the construction and works exploitation phases	107
Table 48: Summary of Roles and Responsibilities in ESMP Implementation	111
Table 49: Capacity Enhancement Program for Effective ESMP Implementation	112
Table 50 : ESMP Monitoring Program	114
Table 51: Estimated Budget to Implement the ESMP	117
Table 52: Potential Impacts and Corresponding Mitigation Measures	119
Table 53: Summary of Stakeholders showing their roles and interest in the project	128
Table 54: Summary of project stakeholder needs	129
Table 55: Proposed strategy for consultation	130

Executive Summary

Background

Urban water supply, which is under the National Water and Electricity Company's (NAWEC) responsibility, is in crisis. In urban areas, about 69 percent of the population has access to safely managed water, but the quality of services is weak due to frequent service outages, with some neighbourhoods not receiving water for days. Preoccupied by the emergency measures to contain the water cuts, NAWEC has not been able to extend services in urban areas at a time when urbanization has been growing at a rate of 4.5 percent a year between 2000 and 2017, and many areas still lack access to water. In addition, water quality is a challenge in terms of high levels of nitrates, iron, and salinity in drinking water. Drinking water salinity is expected to further increase due to climate change and the consequent rise in sea level.

There is also a pressing need to improve NAWEC's storage capacity, which is currently estimated at about 3 hours a day. Only 8 of the 29 elevated tanks are in good condition and the storage capacity is hampered by frequent power cuts. This crisis has been exacerbated by the COVID-19 pandemic with the high demand in water in order to mitigate the risk of the spreading of the virus.

This is where the WASIB Project will focus its interventions. Deep boreholes will be drilled to reach the Maastrichtian aquifer for good quality of water in Sukuta (Salagi Forest, Brikama, Serrekunda Airport area, and Sifoe Forest).

During the Project design, first interventions were supposed to start with drillings be and it was agreed that an Environmental and Social Management Plan (ESMP) will be sufficient to mitigate all the environmental and social risks and impacts and incorporate the clauses into the bidding documents.

Description of the Project

To address the water problem, especially in the Greater Banjul Area, the WASIB project is planning to intervene via the drilling of boreholes in several areas in order to address the water crisis. Subject of this ESIA, this sub-component will drill new boreholes.

Policy, legal and institutional framework

• The National Policy Framework

The policies that will guide the implementation of the Project include the following:

- i. National Development Plan (2018-2021); the principal national policy plan which proposes to increase the national coverage of water in the country;
- ii. Gambia Environment Action Plan, GEAP (2009-2018): Provides guidance in general environmental planning and natural resources management;
- iii. Forestry Policy (2010-19) and the National Biodiversity Strategy and Action Plan (NBSAP), 2015 both of which promote State and community forest and biodiversity management.

• The Legal Framework

This includes the following:

- i. National Environment Management Act, 1999 - the principal legislation in environmental management; Part V of Act provides for certain projects listed under Schedule A to be considered for ESIA, and it includes this Project;
- ii. Environmental Quality Standards Regulations 1999 sets the standards in Schedule 1 in respect of ambient air, saline waters, surface fresh waters and groundwater;
- iii. Biodiversity and Wildlife Act, 2003: provides for the establishment of protected areas for protection of in-situ biodiversity; in addition to protect ex-situ biodiversity;
- iv. National Council for Arts and Culture Act, 2003 Act protects and preserves, restores any monument, relic, ethnographical article, or other article of archaeological ethnographical, or historical relevance. Project activities could unearth objects of historical relevance.

World Bank Environmental and Social Standards relevant to the Project

The Project is classified as posing substantial environmental and social risk. In this regard, the environmental and social standards relevant to the project are primarily:

- ESS No. 1, relating to the assessment and management of environmental and social risks and impacts;
- ESS No. 2, relating to employment and working conditions;
- ESS No. 3, relating to the rational use of resources and the prevention and management of pollution;
- ESS No. 4, relating to the health and safety of populations;
- ESS No. 5, relating to land acquisition, land use restrictions, and involuntary resettlement;
- ESS No. 6, relating to the preservation of biodiversity and sustainable management of biological natural resources;
- ESS No. 8, relating to cultural heritage;
- ESS No. 10, relating to stakeholder mobilization and information.

● Institutional Framework

The institutional framework relevant to the implementation of this Project includes the following:

- National Environment Agency: The NEA enforces the NEMA, 1994 and EIA Regulations 2014, and reviews the ESIA report to grant Environmental Approval for the Project;
- National Water and Electricity Company (NAWEC): Project Proponent, and will lead implementation of ESMP;
- Women's Bureau-Under the Ministry of Women, Children and Social Welfare, specifically promotes gender equity and women's empowerment in The Gambia. It ensures the rights of women affected by the Project are protected; participates in sensitization on gender issues during pre-construction, construction, and operation phases;
- Department of Social Welfare: Protects and promotes the rights of vulnerable people such as children, women and the disabled; supports and guides the process during related grievances; participates in sensitization on GBV, SEA, SH, VAC, etc.;
- Department of Labor: Enforces employment laws to protect employee rights, protect against child labor, and respond to complaints and reports such as accidents, abuse, and discrimination at work.

Description of the baseline environmental and social issues

● The Biophysical Environment

○ Climatic Conditions

The climatic condition in The Gambia is of the Sudano-Sahelian type and is characterized by the occurrence of two distinct seasons: a hot rainy season from May/June to October, and a dry season from November to May with rare occurrence of rainfall in May. Rainfalls are typically heavy nationally, but the south-western part of the country records more rain than the eastern portion. July, August, and September are the highest rainfall months.

○ Hydrology

➤ Surface Water

The surface hydrology within the Project's sphere of influence is mainly the River Gambia, which gets its source from the Fouta Djallon Highlands in Guinea, flowing westward towards the Atlantic Ocean, via communities in which the Project will be implemented. A mosaic of tributaries has branched off from the main river system and

have become major areas of economic activity for the riparian populations through which the tributaries and streams pass.

➤ **Groundwater Resources**

Within the Project sites the ground water is tapped mostly from two main groundwater sources namely, the Shallow Sand Aquifer (SSA) and Deep Sandstone Aquifer (DSA), (the former is essentially where the local hand dug wells tap their supply along the route of the transmission mains).

○ **The Vegetation and Forest Resources**

The following vegetation types are found along the proposed line corridors:

➤ **Riparian Vegetation**

The vegetation within these areas includes reeds, shrubs, and herbaceous plants; it is likely that some parts of these habitats and vegetation will be affected by drilling of boreholes in Kity and at the Salagi Forest Park for Sukuta boreholes.

➤ **The Wooded Savannah**

The wooded savannah (with a canopy cover of more than 40 percent and reaching a height greater than 8 m) and is found along most of the proposed corridors. The dominant species found within these vegetation types are the African locust beans (*Parkia biglobosa*), and the rose wood (*Pterocarpus erinaceus*). Shrubby species found include the bush willows (*Combretum nigricans*), and the Chinese date (*Ziziphus mauritiana*).

● **Human Environment**

○ **Demography and population along the Corridors**

The Greater Banjul Area's population in 2024 is around 1,7 million, thus representing more than half of the country's population, with high population densities. Brikama Local Government Area is the most populous local government area in the country. Between 1993 and 2013, growth in population by 61 percent made Brikama the fastest growing Local Government Area, surpassing Kanifing. The 2024 census showed the same trend between 2013 and 2024.

○ **Modes of Subsistence and Daily Chores in the Project's Area of Influence**

The communities, to a large extent, rely on agriculture and livestock for their subsistence. Like other parts of the country, agriculture is characterized by little diversification, and is mainly subsistence rain-fed, and semi-intensive cash crop production. Other economic activities carried out along the proposed Project affected areas include Market Gardening, Marketing and Petty Trading and Shop keeping, Welding and Carpentry and Youth Employment, Livestock Rearing.

Potential environmental and social impacts and risks

● **Potential impacts during pre-construction and construction phase**

○ **Negative impacts on the biophysical environment**

During activities of the pre-construction phase, no potential positive impact is anticipated on the biophysical environment.

During the construction phase however, potential negative impacts on the biophysical environment will include:

- Impacts relating to geology and soils;
- Air pollution;
- Noise and vibration nuisance;
- Unsightly landscape;
- Improper waste;
- deforestation;
- Negative impacts on fauna.

○ **Negative impacts on the human environment**

- Negligence of vulnerable groups and Gender-Based Violence (GBV);
- Risks to Public Health and Safety;
- Negative impacts from Violence Against Children (VAC);
- Risks to Occupational Health and Safety;
- Risks of Communicable Diseases;
- Community Instability and Reduced Cohesiveness (Including Impacts from Labor Influx);
- Impacts on sites of cultural and historical significance.
 - **Positive impacts on the biophysical environment**

There are no potential positive impacts of significance on the biophysical environment during the construction phase.

- **Positive impacts on the human environment**
 - Creation of temporary jobs;
 - Income generation;
 - Improved community cohesiveness.
- **Potential impacts during operation and maintenance phase**
 - **Negative impacts on the biophysical environment**
 - Impacts on landscape- waste from disused and worn-out materials such as pipes and other equipment will create eyesores if not collected from the sites and managed properly;
 - Loss of Trees ;
 - Loss of fauna.
 - **Negative impacts on the human environment**
 - Risks to public health and safety where people encounter broken pipes during operation leading to floods;
 - Occupational health and safety risks during all works, including operation and maintenance activities, workers are at risk of accidents from machinery, traffic, and illnesses.;
 - Negative impacts on public services particularly during connection to the main water plant, when there will be temporary disruption of services to existing customers.
 - **Positive impacts on the human environment**
 - Employment generation;
 - Enhanced economic development as a result of efficient water supply;
 - Improved livelihoods as a result of better services (education, health, communications, and other social services that are largely dependent on water will be improved);
 - Benefits to youth and vulnerable groups (with continuous water supply, youth could develop skills and trade to enhance their livelihood.
- **Mitigation of Potential Cumulative Impacts**
 - Full implementation of the ESMP to include amongst others, avoiding forests and unrelated removal of vegetation, develop, and implement the C-ESMP, provide information and educate on health and safety. Future cumulative impacts may be mitigated by studies done and implemented at that time;
 - Strategic Environmental Assessment (SEA) of the Government's and NAWEC's wider plans and programs can contribute to coordinating similar projects or different projects in the same area with the aim of mitigating the cumulative impacts.
- **Risk and accident management**

Based on the activities of the Project during all the phases, potential risks were identified, and their significance evaluated based on severity, probability, exposure levels and possibility of control.

The following risks were identified with corresponding mitigation measures:

- Movement and circulation risks such as traffic accidents;
- Noise nuisance;
- Vibration risks
- Risks related to improper use and storage of equipment;
- Fires and explosions;
- Personal injuries such as cuts, struck by objects, stepping on objects, falls
- Risks related to ergonomic; poor manual handling etc.
- Respiratory risks;
- Contagious illnesses, ingestion of contaminated food or drink;
- Risks related to unethical workers (Discriminating vulnerable PAPs, insensitivity to local norms, alcohol/drug abuse impacts etc.)
- Wildlife attacks (reptiles, insects, and animals etc.)
- Risks of work site conditions;
- Work related stress.

Corresponding preventive and protective measures were then recommended for mitigation following the mitigation hierarchy from elimination, control, and reduction of the risks, to providing protection against the hazards. These include:

- Development and implementation of accidents and emergency response plans:
- Training ;
- Public information and awareness;
- Constant supervision of workers;
- Health and safety monitoring, reporting, and recording;
- Limit exposure by reducing working hours;
- Waste should never be burnt; follow waste management plan;
- Use machines to assist in moving heavy and long loads;
- Prohibit public access to work sites;
- No work at night;
- Provision of first aid kits;
- Provision of protective gear.

Environmental and Social Management Plan (ESMP)

The potential impacts and mitigation measures identified for all the various activities are further expanded in an ESMP matrix. For ease of reference during implementation, each mitigation activity is considered along:

- Responsibilities for its mitigation (contractor, Owner Engineer, NAWEC, communities etc.)
- Period of expected mitigation (before, during or after the specific Project activity)
- Responsibilities for monitoring (regional Technical Advisory Committees, NAWEC, NEA, Environmental and Social Safeguards Specialist, DoF, etc.)
- Required budget for mitigation to ensure resources are available in a timely manner.

- **Roles and responsibilities for ESMP implementation**

Implementation of the ESMP is the responsibility of the Contractor and NAWEC. Most of the mitigation measures are the responsibility of the Contractor who will be carrying out the works according to the C-ESMP that will be based on the Project ESIA/ESMP.

The Consultant E&S team will be responsible for overall follow-up, and to ensure that the ESMP is fully implemented with the support of the NAWEC Environmental and Social Safeguards Specialists (ESS). Specifically, the Consultant/Employer will include clauses in the Contractor's agreements that will ensure compliance, and coordination with the GM, among others.

The communities will also have the responsibility of ensuring that villagers avoid work sites, and report to NAWEC or relevant authorities, issues of concern related to the Project; NAWEC through the Consultant as well as Contractor will engage the communities regularly as an oversight measure in this regard and conduct sensitization sessions to ensure communities are aware of reporting measures and understand Project risks.

As the Secretariat of the EIA Working Group, and supported by its members, National Environment Agency will be responsible for the overall external monitoring of the ESMP implementation; in collaboration with the Consultant ESS, they will monitor compliance with the Bank policies as they relate to the environmental aspects of this Project. In addition to the permanent members in the EIA Working Group, other institutions on ad hoc basis will include those specialized in social aspects such as the **Women's Bureau, Department of Social Welfare, Department of Labor, and Department of Health Services**, amongst others.

The project grievance mechanism is part of the global tool set developed to manage relationship between the Project and its stakeholders. The GM is an avenue for all the impacted and interested parties to raise their opinion, concerns, suggestions to NAWEC, Contractors and Consultants with a process allowing those views, concerns, opinions and suggestions to be heard and appropriately treated in a fair, transparent, and inclusive manner.

For sensitive issues regarding Gender Based Violence, Sexual Exploitation and Abuse, Sexual Harassment or Violence Against Children, the contractor will establish a **'GBV, Sexual Exploitation and Abuse (SEA), Sexual Harassment (SH) and Violence Against Children (VAC) Compliance Team' (GCCT)** to find adequate responses.

1. Introduction and background

1.1. Proposed project overview and rationale

The AFD-funded “**Water Supply Project in the Greater Banjul Area**” (WASIB) has been initiated by NAWEC¹ to address the critical challenges facing the urban water supply sector: ageing water supply facilities, high levels of Non-Revenue Water, degradation of groundwater resources (in quality and quantity), and intermittent water supply.

The WASIB project seeks to answer the increasing threats on groundwater resources in the Greater Banjul Area, resulting from Increasing demand for water supply, rapid expansion of urbanized areas, contamination of the shallow aquifer by inadequate wastewater systems, and climate change.

The objectives of the WASIB project are as follows:

- Improve access to drinking water in the Greater Banjul Area;
- Develop quality service within NAWEC;
- Restore financial balance of the urban water supply sector;
- support NAWEC in the development of its capacity as urban water utility.

Phase 1 of the WASIB project intends to respond to the short-term and medium-term requirements for the water supply in the Greater Banjul Area by improving water service toward the already connected population and extending the existing water network; and to finance a Water supply and Sanitation Master Plan defining the long-term investment requirements in the Greater Banjul Area. Medium-term works funded under this first phase will increase water production by 25% and extend the water network to 80,000 new beneficiaries.

Phase 2 of the project intends to improve distribution of the increased water production, by reinforcing the water transmission main between the new well field of Brikama and the GBA urban center at Faji Kunda. Works funded under this second phase will convey an additional 7,000 m³/day through new transmission main and enhance continuity of service, benefiting approximately 140,000 persons to benefit from an improved access to water by the end of the project.

Thus, the program presented aims at completing the works for the construction of:

- 12 water wells tapping the Shallow Sand Aquifer (SSA) (Continental Terminal) in the Greater Banjul area, at an estimated depth of 130 m to 150 m. Each well is designed to reach at least a rate of 100 m³/h with a minimum drilling diameter of 14 “¾,
- 4 water wells tapping the Deep Sand Aquifer (DSA) (Maastrichtian) including reconnaissance phase (1 pilot borehole) in the Greater Banjul area at an estimated depth of 450 m to 600 m. Each well is designed to reach a productivity ranging from 150 to 250 m³/h with a drilling diameter range between 11 “and 12 “¾.

1.2. ESIA scope

Due to changes in the procurement process for the execution of the "Medium-Term Works" package in response to the preliminary design, part of the "Medium-Term Works" was isolated from the overall works package.

This separation aimed to allow the contracting of borehole drilling by a technically qualified provider, given the specific nature of the work. These works are now identified as "Drilling Works." As a result, the environmental tasks mandated by the project have been modified by the inclusion of a preliminary phase in the Environmental and Social Impact Assessment (ESIA) process as agreed with NAWEC and AFD.

This preliminary phase concerns only the "Drilling Works" component which includes the following activities:

- The drilling of 2 boreholes in the airport sector (Emergency Works);

¹ NAWEC – Gambia National Water & Electric Company

- The development of a new sub-shallow well field – about 10 new boreholes (+10 to 12 000 m³/day);
- The Drilling of 4 deep boreholes in the Maastrichtian aquifer (+10 to 12 000 m³/day).

The present document therefore represents the first phase of the project's ESIA. Only the impacts associated with the drilling work are assessed.

1.3. Purpose and objectives of ESIA study

Initially, this ESIA concerns the drilling works stage of the WASIB project. As such, it studies ecological and biophysical impacts as well as stakeholder and community impact to establish mitigations measures which will need to be undertaken for the implementation of the Medium-Term Works.

The ESIA will be completed and consolidated incorporating the medium-term works activities and specifications.

The objectives of this ESIA report are to:

- Apply Gambia's regulatory obligations in order to obtain the environmental compliance certificate issued by the National Environmental Agency (NEA),
- Meet international standards for the implementation of the project,
- Assess the risks and potential impacts resulting from the implementation of the project in its study area,
- Identify practical measures to avoid, reduce or compensate for significant negative impacts, as well as enhance positive impacts,
- Define requirements for management and monitoring,
- To consult the population affected by the project to collect their views, concerns and suggestions in order to take them into account in the avoidance, reduction, compensation and improvement measures.

1.4. Methodological approach for the ESIA

This consisted of the review of relevant national policies and legislation; World Bank Operational Policies; Project Appraisal Document (PAD); relevant international conventions and treaties to which The Gambia is a Party, among others.

The legislation and policies reviewed guided the ESIA study to identify the legal scope of the process and ensured that issues highlighted are given due consideration during the study; where policies have described areas to protect such as historical sites, and forests, special attention was given during the study to watch out for such sites and assess the necessary issues.

The reviewed legislation also highlighted areas to consider during the study, such as the need for community consultation during following phases of the Project; the need to ensure that women are included.

The identified WB Policies that have been triggered by this project also assisted in identifying specific issues to consider during the study. With the ToRs, these project documents provided the ESIA study with the information necessary to identify and evaluate the environmental impacts. These include the:

- Physical scope of the Project in The Gambia;
- Project components, materials and activities that will cause the environmental and social change;
- Institutional arrangements for the project implementation.

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. See the full list of relevant documents reviewed in the Bibliography section.

1.5. ESIA report structure

The report is structured as follows:

- Non-technical summary
- Chapter 1: Introduction and background
- Chapter 2: Institutional and legal framework
- Chapter 3: Project Description
- Chapter 4: Environmental and social baseline situation
- Chapter 5: Assessment of potential impacts and mitigation
- Chapter 6: Environmental and social management plan
- Chapter 7: Stakeholder mapping and engagement
- Chapter 8: Grievance redress mechanism
- Chapter 9: Conclusion

2. Institutional and legal framework

This Chapter describes the various national and international policies, legal and institutional frameworks, as well as the World Bank safeguard policies that will guide the development and implementation of this ESIA and its ESMP. The relationships and relevance of these instruments regarding the WASIB activities are indicated in the table below.

2.1. National policies and legal framework

Table 1 indicates the relevant national and international policies and legal framework that will guide the development and implementation of the WASIB water component.

Table 1 : Relevant National and International Policies and Legal Framework

NATIONAL POLICIES			
Policy	Description	Relevance To WASIB	Focal Institution
Gambia Environment Action Plan, GEAP (2009-2018)	Integrated environment and natural resources management	Provides guidance in general environmental planning and natural resources management	NEA
Forestry Policy (2010-19)	Promotes state and community forests	The forested area of Kity and Sukuta Salagi Forest Park is within the Project study area	DoF
The National Health Policy (2012-2020)	Promotes and protects the health of the population and workers	Addresses health risks and exposures associated with negative environmental consequences of the Project at all stages	DHS
National Climate Change Policy (2016 – 2025)	Policy provides the framework for managing climate risks, building institutions, capacities, & opportunities for climate-resilient development	Promotes sustainable water exploitation for The Gambia people	DWR
Gambia National Gender & Women Empowerment Policy (2010 – 2020)	To mainstream gender in national and sectoral planning and programming to ensure equity and equality	Women are encouraged to be well informed and take part in decision making at all levels of the Project development and implementation	Office of the Vice President & Ministry for Women Affairs
National Youth Policy (2009 – 2018)	Policy aims to mainstream youth issues into the advancement of all sectors	To be inclusive, the Project shall encourage youth participation in decision making and employment	MoYS
National Strategic Environmental Assessment Policy (2017- 2021)	Aims to ensure environmental sustainability	Applies when developing policies, plans or programs in all sectors, including water	NEA
National Transport Policy, (2018-2027)	Defines the priorities and objectives in the transport sector, aimed to serve the country's development goals	NAWEC's water projects usually follow national road alignments under the National Transport Policy	NRA

RELEVANT NATIONAL LEGISLATION			
Legislation	Interpretation of Legislation	Relevance to WASIB	Enforcing Institution
National Environment Management Act, NEMA, 1994	Principal legislation for environmental management; Part V of provides for projects listed under Schedule A to be considered for ESMP	This Project falls under Schedule A requiring an ESIA	NEA
Environmental Impact Assessment Regulations, 2014	Prescribes the need for ESMP, its processes and procedures including ESMP development and implementation	Elaborates on the requirements for environmental and social safeguards of this Project	NEA
The Forest Act, 1998	Provides framework for the reservation and management of forests. 81(1) of the Forest Act highlights the need for EIA of Projects within forest areas	One forested area in Kity and Sukuta Salagi Forest Park falls within the study area of this Project	DoF
The Anti-littering Regulations, 2007	Addresses waste management and pollution issues in relation to environmental health and hygiene	The Project must abide by ensuring that all waste produced during all phases is well managed	NEA
Waste Management Bill (1997)	Addresses waste management and pollution issues	Waste management and pollution issues should be addressed by this piece of legislation	NEA/MOH
Local Government Act, 2002	Act makes provisions for decentralized administrative structures including devolution of functions, powers, and duties of local authorities	The Project falls under West Coast Region administrative regions of the Country	MoLRG
Physical Planning and Development Control Act, 1991	Ensure developments in The Gambia are in line with land use planning and construction standards	The Project construction activities shall be in line with national landuse and planning rules	DPPH
Development Control Regulations, 1995	These Regulations further prescribe the requirements for development control	All planning and construction phases of the Project should give consideration to these Regulations	DPPH
Public Health Act, 1990	Protects public and environmental health including abatement of nuisances and any condition that may be injurious to health	Noise and other risks associated with the Project must be prevented or reduced	Department of Health
The Gambia Roads and Technical Services Authority Act, 2003	Provides for the administration, control, and maintenance of all roads in The Gambia	Relevant to the Project as the road reserve is usually disturbed in installing water infrastructure	NRA
The Gambia Public Utilities Regulatory Authority Act, 2001	Act regulates the activities of providers of certain public utilities in the various economic sectors, including water, electricity, petroleum, and gas	NAWEC, the proponent of this Project will be regulated by this Act	PURA

Environmental Discharge (Permitting) Regulations 2001	Regulations require that a permit be obtained for most discharges of potentially polluting liquids in to or onto the ground (i.e. to groundwater) or into surface waters (such as rivers or streams)	Project implementation has potential to discharge potentially polluting liquids into the Sami bolong	NEA
The Children's Act 2005	Act sets out the rights and responsibilities of children and provides for their care, protection, and maintenance	Rights of children impacted by the project need to be protected	Social Welfare
Labor Act (2007)	Provides the legal framework for administration of labor, recruitment and hiring of labor, and protection of wages	The project hiring and management of its labor force should adhere to this framework	Ministry of Works
Environmental Quality Standards Regulations 1999	Regulations declare standards set out in Schedule 1 in respect of ambient air, saline waters, surface fresh waters and groundwater	Project implementation has potential to generate dust, and to pollute the Sami bolong	NEA
Water Act, 1979	Regulate the water sector for the production of water in quantity and quality for the benefit of human being	NAWEC is providing water in the cities and is bound by this regulation	DWR
Sexual Offences Act, 2013	Updates the law and procedures regarding the trial of rape, sexual offences, and related matters	This Act is relevant to the Project due to the need for protection of vulnerable persons within the Project sites against sexual offences, which is defined in the Act	Women's Bureau
The Women's Act 2010	Aims to advance women's rights to land and natural resources to promote their economic and social empowerment	Relevant to this project in view of potential impact on agricultural land farmed by women; need for adherence to OP 4.12; avoid gender-based violence (GVB) and sexual exploitation and abuse (SEA)	Women's Bureau

2.2. Institutional framework

The institutional framework for implementation of ESMP is outlined in Table 2.

Table 2 : Institutional arrangement for WASIB implementation and monitoring

Institution	Responsibilities
Ministry of Environment, Climate Change and Natural Resources (MECCNAR)	Oversees the NEA and implementation of environmental laws and policies of The Gambia
National Environment Agency (NEA)	NEA is the technical arm for environmental management in The Gambia and enforces the NEMA, 1994; ESMP Regulations 2014 and similar legislation
Ministry of Petroleum Energy (MOPE)	The MoPE is the overseeing institution of NAWEC, and all energy and water related projects

Institution	Responsibilities
National Water and Electricity Company (NAWEC)	As the implementing arm of the MoPE, NAWEC is the main operator and manager of water production in The Gambia. NAWEC is also responsible for the provision of water supply and sanitation services for the urban centers with more than 10,000 inhabitants; it is the executor of this WASIB Project which intervention area will be in the Greater Banjul Area.
Public Utilities Regulatory Authority (PURA)	PURA is a multi-sector regulator of utilities in The Gambia mandated to regulate water tariffs and sector amongst others.
Ministry of Lands and Regional Government (MoLRG)	Oversees all the local government authorities including Regional Technical Advisory Committees, enforcement of legal regulations on land use and administration. Oversees the Department of Lands and Surveys, and the Department of Physical Planning and Housing.
Department of Forestry (DoF)	Responsible for the maintenance and development of forest resources in The Gambia. It recommends sites for forest reserves and parks, community forests and private forests, and monitors their management for sustainability.
Department of Water Resources	Responsible for the management, development, conservation and protection of the country's water resources in order to ensure a safe and sustainable exploitation of these resources for domestic, trade, agriculture and other uses which are responsive to current and future quality of life and economic development needs of present and future generations of citizens of The Gambia and to provide timely and accurate weather and climate data and information to safeguard population and promote food security.
Ministry of Health and Social Welfare (MoH&SW)	Responsible for overall formulation and direction of the national health agenda, planning and health infrastructural development. Oversees the potential beneficiary health facilities of this Project.

2.3. Environmental and social safeguard of the WB

In addition to the need to comply with the environmental laws and regulations of The Gambia, this Project will also be carried out in compliance with the World Bank environmental and social safeguards policies. These are designed to protect the environment and beneficiary communities from potential adverse effects of projects, programs, plans and policies. The WB safeguard policies (OP) that may be triggered by this Project are discussed in the following sections.

2.4. AFD's environmental and social framework

AFD takes measures to assess and control the environmental and social risks of the operations it finances. It implements procedures to identify, prevent and mitigate environmental and social damage and human rights violations that may result from the activities it finances. However, AFD has chosen to harmonize the principles of its Environmental and Social Risk Management policy for operations financed in foreign countries and to coordinate its actions with the environmental and social framework of multilateral donors. This is why it has chosen to align itself with the environmental and social standards of the World Bank for projects with high or significant environmental and social impacts.

AFD refers to the World Bank's ten [Environmental and Social Standards](#) (ESS), which set out the obligations of Borrowers.

The content of these ten standards is presented in the table below.

Table 3 : World Bank E&S standards

NES	Standards	Content	Application to the project
N°1	Assessment and management of environmental and social risks and impacts	ESG No. 1, Assessment and Management of Environmental and Social Risks and Impacts, sets out the Borrower's responsibilities to assess, manage and monitor the environmental and social risks and impacts associated with each stage of a project financed by the Bank through the Investment Project Finance (IPF), in order to achieve environmental and social outcomes consistent with the Environmental and Social Standards (ESG).	Yes
N°2	Labor and working conditions	NES No. 2, Employment and Working Conditions, recognises the importance of job creation and income generation in the pursuit of poverty reduction and inclusive economic growth. Borrowers can promote constructive relationships between project workers and the coordination/manager and enhance the benefits of project development by treating workers fairly and ensuring safe and healthy working conditions.	Yes
N°3	Resource efficiency and pollution prevention and management	ESN No. 3, Resource Efficiency and Pollution Prevention and Management, recognises that economic activity and urbanisation often generate increased levels of air, water and land pollution, and consume scarce resources in ways that can threaten people, ecosystem services and the environment at local, regional and global levels. The NES describes the requirements necessary to address the rational use of resources and the prevention and management of pollution throughout the life cycle of a project.	Yes
N°4	Community Health and safety	NES No. 4, Population health and safety, deals with the risks and impacts on the safety, security and health of communities affected by the project, as well as the respective responsibilities of the Borrowers to reduce or mitigate these risks and impacts, paying particular attention to groups which, because of their particular situation, may be vulnerable.	Yes
N°5	Land acquisition, restrictions on land use and involuntary resettlement	NES No. 5, Land Acquisition, Land Use Restrictions and Involuntary Resettlement, covers the loss of assets or access to assets resulting in the loss of a source of income or livelihood. The basic principle of the NES is that involuntary resettlement should be avoided. Where involuntary resettlement is unavoidable, it should be limited, and appropriate measures to minimise negative impacts on displaced persons (and host communities hosting displaced persons) should be carefully planned and implemented.	No
N°6	Biodiversity conservation and sustainable management of living natural resources	ESS No. 6, Biodiversity conservation and sustainable management of living natural resources, recognises that the protection and conservation of biodiversity, and the sustainable management of living natural resources, are of key importance for sustainable development. It also recognises the importance of conserving the key ecological functions of habitats, including forests, and the biodiversity they support. ENS 6 also addresses the sustainable management of primary production and the use of natural resources and recognises the need to consider the livelihoods of project-affected parties, including Indigenous Peoples, whose access to or use of biodiversity or living natural resources may be affected by a project.	Yes
N°7	Indigenous peoples/sub-saharan African historically	NES n°7, Indigenous Peoples / Historically Disadvantaged Traditional Local Communities of Sub-Saharan Africa, ensures	

NES	Standards	Content	Application to the project
	underserved traditional local communities	that the development process promotes full respect for the human rights, dignity, aspirations, identity, culture and natural resource-based livelihoods of Indigenous Peoples / Historically Disadvantaged Traditional Local Communities of Sub-Saharan Africa. NES n°7 also aims to avoid the negative impacts of projects on historically disadvantaged indigenous peoples / traditional local communities of sub-Saharan Africa or, if this is not possible, to reduce, mitigate and/or compensate for these impacts.	No. No indigenous peoples as defined by NES N°7 within the study area
N°8	Cultural heritage	NES no. 8, Cultural Heritage, recognises that cultural heritage provides a continuity of tangible and intangible forms between the past, the present and the future. NES no. 8 sets out measures designed to protect cultural heritage throughout the life of a project.	Yes
N°9	Financial intermediaries	SES No. 9, Financial Intermediaries (FIs), recognises that sound domestic financial and capital markets and access to finance are important factors for economic development, growth and poverty reduction. FIs are required to monitor and manage the environmental and social risks and impacts of their portfolios and the FI's sub-projects, and to monitor portfolio risk in relation to the nature of the funding being channelled/managed. The way in which the FI manages its portfolio may take different forms, depending on a number of considerations, including the capabilities of the FI and the nature and scope of the funding to be provided by the FI.	No. Applicable only to financial intermediaries.
N°10	Stakeholder engagement and information disclosure	ESG No. 10, Stakeholder Engagement and Information, recognises the importance of open and transparent consultation between the Borrower and project stakeholders as an essential element of international good practice. Effective stakeholder consultation can enhance the environmental and social sustainability of projects, improve project acceptance, and contribute significantly to the successful design and implementation of projects.	Yes

3. Project description

3.1. Drillings work overview

The initial works will initially consist of a phase of hydrogeological exploration. The geometry and nature of the geological strata are subject to uncertainty, requiring flexibility and adaptation (e.g., in terms of equipment and materials to be used, expected end of the activities, partial filling of a pilot borehole, etc.) are required to carry out the drilling work successfully. The technical specifications set out below (see section 3.5) describe:

- The minimum requirements for a drilling operation and well construction;
- The sequence of well development and pumping tests, and;

The procedure for sampling groundwater for laboratory analysis.

The final depths of the boreholes and the specifications for their equipment will depend on the lithological context and the results of the reconnaissance stage. The length of the equipment (total length, screen intervals and casing) will be validated once the logging has been completed, defining the best potential screen intervals.

For each selected site, the drilling work will be carried out as follow:

- Drilling of the exploration/pilot borehole (see section 3.5);
- After a validation step (geological log and well logging interpretation), the borehole will be drilled to the depth defined by the lithological data analysis.

This will be followed by well development of the well and a series of pumping tests. Upon completion of the pumping tests, logging and well completion report, the well will be considered as completed.

3.2. Location of drilling sites

The WASIB drilling works are all located in the Greater Banjul Area (GBA) (Figure 1). The drilling sites are presented in Figure 1 below.

All lands associated with the boreholes have been allocated to NAWEC. The land within the airport premises have been allocated by the Airport authority and approved by the ministry of land.

The Ministry of Land has allocated seven plots within the army premises for 7 boreholes in the Sifoe forest.

The Sifoe village has transferred land ownership to NAWEC for the remaining boreholes in the Sifoe forest.

The Ministry of Land has transferred ownership to NAWEC of two plots in the Sukuta forest for two boreholes.

The remaining boreholes' location) are within existing NAWEC properties boundaries.

All appropriate documentation is provided in Annex 5.



Figure 1 : WASIB Drilling site location.

3.2.1. Geological and hydrogeological context

The Gambia is located at the center of the Meso-Cenozoic regional coastal sedimentary basin. The stratigraphic classification is the following (from bottom to top):

- The Upper cretaceous formation is composed of Maastrichtian rocks that are in sandy facies with interbedded sandstones and clays,
- The Lower Tertiary formation is comprised of Paleocene that is made up of limestone and occasional calcareous marl, karstified in the western part of the basin and of Eocene, composed of marly limestones in the West,
- The Upper Tertiary formation consists of Oligocene, mainly made of sand and clay and of Continental Terminal, made of sandy and clayey sandstones.

The geological cross section East-West in the Gambia is presented in Figure 2.

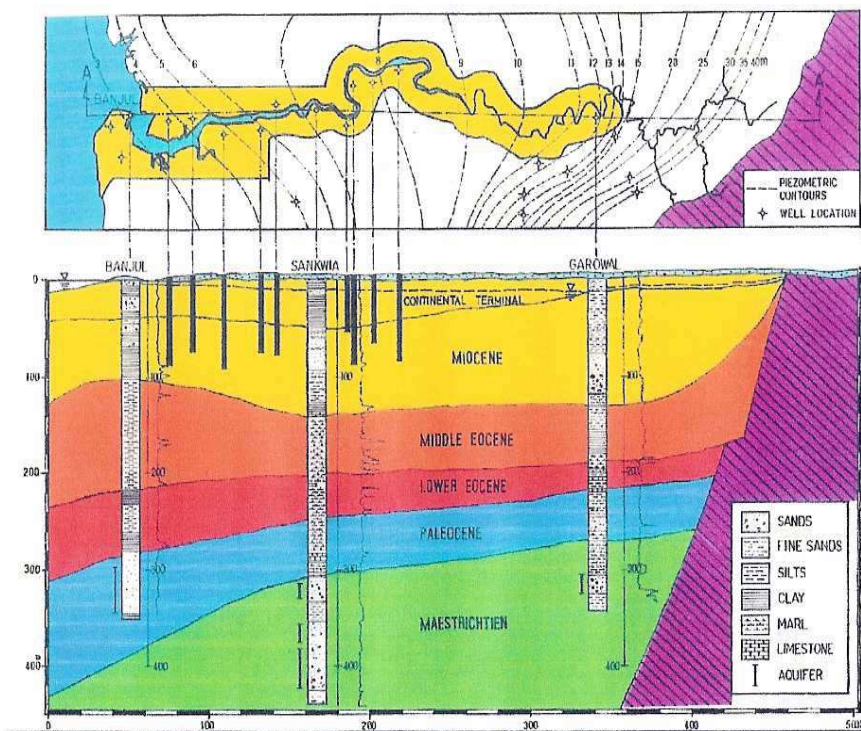


Figure 2 : Geological cross section Est-West in the Gambia (Dr Gassama)

The aquifers providing groundwater resources occurs mainly in:

- The Upper Cretaceous formation: the Deep Sandstone Aquifer (DSA) (Maastrichtian aquifer),
- The Upper Tertiary formation: the Shallow Sand Aquifer (SSA).
- In The Gambia, only the Shallow Sand Aquifer (SSA) is currently exploited.

The lithological sequence of the geological formation in The Gambia is described in the Table 4 :

Table 4 : Lithological synthesis of the geological formation in the Gambia

Era	Period	Lithology	Type
Tertiary	Pliocene	Laterite, coarse sand Clay silt	Aquifer (SSA) Aquitard (SSA)R
	Miocene	Sand and Sandy-Clay	Aquifer (SSA)
	Oligocene		
	Eocene	Karstified limestone Shales and Marly Limestones (carbonates)	Aquifer Aquitard
	Paleocene	Sand, Limestone Calcareous marl	Aquifer Aquitard
Secondary	Cretaceous sup	Medium to coarse Sand and sandstones interbedded with Sandy clay	Aquifer (Maastrichtian)

Note: In hydrogeology, an aquitard is an impermeable or semi-permeable formation that participates in the vertical drainage of the surrounding formations.

3.2.1.1. Shallow Sand Aquifer (SSA)

The **Shallow Sand Aquifer (SSA)** is subdivided into the upper phreatic aquifer (Continental Terminal) and a lower semi-confined aquifer (Oligo-Miocene). These two units are separated by a 15-30 m thick clay-silt aquitard, which provides a hydraulic connection (The geophysical results show that the semi permeable layer is discontinuous or likely absent in the Kity area).

The first unit (upper phreatic aquifer) is mainly composed of laterite and coarse sand.

The second unit (semi-confined aquifer) is composed of unconsolidated sand with texture ranging from fine to coarse sand, but a major part of the aquifer consists of medium and coarse sand. The boreholes in Kity are designed to tap the semi-confined aquifer.

According to the geophysical results, the maximal total thickness of the semi-confined aquifer is expected to be close to 130m in Kity/Sifoe.

The water level is expected to be close to 5-25m (according to the NAWEC borehole data).

3.2.1.2. Deep Sandstone Aquifer (DSA)

The **deep sandstone aquifer** system comprises of mainly Maastrichtian (late Cretaceous) sedimentary deposits and Paleocene sandstone, separated by Eocene and Paleocene formations.

The Maastrichtian aquifer is generally composed of sand, sandy clay, and calcareous sandstone in direct contact with the overlying, generally impermeable Paleocene/Eocene formations (making it confined).

The Paleocene formation is composed of limestone and calcareous marl, karstified in the Western part of the basin. The Eocene sediments consist mainly of shales and marly limestones (carbonates), covered by the SSA.

The deep aquifer system is around 250 m thick and towards the West, thickness reach more than 300 m. **In the GBA, the geophysical results and the geological interpolation tend to show that the top of the Maastrichtian aquifer depth varies between 490 m to 540 m.**

The more recent conceptual understanding (DGPRES, 2021 from Senegal) indicates a flow regime from SE to NW, with different hydraulic characteristics.

This system is generally highly productive, although aquifer properties vary according to local characteristics (lithology, thickness, etc.).

Based on the knowledge acquired in Senegal (More than 1 300 boreholes tapping the Maastrichtian), the reasonable operation rate should be limited to 150 m³/h.

3.2.2. Borehole siting

3.2.2.1. SSA borehole in Sifoe Forest

The new well field in Kity/Sifoe area will be developed on the former presidential garden in Kity/Sifoe in the south of the GBA on land owned by the government of The Gambia. The relevant ministries and/or government authorities have allocated the plots to NAWEC for the drilling works. The land transfer documents confirming the land allocation to NAWEC are provided in Annex 5.

The land coverage consists mainly of forests and bushes. The former garden is surrounded by agricultural lands.

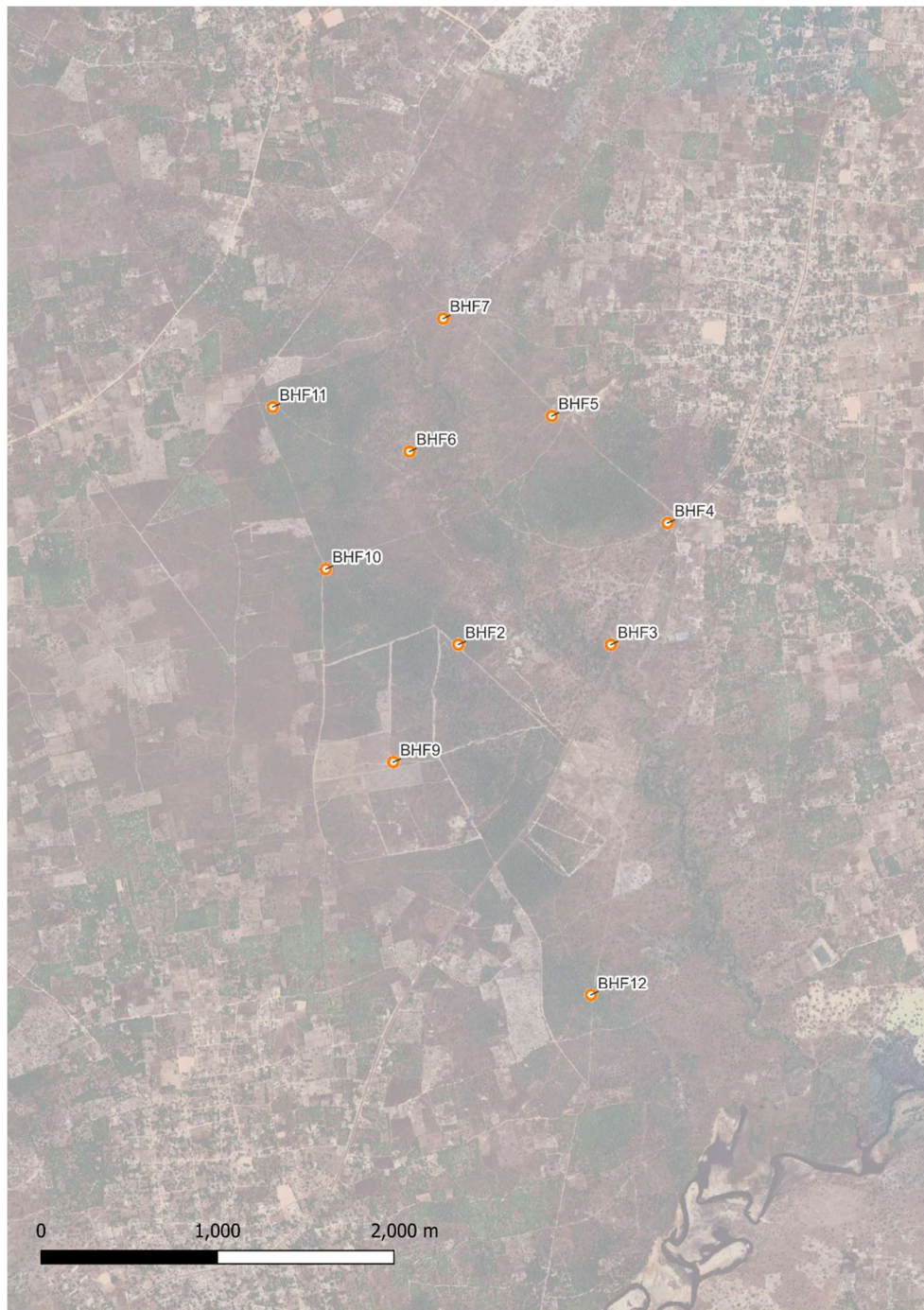


Figure 3 : Satellite view of the SSA BH location in Kity/Sifoe

3.2.2.2. SSA borehole at the airport

The two boreholes to be drilled in the airfield area will be located within the airport premises. The Gambia Civil Aviation Authority approved the location and allocated the land to NAWEC the 2 August 2024 (Annex 5).

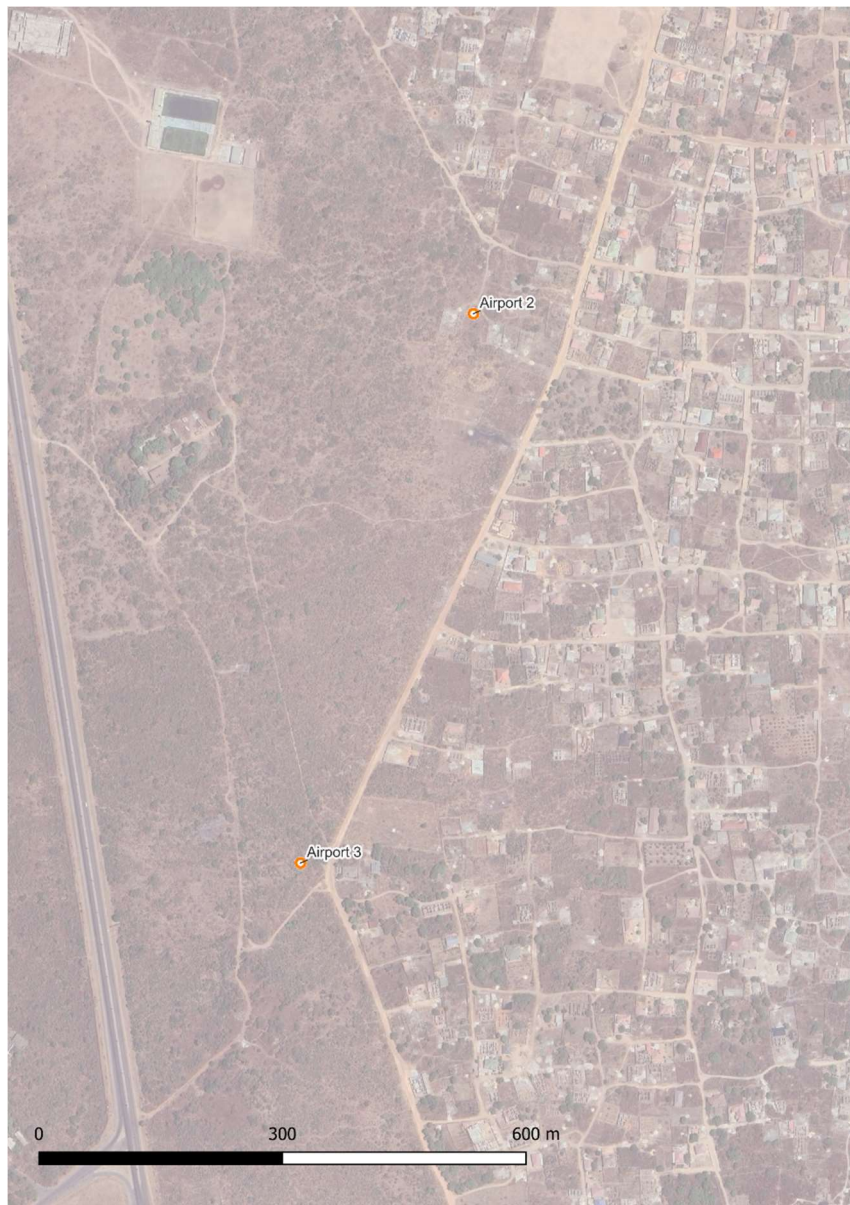


Figure 4 :Satellite view of the SSA airport BH location

3.2.2.3. DSA (Maastrichtian) borehole

Finally, four deep boreholes will be drilled at the existing Water Treatment Plants (WTPs): one at Serrekunda, two at Sukuta and one at Brikama:

- In Serrekunda, the borehole will be drilled within the WTP. Serrekunda is a very crowded and dense area, with potentially difficult access conditions (Figure 5),
- In Brikama, the borehole will be also drilled within the WTP, in an empty area belonging to NAWEC, with direct access via the road (Figure 6),
- In Sukuta, due to a lack of space available within the WTP, the two boreholes will be drilled in the Salagi forest on the other side of the road. (Figure 7). The Ministry of Environment, Climate Change & Natural Resources (MECCNAR) allocated the land for these two locations on 5 September 2024 (Annex 5)



Figure 5 : Satellite view of the DSA borehole location in Serrekunda WTP



Figure 6 : Satellite view of the DSA borehole location in Brikama WTP



Figure 7 : Satellite view of the DSA boreholes location near Sukuta WTP

3.3. Specific description of the affected boreholes sites in the Greater Banjul Area

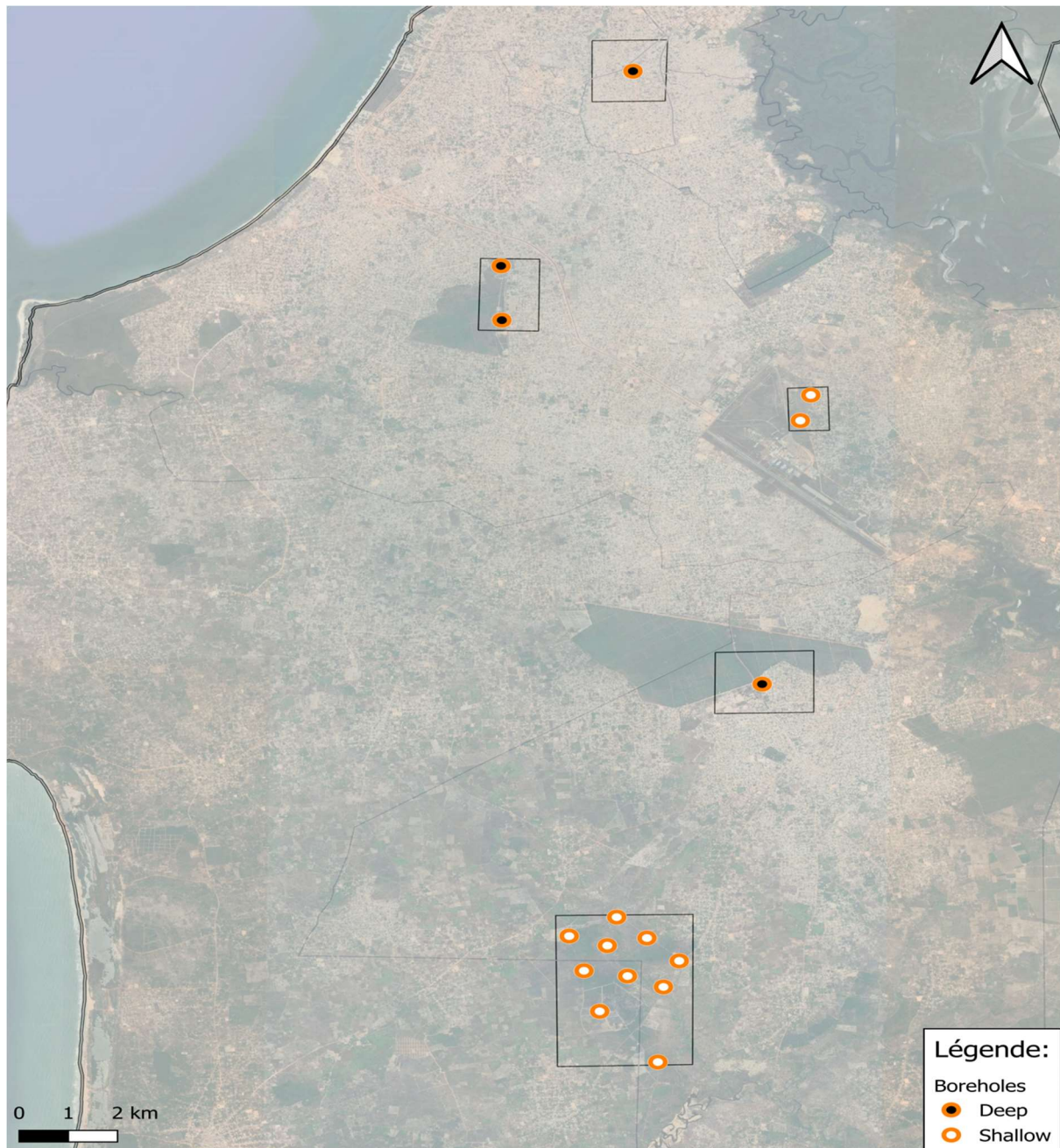


Figure 8 : Map of the WASIB boreholes in GBA

For the implementation of this Project, sixteen new boreholes will be drilled to drastically improve the water supply in the Greater Banjul Area.

The new boreholes will be drilled in Brikama, Serrekunda, Sukuta, Kitty, and the airport.

3.3.1. Brikama Borehole



Figure 9 : Map of Brikama borehole

The Brikama borehole will be drilled inside the NAWEC facility in an industrial area with companies and factories surrounding the area. The main road connecting Brikama to Banjul is situated approximately 200 meters away while the Nyambai Forest Park is situated approximately 300 meters away. This infrastructure will not affect settlements or livelihood or means of livelihood of any of the Brikama population. The easy accessibility of the site will prevent any disturbance to the economic activities of other companies situated around the NAWEC compound within which this borehole will be drilled.

3.3.2. Serrekunda Borehole



Figure 10 : Map of Serrekunda borehole

The Serrekunda borehole is the one borehole situated in a more sensitive area as it is not far from the biggest market in The Gambia, with lots of traffic and economic activities. But since the borehole will be drilled inside the NAWEC property and the drilling activity will not affect any third party, transportation of drilling equipment may disturb traffic. The most challenging part of the Project will be connecting the new boreholes to the NAWEC water system with the digging of trenches to lay the water pipes in a busy market and economic activities area. But this will be dealt with in the updated ESIA which will cover the whole WASIB Medium-Term scope of work.

3.3.3. Sukuta boreholes



Figure 11 : Map of Sukuta boreholes

The two Sukuta boreholes are in the buffer zone of the Salagi Forest Part. The sites owned by the government of The Gambia have been allocated for the drilling works. The MECCNAR) allocated the land for these two locations on 5 September 2024 (Annex 5)

The boreholes are separated from the settlement by the highway connecting Sukuta area to villages like Jabang, Jambur and Jambangjelly. Work will not affect any third party, people livelihood or means of livelihood.

The buffer zone vegetation of the Salagi forest Park is mainly shrubs, but it is a habitat, and its impact will affect the fauna living in the forest buffer zone. But the buffer zone is not intact, NAWEC has already some boreholes in that buffer zone of the forest and has erected some electricity Transmission Lines and two substations, one of which is a 225/33 kV substation interconnected to the regional energy project sharing electricity between Senegal, The Gambia, Guinea and Guinea Bissau. Also, NAWEC has signed a Memorandum of Understanding with the Department of Forestry for the reforestation of affected areas. WASIB scope of work should be included in that MoU so areas affected in Sukuta and Sifoe will be reforested to reduce the impact of the project on the flora and fauna of the Greater Banjul Area.

3.3.4. Sifoe new field (with 10 boreholes to be drilled)

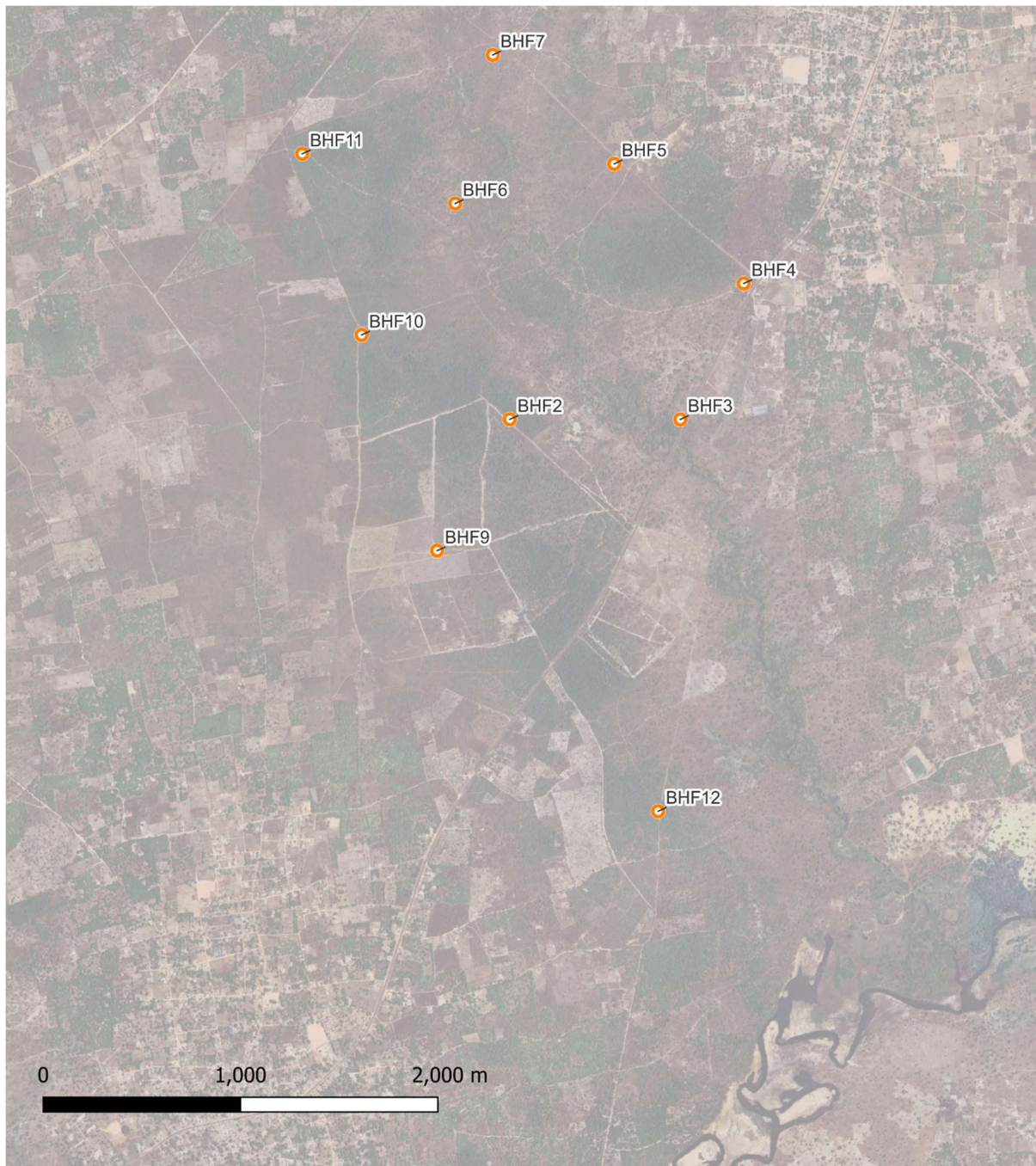


Figure 12 : Map of the 10 boreholes of Sifoe

The Sifoe borehole sites are owned by the government of The Gambia and the land has been allocated to NAWEC for the drilling works (Annex 5).

This is a very forested area with trees and shrubs. It was formerly the farm of the former President, but since the area was unused for years, the vegetation developed, and it became a very forested area. However, it is not a forest park legally recognized by the Forest Act. Some trees and natural habitats will be affected by these 10 boreholes. The work will not affect third parties; no project affected persons, or livelihood or means of livelihood will be affected because the locations for the boreholes drilling have not been accessible to the communities since the Army was established in the area.

This is a sensitive area, and since impact cannot be avoided, the Project should work with the Department of Forestry in order to incorporate WASIB project in the already existing MoU between NAWEC and DoF. This will allow to offset the affected trees in another forest park or near the affected site in Sifoe.

3.3.5. Airport Boreholes



Figure 13 : Map of Airport Boreholes

Like the other boreholes sites, these two boreholes of the airport are also situated in government property (and have been allocated for the drilling work) and the work should not affect any person's asset, livelihood or means of livelihood. Situated inside the Banjul International Airport land and well fenced and secured, the work should not affect any economic activities or people's lives. Areas to be drilled will also not affect airport activities because they are a few hundred meters from the runway.

3.4. Worksite organization

3.4.1. Working areas and road access

If required, preliminary earthworks and brushing will be carried out to facilitate access to the drill sites and working areas, including track preparation, ground leveling, and access road construction.

Road access will be maintained throughout the works to ensure easy and safe access for all types of vehicles, with a minimum width of 6 meters.

For the drilling work phase, no connection to the water supply nor electricity network will be required.

All regulations in force near the water production stations or in the drilling area will be applied. This includes working hours, traffic, safety rules, and other relevant regulations.

3.4.2. Organization

3.4.2.1. General organization

The working area, including equipment and tools storage, setting up stores, and site offices, will be as close to the borehole site as possible the location of which will be indicated by NAWEC.

Drilling activities and internal co-activities within the working area will be planned in advance.

Storage areas that may require specific access for providers will be clearly indicated.

3.4.2.2. Field requirements

A drill pad will be installed prior to the commencement of drilling activities.

The working area will be physically delineated on the field, with the delineation being temporary.

Hazardous areas, such as storage of hazardous materials and ponds, within the working area will be physically delineated by rigid barriers or fences.

If hazardous materials or equipment with restrictive conditions of use are present, they will be placed in designated areas with appropriate signage and restricted access. All hazardous liquids will be clearly identified and stored in safe places with retention measures in place to contain any unexpected leakages.

3.5. Technical description of the work

3.5.1. Shallow Sand Aquifer (SSA) boreholes (Continental terminal)

3.5.1.1. Objectives

The well is designed to reach at least a rate of 100 m³/h. The maximum targeted depth for the reconnaissance phase will be approximately 120 m, depending on the findings. The shallowest aquifer, composed of fine sands, will be sealed to:

- Avoid the penetration of poor-quality groundwater into the well and limit the risks of pollution transfer from the subsurface to the well,
- Facilitate the pump housing design and particularly the pumping casing length to meet the requirements in terms of pumps characteristics (mainly diameter to ensure the target rate) and expected groundwater drawdown.

The well equipment solution (drilling and equipment diameters) is designed to ensure future operability and to optimize the expected aquifer potential, even in case of unexpected poor results. Therefore, the final monoscopic borehole design has been chosen, as it offers the following advantages:

- A pumping housing casing with a specific diameter to facilitate the submersible pump and riser maneuvers with enough clearance, the installation of sensors (e.g., water low level detection), and/or the installation of a piezo tube for manual groundwater level measurements or automatic recording (if piezometric sensors are purchased to ensure continuous monitoring of the well),
- A pumping house design of sufficient size to ensure that the up-hole velocity is not less than 1.5 m/sec,
- An annulus between the casing and the borehole that is sufficient to accommodate centralizers and allow proper cementing (2" as per international recommended practices),
- A sufficient annulus width (2") for the well completion with the gravel pack.

Reinforced PVC or uPVC is also proposed due to its availability, good performance, and variety of characteristics (diameter, strength, screen open area, etc.), as well as its robustness and longevity.

Usually, uPVC is more available for common diameters than other materials, offering greater flexibility in terms of purchasing and the option to adjust the preliminary design based on the drilling/logging outcome.

3.5.1.2. Methodology

For each borehole, a pilot borehole will be drilled to adjust the well design.

This phase will consist in drilling a borehole of 8"1/2 from the bottom of the conductor casing (± 15 m) up to 120m maximum (expected bottom of the semi-deep/confined sandy aquifer). This depth has been decided regarding the geological and geophysical interpretations of the Continental Terminal - Miocene study.

Drilled formation sample will be collected every meter. Collected samples will be described and field lithology logging as well as grain size analyses.

This phase will be completed with well logging using geophysical methods such as Natural Gamma Ray, Spontaneous Potential (SP), Normal Resistivity (short & long, R16 & R64), and Temperature. This will allow for the final well design to be decided according to the common methodology used (Figure 14).

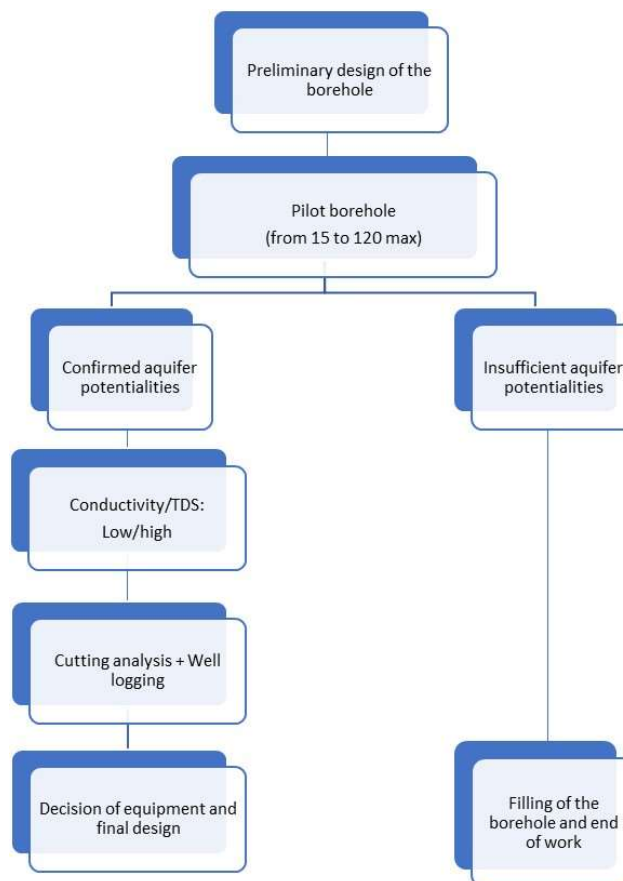


Figure 14 : Step by step methodology for well final design

3.5.1.3. Drilling and installation of a conductor casing

A conductor casing aims to stabilize the first meters of a borehole, usually unconsolidated, during drilling (stability, and workers and rig safety), completion and use. It also prevents the direct infiltration of polluted surface waters between the casing and borehole. It will consist of:

- Drilling a 20" borehole to a minimum depth of ± 15 m from the ground surface,
- Installing a 16" diameter conductor steel casing to a minimum depth of ± 15 m,
- Injecting a cement grout sanitary seal into the annulus between the borehole and conductor steel casing.

3.5.1.4. Reconnaissance phase

i. Drilling of a pilot borehole and geological observations

The pilot borehole drilling is necessary to obtain local data regarding the geological background and identify the semi-confined aquifer of the SSA.

This phase will consist in drilling an 8"1/2 borehole ± 15 m depth to a maximum of ± 120 m by direct mud circulation.

All along the drilling phase, mud viscosity will be controlled on a relevant frequency following the Marsh funnel viscosity procedure ensuring:

- The stability of the borehole walls,
- The removal of destroyed materials by the drill bit from the borehole followed by a mud separation treatment operated in surface in conformity with the best practices.

Samples of drilled formation will be collected every meter. Each sample will be washed and placed in PVC bags and labelled with the well number and the drilling depth.

Collected samples will be described, and field lithology logging, as well as grain size analyses and biostratigraphic (palaeontology or micropalaeontology) descriptions, will be conducted.

This phase will conclude with well logging, which will determine the final design of the testing well.

ii. Laboratory tests and determination

Laboratory testing and analyses will be performed during each step of the reconnaissance phase. The program includes sieve analyses and biostratigraphic determinations. The following analyses are planned:

- Sieves analyses:
 - provision of 5 samples or 1 every 15 m from 60 to 135 m,
 - Standard applied: ASTM C136 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates or equivalent,
- Biostratigraphic analyses:
 - 2 samples in Miocene (expected nature: marls with shelly limestone potentially fossiliferous),
 - Confirmation of azoic character of marls and identification of fossils in shelly limestones.

iii. Well logging

Well logging will be conducted in the uncased borehole from 15 m to a total depth of approximately 90 to 120 m once the pilot borehole is drilled. The program will include the following parameters:

- Natural Gamma ray,
- Spontaneous Potential (SP),
- Normal resistivity, short & Long (R16 & R64),
- Temperature.

iv. Decision and final design

After examining the formation samples, conducting sieve analyses of drill cuttings, and reviewing the results of geophysical logs and field measurements (conductivity/TDS), the final well design will be determined.

In the event of a total lack of potential aquifers, an insufficient number of potential aquifers, or unacceptable water quantity and quality, the borehole will be completely filled with bentonite, cement, or other impervious materials.

If the drilled water-bearing zones are deemed sufficient to produce the desired quantity and quality of water, a final well design schedule will be prepared. This schedule will include the final well depth, the interval lengths of screens, and the lengths of blank well casings.

3.5.1.5. Well construction phase

The pilot borehole will be reamed to the specified diameter for the productive casing and productive screen. It will consist of:

- Reaming the pilot borehole from the bottom of the conductor casing (± 15 meters) to the specified diameter for the productive casing (14 $\frac{1}{4}$ inches) and to total depth (± 120 meters).
- Supplying and installing the UPVC casing pipes (DN 250 mm) in accordance with the specifications and specified final well design.
- Supplying and installing the UPVC slotted pipes (DN250 mm) in accordance with the specifications and specified final well design.
- Supplying and installing a 3-meter UPVC blank pipe with an end cap as a bottom sediment trap (DN250 mm).

Defining the screen slot is essentially based on the interpretation of the granulometric curve of the aquifer formation. As mentioned earlier, there is a lack of data regarding this crucial information. In the absence of representative sieve analyses, the screen slot is assessed using a theoretical approach. The slot size is determined based on the following criteria:

- The slot should retain at least 40% to 50% of the formation.
- The slot should retain a minimum of 90% of the gravel pack.

Regarding the available sieves analyses (Casamance 1978-80) for the three aquifer types existing, it is noted that 50% of the aquifer materials is made of sands within the interval 0.2 to 0.7 mm.

A safe approach regarding the significant variability observed from existing sieves analyses is to **select a slot of 0.5 mm as an average/optimized solution** to avoid the penetration of fine materials into the screen intervals. This assumption will be validated with the results of sieves analyzes to perform during the drilling works.

The equipment specifications are summarized in the following table.

Table 5 : SSA well design – Casing specifications

Parameter	Casing	Screen
Nature	UPVC	UPVC
DN (mm)	250	250
OD/ID (mm)	280/248 mm	280/248 mm
Collapse pressure (bars)	16	16
Connection	Threaded connections	Threaded connections
Type	Casing	Screen Slot 0.5 mm, minimal open area 12%.

Based on the geological and geophysical information of the strata penetrated, the well design will be completed and proposed for equipment. The preliminary estimation of the equipment for the 10 boreholes is presented below:

Table 6 : Characteristics of the testing well equipment for one well

Depth (m)		Length (estimation) (m)*	Description
From	To		
+ 0.00 m	± 15 m	15	Steel casing 16"
+ 0.00 m	± 75 m	75	Casing UPVC DN250

Depth (m)		Length (estimation) (m)*	Description
From	To		
±75m	±117m	42	Screen UPVC DN250
±117m	±120m	3	UPVC blank pipe DN250 with an end cap as a bottom sediment trap

3.5.1.6. Well completion

The screen slots will be adapted to the granulometry of the aquifer material. Based on the existing borehole log, a slot size of 0.5 mm will be used. The size of the gravel pack grain will be compatible with the screen slots. The lower granulometry will correspond to the slot size 10-20% to avoid the introduction of fine material into the well. The completion of the annular space will include:

- A cement grout in the annulus between the borehole and the casing to a minimum depth of ±15 meters.
- A cement grout in the annulus between the borehole and the casing from ±0 meters to the specified depth of the productive casing (±50 meters).
- The annulus between the borehole and well casing and screen from a depth of ±52.5 meters to ±120 meters will be filled with gravel pack. All gravel for packing will be made of siliceous material (>90%).
- A grout seal in the upper portion of the annulus between the borehole and the casing.

3.5.1.7. Well development

The following procedure will be applied to ensure the testing well development:

- Washing the well with clean water (drinkable water) to remove the fine sediments and mud remains,
- Developing the well with air lift.

3.5.1.8. Pumping test

The following procedure will be applied to obtain the critical flow rate, the well head losses and the hydrodynamic parameters:

- Conduct a well production pumping tests (a step-drawdown pumping test (SRT) with up to four pumping rates),
- Carry out a 72-hour constant-rate pumping test (CRT) at a target pumping rate followed by a recovery test,
- At the end of constant rate pumping test, a water sample will be collected and analyzed as per Specifications.

3.5.1.9. Groundwater sampling

At the end of the constant rate pumping test, two water samples will be collected and tested at a certified laboratory. The specific parameters to be measured will be at least:

Table 7 : Recommended list of parameters to be analysed at the end of the CRT

In-situ parameters	
pH	Turbidity
Electrical conductivity	Total Suspended Solids
Dissolved oxygen	Temperature
General parameters	
Odor	Alkalinity
Color	Total Suspended Solids
Hardness	

Anions-Cations	
Calcium	Nitrates
Potassium	Phosphates
Magnesium	Sulphates
Sodium	Fluoride
Chlorides	Carbonates
Nitrite	Bicarbonates
Micro-organisms	
Cryptosporidium	Legionella
Giardia lamblia	Total Coliforms (including fecal coliform and E. Coli)
Heterotrophic plate count (HPC)	Viruses (enteric)
Chemicals	
Aluminum	Cyanide (as free cyanide)
Ammonia	Iron
Antimony	Lead
Arsenic	Manganese
Barium	Mercury (inorganic)
Beryllium	Selenium
Cadmium	Thallium
Chromium (total)	Tin
Cobalt	Vanadium
Copper	
Organic Chemicals	
Acrylamide	Endrin
Alachlor	Epichlorohydrin
Atrazine	Ethylbenzene
Benzene	Ethylene dibromide
Benzo(a)pyrene (PAHs)	Glyphosate
Carbofuran	Heptachlor
Carbon tetrachloride	Heptachlor epoxide
Chlordane	Hexachlorobenzene
Chlorobenzene	Hexachlorocyclopentadiene
2,4-D	Lindane
2,4-Db	Methoxychlor
2,4-DBc	Oxamyl (Vydate)
DDT and metabolites	Polycyclic aromatic hydrocarbon (US-EPA 16)
Dalapon	Polychlorinated biphenyls (PCBs)
1,2-Dibromo-3-chloropropane (DBCP)	Pentachlorophenol
o-Dichlorobenzene	Picloram
p-Dichlorobenzene	Simazine
1,2-Dichloroethane	Styrene

1,1-Dichloroethylene	Tetrachloroethylene
cis-1,2-Dichloroethylene	Toluene
trans-1,2-Dichloroethylene	Toxaphene
Dichloromethane	TPhs
1,2-Dichloropropane	2,4,5-TP (Silvex)
Di(2-ethylhexyl) adipate	1,2,4-Trichlorobenzene
Di(2-ethylhexyl) phthalate	1,1,1-Trichloroethane
Dinoseb	1,1,2-Trichloroethane
Dioxin (2,3,7,8-TCDD)	Trichloroethylene
Diquat	Vinyl chloride
Endothall	

3.5.1.10. Final testing and taking-over

i. Preparation

In order to prepare the well reception, the following well logging program will be completed in case borehole:

- Water resistivity and temperature log under a static and dynamic conditions,
- Flowmetry in dynamic conditions.

This operation requires the implementation of a testing pump meeting the needs for the expected measurements.

Finally, a camera video inspection will be conducted to verify the well integrity and the conformity of the construction regarding the final design.

ii. Disinfection of the well

A well disinfection will be conducted by using an appropriate product. Only chlorine or other compounds approved by the Health Services, Drinking Water Board, etc. will be used as disinfectants.

iii. Well head and connection to the network

A plain concrete footing will be cast around the upper part of the surface casing to fill the space between the surface casing and the wall of the borehole.

3.5.2. Deep Sand Aquifer (DSA) boreholes

3.5.2.1. Objectives

The program involves drilling four deep boreholes to tap into the Maastrichtian aquifer, located near some of NAWEC's existing treatment plants. Borehole productivity is expected to range from 150 to 250 m³/h, which is optimistic compared to the current operational rates in the region. The produced water will be mixed with groundwater pumped from the existing well-fields.

In The Gambia, existing data for the Maastrichtian aquifer are extremely limited. The uncertainty related to the aquifer's detailed nature, thickness, and the presence of fresh, mineralized, or salty water precludes proposing a singular and definitive design. The main uncertainties are as follow:

- Uncertainty 1: contact between the Paleocene formation and the Maastrichtian.
- Uncertainty 2: thickness of the Maastrichtian and more particularly thickness of the freshwater bearing portion vs. lower brine/salty portion.

Since no local information is currently available, the current design will be implemented for the first well to obtain local data regarding the geological background and identify the depth of the Maastrichtian aquifer and may be adapted in the following three locations (pumping chamber length may be shortened). For the first

selected location, the aim of the reconnaissance will be to address the two above-mentioned uncertainties or provide sufficient information to make a final decision on whether to continue with the project or adjust the strategy.

The expected depth of the Maastrichtian top for the three drill sites (see section 3.2.2) has been estimated as follows:

- Serrekunda: 490-500 m,
- Sukuta: 500-520 m, potentially deeper than in Serrekunda,
- Brikama: 520-540 m.

3.5.2.2. Drilling and installation of a conductor casing

The conductor casing will be used for the same purposes as described for the drilling work in the SSA. In the Maastrichtian, it will specifically consist of:

- Drilling a borehole with a 33" bit from ground surface to a minimum depth of ± 12 m,
- Installing a 28" diameter conductor steel casing to a minimum depth of ± 12 m,
- Injecting a cement grout sanitary seal into the annulus between the borehole and conductor steel casing to a minimum depth of ± 12 m.
- Drilling from the bottom of the conductor casing in 26" to a minimum depth of ± 60 m,
- Installing a 22" diameter conductor steel casing to a minimum depth of ± 60 m,
- Injecting a cement grout sanitary seal into the annulus between the borehole and conductor steel casing to a minimum depth of ± 12 m.

3.5.2.3. Reconnaissance phase

i. Drilling and geological observations

During drilling, well logging will be performed at the end of each stage of reconnaissance. The program will include Natural Gamma ray, Spontaneous Potential (SP), Normal resistivity, short & Long (R16 & R64), calliper and Temperature. It will allow to decide a final design for the well.

The three stages are as follows:

- Stage 1: complete the reconnaissance and drilling of the SSA and definition of the aquifer substratum (base of the Oligocene/top Eocene). This section will be then completed with the first casing,
- Stage 2: Complete the reconnaissance and drilling of the Eocene and Paleocene formation,
- Stage 3: Complete the reconnaissance and drilling of the Maastrichtian sands and confirm the depth of the fresh/saline water interface.

ii. Laboratory tests and determination

Laboratory testing and analyses will be performed during each step of the reconnaissance phase. The program includes sieve analyses and biostratigraphic determinations. The following analyses are planned:

- Sieves analyses:
 - target: Maastrichtian sands below 450 m (expected depth),
 - provision of 5 to 10 samples or 1 every 10 m,
 - Standard applied: ASTM C136 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates or equivalent.
- Biostratigraphic analyses:
 - 1 sample in Miocene (expected nature: marly limestones) between 150 and 250 m (expected depth interval),
 - 4 samples in Eocene (expected thickness 200 m, nature: limestones to marls, late Eocene being marls, slightly sandy and pyritic with some intercalations of limestones with flint nodules),

- 2 samples in Paleocene (expected thickness 130 m, nature: marls, clays, sandy limestones),
- 1 sample in Maastrichtian, this formation being potentially azoic.

iii. Well logging

- A well logging will be conducted after each drilling's stage:
 - From ± 450 m to a depth of ± 600 m.
 - The logging program will include the following:
- Natural Gamma ray,
 - Spontaneous Potential (SP),
 - Normal resistivity,
 - Short & Long (R16 & R64),
 - Calliper,
 - Water resistivity and temperature.

iv. Decision and final design

After examining the formation samples, conducting sieve analyses of drill cuttings, and reviewing the results of geophysical logs and field measurements (conductivity/TDS).

3.5.2.4. Well construction phase

All along the drilling phase, mud viscosity will be controlled on a relevant frequency following the Marsh funnel viscosity procedure ensuring:

- The stability of the borehole walls,
- The removal of destroyed materials by the drill bit from the borehole followed by a mud separation treatment operated in surface in conformity with the best practices.

Samples of the drilled formation will be collected every meter. Each sample will be washed and placed in PVC bags and labelled with the well number and the drilling depth.

Collected samples will be described and field lithology logging as well as grain size analyses were conducted.

Each stage of the drilling will be followed by well logging which will allow to decide a final design for the testing well.

A biostratigraphic analysis will be carried out to identify the stratigraphic units and their lithological characteristics. Some selected samples (10) will be prepared and sent for analysis.

i. Installation of casing & screen: Option 1 (8"5/8)

This equipment is chosen in priority for the first reconnaissance borehole to be drilled as it is expected to maximize the rate for pumping tests purposes.

The equipment specifications are summarized in Table 8.

Table 8 : Characteristics of the casings and screen used for the well construction (option 1: 8"5/8)

Parameter	Casing	Casing	Casing	Casing	Screen	Sand trap
Expected depth (m)	0-12	12-60	60-220	210-450	450-550	550-575
Nature	Steel Casing	Steel casing	Steel casing	Stainless steel	Stainless steel	Stainless steel
OD (mm)	28"	22"	16"	8"5/8	8"5/8	8"5/8
Wall thickness (mm)	Minimum 0.3"	Minimum 0.3"	Minimum 0.3"		Calculation based on collapse, tensile strength and compressive loads required	Calculation based on collapse, tensile strength and compressive loads required

Parameter	Casing	Casing	Casing	Casing	Screen	Sand trap
Connection	Threaded coupling	Threaded coupling	Threaded coupling	Threaded connections	Thread connections	Thread connections
Type	API, grade B, 5L seamless	API, grade B, 5L, seamless	API, grade B, 5L, seamless	Casing	Screen Slot 0.75 mm, minimal open area 7.3%.	

Based on the geological and geophysical information of the strata penetrated, the well design will be completed and proposed for equipment.

3.5.2.5. Well completion

The screen slots will be adapted to the granulometry of the aquifer material. Based on the existing borehole log, a slot size of 0.75 mm will be used. The size of the gravel pack grain will be compatible with the screen slots. The lower granulometry will correspond to the slot size 10-20% to avoid the introduction of fine material into the well. The completion of the annular space will include:

- A cement grout in the annulus between the borehole and the casing (from 0 to ± 25 meters),
- The annulus between the borehole and well casing from depth 0m to ± 250 m will be filled with a cement grout, sludge density 1.8 to 1.9 kg/dm³,
- The annulus between the borehole and well casing from depth ± 250 m to a depth of ± 450 m will be filled with a cement grout, sludge density 1.8 to 1.9 kg/dm³,
- Gravel pack from depth ± 425 m to a depth of ± 575 m, with a standard gravel size between 2.0-4.0 mm. All gravel for packing shall be well-rounded, graded, hard, water-worn, and washed, clean of silt, fine sand, dirt, and foreign matter,
- A grout seal in the upper portion of the annulus between the borehole and the casing from the top of the gravel pack to the ground surface.

3.5.2.6. Well development

The same procedure as per the SSA boreholes specifications will be applied to ensure the testing well development (see section 3.5.1.7).

3.5.2.7. Pumping test

The same procedure as per the SSA boreholes specifications will be applied to ensure the pumping test (see section 3.5.1.8).

3.5.2.8. Groundwater sampling

Two water samples will be collected and tested at a certified laboratory. Specific parameters to be measured will be at least the parameters listed in Table 7.

3.5.2.9. Final testing and taking-over

The same procedure as per the SSA boreholes specifications will be applied to ensure the final testing phase (see section 3.5.1.10).

4. Environmental and social baseline situation

4.1. Data gathering

It is understood that the potential negative impacts of the Project are largely expected to come from the installation of the facilities during the construction phase; the operational phase, when the facilities are finally commissioned and functional, will largely lead to positive impacts in view of the importance of quality water supply to lives and livelihoods. But since the drilling areas are isolated from settlements in sites belonging to the Government or to NAWEC, gathered data will focus on drilling areas. The field exercise entailed real-time observations, field sampling, in-situ measurements, and laboratory analysis. For example, the '*construction of the boreholes*' has strong potential for soil and air contamination as well as groundwater pollution if not properly managed.

Where there are sensitive ecosystems such as the gazetted forests at Sifoe, Kitty and Salagi, primary qualitative and quantitative assessments, supported by land use/land cover mapping, were performed to provide understanding of the vegetation and biodiversity (paying particular attention to the species under the IUCN Red List) that could be affected by the planned activities.

A detailed description of the sites where boreholes will be drilled is at the end of this chapter.

4.2. Physical environment

4.2.1. Geology

The Gambia is located on one of the major sedimentary basins of Africa, usually referred to as the Mauritania/Senegal Basin. The basin was formed because of the breakup of the ancient landmass of Gondwana in the South Atlantic Ocean in late Paleozoic and early Mesozoic times. Repeated step-faulting along parts of the continental margin led to subsidence of the basin and continual deposition of detrital material, originating from the more stable interior of the continent, thereby forming an immensely thick sedimentary sequence.

The thickness of the sediments from the Maastrichtian up to Quaternary is estimated to be a little over 1,000 meters. The Maastrichtian is formed of terrestrial sands and sandstones with intercalated clay levels derived from the erosion of the Futa Jallon massif.²

4.2.2. Climate and climate change

According to "Irrigation in Africa in figures AQUASTAT Survey – 2005 », The Gambia territory is characterized by 7-8 months of hot and dry Sudano-Sahelian climate and 4-5 months of rain from June to October. Rainfall is heaviest in August but there are variations with most rain recorded in the southwest of the country. Average annual rainfall is 800 mm/year with lesser rains inland (eastwards) and considerable inter-annual differences. In The coastal areas of the country experience relatively lower temperatures.

The Gambia like the whole West African region is prone to variation in climate. To make these findings, climate projections can be presented via individual models or through multi-model ensembles. The world Bank Climate Change Knowledge Portal (CCKP) supports the analysis of climate impacts using multi-model ensembles, as they represent the range and distribution of the most plausible projected outcomes when representing expected changes.

So, for The Gambia, temperature data can predict:

- The mean annual temperature in The Gambia is projected to increase by between 1.1°C to 3.1°C by the 2060's and by between 1.8°C to 5.0°C by the 2090's.

² World Uranium Geology, Exploration, Resources and Production International Atomic Energy Agency 2020, p. 225.

- The projected rate of warming is faster in the interior regions of The Gambia than in those areas closer to the coast.
- All projections indicate substantial increases in the frequency of days and nights that are considered 'hot' in the current climate.

Regarding precipitation, the analysis of the different models suggests:

- Projections of mean annual rainfall averaged over the country from different models in the ensemble project a wide range of increases and decreases in precipitation for the Gambia, but tend towards decreases, particularly in the wet season (July, August, and September).
- Projected annual precipitation changes range from -23 to +18% by the 2090's, with ensemble means between 0 and -3% and with increasing occurrence of heavy rainfall events.
- Projected July, August, and September changes range from -53 to +74% by the 2090's, with ensemble means between -7 and -20%. The range of projections from different models in the ensemble includes both increases and decreases in all seasons.

Table 9 : Recorded Annual Rainfall in West Coast Region (mm) 2009-2018

Year/Region	WCR
2009	1,418.7
2010	1,203
2011	881
2012	1,374.1
2013	1022.4
2014	613.6
2015	1,253.5
2016	822.2
2017	868.1
2018	889.8
Regional mean	1,034.6

Source: Department of Water Resources, 2019

4.2.3. Groundwater characteristics

Comprehensive studies and detailed description of the country's groundwater systems can be found in a few reports like WASIB project environmental and social feasibility or Royal Heskoning report. The overall characteristics of the groundwater occurrences throughout The Gambia feature two main aquifer systems, i.e., the Shallow Sand Aquifer and the Deep Sandstone Aquifer (**more details are on the chapter 3 above**).

4.2.3.1. Shallow Sand Aquifer (SSA)

The SSA is found and tapped throughout the Gambia. The SSA is subdivided into two distinct units, the phreatic aquifer, and the semi-confined aquifer. The two are separated by a clay-silt layer – at places nearly impermeable (aquitard) – typically 15 m to 30 m thick that allows limited hydraulic connection between the two.

All groundwater utilized in The Gambia is abstracted from the shallow sand aquifer partly through numerous dug wells tapping water from the upper phreatic part of the SSA and from boreholes sunk in the lower semi-confined part of the SSA, which constitute the backbone of the water resources exploited for potable use in The Gambia.

4.2.3.2. Phreatic aquifer

This upper aquifer system is found on both banks of the Gambia River and comprises mainly fine to medium grained quartz sands with occurrences of silt and clay. The aquifer occurs at depths between 10 m and 30 m, and in most places has an overlying lateritic layer.

All the hand-dug wells in the Gambia exploit this aquifer. Some shallow boreholes also tap water from the phreatic aquifer. Generally, the aquifer thickness increases towards the east of the country, and similarly there is also an increase in a north-south direction. Over the past few years, however, the reliability of this upper aquifer as a water source has to some extent diminished with an increasing number of the shallow wells

seasonally running dry and also in some cases with an increase in salinity of the well water (particularly the wells located in the vicinity of the coastal zone in the Greater Banjul Area). This phenomenon is attributed to the increasing abstractions with sinking of new boreholes into the semi-confined aquifer due to the rapid population growth experienced in this part of the country.

4.2.3.3. Semi-confined aquifer

This aquifer is mainly composed of fine to medium-grained sands and coarse sands with calcite. The depth of the aquifer varies between 30 m to 100 m below ground level, and the static water level is generally between 10 m and 20 m below ground level, but in a few cases at depths below 30 m. Across the country, the groundwater table (piezometric surface) is characterized by 'mounds' and 'sinks'. Generally, the 'mounds' are found in areas where – relatively speaking – higher recharge rates prevail and feature radial outward flows. The best examples are the Kombo Peninsula mound (in the GBA) and Niimi (Kerewan). Groundwater level dynamics and fluctuations in the SSA depend to a large extent on rainfall. The phreatic aquifer is recharged by direct infiltration and therefore exhibits seasonal fluctuations of groundwater levels directly correlated to rainfall events.

4.2.3.4. Deep Sandstone Aquifer (DSA)

Paleocene sandstones occur at average depths typically 250 to 400 meters below ground level. The aquifer is recharged through lateral flow over long distances from the southern part of Senegal. Water found in the DSA is of fossil origin, several thousands of years old, and is stored under confined (artesian) conditions of considerable volume. Three older exploratory boreholes at Banjul, Sankwia and Garowal penetrating down to the DSA have proven that there is an increasing mineralization of the deep groundwater in an east to west direction. This implies that good quality water (for potable use) in the DSA is expected only in the eastern part of the country, where the reservoir (aquifer storage volume) is estimated to hold 80,000 Mm³ of a total of about 650,000 Mm³. Water sampling has been carried out for over 20 years, and the results suggest that the groundwater chemistry in the DSA has remained constant.

The groundwater of the DSA can be considered a huge untapped resource for The Gambia. It has been argued that the deep DSA groundwater can be abstracted and 'diluted' with groundwater from the SSA to obtain a 'raw' water quality, which with conventional treatment processes can be used for potable water supply.

4.3. Biological Environment

This section presents the biological investigations of the proposed locations of the 10 shallow boreholes within the Sifoe Forest, including the SWTP; the Airport (2); the Maastrichtian boreholes within Salagi Forest Park (2); the Serekunda WTP (1); and the Brikama WTP (1). A total of 17 proposed sites were investigated as indicated in Table 10 below.

Prior to fieldwork, an analysis of available documentation was carried out. The sources of information are listed at the end of the report. It should be noted that there is little recent documentation available on the areas of interest to the project. No specific study was done at the Sifoe forest. Studies of other similar areas in the Greater Banjul Area were taken as an example to see similarities in terms of quality and quantity of trees.

Trees enumerated in the tables below have been identified during field surveys by the Consultant.

The approach employed was a complete census in the proposed sites, i.e. a 100% inventory of the flora/fauna within the defined boundaries of the drilling sites was carried out. Within these areas, the overall flora/fauna species composition and structure was documented; all trees meeting the diameter at breast height (DBH) threshold (≥ 10 cm) had both their diameters and heights measured.

Given that the objective of the investigation is to determine faunal species presence and absence, and with the number of resources available, the study areas were limited to the drilling sites; essentially the areas defined for the investigation of the flora. In this regard, both direct and indirect observation methods were employed.

From the 10 to 15 of April 2025 corresponding to the dry season, following receipt of access approval by the Ministry of Defense, the team walked along trails (where possible, as in the Sifoe Forest) and recorded all observed mammals, during the day between 10 a.m. to 3 p.m. In addition, the specialist identified and recorded animal tracks along the trails and in the sand, collecting and identifying fecal droppings, birds' feathers, etc. This method recorded easily detectable species.

Within the smaller designated areas for the boreholes (50 x 50m) the entire plot was be walked over, recording the observed animal and bird species.

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 through filed observations by the biologists.

Table 10 : The Medium-term WASIB borehole locations (including WASIB Drilling works boreholes)

	Borehole No	Location	Coordinates		Size (m)	Area (m ²)
1	SWTP	Sifoe	-16.40.601	13.12.772	150 x 150	2.25
2	BHF11	Kitty	-16.6923008	13.22910023	50 x 50	0.25
3	BHF7	Kitty	-16.6833992	13.2336998	50 x 50	0.25
4	BHF6	Kitty	-16.68510056	13.2269001	50 x 50	0.25
5	BHF10	Kitty	-16.68939972	13.22089958	50 x 50	0.25
6	BHF5	Kitty	-16.67770004	13.22879982	50 x 50	0.25
7	BHF2	Kitty	16.68222	13.21694	50 x 50	0.25
8	BHF9	Kitty	- 16.68556	13.21083	50 x 50	0.25
9	BHF3	Kitty	-16.67449951	13.21710014	50 x 50	0.25
10	BHF4	Kitty	-16.67160034	13.22329998	50 x 50	0.25
11	BHF12	Kitty	-16.67539978	13.19909954	50 x 50	0.25
12	Maastrichtian	DSA Sukuta 1	-16.70619965	13.38969994	50 x 50	0.25
13	Maastrichtian	DSA Sukuta 2	-16.70590019	13.3767004	50 x 50	0.25
14	SSA BH Airport 1	Airport 1	-16.64780045	13.35919952	50 x 50	0.25
15	SSA BH Airport 2	Airport 2	-16.64970016	13.35299969	50 x 50	0.25
Total						5.75
16	Maastrichtian	DSA Serekunda	-16.68169975	13.4364996		
17	Maastrichtian	DSA Brikama	-16.65649986	13.28969955		

4.3.1. Local context

4.3.1.1. Vegetation

Generally, vegetation plays multiple functions including the provision of domestic energy for cooking, building materials in the form of poles and timber, medicinal products, wild fruits and nuts, honey, and other services. The environmental functions include soil erosion control, carbon sequestration and the enhancement of local climatic conditions.

4.3.1.2. Protected area

Under the Forestry Department there are various types of forest areas including Community Forests. In the GBA are Nymbai, Bamba, Salagi, Foroya, and Kabafita Forest parks are the main protected natural forests reserves; they are all far from the areas where the drillings of the boreholes will be implemented.

The Kity area is not a protected forest, but forest trees are there and some may be impacted.

In Sukuta, the two boreholes will be drilled in the buffer zone of the Salagi Forest Park which is a protected area, but the buffer zone is being used by NAWEC for Water and Electricity projects for decades with some existing boreholes and electricity infrastructure already implemented. The Settlements are on the other sides of the road; no activities or third-party interest will be affected during work.

The vegetation of these forest areas includes mainly *Tectona grandis*, *Eucalyptus Sp.*, *Adansonia digitata*, *Ceiba pentandra*, *Borassus aethiopium*, *Elaeis guineensis*, *Detarium senegalensis*, *Ficus gnaphalocarpa*, etc.

4.3.1.3. Reminder of international conservation status

IUCN statutes are defined as follows:

In Critical Danger (CR)

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered and therefore faces an extremely high risk of extinction in the wild.

Endangered (EN)

A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered and therefore faces a very high risk of extinction in the wild.

Vulnerable (VU)

A taxon is said to be Vulnerable when the best available data indicates that it meets one of the criteria A to E corresponding to the Vulnerable category and, consequently, that it faces a high risk of extinction in the wild.

Near-threatened (NT)

A taxon is Near Threatened when it has been assessed against the criteria and does not currently meet the criteria for Critically Endangered, Endangered or Vulnerable, but is close to meeting the criteria for the Threatened group or is likely to do so in the near future.

Least Concern (LC)

A taxon is said to be of Least Concern when it has been assessed against the criteria and does not meet the criteria for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.

Insufficient data (DD)

A taxon falls into the Data Deficient category when there is insufficient data to directly or indirectly assess the risk of extinction based on its distribution and/or population status. A taxon in this category may have been extensively studied, and its biology may be well known, but relevant data on abundance and/or distribution are not available. It is therefore not a 'Threatened' category. Listing a taxon in this category indicates the need to gather more data and does not exclude the possibility of demonstrating, through future research, that the taxon could have been classified in a 'Threatened' category. It is imperative to make full use of all available data. In many cases, the choice between Data Deficient and a 'Threatened' category needs very careful consideration. If the range of a taxon is suspected to be relatively circumscribed, or if a considerable amount of time has elapsed since the taxon was last observed, the choice of a 'Threatened' category may be perfectly justified.

Not Evaluated (NE)

A taxon is said to be Not Evaluated when it has not yet been tested against the criteria.

The abbreviation for each category, given in brackets, corresponds to the English name in all languages.

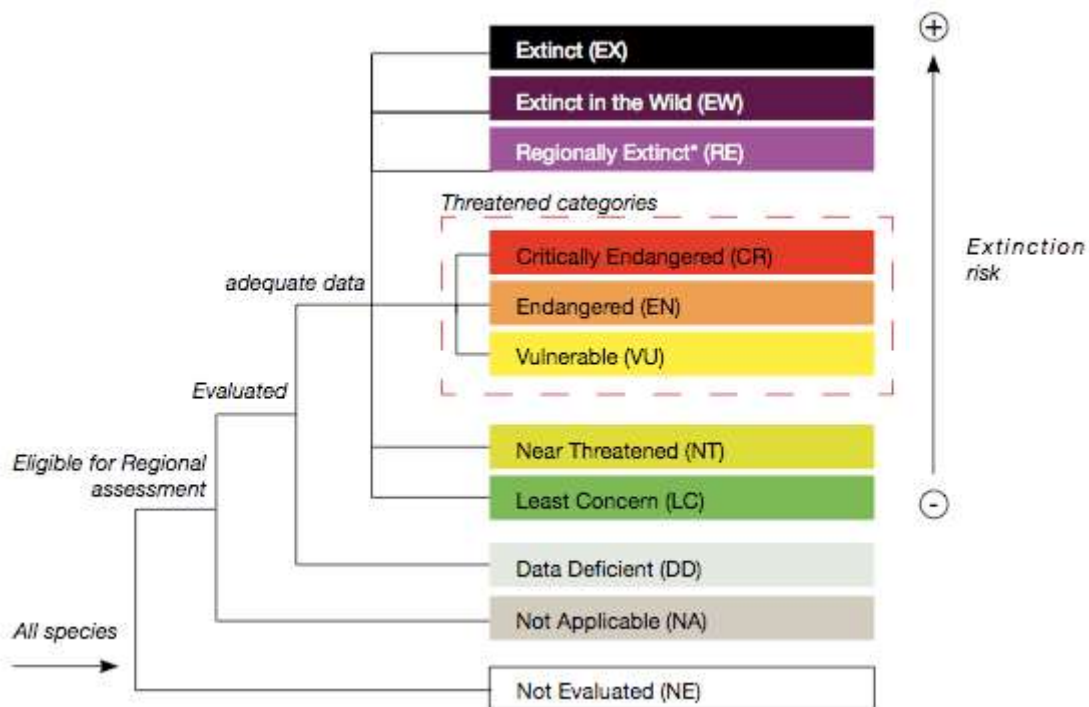


Figure 15: Structuring of IUCN categories (source IUCN Red List Categories and Criteria. Version 3.1)

Although IUCN information and assessments are critical in identifying species of conservation concern, they must be used with caution. Among the species assessed, some remain in the DD category, i.e. species potentially at stake but for which there is a lack of sufficient information to assign a status.

Finally, it should not be forgotten that IUCN Red List species conservation status assessments are constantly evolving. The conservation status of species evolves in line with population dynamics and the natural and anthropogenic pressures they face, requiring regular revisions of these conservation statuses. Technological advances, notably through the development of genetic analyses, are redefining the boundaries between species and leading to the distinction of new species.

Finally, the degree of knowledge of the distribution range of animal species in the DRC is currently more or less refined, depending on the knowledge available. This should be considered in the light of the fact that species distribution evolves at the same time as habitats are modified by human action.

4.3.2. The Sifoe Forest

As presented in section 3.3.4, the new well field in Sifoe area will be developed on the former presidential garden in Kity/Sifoe in the south of the GBA. The land coverage consists mainly of forests and bushes. The former garden is surrounded by agricultural lands.

The Sifoe Forest, (also known as Sifoe Farm), essentially extends from the traditional fields of the community of Sifoe to the fields of Kity, an area of approximately **360ha**.

This area was claimed by the former President of the country who planned to use it as a farm, and thus had soldiers stationed on it. After his departure, and like all other farms/agricultural enterprises he owned, the Sifoe Fram was taken over by the current government, and is now proclaimed as Government land. The land is currently utilized/allocated to the Ministry of Defense. The following figure shows the extent of the Sifoe Forest/Farm.



360 hectares

Figure 16 : The extend of the Sifoe Forest (source: Google map)

Some signs of human activity were identified at certain sites during the field investigations. These activities appear to have been initiated prior to the army's occupation of the area. Such activities have since ceased. Indeed, since the departure of the former president, there is a form of a settlement by The Gambia Armed Forces whose presence limits incursion by the surrounding communities, which has seen the area relatively more forested than many other parts of the WCR (West Coast Region).

However, it should be noted that this area is not completely enclosed by physical barriers and remains "accessible" to the surrounding communities.

During the course of consultations, it was indicated to the Consultant that the forest (or at least part of it) is being earmarked for an Army Training School in the future.

NAWEC has received all land allocation documents for all the boreholes sites (Annex 5).

Clearly, the proposed training school, the well field and the other facilities planned for the "Medium-Term Works" phase of the WASIB project will have cumulative effects on the forest, which will have to be addressed.

Considering the ten planned boreholes within the forest (50 x 50m each), at the stage of the Drilling Works, the project footprint will be approximately **2.5-ha** of the 360-ha area.

The location of the borehole sites within the Sifoe Forest is presented in the figure below.

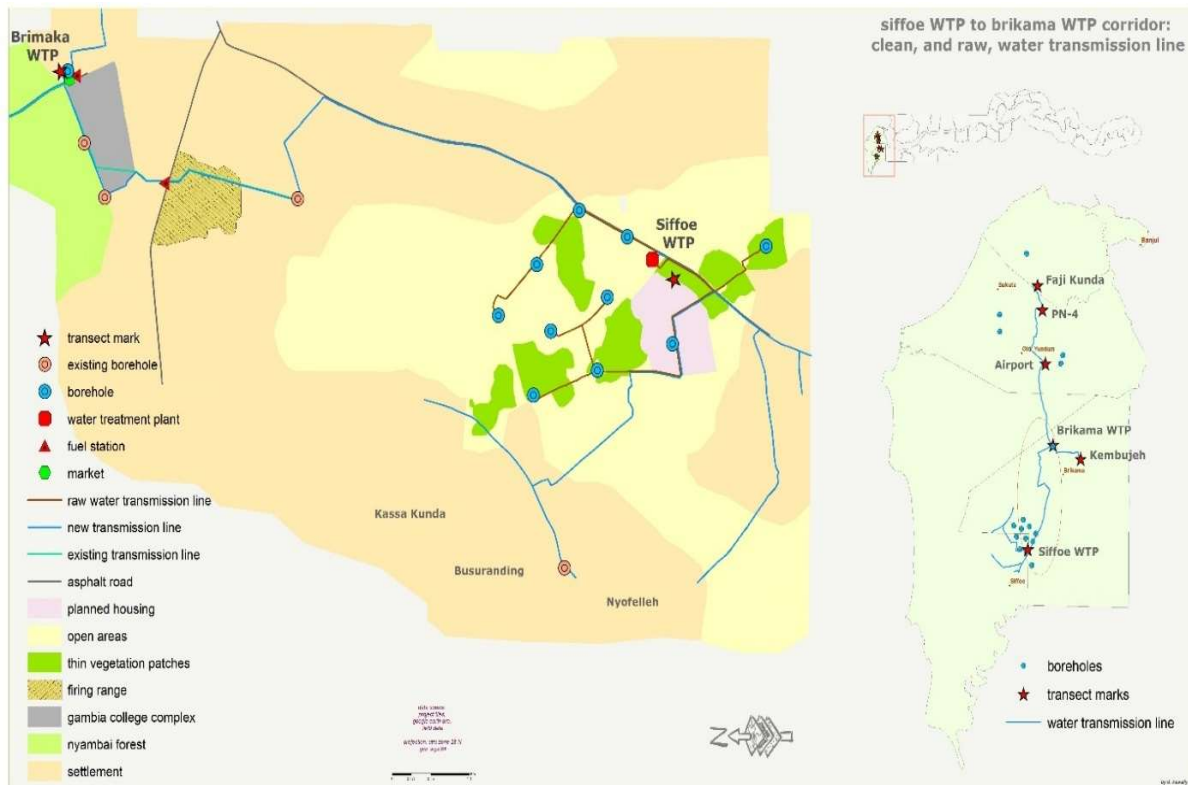


Figure 17 : Location of the borehole sites within the Siffoe Forest

4.3.2.1. The Flora

The species listed in table 11 below were identified during the field survey because no study was done in the Siffoe/Kity area in the last decades since it is not a forest park, it was the farm of the former President of the country.

The flora within the forest is characterized by dry woodlands and perennial scrub species. The presence of an elevated forest canopy of some indigenous tree species makes it an ecologically important location for roosting birds and other small mammals. In addition to the trees, the area contains understory vegetation, including shrubs and grasses, which contribute to the overall ecological balance of the site. Figure 18 to Figure 21 show the vegetation types found within the forest.

The trees play important ecological roles, including providing shade, stabilizing the soil, offering habitat for wildlife, and contributing to carbon sequestration. Furthermore, many of the species have significant medicinal, cultural, and economic values. The bark and leaves of some of the trees are used in Gambia for medicinal purposes. The forest is also a source of fuel for domestic cooking, etc.

Table 11 shows the various types of vegetation within the forest and their status under the IUCN Red List.

But where the 10 boreholes will be located the land has not been utilized by the communities for firewood, or medicinal needs since the Army was established. These 10 boreholes sites are located at the heart of the forest along existing access paths.

As mentioned above, when the drilling works commence approximately 2,5 ha out of 360 ha (>0.07%) of the Siffoe/Kity forest and other vegetation may be cleared to make way for the facilities (Important trees and species will be marked and protected from the clearing of the site), and this can lead to habitat loss, changes in microclimate, increased risks of soil erosion, and a reduction in carbon sequestration. The forest and vegetation lost to the project must be replaced to support the Department of Forestry's tree replacement program, which aims to restore indigenous tree species that are becoming scarce in Gambian forests.

Overall, the project will not lead to the extinction of endangered and endemic tree species, nor the degradation of critical ecosystems, and habitats.

Nonetheless, it will be noted that two of the species (the baobab and the African rose wood) are listed as Threatened Species, the mahogany listed as Vulnerable, the Apple-ring acacia, the winter thorn and mimosa listed as Near Threatened under the IUCN Red List. In this regard all efforts must be made to protect the species when the construction works start. Where they cannot be avoided, however, their falling should be minimized.



Figure 18 : Marks of harvested tree back (note the bark removed)



Figure 19 : Typical vegetation of the forest



Figure 20 : Stands of palm trees



Figure 21 : The Guinea Plum

Table 11 : Plant species recorded in the Sifoe Forest and their IUCN status

N	Common English name	Scientific name	National conservation status	IUCN Red List
1	Baobab	<i>Adansonia digitata</i>	No	TS
2	Rhun palm	<i>Borassus aethiopum</i>	No	LC
3	Ironwood	<i>Prosopis Africana</i>	No	LC
4	Mohogany	<i>Khaya senegaleensis</i>	No	Vul
5	Gingerbread plum	<i>Parinari macrophylla</i>	No	LC
6	Silk cotton	<i>Ceiba pentandra</i>	No	LC
7	African rosewood	<i>Pterocarpus erinaceus</i>	No	TS
8	Camel's Foot Tree (Fara)	<i>Piliostigma thonning</i>	No	NA
9	Raffia palm	<i>Raphia palma-pinus</i>	No	Data deficient
10	Oil palm	<i>Elaeis guineense</i>	No	NL

N	Common English name	Scientific name	National conservation status	IUCN Red List
11	Black plum	<i>Vitex doniana</i>	No	LC
12	Senegal Saba (Kaba)	<i>Saba senegalensis</i>	No	LC
13	Guinea gumvine (folay)	<i>Landolphia heudelafii</i>	No	Not evaluated
14	Baransango	<i>Acacia albida</i>	No	NT
15	Mimosa	<i>Dychrostachys Cinarea</i>	No	NT
16	Silver Terminalia (Wolo)	<i>Terminalia albida</i>	No	LC
17	Sinjango	<i>Cassia sieberiana</i>	No	LC
18	Red-leaved Fig (Soto)	<i>Ficus ingens</i>	No	LC
19	Guinea Plum (Tamba)	<i>Parinari macrophylla</i>	No	LC
20	Sicklebush (Kurulungo)	<i>Dichrostachys glomerata</i>	No	LC

Source: SDF biological field investigation at Sifoe and Kity

NB: T S - Threatened Species; L C - Least Concern; V – Vulnerable; N T – Near Threatened; N A - Not Assessed

4.3.2.2. The Fauna

Since there has never been any comprehensive inventory of the fauna, the present checklist is the result of observations of biodiversity experts implemented in 10-15 April 2025 and probably reflects the most characteristic species in the region.

The Sifoe Forest is situated far from the wildlife protected areas such as the Bolong Fenyo Community Wildlife Reserve³, the Tanbi Wetlands National Park the Abuko Nature Reserve. It is therefore not a corridor for birds, reptiles and mammalian wildlife.

Nonetheless, it hosts wildlife (mammals, birds, reptiles and amphibians) as indicated in Table 12 below. **None of the species is of significance under the IUCN Red List.** The following list was also validated during the community consultation meetings in the course of developing this report. There are also soil macro and microorganism, (fungi), and small insects.

With the clearance of the vegetation serving as habitat and food sources of some fauna and avifauna species, there is a moderate threat of habitat loss of the various species occurring in the area. The low monkey population (vervet monkey) could also be affected in the area.

Table 12 : Mammalian fauna in the Sifoe Forest

No	Common English Name	Scientific Name	National conservation status	IUCN Red List
1	Fruit bat	<i>L. anagolesis smithii</i>	No	NL
2	Senegal bush baby	<i>Galago senegalensis</i>	No	NL
3	Red flanked duiker	<i>Cephalophus rufilatus</i>	No	LC
4	Gambia mongoose	<i>Mungos gambianus</i>	No	LC
5	Sun squirrel	<i>Heliosciurus</i>	No	LC
6	Cane rat	<i>Thryonomys swinderianus</i>	No	LC
7	Gambian giant rate	<i>Cricetomys gambianus</i>	No	LC
8	Hare	<i>Lepus saxatilis</i>	No	NL
9	Spitting cobra	<i>Naja nigricollis</i>	No	LC
10	Sand snake	<i>Psammophis sibilans</i>	No	LC
11	Nile monitor	<i>Varanusn. niloticus</i>	No	NL
12	Armitage skink	<i>Chalcides armitagei</i>	No	LC

³ Bolon Fenyo Community Wildlife Reserve (BFCWR), covers an area of 320ha, and was gazetted as a protected area in 2008. It is located along the Atlantic coast, and has exceptionally high habitat diversity for its comparatively small area; the habitats include marine, estuarine, fresh water marsh, coastal dune, mangrove, woodland/savanna and thicket, and provides critical roosting ground for both residential and migratory species of birds.

No	Common English Name	Scientific Name	National conservation status	IUCN Red List
13	Skinless gecko	<i>Geckolepis megalepis</i>	No	LC
14	Rock python	<i>Python sebae</i>	No	LC
15	Puff adder	<i>Bitis arietans</i>	No	LC
16	African bush snake	<i>Philothamnus semivariegatus</i>	No	LC
17	Black forest cobra	<i>Naja guineensis</i>	No	LC
18	Panther chameleon	<i>Furcifer pardalis</i>	No	LC

Source: SDF biological field investigation at Sifoe and Kity

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

4.3.2.3. The avifauna

The dry woodlands and perennial scrub species, and the presence of an elevated forest canopy makes the Sifoe Forest an ecologically important location for roosting birds; they provide a roosting ground for both residential and migratory species of birds. A checklist of woodland birds recorded are Hornbills, Helmet guinea fowls, doves and pigeons, startling, egret species, sunbirds and weavers. Table 13 shows the avifauna recorded in the area, and their conservation status in the IUCN Red List. Only the Cattle egret is recorded as “Threatened” globally, although nationally the Department of Parks and Wildlife Management (DPWM) indicates that it is not a threatened species.

The avifauna of the area consists of a diversity of bird species that use the forest as roosting and feeding area. The forest is barely 10 kilometers away from the Bolong Fenyo in Gunjur which is located along the migratory routes <https://www.accessgambia.com/information/large08/gunjur-coast.jpg> of many Palearctic migrant species such as the Caspian terns, black winged stilt, black backed gull.

It is therefore not unlikely that some of them may venture to roost within the Sifoe Forest.

In view of this, the avifauna within the forest could be of both national and international significance, and therefore the risk of disturbing their temporal habitats and roosting activities and feeding grounds should be avoided or minimized.

Table 13 : Avifauna recorded in the Sifoe Forest

No	Common English name	Scientific name	National Conservation Status	IUCN Red List
1	Red-billed hornbill	<i>Tockus erythrorhynchus</i>	No	L C
2	Helmeted Guinea fowl	<i>Numida meleagris</i>	No	L C
3	Yellow-billed hornbill	<i>Tockus flavirostri</i>	No	L C
4	African mourning dove	<i>Streptopelia decipiens</i>	No	L C
5	Greater blue-eared starling	<i>Lamprolornis chalybeus</i>	No	N L
6	Little egret	<i>Egretta garzetta</i>	No	L C
7	Pied crow	<i>Corvus Albus</i>	No	L C
8	Red eyed dove	<i>Streptopelia semitorquata</i>	No	L C
9	Beautiful Sun Bird	<i>Nectarinia Pulchella</i>	No	L C
10	Little bee-eater	<i>Merops Pusillus</i>	No	L C
11	Common bulbul	<i>Pycnonotus Barbatus</i>	No	L C
12	Osprey	<i>Pandion haliaetus</i>	No	LC
13	Brown-necked parrot	<i>Poicephalus fuscicollis</i>	No	LC
14	Lanner falcon	<i>Falco biarmicus</i>	No	LC
15	Black backed gull	<i>Larus marinus</i>	No	LC
16	Cattle egret	<i>Genus Bubulcus</i>	No	LC
17	Abyssinian roller	<i>Coracias abyssinicus</i>	No	LC
18	Caspian tern	<i>Hydroprogne caspia</i>	No	LC

Source: SDF biological field investigation at Sifoe Forest

NB: LC - Least Concern; NL – Not Listed

4.3.2.4. Habitat sensitivity

The occurrence of threatened species including IUCN Red List fauna, the presence of protected areas within 10km radius from the proposed project site and their status were assessed.

Desktop reviews, and field surveys, together with consultations with nearby communities have assured the following findings that:

- No protected biodiversity sites within 5km radius of the proposed project have been found;
- No sensitive areas, like wetlands, are found;
- No IUCN Red List fauna and flora species are found in this proposed project site;
- No potential sensitive biodiversity resources are found on this proposed project site.

4.3.3. Biological investigation of the proposed drilling sites in Sifoe Forest

4.3.3.1. Borehole BHF11 (GPS: -16.6923008 -13.22910023)

Proposed borehole Site BHF11 encompasses an area of approximately 50m x 50m. A baseline vegetation field inventory was conducted on 12th April 2025.

The inventory recorded five established trees within the site boundaries, predominantly **mature oil palm (*Elaeis guineensis*) (4 trees)** along with one smaller *Ceiba pentandra* (see table 14 below).

Significant understory development was observed, characterized by rich natural regeneration including species like *Ficus ingens*, and *Ceiba pentandra*, combined with climbers like *Saba senegalensis* and *Combretum micranthum*, or Kinkeliba. This combination of mature trees and dense understory components creates a closed canopy structure (see figure).

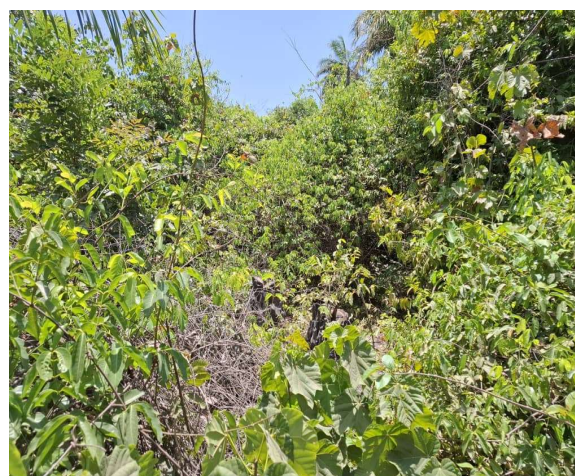


Figure 22 : Rich under storey and climbers

The presence of mature *Elaeis guineensis* suggests potential land use related to palm resources, while the dense, diverse understory indicates significant ecological value.

Proposed borehole drilling activities will present a direct conflict with this established vegetation, requiring significant clearing of both mature trees and the dense understory. This would result in loss of tree resources and habitat complexity.

Table 14 : F1 - Flora and Fauna recorded at the proposed Borehole BHF11 and their IUCN status

No	Common English name	Scientific name	Dia (m)	Ht.(cm)	Status in IUCN Red List
1	Oil palm	<i>Elaeis guineensis</i>	36	15	LC
2	Oil palm	<i>Elaeis guineensis</i>	30	13	LC
3	Oil palm	<i>Elaeis guineensis</i>	28	10	LC
4	Oil palm	<i>Elaeis guineensis</i>	34	13	LC

No	Common English name	Scientific name	Dia (m)	Ht.(cm)	Status in IUCN Red List
5	Silk cotton	<i>Ceiba pentandra</i>	10	6	LC

Fauna recorded at the proposed Borehole F1 and their IUCN status						
Fauna			National conservation status	Source of identification		IUCN Red List
				During field visit	Biblio. research	
1	Red eyed dove	<i>S. semitorquata</i>	No	x		LC
2	Pied crow	<i>Corvus albus</i>	No	x		LC

NB: LC- Least Concern

4.3.3.2. Borehole BHF7 (GPS: -16.6833992 - 13.2336998)

Proposed borehole Site BHF7 encompasses an area of 50m x 50m. A baseline vegetation field inventory for the ESIA was conducted on 12 April 2025.

The site is predominantly characterized as grass and shrub land, with extremely sparse tree cover.

Only one established tree, an *Anacardium occidentale* (Cashew) with a diameter of 37cm and height of 3.5m, was recorded within the site boundaries (see table below). This vegetation structure suggests that the area was previously cleared of its original natural vegetation, possibly for establishing a cashew plantation, with most planted trees subsequently failing to survive. This interpretation is partially supported by observations in the vicinity, where several nearby areas are enclosed by fencing (wooden posts and barbed wire), indicating patterns of private land management and cultivation in the general locality. These activities have ceased since the army arrived. The land, now utilized by the Army, has been allocated to NAWEC.



Figure 23 : Vegetation structure of Borehole site BHF7

Table 15 : F2- Flora and Fauna recorded at the proposed Borehole F2 and their IUCN status (13.04.25)

No	Common English name	Scientific name	Dia (m)	Ht.(cm)	Status in IUCN Red List
1	Cashew	<i>Anacardium occidentale</i>	37	3.5	L C

Fauna recorded at the proposed Borehole F2 and their IUCN status

Fauna			National conservation status	Source of identification		IUCN Red List
				During field visit	Biblio. research	
1	Sun squirrel	<i>Heliosciurus gambianus</i>	No	x		LC

NB: LC – Least Concern

4.3.3.3. Borehole BHF6 (GPS: -16.68510056 - 13.2269001)

The baseline vegetation field inventory was conducted on 12th April 2025 and identified **16 trees** within the given site. The site has a wide range of species diversity. *Ficus capensis* was the most frequently recorded species; the site supports a variety of other trees including *Faidherbia albida*, the African rosewood (*Pterocarpus erinaceus*), and the oil palm tree (*Elaeis guineensis*), among others as detailed in the inventory table below.

Whilst all the other species recorded are of **Least Concern**, (GPS coordinates have not been recorded) the single specimen of African rosewood is **Threatened** as per the IUCN Red List. Please note its coordinates for ease of identification.



Figure 24 : Vegetation structure of site BHF6

Table 16 : BHF6-Flora recorded at the proposed Borehole BHF6 and their IUCN status (12.04.25)

No	Common English name	Scientific name	Dia. (cm)	Ht.(m)	Coordinates	Status in IUCN Red List
1	Apple-ring acacia	<i>Faidherbia albida</i>	11	3.5		LC
2	Apple-ring acacia	<i>Faidherbia albida</i>	13	4.4		LC
3	A. rosewood	<i>Pterocarpus erinaceus</i>	10	4	13.22708 -16.68511	EN
4	Sicklebush	<i>Dichrostachys glomerata</i>	15	3.5		LC
5	Gingerbread plum	<i>Parinari macrophylla</i>	9	3.3		LC
6	Cape fig	<i>Ficus capensis</i>	15	3.8		LC
7	Camel's foot	<i>Piliostigma thonningii</i>	12	3.6		LC
8	West African copal tree	<i>Daniellia oliveri</i>	16	5		LC
9	Cape fig	<i>Ficus capensis</i>	36	8		LC
10	Cape fig	<i>Ficus capensis</i>	42	5		LC
11	West African copal tree	<i>Daniellia oliveri</i>	26	5		LC

No	Common English name	Scientific name	Dia. (cm)	Ht.(m)	Coordinates	Status in IUCN Red List
12	Camel's foot	<i>Piliostigma thonningii</i>	21	4		LC
13	Cape fig	<i>Ficus capensis</i>	23	5		LC
14	Cape fig	<i>Ficus capensis</i>	20	5		LC
15	Sicklebush	<i>D.glomerata</i>	25	5.2		LC
16	Oil palm	<i>Elaeis guineensis</i>	38	5.6		LC

NB: L. C - Least Concern; TS – Threatened species; EN - Endangered

No fauna species was encountered during the field investigation implemented by the Consultant.

4.3.3.4. Borehole BHF10 (GPS: -16.68939972 - 13.22089958)

Conducted on 12th April 2025 the field inventory identified 14 established trees within the site boundaries. The vegetation includes **four mature oil palms (*Elaeis guineensis*) alongside other species** (see table). Additionally, the site features tall grass as the predominant ground cover.

Figure 25 : Sign Board of The Real Estate Operating in the Area



Figure 26 : Cleared Area 207m away from the Center of Bore Site 4



Figure 27 : Estate development in the neighborhood of Borehole BHF10

Table 17 : BHF10- Flora recorded at the proposed Borehole BHF10 and their IUCN status (13.04.25)

No	Common English name	Scientific name	Dia (cm)	Ht. (m)	Status in IUCN Red List
1	Oil palm	<i>Elaeis guineensis</i>	36	11	LC
2	Oli palm	<i>Elaeis guineensis</i>	45	15	LC
3	Oil palm	<i>Elaeis guineensis</i>	39	12	LC
4	Oil palm	<i>Elaeis guineensis</i>	32	11	LC
5	Drumstick tree	<i>Cassia siberiana</i>	10	4.5	LC
6	Drumstick tree	<i>Cassia siberiana</i>	8	3.5	LC
7	Drumstick tree	<i>Cassia siberiana</i>	5	3	LC
8	Drumstick tree	<i>Cassia siberiana</i>	8	3.8	LC
9	Drumstick tree	<i>Cassia siberiana</i>	6	3	LC
10	Camel's Foot	<i>Piliostigma reticulatum</i>	7	4	NA
11	Sickle Bush	<i>Dichrostachys glomerata</i>	9	5	LC
12	Camel's Foot	<i>Piliostigma reticulatum</i>	13	6	NA
13	Sickle Bush	<i>Dichrostachys glomerata</i>	6	5	LC
14	Mandingo cola	<i>Cola codifolia</i>	24	7	LC

NB: L C – Least Concern; N A- Not Assessed

No fauna species was encountered during the field investigation implemented by the Consultant.

4.3.3.5. Borehole BHF5 (GPS: -16.67770004 - 13.22879982)

Conducted on 12th April 2025, the field inventory recorded only two established trees within the site boundaries, both identified as Natal mahogany (*Trichilia emetica*) which under the IUCN is listed as **Least Concern**.

Beneath the canopy of the **two mature trees**, the site supports scattered shrubs and natural regeneration. Prominent regenerating species include *Trichilia emetica*, *Parkia biglobosa*.



Figure 28 : Vegetation structure of Borehole BHF5 site

Table 18 : BHF5- Flora recorded at the proposed Borehole BHF5 and their IUCN status

No	Common English name	Scientific name	Dia. (cm)	Ht. (m)	Status in IUCN Red List
1	Natal mahogany	<i>Trichilia emetica</i>			LC
2	Natal mahogany	<i>Trichilia emetica</i>			LC

No fauna has been encountered during the field visit investigation.

4.3.3.6. Borehole BHF2 (GPS: - 16.68222 - 13.21694)

A baseline field vegetation inventory was conducted on the 11th of April 2025 recording 19 trees within the defined site boundaries. The assessment confirmed the presence of numerous mature trees within the site. The species composition, detailed in the accompanying inventory table, includes several well-established trees of significant sizes, indicating a mature tree community. The dominant species is the Apple-ring acacia (*Faidherbia albida*), ranging in height between 4- 21 meters, as the biggest specimen. In addition to the tree layer, the site exhibits a dense grass cover as the predominant ground vegetation. On the whole, none of these species happen to be on the IUCN Red List.

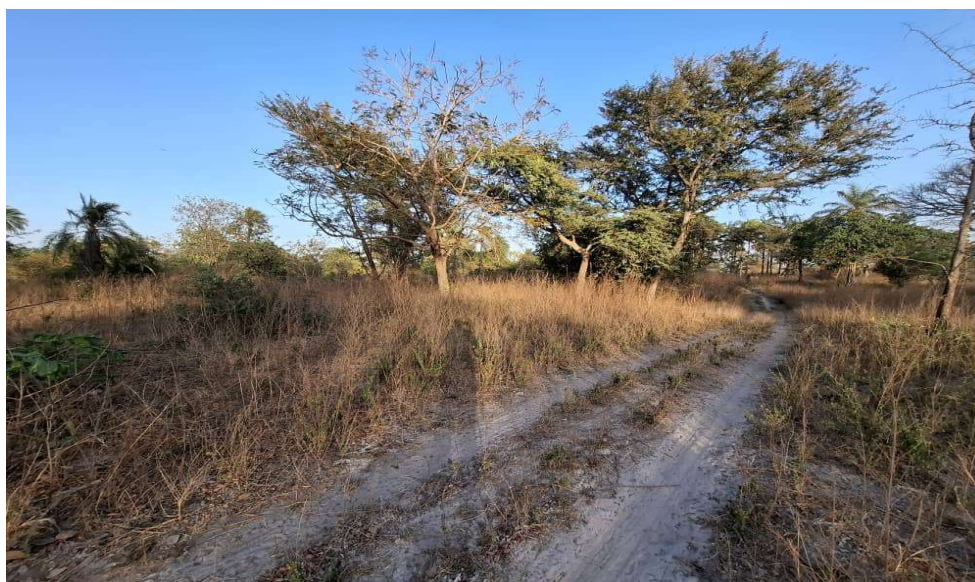


Figure 29 : Vegetation structure of BHF2

Table 19 : BHF2- Flora recorded at the proposed Borehole BHF2 and their IUCN status (12.04.25)

No	Common English name	Scientific name	Dia. (cm)	Ht.(m)	Status in IUCN Red List
1	Apple-ring acacia	<i>Faidherbia albida</i>	45	12	LC
2	African locust bean	<i>Parkia biglobosa</i>	60	18	LC
3	Apple-ring acacia	<i>Faidherbia albida</i>	40	16	LC
4	Apple-ring acacia	<i>Faidherbia albida</i>	53	16	LC
5	Apple-ring acacia	<i>Faidherbia albida</i>	70	21	LC
6	Apple-ring acacia	<i>Faidherbia albida</i>	58	17	LC
7	Cape fig	<i>Ficus capensis</i>	50	16	LC
8	Apple-ring acacia	<i>Faidherbia albida</i>	20	14	LC
9	Apple-ring acacia	<i>Faidherbia albida</i>	18	12	LC
10	Cape fig	<i>Ficus capensis</i>	20	7	LC

No	Common English name	Scientific name	Dia. (cm)	Ht.(m)	Status in IUCN Red List
11	Apple-ring acacia	<i>Faidherbia albida</i>	8	7	LC
12	Oil palm	<i>Elaeis guineensis</i>	32	12	NL
13	Camel's foot	<i>Piliostigma thonningii</i>	26	10	NA
14	Oil palm	<i>Elaeis guineensis</i>	36	18	NL
15	Oil palm	<i>Elaeis guineensis</i>	30	21	NL
16	Sickle bush	<i>Dichrostachys glomerata.</i>	12	7	LC
17	Apple-ring acacia	<i>Faidherbia albida</i>	18	8	LC
18	Apple-ring acacia	<i>Faidherbia albida</i>	12	4	LC
19	Cape fig	<i>Ficus capensis</i>	14	4.5	LC

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

No fauna has been encountered during the field visit investigation.

4.3.3.7. Borehole BHF9 (GPS: 16.68556; Y=13.21083)

Proposed borehole Site BHF9 encompasses an area of approximately 50m x 50m. A baseline field inventory for the EIA was conducted on 12th April 2025.

The site was observed to have undergone recent and extensive clearing of most of the pre-existing vegetation. At the time of the survey, **only one tree**, an *Elaeis guineensis*, remained standing within the inventoried boundaries (see Table 20). The cleared site shows an obvious difference from the adjacent eastern area, where undisturbed dense stands of *Borassus aethiopum* remain (see Figure 22). This neighboring vegetation likely represents Site BHF9's original condition before clearing.

As previously mentioned, some human interventions in some sites have been identified during field investigations. Those activities were initiated before the army occupied the site. But, since its arrival, the army has been controlling the Sifoe Farm area.

The continuous presence of the armed forces has effectively restricted access to the area by surrounding communities. No human activity related to land use, resource extraction, or agricultural exploitation has been recorded or identified within the proposed site.

Table 20 : BHF9 - Flora recorded at the proposed Borehole BHF9 and their IUCN status (12.04.25)

No	Common English name	Scientific name	Dia.(cm)	Ht. (m)	Status in IUCN Red List
1	Oil palm	<i>Elaeis guineensis</i>	31	10	LC

NB: L C – Least Concern



Figure 30 : Start of construction on borehole BHF9 site



Figure 31 : Clear Falling where Borehole BHF9 is located

No fauna has been encountered during the field visit investigation.

4.3.3.8. Borehole BHF3 (GPS: -16.67449951 - 13.21710014)

Field verification at Borehole BHF3 confirmed the site is currently enclosed by a perimeter fence consisting of wooden posts and barbed wire. The location is along the edge of forest, along the road.

A field inventory of existing trees within Site was conducted on the 11th of April 2025. **A total of 22 trees were recorded within the proposed 50x50m drilling site.** The vegetation is dominated by *Faidherbia albida* or the Apple-ring acacia with **17 individual trees of the species present**, including several mature trees (See table 21 for a detailed list of the tree composition on the site).

No fauna has been encountered during the field visit investigation.

Other than the naturally established tree species, there are also some cashews (*Anacardium occidentale*) planted in the area. Only one specimen of Red wood (*Lophira alata*) is recorded under the IUCN Red List.



Figure 32 : Wooden fence post and cashew plants Established cashew trees in Site BHF3

As indicated above, all drilling sites are located within the area currently occupied and controlled by the army. During field observations, physical barriers at certain locations around the edge of the forest were observed. These barriers bear witness to human activity prior to the arrival of the army. The barriers have not been replaced or reinforced by the army since taking over the area.

As mentioned above, currently no human activity related to land use, resource extraction, or agricultural exploitation has been recorded or identified within the proposed site.

Flora recorded at the proposed BHF3 borehole is presented in the table below.

Table 21 : BHF3- Flora recorded at the proposed Bore BHF3 and their IUCN status (11.04.25)

No	Common English name	Scientific name	Dia.(cm)	Ht. (m)	Coordinates	Status in IUCN Red List
1	Apple-ring acacia	<i>Faidherbia albida</i>	35	12		LC
2	Apple-ring acacia	<i>Faidherbia albida</i>	30	8		LC
3	Apple-ring acacia	<i>Faidherbia albida</i>	15	7		LC
4	Red ironwood	<i>Lophira alata</i>	12	3.5	13.21707 -16.67443	Vul
5	Cashew	<i>A. occidentale</i>	15	3.5		LC
6	Apple-ring acacia	<i>Faidherbia albida</i>	40	9		LC
7	Apple-ring acacia	<i>Faidherbia albida</i>	32	9		LC
8	Apple-ring acacia	<i>Faidherbia albida</i>	30	9		LC
9	Apple-ring acacia	<i>Faidherbia albida</i>	26	9		LC
10	Cashew	<i>A. occidentale</i>	13	3		LC
11	Cashew	<i>A. occidentale</i>	21	3.2		LC
12	Apple-ring acacia	<i>Faidherbia albida</i>	13	3		LC
13	Cape fig	<i>Ficus ingens</i>	23	5		LC
14	Apple-ring acacia	<i>Faidherbia albida</i>	32	11		LC
15	Apple-ring acacia	<i>Faidherbia albida</i>	12	4		LC
16	Apple-ring acacia	<i>Faidherbia albida</i>	32	7		LC
17	Apple-ring acacia	<i>Faidherbia albida</i>	12	6		LC
18	Apple-ring acacia	<i>Faidherbia albida</i>	14	7		LC
19	Apple-ring acacia	<i>Faidherbia albida</i>	16	6		LC
20	Apple-ring acacia	<i>Faidherbia albida</i>	12	5		LC
21	Apple-ring acacia	<i>Faidherbia albida</i>	20	8		LC
22	Apple-ring acacia	<i>Faidherbia albida</i>	29	8.6		LC

NB: L C- Least Concern; Vul- Vulnerable

4.3.3.9. Borehole BHF4 (GPS: -16.67160034 - 13.22329998)

The field inventory was carried out on 11th April 2025. The survey recorded a total of 15 trees within the defined site boundary. The site has a diversity of tree species with several economically and ecologically significant species including *Parkia biglobosa* (African locust bean), *Adansonia digitata* (Baobab), *Khaya senegalensis* (African mahogany) and *Pterocarpus erinaceus* (African rosewood).

The African mahogany and Rosewood are both listed in the IUCN Red List as *Vulnerable* and *Threatened Species* respectively. Their respective locations within the plot are indicated by their coordinates (see table for a comprehensive list of tree species).



Figure 33 : *Kaya senegalensis* in plot BHF4 - The vegetation structure in BHF4

Table 22 : BHF4: Flora recorded at Borehole BHF4 and their IUCN Red List Status (11.04.25)

No	Common English Name	Scientific name	Dia (cm)	Ht (m)	Coordinates	Status in IUCN Red List
1	Camel's foot	<i>Piliostigma thonningii</i>	12	4		LC
2	Mahogany	<i>Khaya senegalensis</i>	43	13	13.22325 -16.67164	Vul
3	African locust bean	<i>Parkia biglobosa</i>	37	14		LC
4	Camel's foot	<i>Piliostigma thonningii</i>	13	4.5		LC
5	Camel's foot	<i>Piliostigma thonningii</i>	16	4		LC
6	Neem	<i>Azadirachta indica</i>	33	5		LC
7	Camel's foot	<i>Piliostigma thonningii</i>	5	3.5		LC
8	Baobab	<i>Adansonia digitata</i>	16	4		LC
9	Gingerbread plum	<i>Parinari macrophylla</i>	5	4.5		LC
10	Wild mango	<i>Cordia africana</i>	23	5		LC
11	Sarcocephalus latifolius	<i>Nauclea lartifolia</i>	14	3.8		LC
12	African rosewood	<i>Pterocarpus erinaceus</i>	12	4.5	13.22347 -16.67167	EN
13	Iron tree	<i>Prosopis africana</i>	17	4.5		LC
14	Sarcocephalus latifolius	<i>Nauclea lartifolia</i>	10	3.8		LC
15	Iron tree	<i>Prosopis africana</i>	42	5.5		LC

NB: L C- Least Concern; EN- Endangered ; Vul- Vulnerable

No fauna has been encountered during the field visit investigation.

4.3.3.10. Borehole BHF12 (GPS: -16.67539978 - 13.19909954)

The baseline vegetation field inventory, conducted on the 13th April 2025, recorded 19 established trees within the site boundaries, primarily dominated by mature oil palm trees (*Elaeis guineensis* - 15 individuals).

Field observations confirmed active palm wine tapping occurring on site (see Figure). Other inventoried trees include a large rhun palm (*Borassus aethiopum*). Smaller individuals of *Ceiba pentandra* and *Cola cordifolia* also occur on the plot.



Figure 34 : Palm wine tapping and climbers at Borehole BHF12

While the upper stage of the site is dominated by oil palm (*Elaeis guineensis*), it also has a rich and diverse understory composed of species including the Drumstick tree (*Cassia sieberiana*), and *Cola cordifolia*, or Mandingo cola.

Additionally, large woody climbers, specifically *Saba senegalensis* and *Landolphia heudelottii*, are prevalent throughout the site. This combination of mature canopy trees, regenerating woody species, and climbers' results in a very closed canopy structure.

The presence of both economically valuable tapped palms, a host of valuable tree species and a dense regenerating understory signifies current economic use and considerable ecological value within Site BHF12.

Some faunae were noted including the Sun squirrel (*Heliosciurus gambianus*), and a few bird species such as the Pied crow (*Corvus albus*), the African mourning dove, and the Greater, blue-eared starling (*Lamprotornis chalybeus*).

Table 23 : BHF12 - Flora and Fauna recorded at the proposed Borehole BHF12 and their IUCN status

No	Common English name	Scientific name	Dia. (cm)	Ht (m)	Status in IUCN Red List
1	Oil palm	<i>Elaeis guineensis</i>	36	11	LC
2	Oil palm	<i>Elaeis guineensis</i>	55	14	LC
3	Oil palm	<i>Elaeis guineensis</i>	45	12	LC
4	Oil palm	<i>Elaeis guineensis</i>	41	12	LC
5	Oil palm	<i>Elaeis guineensis</i>	39	10	LC
6	Oil palm	<i>Elaeis guineensis</i>	36	16	LC
7	Oil palm	<i>Elaeis guineensis</i>	45	13	LC
8	Oil palm	<i>Elaeis guineensis</i>	41	12	LC
9	Oil palm	<i>Elaeis guineensis</i>	35	16	LC
10	Oil palm	<i>Elaeis guineensis</i>	37	15	LC
11	Oil palm	<i>Elaeis guineensis</i>	47	12	LC
12	Oil palm	<i>Elaeis guineensis</i>	45	11	LC
13	Oil palm	<i>Elaeis guineensis</i>	50	14	LC

No	Common English name	Scientific name	Dia. (cm)	Ht (m)	Status in IUCN Red List	
14	Oil palm	<i>Elaeis guineensis</i>	45	12	LC	
15	Oil palm	<i>Elaeis guineensis</i>	39	11	LC	
16	Silk cotton	<i>Ceiba pentandra</i>	9	6	LC	
17	Rhun palm	<i>B. aethiopum</i>	56	13	LC	
18	Mandingo cola	<i>Cola cordifolia</i>	7	6	LC	
19	Dwarf red ironwood	<i>Lophira lanceolata</i>	12	10	LC	
20	Senegal Saba	<i>Saba senegalensis</i>			LC	
21	Guinea gumvine	<i>Landolphia heudelottii</i> ,			LC	
Fauna recorded at the proposed Borehole BHF12 and their IUCN status						
Observed			National conservation status	Source of identification		IUCN Red List
				During field visit	Biblio.	
1	Sun squirrel	<i>Heliosciurus gambianus</i>	No	x		LC
2	Pied crow	<i>Corvus Albus</i>	No	x		LC
3	African mourning dove	<i>Streptopelia decipiens</i>	No	x		LC
4	Greater blue-earned starling	<i>Lamprotornis chalybeus</i>	No	x		LC

NB: L C- Least Concern



Figure 35 : Overview of BHF12 vegetation structure and an access road

Due to BHF12's location at the intersection of multiple access paths and turn-around point, use of the buffer zone will need to be prioritised for the drilling activities as to minimise potential impact of the activity.

4.3.4. Biological investigations of the proposed drilling sites – Airport

4.3.4.1. SSA BH Airport 2: (GPS: -16.64780045 - 13.35919952)

The proposed borehole site initially designated "SSA BH Airport 2" required relocation from its original position due to development activities (including some construction) in that area. The site was thus repositioned approximately 220m southwest to the new coordinates 13.35901, -16.64963, placing it approximately 620m from the surveyed 'SSA BH Airport 3' site.

A field inventory was conducted at this relocated site on 13th April 2025 within the approximately 50m x 50m footprint. The selection of this site deliberately targeted an area dominated by shrubs to avoid impacting mature trees.

Project implementation will primarily involve the clearance of shrubs within the required working area, with minimal impact on mature trees. The figure below shows the vegetation structure at **SSA BH Airport 2**.



Figure 36 : Vegetation structure of SSA BH Airport 2 Replacement (new location)

Table 24 : SSA BH Airport 2: Replacement (New location) (13.04.25)

No	Common English name	Scientific name	Dia. (cm)	Ht. (m)	Coordinates	Status in IUCN Tred List
1		Terminalia macroptera	12	4	- 13.35901 -16.64963	LC
2		Terminalia macroptera	10	4		LC
3	Neem	Azadirachta indica	14	3.5		LC

NB: L C – Least Concern

The airport is in an urban area. No fauna has been encountered during the field visit investigation.

4.3.4.2. SSA BH Airport 3 (GPS: -16.64970016 - 13.35299969)

The field inventory at this site was conducted on 13th April 2025, and 15 trees within the site boundaries were enumerated.

Most common within the tree community are the **African rosewood** (*Pterocarpus erinaceus*) listed as **Threatened Species** under the IUCN Red List. Other species present include the Sickie bush (*Dichrostachys glomerata*) and the African locust bean (*Parkia biglobosa*).

No fauna has been encountered during the field visit investigation.

Table 25 : SSA BH Airport 3: (13.04.25)

No	Common English name	Scientific name	Dia. (cm)	Ht. (m)	Coordinates	Status in IUCN Red List
1	Kwandari	<i>T. glaucescence</i>	12	5		LC
2	Kwandari	<i>T. glaucescence</i>	10	4		LC

3	Kwandari	<i>T. glaucescence</i>	11	3.5		LC
4	Kwandari	<i>T. glaucescence</i>	10	4		LC
5	Kwandari	<i>T. glaucescence</i>	13	4.2		LC
6	Sickle bush	<i>D. glomerata</i>	9	3.8		LC
7	African locust bean	<i>Parkia biglobosa</i>	6	4		LC
8	African rosewood	<i>P. erinaceus</i>	30	5	13.35299 -16.64975	EN
9	Chinese date	<i>Ziziphus jujuba</i>	8	4		NE
10	African rosewood	<i>P. erinaceus</i>	7	4	13.35302 -16.64987	EN
11	African rosewood	<i>P. erinaceus</i>	5	3.2	13.35297 -16.64989	EN
12	African rosewood	<i>P. erinaceus</i>	7	3.5	13.35290 -16.64988	EN
13	African rosewood	<i>P. erinaceus</i>	5	3.5	13.35292 -16.64984	EN
14	African rosewood	<i>P. erinaceus</i>	4	3.2	13.35292 -16.64979	EN
15	Chinese date	<i>Ziziphus jujuba</i>	13	5		NE

NB: L C – Least Concern; EN - Endangered – Threatened Species; N E - Not Evaluated



Figure 37 : Vegetation structure of SSA BH Airport 3

4.3.5. Maastrichtian DSA Serekunda (GPS: -16.68169975 - 13.4364996)

The proposed borehole site is within the Serekunda NAWEC Water Treatment Plant, and therefore inside Government property. The site does not have any form of vegetation nor harbor any fauna which will be disturbed by the project.

4.3.6. Maastrichtian DSA Brikama (GPS: --16.6564998613.28969955)

The proposed location for this other deep borehole in Brikama is also in Government land, at the NAWEC compound. This site is devoid of any trees or vegetation that will need to be cleared to make way for the borehole. The figure below shows the main type of grass that has been allowed to grow on the site.



Figure 38 : Grounds of the BWTP covered with grass and short palm trees

4.3.7. The Salaji Forest Park

As presented in section 3.3.3, the two Sukuta boreholes are in the buffer zone of the Salaji Forest Part.

Located near Sukuta, the Salaji Forest Park (approximately 13°22'36"N 16°42'43"W) is one of the earliest Forest Parks in the country, established on 1st January 1954. It is 262ha in area, and 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.

The Park is surrounded by rapidly developing settlements such as Sare Pateh/Mariama Kunda to its west, Salaji to the north, Jabang to the south, and the main Sukuta/Jambanjelly highway to the east.

The park's details are limited, suggesting a need for further investigation into its specific ecological characteristics. Its age indicates that it has likely undergone various ecological changes, and currently it actually faces challenges related to environmental neglect such as deforestation and controversies over land use. Recently there was massive vegetation clearing for a controversial temporary land allocation for basalt storage within the area declared as the amenity belt of the park, which has caused outrage within the community of Sukuta.

It is experiencing some level of disturbance due to human activities such as firewood collection and expanding waste dump sites along its fringe with nearby communities, as well as along the main highway. Nonetheless, it has diverse flora and fauna, including mammals, birds, and invertebrates as described below.

Tree planting initiatives by local communities, such as the Sukuta Village Development Committee, are some of the ongoing efforts to maintain and enhance the forest cover. In addition, along its fringes parallel to the road alignment, (called the amenity belt) the DOF (Department Of Forestry) carries out propagation of indigenous tree species for two reasons, to act as buffer to protect the gmelina plantation, as well as to preserve and protect the indigenous tree species from being lost due to over harvesting. Among these tree species are the rhun palm (*Borassus aethiopum*), mahogany (*Khaya senegaleensis*), iron wood (*Anonychium africanum*), and the West African Laburnum (*Cassia sieberiana*), etc.

The DOF also conducts fire-line weeding during the dry season to protect the trees and the park from bush fires which usually start at the illegal dumpsites created by residents close to the park or started by individuals who use the park for illegal activities.

4.3.7.1. The flora

As indicated earlier, the Park consists typically of the gmelina (*Gmelina arborea*) widely used for timber and furniture due to its fast-growing nature. Other tree species include an extensive and dense shrub layer/understory dominated by the Opium-antidote/Kinkeliba (*Combretum micranthum*).

Table 26 below the varieties of the vegetation found within and surrounding the Salaji Forest during the field investigation, and their status under the IUCN Red List. Figure 39 shows some of the vegetation of the park.

It is important to note that the rhun palm particularly, and the other forest trees within the amenity belt are being preserved since their numbers in the country are dwindling. Among the others are the African rosewood, (*Pterocarpus erinaceus*) which is heavily harvested nationally (almost overexploited for its timber, which is in high demand in Asia); according to the IUCN Red List, it is a **Threatened Species**. The silver terminalia (*Terminalia glaucescens*) is also found within the park; while a specific English common name is lacking, this species is recognized with traditional uses for its promising pharmacological properties. Traditionally, various parts of the tree are used as medicine for a range of ailments including malaria, diabetes, and as an anti-dysenteric and anti-microbial agent.

Table 26 : Plant species recorded in the Salaji Forest Park 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	Rhun palm	<i>Borassus aethiopum</i>	No	LC
3	Oil palm	<i>Elaeis guineense</i>	No	NL
4	West African Laburnum (Sinjango)	<i>Cassia sieberiana</i>	No	LC
5	Sicklebush (Kurulungo)	<i>Dichrostachys glomerata</i>	No	LC
6	Ironwood	<i>Anonychium africanum</i>	No	LC
7	Mohogany	<i>Khaya senegaleensis</i>	No	Vul
8	African locust bean	<i>Parkia biglobosa</i>	No	LC
9	Senegal Saba (Kaba)	<i>Saba senegalensis</i>	No	LC
10	Apple-ring acacia (Baransango)	<i>Faidherbia albida</i>	No	LC
11	Silver Terminalia (Wolo)	<i>Terminalia glaucescens</i>	No	LC
12	Opium-antidote/ Kinkeliba	<i>Combretum micranthum</i>	No	LC
13	African rosewood	<i>Pterocarpus erinaceus</i>	Yes	TS
14	Ginger-bread plum	<i>Parinari macrophylla</i>	No	TS
15	Camel's foot	<i>Piliostigma reticulatum</i>	No	NA
16	Wild mango (Tabbo)	<i>Cordia pinata</i>	No	NA
17	African teak	<i>Milicia excelsa (C.excelsa)</i>	No	NT
18	Guinea gumvine/Rubber vine (folay)	<i>Landolphia heudelafii</i>	No	NA
19	Mandingo cola	<i>Cola cordifolia</i>	No	LC

Source: **Sustainable Development Focus field investigation in Salaji Forest Park**

NB: L - Least Concern; N L - Not Listed; V – Vulnerable; T S - Threatened Species; N A- Not Assessed; N T – Near Threatened



Figure 39 : Lush stand of rhun palms and the dominant under storey - *Combretum micranthum*



Figure 40 : The fringes of the park along the road used as waste dump

4.3.7.2. The Fauna

No published data about the fauna is available for this area. However, the following species are spotted in the Forest Park during the field investigations: the Green vervet monkey, the Patas monkey and the little night monkey known as the Galagos or bushbabies. It is also home to several small mammals, reptiles and rare migratory birds such as the Egyptian plover. Table 27 below shows the various mammalian species that are found in the Park.

Table 27 : Mammalian fauna in the Salaji Forest Park

No	Common English Name	Scientific Name	National conservation status	IUCN Red List
1	Fruit bat	<i>L. anagolesis smithii</i>	No	NL
2	Senegal bush baby	<i>Galago senegalensis</i>	No	NL
4	Gambia mongoose	<i>Mungos gambianus</i>	No	LC
5	Sun squirrel	<i>Heliosciurus</i>	No	LC
6	Cane rat	<i>Thryonomys swinderianus</i>	No	LC
7	Gambian giant rat	<i>Cricetomys gambianus</i>	No	LC
8	Hare	<i>Lepus saxatilis</i>	No	NL
9	Spitting cobra	<i>Naja nigricollis</i>	No	LC
10	Sand snake	<i>Psammophis sibilans</i>	No	LC
11	Nile monitor	<i>Varanusn. niloticus</i>	No	NL

No	Common English Name	Scientific Name	National conservation status	IUCN Red List
12	Armitage skink	<i>Chalcides armitagei</i>	No	LC
13	Skinless gecko	<i>Geckolepis megalepis</i>	No	LC
14	Rock python	<i>Python sebae</i>	No	LC
15	Puff adder	<i>Bitis arietans</i>	No	LC
16	African bush snake	<i>Philothamnus semivariegatus</i>	No	LC

Source: *Sustainable Development Focus field investigation in Salaji Forest Park*

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

4.3.7.3. The avifauna

Some of the recorded species during the field investigations are the Black-necked Weaver, Senegal coucal, African Grey Hornbill, Tawny-flanked Prinia, etc. See Table 28 for more of the observed species.

Table 28 : Avifauna recorded in the Salaji Forest Park

No	Common English name	Scientific Name	National Conservation Status	IUCN Red List
1	Black-necked Weaver	<i>Ploceus nigricollis</i>	No	L C
2	African Grey Hornbill	<i>Lophoceros nasutus</i>	No	L C
3	Tawny-flanked Prinia	<i>Prinia subflava</i>	No	L C
4	Senegal Coucal	<i>Centropus senegalensis</i>	No	L C
5	African mourning dove	<i>Streptopelia decipiens</i>	No	L C
6	Greater blue-eared starling	<i>Lamprolornis chalybeus</i>	No	N L
7	Little egret	<i>Egretta garzetta</i>	No	L C
8	Pied crow	<i>Corvus Albus</i>	No	L C
9	Red eyed dove	<i>Streptopelia Semitorquata</i>	No	L C
10	Beautiful Sun Bird	<i>Nectarinia Pulchella</i>	No	L C
11	Little bee-eater	<i>Merops Pusillus</i>	No	L C
12	Black-billed Wood-dove	<i>Turtur abyssinicus</i>	No	L C
13	Little Bee-eater	<i>Merops pusillus</i>	No	L C
14	Ahanta Francolin	<i>Pternistis achantensis</i>	No	L C
15	White-throated Bee-eater	<i>Merops albicollis</i>	No	L C
16	Common bulbul	<i>Pycnonotus Barbatus</i>	No	L C
17	Hooded Vulture	<i>Necrosyrtes monachus</i>	No	CE
18	Snowy-crowned Robin-chat	<i>Cossypha niveicapilla</i>	No	LC
19	Violet Turaco,	<i>Musophaga violacea</i>	No	LC
20	Laughing Dove	<i>Spilopelia senegalensis</i>	No	LC
21	Stone Partridge	<i>Ptilopachus petrosus</i>	No	LC
22	Palm-nut Vulture	<i>Gypohierax angolensis</i>	No	LC
23	Long-tailed Nightjar	<i>Caprimulgus climacurus</i>	No	LC
24	Egyptian plover	<i>Pluvianus aegyptius</i>	No	LC

Source: *Sustainable Development Focus field investigation in Salaji Forest Park*

TNB: L.C - Least Concern; N L – Not Listed; CE -critically Endangered; TS Threatened Species

4.3.7.4. Proposed boreholes site in the Salaji Forest Park

It is important to note that of all the sites to host boreholes within the WASIB Project, only this area is a nationally designated Forest Park (unlike the Sifoe Farm) designed among other reasons to preserve and protect the national forest biodiversity. Whilst all forests contribute to the balance of nature, ensuring the continuation of vital ecological processes like pollination, seed dispersal, and nutrient cycling, etc. specifically, the Salaji Forest Park (one of 66 Forest Parks in the country) was created to safeguard and preserve the unique forest ecosystem for the propagation of the gmelina species.

Like all national Parks, it is the responsibility of the DOF to ensure that Parks are protected and managed in a sustainable manner. As noted above, the DOF is implementing a program of replanting ingenuous tree species

within the amenity belt (or buffer) which protects the gmelina plantation on the one hand and restores the dwindling forest trees.

It is within this environment that two Maastrichtian boreholes (DSA 1 and DSA 2) will be drilled, each within a 50 x 50m area. Below is the assessment of the areas identified to host the boreholes.

- **Borehole DSA Sukuda 1**

The proposed site for this borehole will be about 25 meters from the road alignment within a 50 x 50m area. The plot is mainly composed of juvenile rhun palms, with a sparse presence of woody species comprising mainly Kinkeliba (*Combretum micranthum*), *T. glaucescence*, and a huge specimen of Mandingo cola (*Cola cordifolia*) within the plot with DBH 86cm. Although of **Least Concern** under the IUCN Red List, the tree should be spared from falling during the works.

The topography is flat with loamy soil, and parts of the plot are indiscriminately used as illegal dumpsites and waste is primarily composed of domestic refuse such as plastic bags, and organic material.



Figure 41 : Juvenile rhun palm stand and Cola Cordifolia tree (DBH 86cm) within the plot

No fauna has been recorded within the proposed site during the field investigations.

- **Borehole DSA Sukuta 2**

Located about 1.5 km from DSA 1 Borehole DSA 2 is also located about 25 meters from the road alignment into the amenity belt within a 50 x 50m area. The plot has a mixed woody vegetation type, but it predominantly comprises rhun palms; a total of 14 tree specimens were counted as indicated in table below, including the rhun palm which range in height between 10-14m, and the others between 8-12m. See Table 29 below for a more comprehensive species composition.

Table 29 : The major tree species on the plot with their measurements

No	Common English name	Scientific name	Diameter -DBH (cm)	Height (m)	Status in IUCN Red List
1	Rhun palm	<i>Borassus aethiopum</i>	41	13	LC
2	Rhun palm	<i>Borassus aethiopum</i>	33	11	LC
3	Rhun palm	<i>Borassus aethiopum</i>	25	10	LC
4	Rhun palm	<i>Borassus aethiopum</i>	35	10	LC
5	Rhun palm	<i>Borassus aethiopum</i>	30	12	LC
6	Rhun palm	<i>Borassus aethiopum</i>	38	14	LC
7	Rhun palm	<i>Borassus aethiopum</i>	34	10	LC
8	Rhun palm	<i>Borassus aethiopum</i>	36	11	LC
9	Rhun palm	<i>Borassus aethiopum</i>	40	13	LC
10	Sicklebush	<i>Dichrostachys glomerata</i>	11	8	LC
11	North African almond	<i>Terminalia glaucescence</i>	16	10	LC

12	North African almond	<i>Terminalia glaucescence</i>	14	12	LC
13	Sicklebush	<i>Dichrostachys glomerata.</i>	10	8	LC
14	North African almond	<i>Terminalia glaucescence</i>	16	11	LC

Source: Sustainable Development Focus field investigation in Salaji Forest Park

As indicated in the Table above, the plot has a good number of rhun palms, ostensibly replanted by the DOF in its efforts to increase their dwindling numbers within the country. Occupying this plot to drill the boreholes will potentially require the removal of some of the trees, which will negate the efforts and resources of the DOF in its tree replanting program. It is important to note, however, that this species does not present any major issue.

No fauna has been recorded within the proposed site during the field investigations.

4.3.8. Conclusion and recommendations

The baseline vegetation assessment of the twelve proposed 50m x 50m borehole sites revealed significant variability in ecological characteristics and potential implications across the surveyed locations. While some sites present relatively minor vegetation constraints, several others pose considerable challenges that must be addressed ahead of the implementation. Key findings across the sites include:

- **Significant Mature Tree Presence:** Sites BHF11, BHF5, BHF2, BHF3, BHF4, and BHF12 contain numerous established, mature trees, often including ecologically or economically significant species (*Acacia albida*, *Khaya senegalensis*, *Parkia biglobosa*, *Trichilia emetica*, *Elaeis guineensis*). Borehole implementation at these locations will inevitably require the removal of substantial tree resources and habitat for fauna and Avifauna in the area.
- **Complex Understory and Regeneration:** Several sites (including BHF11, BHF5, BHF12) show dense understory vegetation, including rich natural regeneration and climbers, contributing to closed canopy structures and higher ecological complexity. Clearing these sites will impact multiple vegetation strata and habitat value.
- **Sites with Lower Tree Impact:** The relocation of SSA BH Airport 2 successfully demonstrated that careful site selection can minimize impacts on mature trees. Site SSA BH Airport 3 also presented generally lower tree density and size compared to most of the other locations.

Principal Implications and Recommendations:

- **Vegetation Loss:** The primary direct impact at multiple sites will be the loss of mature trees and associated habitat. Mitigation strategies, such as minimizing the final clearance footprint should be integral to the project plan.

These baseline findings provide essential input for the ongoing EIA, highlighting key environmental and social considerations that must be addressed to ensure the sustainable and responsible implementation of the proposed borehole project.

4.4. Socioeconomic environment

4.4.1. Population growth and Distribution

The Greater Banjul Area's population in as of the 2024 census is around 70% of the 2,422,000 inhabitants of the country's population, with high population densities. Brikama Local Government Area is the most populous local government area in the country. Between 1993 and 2013, growth in population of 61 percent made Brikama the fastest growing Local Government Area, surpassing Kanifing. The same trend has been maintained in the 2024 Census. Communities are living near some intervention sites. Apart from the intervention inside the forested Sifoe area, and the buffer zone of the airport, the rest of the sites are NAWEC existing site where works are planned to upgrade equipment and improve the drilling and quality of the water. In those sites, the impacts on surrounding communities will be very minor. All the boreholes to be drilled are within Greater Banjul Areas, with two sites situated in Brikama and Serrekunda NAWEC facilities and inside the airport, which is the most densely populated area in the country. The sites themselves are inside NAWEC premises for Brikama, Airport and Serrekunda boreholes with no interaction with third parties' properties, activities or livelihoods that is why the socio-economic chapter is general. Regarding Sifoe, Kity, and Sukuta, those sites are in buffer zones of forested

areas and will affect the biodiversity, but land transfer documents have been processed to put those sites under NAWEC name.

4.4.2. Health

In Greater Banjul Area (GBA), there is a major health center (Brikama, Kanifing, Serrekunda, and Banjul) serving the whole region in addition to minor health facilities and health posts around Kity and Sukuta other areas where boreholes will be drilled as part of WASIB. The nearest hospital is in Banjul, the capital city, which is 33 kilometers away from Brikama. The major health center in Brikama town is equipped with trained medical personnel and support staff. The major constraints are the retention and attrition rates of nurses and other medical personnel. The capacity needs include human resources, equipment and upgrading of the facility to accommodate the inflow of patients in the region.

4.4.3. Access To Water

Households' sources of water vary. While waiting for the detailed result of the 2024 census, during the 2013 Population and Housing census, 32.8% of the households reported having access to piped water in their compounds whilst 21.4% accessed water from public standpipes in the country. ***The 2024 census is yet to be available, only the first results regarding population distribution are available.***

NAWEC water supply in the area is pumped from about thirty bore holes. The treated water is distributed to Water tanks located in Sukuta, Brikama, Brusubi, Banjul, Kotu, Serrekunda and Kanifing. Those who cannot afford to connect either buy water from compounds with taps or use public wells or boreholes in private compounds to draw water. Furthermore, although NAWEC continues to expand coverage, supply is irregular, and water shortages affect people's daily lives.

4.4.4. Domestic Sewage

There is no sewage system in the entire study area. Instead, people depend on pit latrines and dug up holes in which the wastewater is collected. Modern buildings in residential areas have septic covered tanks which are periodically emptied by septic truck operators and the contents deposited in the Kotu ponds facility.

Large buildings (primarily hotels) in the vicinity of Kotu are connected directly to the Kotu Ponds facility. This last infrastructure is not related to the WASIB. It is a pond collecting wastewater for treatment by decantation before releasing the treated water into the ocean.

4.4.5. Disadvantaged and Vulnerable Groups

The women make up to 49 percent of Greater Banjul Area population (2024 census). Despite their numerical strength the women are generally often marginalized in the decision-making process as it relates to the allocation of land. This is particularly relevant where they are engaged in agricultural activities; the impact of this marginalization is compounded by cultural norms and customs which tend to privilege men and boys over women and girls.

Therefore, given their social status, women would be considered as disadvantaged and vulnerable group in this Project, especially exposing them to SEA/SH risks. In addition to women, other groups regarded as vulnerable, and disadvantaged include the elderly and minors, sexual and gender minorities, and persons with disabilities. Like women, these groups are more likely to be adversely affected by the Project impacts and/or more limited than others in their ability to take advantage of the Project's benefits.

To ensure that these groups are not left out in the process, special efforts should be made to meet and discuss with them in a safe, ethical and culturally appropriate manner during project implementation (such as through women-only focus group discussions facilitated by female facilitators during hours that are appropriate to the local women and in places that are viewed by them as confidential and safe⁴), especially bearing in mind that some of them (especially women) will potentially be impacted negatively when it concerns employment for

⁴ It is important to note that outright questions about whether a woman (or anyone she personally knows in her community) has experienced GBV should not be discussed in a group setting as this could expose the woman to community backlash and physical and social harm.

instance or exposure to GBV. In this regard, all necessary assistance and support to these groups of persons will be ensured in the implementation of this Project.

4.4.6. Gender Considerations and Gender-Based Violence (GBV)

Despite the commitment of the Government of The Gambia towards gender equality women still make up the majority of the poor and extremely poor and are faced with many disparities including in access to education, healthcare, and salaried employment. In addition, women have limited access to resources such as land and financing and their rate of participation in the labor force is only 37.8 percent as compared to 53.2 for men.

In 2019, The Gambia was ranked 174th out of 189 countries with a score of 0.466, according to the UNDP Human Development Report's Index ranking. According to the Gender Inequality Index⁵ (GII), 2016 Gambia was ranked 143rd with a value of 0.622; poverty of the women is closely linked with very low literacy levels (40 percent for women and 64 percent for men) and education attainment rates for a variety of reasons including cultural norms and physical access.

GBV can cause economic and psycho-social harm to an individual through for example, property damage and restriction of access to resources; by impacting the person's personal health and safety, leading to social exclusion; and by fostering dependency on their partners for all material needs which can often perpetuate the cycle of violence. For all those reasons, special risks mitigation measures will be implemented such as developing and endorsing a Code of Conduct for all individual associated with the project, train workers and community members of essential SEA/SH concepts and including SEA/SH sensitive procedures within the project grievance mechanism and on the Codes of Conduct. All those elements will be included in a SEA/SH Action Plan.

In view of the above, during project implementation, particular attention will be paid to the needs of those impacted, including women and children, those below the poverty line, the elderly, etc.

4.4.7. Violence Against Children (VAC)

Violence Against Children (VAC) is defined as physical, sexual, emotional and/or psychological harm, neglect, or negligent treatment of minor children (i.e., under the age of 18), including exposure to such harm⁶, that results in actual or potential harm to the child's health, survival, development, or dignity in the context of a relationship of responsibility, trust, or power. This includes using children for profit, labor⁷, sexual gratification, or some other personal or financial advantage. This also includes other activities such as using computers, mobile phones, video, and digital cameras or any other medium to exploit or harass children or to access child pornography.

During the implementation of the Project, the potential areas where this can be manifested may include:

- Employing children under the age of 18 years,
- Using children for personal or financial advantage by both contractors and employees,
- Any other way to harass children, including sexual exploitation and physical or sexual violence.

In this regard, the Project Team and Contractors must ensure that no aspects of the Project works involve children under the minimum age of 16 for light work (as per *The Children's Act, 2005*), and none under the age of 18 for hazardous work and work that impacts their schooling and social or moral development.

The Labor Act, 2007 prohibits children under 18 from engaging in agricultural, industrial, or non-industrial work for economic gains. In addition, to strengthen and protect children against possible violence and exploitation, the above-mentioned **Code of Conduct and the SEA/SH Action Plan for Implementing ESHS and OHS Standards**,

⁵ The Gender Inequality Index (GII) reflects women's disadvantage in three dimensions—reproductive health, empowerment and the labor market—for as many countries as data of reasonable quality allow. The index shows the loss in human development due to inequality between female and male achievements in these dimensions. It ranges from 0, which indicates that women and men fare equally, to 1, which indicates that women fare as poorly as possible in all measured dimensions.

⁶ Exposure to GBV is also considered VAC.

⁷ The employment of children must comply with all relevant national legislation, including labor laws in relation to child labor and World Bank's safeguard policies on child labor and minimum age. They must also be able to meet the Project's Occupational Health and Safety competency standards.

and Preventing Gender Based Violence (GBV) and Violence Against Children (VAC) must be rigorously applied and monitored for compliance. These Codes will be included in the Contractors ESMP.

The main occupation is therefore agriculture, including crop production (with men cultivating groundnuts (cash crop), millet and corn (food crop), and women engaging in the vegetable gardening (sorrel, tomatoes, onions, peppers, salads, cassava, bissap, sorrel); and fruit growing carried out by both men and women (cashew nuts, mangoes mainly). There is also some animal husbandry, with the rearing of cattle, sheep, and goats. Small scale business activities are largely present. Those activities are related to tourism, trade, building and housing which is greatly developing in the Greater Banjul Areas these last years.

5. Assessment of potential impacts and mitigation

5.1. Impact assessment methodology

5.1.1. Approach

The environmental and social impact assessment methodology proposed here consists in a systematic methodology derived from the approaches of the World Bank and ISO 14001 which is based on the use of a simplified Leopold matrix adapted to the challenges of the project.

The Leopold matrix is a qualitative assessment method for environmental impacts created in 1971 and commonly used in environmental assessment. It allows, thanks to a double entry grid, to identify which project activities affect which environmental and social components, then to assess the severity of the expected impact. It provides a visual representation of the impact assessment and helps to synthesize its content in a format accessible to all readers. The implementation of this methodology is based on three steps:

The **first step** is to:

- On the one hand, identify the **impact factors** i.e. the activities, consumption or emissions of the project which could be the source of impacts on the environment. Identification is done based on the project description (Cf. paragraph 3). Accidental situations are also considered as impact factors, but they are discussed in a dedicated section of the report relating to technological risks as they don't correspond to a "normal" situation but a degraded situation.
- On the other hand, identify what the **sensitive components** of natural and human environments can be affected by the Project and then assign them a level of sensitivity/value. The sensitivity of the environment is rated using a 4-level scale, from the lowest to the highest scale of social and environment's sensitivity.

A summary of impact factors and sensitive components is presented below.

Table 30 : Summary of impact factors and sensitive components

Impact factors		Sensitive component	
Phase	Theme	Environment	Theme
Preparation	Project land acquisition	Physical environment	Climate and climate change related risks Air quality Noise Hydrology Hydrogeology Geology, topography and soils Landscape
Construction	Civil works, including drilling Traffic Solid waste production Green waste production Liquid discharges production Resources consumption (energy, water) Employment Accidental situation	Natural environment	Habitat and flora Fauna
Operation	Easement of IZ Atmospheric emission Solid waste production Liquid discharges production Resources consumption (energy, water) Traffic Employment Accidental situation	Human environment	Demographic balance and migrations Women and gender issues Vulnerable groups Land tenure and land use Economic activities, livelihoods and local economy (employment) Habitat and settlements Health and Safety Archaeological heritage Access to water Waste management Cultural Heritage Ecosystem services

The **second step** is to identify which **impact factor can affect each sensitive component** of the environment in order to methodically identify what the environmental and social impacts are generated by the project (direct, indirect, cumulative, transboundary). The results are presented in the matrix form of the Leopold matrix type to visualize the issues globally and quickly. Sensitive elements of the environment are presented in column and impact factors are presented in row by project phase.

The intensity of the impact is afterwards rated on a scale of 1 to 4 using a semi-qualitative method. The **importance of the impact** that results from the combination of the sensitivity level of the component with the intensity of the impact is then determined.

The **third step** is to identify the **avoidance (A) and reduction (R) measures** for the potential impact, then estimate the residual impact once these measures are taken into account. If the implemented measures are sufficient, the residual impact is negligible or minor, therefore no compensatory measure will be proposed and only follow-up can be proposed. The **compensation measures (C)** only intervene in return for a residual impact considered to be significant (moderate and major). Compensation measures (C) are implemented only if avoidance and reduction measures cannot be implemented or are deemed insufficient.

Regarding the residual impacts (after application of the mitigation measures), the Leopold matrix is used again and presents the significance of the impact given the recommended measures. Note that the complexity of the mitigation measure implementation (in terms of technical aspect, cost or recognized effectiveness) might influence the significance of the residual impact.

Substantially, the presentation of the impact assessment within the report will be based on:

1. Presentation of the Leopold matrix on the potential impacts of the project.
2. Detailed analysis of impacts by major project phase (design / preparation, construction, operation). Presented in a textual manner, this analysis focuses on the affected components. The impacts of the project (all sources of impact combined) are thus detailed in terms of their effect on air quality, quantity of water resources, habitat, employment or livelihood sources, etc. At the end of the description, the impact severity rating is presented in a table and determined by the strongest index in the matrix. Finally, mitigation measures are proposed, and the residual impact assessed.
3. Presentation of the Leopold matrix on the residual impacts of the project.

The assessment of potential and residual impacts is ultimately an expert opinion which takes into account both qualitative, semi-quantitative and quantitative aspects to build its judgment.

5.1.2. Impact intensity rating

An environmental or social impact may be described as a change in a pre-existing environmental or social state resulting from human activity or intervention. In order to classify the different impacts and to identify those that are the most important, it is necessary to rate their intensity. The notion of intensity covers the characteristics of the impact, its nature, the type of effects (direct or indirect), its duration and its geographical extent.

The intensity (I) of the impacts is rated on 4 levels from the lowest intensity to the highest intensity. The rating is established by an expert opinion, according to the guidelines presented in the table below.

Table 31 : Impact intensity level and criteria

Level of intensity	Guide
NEGLECTIBLE 1	Negative, direct and indirect impact, short-term (a few months), limited (project area and immediate surroundings) Low consumption of raw materials and effluent discharged close to natural levels, non-hazardous. No observed degradation of environment. No negative incidence on local neighboring communities whatsoever.
MINOR 2	Negative, direct and indirect impact, short-term (a few months), small or medium scale (project area and surrounding areas, some villages) Significant consumption of raw materials and effluent released detectable, but below thresholds recognized as having an effect on health. Waste generation but properly managed. Moderate and acceptable environmental degradation. Small reversible perturbations on the local neighboring communities (nuisances mainly).

Level of intensity	Guide
MODERATE 3	Negative, direct and indirect impact of medium duration (up to a year) moderately or widely extended (scale of several villages, of a department). Significant consumption of raw materials with local scarcity and potential conflicts and low biodegradable discharges and/or hazardous substances with chronic human health effects in the event of long-term exposure. Significant production of sorted waste. Significant but reversible changes in environments. Irreversible but limited losses for local neighboring communities (few houses, crops, etc.). Degradation of public services functioning or access due to the project.
MAJOR 4	Negative, direct and indirect, long-term or irreversible, widespread impact (scale of a region, watershed, river, national park). Significant consumption of raw materials with local scarcity and potential conflicts and discharges that are non-biodegradable and/or hazardous substances with potential impacts on human health, including death and serious injuries. Significant waste generation without sorting or treatment. Destruction of large areas of habitat, heritage, landscapes. Irreversible, large-scale losses for communities: several villages displaced, loss of valuable farmland on several hectares, loss of public services, etc.
P	Positive impact Favorable impact to socio-economic development or that may benefit the environment.

5.1.3. Impact importance rating

The impact assessment consists first in identifying whether the impact is positive or negative:

- Negative impact: an impact that generates environmental pollution, social disturbance or damage to private assets or valuable fauna and flora,
- Positive impact: positive impact on socio-economic development or bringing environmental benefits.

Then, it requires identifying if it is direct or indirect:

- Direct impact: an impact that expresses a causal relationship between a project activity and an environmental (physical or natural) or social component,
- Indirect impact: the impact that flows from and follows a direct impact in a chain of consequences.

Thereafter, the importance of the impact should be assessed by multiplying the impact intensity (I) and the sensitivity of the receiving environment (SE) according to the matrix presented below.

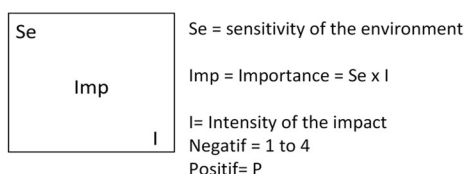


Figure 42 : Impact importance rating system

The multiplication result is a figure which indicates the impact importance as per the scoring system presented below.

Table 32 : Scoring system for impact importance

Importance Imp = Se x I	Intensity of the impact (I)				
	P	1	2	3	4
Sensitivity of the receiving environment (Se)	1	1	2	3	4
	2	2	4	6	8
	3	3	6	9	12
	4	4	8	12	16

Legend:

Positive impact
P

0: NO IMPACT	
1-2: NEGLIGIBLE	5 – 9: MODERATE
3-4: MINOR	>9: MAJOR

The importance of the impact can therefore be categorized as follows:

- No impact (white),
- Negligible (blue): the impact is low enough that no mitigation action is required,
- Minor (green): the impact is low, but measures, in particular good environmental and social practices, should be mentioned,
- Moderate (orange): impact that requires avoidance, reduction and compensation measures to become acceptable,
- Major (red): This impact concerns the environmental and social components which are very sensitive or have a very high intensity impact, requiring specific measures to be implemented to mitigate impact to acceptable level.

In the analysis, a table as the one below is presented for each impact to summarize the main evaluation criteria.

Table 33 : Scoring system for each impact assessment

Nature of the impact	Effect of the impact	Sensitivity level of the component	Level of impact intensity	Importance of the impact
POSITIVE	DIRECT	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE
NEGATIVE	INDIRECT	MINOR	MINOR	MINOR
		MODERATE	MODERATE	MODERATE
		MAJOR	MAJOR	MAJOR

5.1.4. Identification of mitigation measures

The best way to preserve the social and environmental component is to focus first on preventing and **avoiding** the identified impacts. For this purpose, the measures envisaged may concern fundamental choices related to the location and technical design of the project in order to achieve geographical, temporal or technical avoidance. Since negative environmental impacts could not be fully avoided at a reasonable cost, the remaining degradation should be **reduced** by technical mitigation solutions.

As a last resort, **compensatory measures** must be taken to provide a positive counterpart if negative impacts persist, aimed at globally preserving the environmental quality of the environment or achieving “no net loss of biodiversity”, or “net gain” based on the values of biodiversity considered. This “Avoid, Reduce, Compensate” or “ARC” approach is good international practice. The presentation of the measures will therefore be based on the presentation of the avoidance, reduction and then compensation measures.

Compensation measures are used when a residual impact is considered significant (moderate or major importance). They are implemented only in the event that avoidance or reduction measures cannot be implemented or are deemed insufficient.

Table 34 : Mitigation Strategy based on the overall impact importance

Impact Importance	Description
NEGLIGIBLE	Not Significant. Any impacts are expected to be indistinguishable from the baseline or within the natural level of variation. These impacts do not require mitigation and are not a concern of the decision-making process.
MINOR	Detectable but not significant. Impacts of “minor” importance are expected to introduce noticeable changes to baseline conditions, beyond natural variation, but are not expected to cause hardship, degradation, or impair the function and value of the resource/receptor. However, these impacts warrant the attention of decision-makers and should be avoided or mitigated where practicable.
MODERATE	Significant. Impacts of “moderate” importance are likely to be noticeable and result in lasting changes to baseline conditions, which may cause hardship to or degradation of the resource/receptor, although the overall function and value of the resource/receptor is not disrupted. These impacts are a priority for mitigation in order to avoid or reduce the significance of the impact.

Impact Importance	Description
MAJOR	Significant. Impacts of “Major” importance is likely to disrupt the function and value of the resource/receptor and may have broader systemic consequences (e.g. ecosystem or social well-being). These impacts are a priority for mitigation in order to avoid or reduce the significance of the impact.

5.2. Definition of Areas of Influence (Aoi)

Taking into account the type of project, the zones of influence make it possible to:

- Define the environmental and social sensitivities of the environment,
- Identify the potential environmental and social impacts (direct and indirect) and
- Propose appropriate measures for each impact.

These areas of influence determine the level of effort required for data collection and environmental and social investigations. Investigations on the scale of the wider study area are not intended to provide exhaustive information. On the other hand, they will enable the environmental and social context of the area to be described, and therefore the indirect impacts likely to be observed to be specified.

- The restricted area of influence corresponds to the actual project footprint, i.e. the entire geographical area immediately impacted by the project's physical activities. It includes the land that will host the project's drilling activities, as well as areas used temporarily during the field work activities, storage sites and equipment parking areas. Based on the information on activities, it includes.

The restricted access zones corresponding to the fenced perimeter around the drilling area.

- The project's area of direct influence is defined as the geographical area where the direct impacts of the project are expected to occur. This area includes locations where project activities are expected to have an immediate effect on the environment and local communities, whether during the field work activities. The impacts considered may be physical, ecological, social or economic, such as the disturbance of natural habitats, pollution, or noise and vibration pollution directly linked to project operations.

The area of direct influence has been defined by a 500 m buffer zone around the restricted area of influence.

- Given the nature of the activities and associated impact planned as part of this impact study, **the definition of an extended zone of influence does not seem relevant.**

The table below describes the restricted area of influence and the area of direct influence for each borehole. For the boreholes DSA Brikama and DSA Serrekunda, as they are located within the water treatment plant perimeter, no fences or gates will be created around the boreholes. Therefore, the restricted area of influence for these two boreholes is the water treatment plant perimeter.

Name	Restricted area of influence	Area of direct influence
Airport 2	30m x 30m	500 m ²
Airport 3	30m x 30m	500 m ²
BHF10	50m x 50m	500 m ²
BHF11	50m x 50m	500 m ²
BHF12	50m x 50m	500 m ²
BHF2	50m x 50m	500 m ²
BHF3	50m x 50m	500 m ²
BHF4	50m x 50m	500 m ²
BHF5	50m x 50m	500 m ²
BHF6	25m x 25m	500 m ²

Name	Restricted area of influence	Area of direct influence
BHF7	50m x 50m	500 m ²
BHF9	50m x 50m	500 m ²
DSA Brikama	WTP perimeter	500 m ²
DSA Serekunda	WTP perimeter	500 m ²
DSA Sukuta 1	30m x 30m	500 m ²
DSA Sukuta 2	30m x 30m	500 m ²

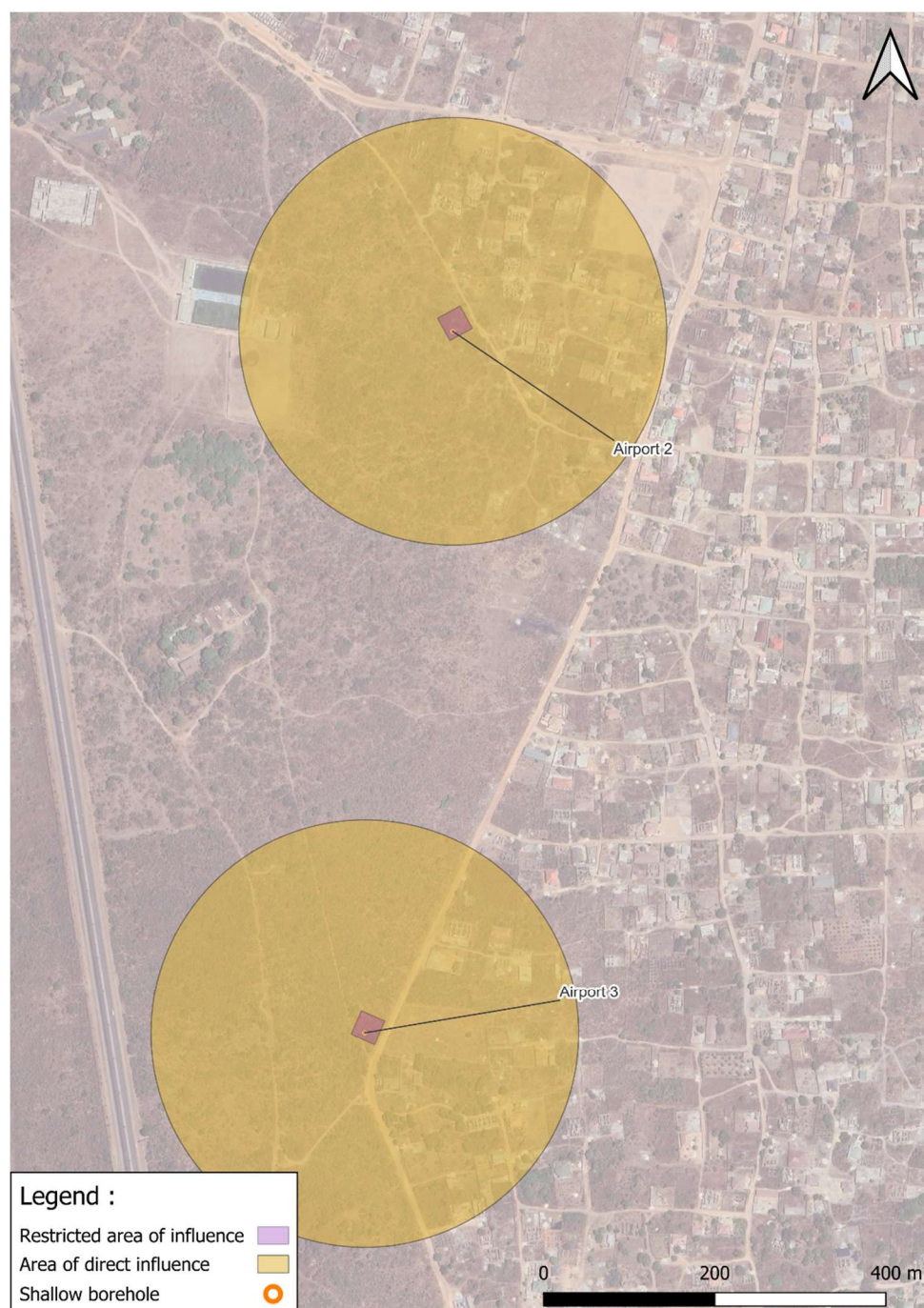


Figure 43 : Airport drilling sites - Areas of influence



Figure 44 : Brikama drilling site - Areas of influence

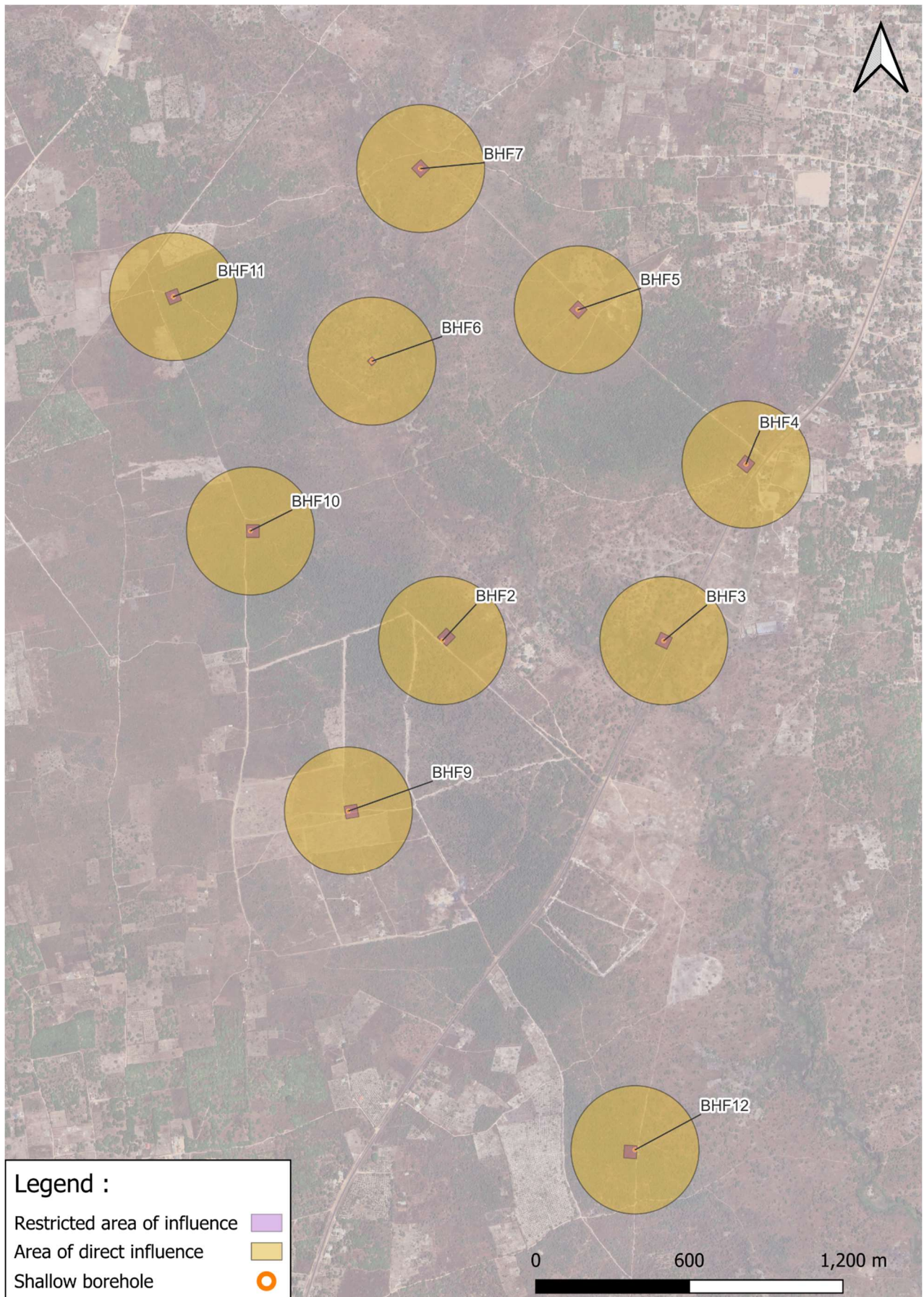


Figure 45 : Sifoe drilling sites - Areas of influence

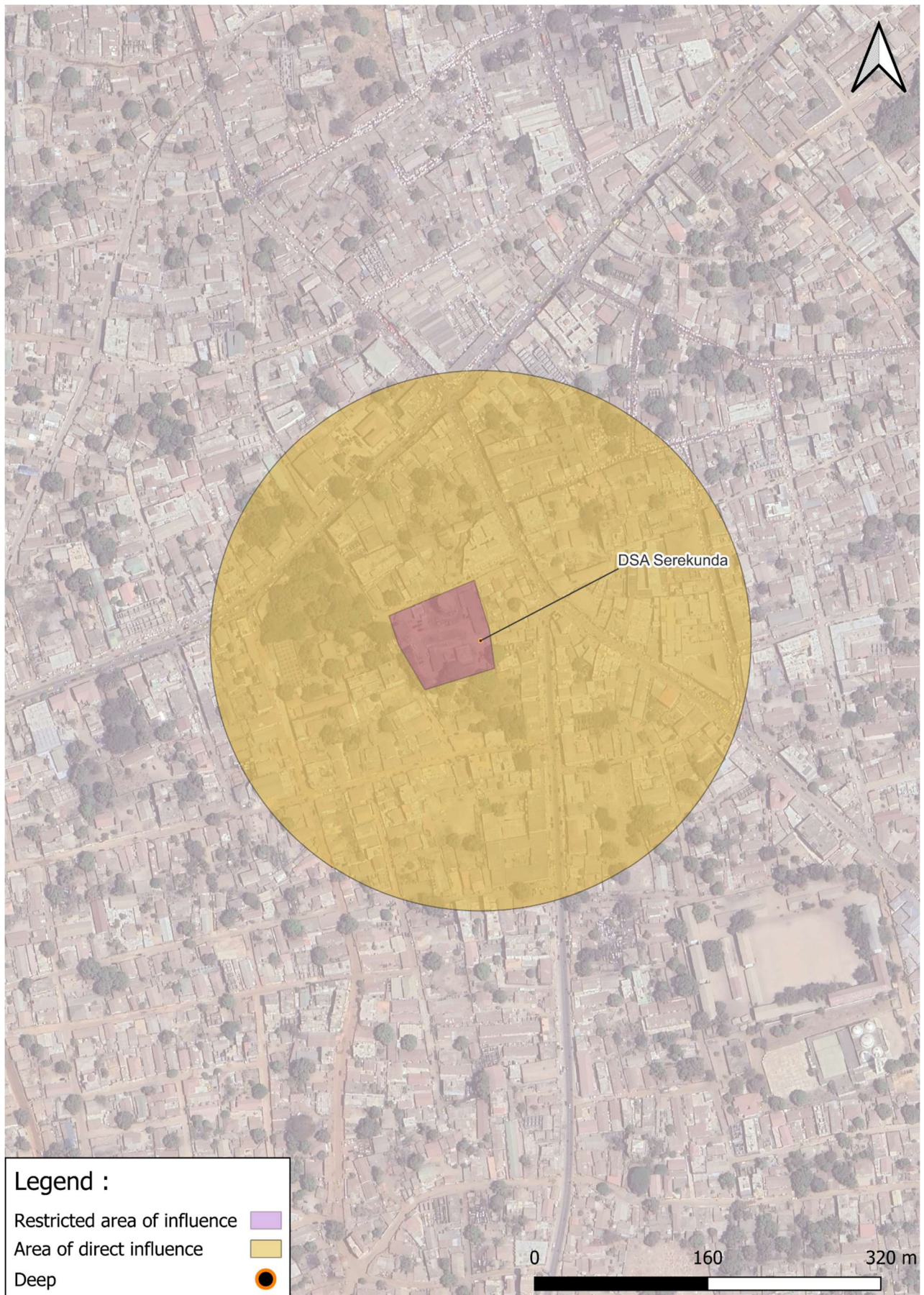


Figure 46 : Serrekunda drilling site



Figure 47 : Sukuta drilling sites - Areas of influence

5.3. Anticipated benefits from the project

The positive impacts noted are related to several development sectors, which indicates the importance of urban water in achieving the Sustainable Development Goals (SDGs). Beyond being consistent with different national planning documents, the WASIB project is likely to induce several positive impacts during the construction and operation phases. The following table presents the different generic positive impacts of the program during the construction and operation phases.

Table 35 : Positive impacts of the project

Phase	Environmental and social Sources	Positive Impacts
Works	Human	-Creation of local temporary jobs -Recruitment of local artisans -Youth employability development -Development of small businesses during the construction phases
Exploitation	Human	-Contribution to the acceleration of the fight against morbidity and mortality related to diarrhea, cholera, typhoid fever, salmonellosis, malaria, especially in children etc. -Reduction of health expenditure (medical care of populations)
		-Reduction of health expenses -Decrease in women's workloads
		- Increasing supply and promoting access to drinking water for low-income households -Improvement of the quality of drinking water -Improved quality and access to drinking water services in the GBA areas -Maintenance of drinking water services qualitatively and quantitatively satisfactory in the different human settlements in the GBA -Women's time and energy savings (reduction of water chores) -Better health of the populations especially the most vulnerable (women and children) -Better access to hygiene - School hygiene and increased care activities,
	Urbanization	-Contribution to the acceptability of repulsive urban areas and land valuation -Contribution to the reduction of spatial disparities
	Environment	-Contribution to the improvement of the living environment -Reduction of fecal danger

5.4. Impacts and mitigation related to construction stage

5.4.1. Impact on physical and biological environment

5.4.1.1. Impact on topography

Impacts

The impact of the Project on the topography and bathymetry is assessed in terms of:

- The removal of superficial/bedrock deposits.
- The superficial/bedrock deposits' stability.

The soil of the Project area will be modified due to grading and levelling activities (on land).

Land topography

The work is projected to follow as much as possible the natural topographical conditions of the Project site to maintain the existing drainage patterns. Moreover, temporary soil disturbance can be observed for the development of the works area within the Project boundary. All cut material will be distributed across the project area with no excess soil expected to be disposed off-site.

As no large excavation or significant bedrock disturbance is anticipated, impacts on topography are expected to be negligible.

Erosion

Due to the soil nature, there is an erosion risk strengthened by the clearing activities and the removal of all vegetation. Bare soils are more exposed to erosion, mainly during the rainy season. This risk also concerns storage areas for materials and excavation products.

Cut / fill zones may be affected by rain erosion during storage and handling and generate sediment runoff. The management of cut / fill must be anticipated because it involves:

- Temporary storage of non-cohesive materials during construction may be easily affected by erosion, and which may lead to landslides if the deposits are too high, steep or poorly stabilized.
- A surplus of cut to be stored on the site permanently because it cannot be reused.

Heavy rainfall can lead to increase the sediment transport from the highest points to the lowest points. Sediment accumulation can therefore be observed towards the lowest parts of the site. Nevertheless, the topography being predominantly flat, impact of erosion is expected to be limited.

The design expects a neutral cut / fill balance thus preventing soil erosion off site. This optimization also limits costs as well as many environmental impacts such as energy consumption, material consumption from outside, GHG emissions, truck traffic, dust emissions and noise pollution.

Impact score

Table 36 : Impact of civil works on topography and erosion during construction phase

Nature of the impact	Effect of the impact	Sensitivity level of the component	Level of impact intensity	Importance of the impact
POSITIVE	DIRECT	NEGLECTIBLE	NEGLECTIBLE	NEGLECTIBLE
NEGATIVE	INDIRECT	MINOR	MINOR	MINOR
		MODERATE	MODERATE	MODERATE
		MAJOR	MAJOR	MAJOR

Measures

- For work areas and base camp:
 - Preferentially locate storage areas on flat areas to reduce topographical alterations. If necessary, it is preferable to opt for earthworks in steps to minimize soil excavation.
 - Ensure rehabilitation of all affected areas at the end of the work.
- Stripped soil management. The soil storage area that will not be remobilized for 6 months will be covered with a thin topsoil to promote the development of herbaceous vegetation. The other temporary storage zones will be protected on their slopes by a synthetic cover. Deposits should not exceed six meters in height, their slope 1.5H / 1V and be equipped with a mid-height riser (three meters).
- Main excavation work shall be conducted during low precipitation periods, as much as possible.
- Implementation of silt fence to retain the soil on disturbed land until the activities disturbing the land are sufficiently completed to allow revegetation and permanent soil stabilization to begin. A reasonable rule-of-thumb for the proper amount of silt fence is—30 meters of silt fence per 1,000m² of disturbed area (EPA stormwater best management practice). The silt fence shall be placed on slope contours or at the bottom edge of the soil piles to maximize ponding efficiency. Heavy porous filter fabric like geotextile with steel posts shall be privileged.
- Progressive soil rehabilitation to avoid large erosion phenomena, especially during rainy season. Revegetation and soil stabilization shall be considered, including for the work area and base camp.

Residual impact

The residual impact is considered negligible.

5.4.1.2. Contamination of phreatic nappe

Excavation of topsoil and placement of material will result in increased leaching of the soil during the rains.

The production of excavated waste can also allow seepage of wastewater into the sub-shallow water of construction sites. On groundwater, the impact of work is to be feared with the infiltration of liquid waste into the water table. The basic building site installation could accentuate the problem of the management of wastewater and other used oils coming from the maintenance of engines.

Table 37 : Impact of civil works and dredging on groundwater during construction phase

Nature of the impact	Effect of the impact	Sensitivity level of the component	Level of impact intensity	Importance of the impact
POSITIVE	DIRECT	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE
NEGATIVE	INDIRECT	MINOR	MINOR	MINOR
		MODERATE	MODERATE	MODERATE
		MAJOR	MAJOR	MAJOR

Mitigation measures

- Systematic evacuation of non-reusable toxic cuttings
- Parking, in the evening and at the end of the week, construction machines outside the drilling areas
- No maintenance or washing of machinery in the borehole right-of-way area
- Driver awareness
- Plan an effective plan for solid and liquid waste management

The residual impact with mitigation measures in place is considered minor.

5.4.1.3. Atmospheric pollution

Air quality will also be affected by dust emissions during clearing of sites, preparation, excavation and backfilling, concrete preparation for civil works, and machinery traffic. Emissions of dust can be the basis of pulmonary infections on site personnel and therefore require measures to mitigate their impact. Air pollution is the result of dust emissions into the atmosphere caused by equipment and construction vehicles (SO₂, NO_x, CO, CO₂, and HC) and excavation work. The spread of this dust will also be accentuated by windy and dry weather.

Table 38 : Impact of civil works on Air quality during construction phase

Nature of the impact	Effect of the impact	Sensitivity level of the component	Level of impact intensity	Importance of the impact
POSITIVE	DIRECT	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE
NEGATIVE	INDIRECT	MINOR	MINOR	MINOR
		MODERATE	MODERATE	MODERATE
		MAJOR	MAJOR	MAJOR

Mitigation measures

- Use dust offal
- Covering trucks carrying fine sand and materials
- Wearing dust masks for site personnel
- Sensitization of local populations
- Monitoring the wearing of protective equipment and awareness campaigns
- Regularly maintain equipment and construction machinery

- Access to pre-construction sites by the public must be prohibited by placing appropriate signs and barriers in combination with community sensitization on health and safety during works
- Reduce speed to 10-20 km/h when entering settlements

Gaseous Pollution

- Contractors must also be warned in their agreement clauses to reduce air pollution through use of well-maintained equipment. Equipment must be serviced frequently and run below the optimal, as overloading strains the mechanisms that produce incomplete combustion. High quality oils must also be used to reduce dangerous air emissions
- Emission standards prescribed in the Environmental Quality, Permitting and Discharge Regulations must not be exceeded
- Ensure that engines of vehicles and machines are not left operating idle.

5.4.2. Impact on the biological environment and mitigation

The assessment period is too short for an ecological survey that could look at types of species as well species abundance; such a conclusive assessment requires the consideration of seasonal variations, hence one major reason that a limited biodiversity assessment was performed. In this regard, the assessment focused on the existence of habitats of ecological significance in the project area, in other words, the assessment looked at the potential impact of “habitat degradation” in the project area looking at factors that include:

- presence of protected areas within area;
- presence of non-protected sites within the area that may be sensitive to the project;
- presence of potentially-sensitive biological resources within the area.

Site clearing and preparation could impact some sites, especially Kity and Sukuta Salagi Forest Park buffer zone that present a relatively dense vegetation cover. The drilling activities and their preparation may have a significant impact on vegetation and biodiversity because those trees are habitats of biodiversity.

The sites identified for the ten (10) boreholes in Sifoe/Kity area have patches of small vegetation made largely of shrubs, but these are fully disturbed, and very small, for any conservation value. In fact, it was observed that only one of the boreholes will require a fairly significant amount of clearance of vegetation composed, mainly, of shrubs and grass. A two kilometers radius (the LAA) around the Sifoe/Nyofeleh and Sifoe/Busuranding is largely of farmlands, low-growth and settlements with no noticeable area of conservation significance.

In essence, the overall situation is one of significantly disturbed, or totally absent, areas of ecological importance in the entire project area such that the project has little potential to cause any *habitat degradation*.

Given the regulations governing the cutting of protected species or forest trees but also the high density of trees observed, it would be appropriate for existing protected plant species to be kept outside the boundaries of the project sites as much as possible. For the species that will be affected by the project, the NAWEC will have to consider their regeneration with varieties adapted to the area. The water and forest services should be involved throughout the project cycle. Cutting products can nevertheless be made available to local communities in accordance with forest regulations.

The trees within the project footprint serve vital ecological functions: they provide shade, stabilize soils, offer habitat to wildlife, and contribute to carbon sequestration. Approximately 5 hectares of forest and associated vegetation will be cleared to accommodate the borehole facilities. This clearing may lead to habitat loss, alterations in the microclimate, increased risk of soil erosion, and a reduction in carbon absorption capacity.

To mitigate these impacts, all vegetation lost due to the project will be replaced in support of the Department of Forestry's tree replacement program, which aims to restore indigenous tree species becoming scarce in Gambian forests.

While the project is not expected to result in the extinction of any endangered or endemic tree species, certain vulnerable species have been recorded in the area (only in Sifoe). These include:

- Baobab (*Adansonia digitata*) – Threatened
- African Rosewood (*Pterocarpus erinaceus*) – Threatened
- Mahogany (*Khaya senegalensis*) – Vulnerable
- Apple-ring Acacia (*Faidherbia albida*), Winter Thorn, and Mimosa species – Near Threatened

Accordingly, every effort will be made to preserve these species during construction. Where avoidance is not feasible, tree removal will be minimized, and affected species will be replaced under the provisions of the Memorandum of Understanding (MoU) between NAWEC and DoF related to reforestation (Annex 6).

Despite these impacts, it is important to highlight that significant portions of the forested area will remain undisturbed, thereby ensuring the continued preservation of the local ecosystem and its biodiversity functions.

Table 39 : Impact of civil works on vegetation and fauna

Nature of the impact	Effect of the impact	Sensitivity level of the component	Level of impact intensity	Importance of the impact
POSITIVE	DIRECT	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE
NEGATIVE	INDIRECT	MINOR	MINOR	MINOR
		MODERATE	MODERATE	MODERATE
		MAJOR	MAJOR	MAJOR

The residual impact with mitigation measures in place is considered minor , over an area of 2 500 m² for each borehole.

Mitigation measures

- Develop with the Department of Forestry (DoF) a compensatory reforestation plan in line with the existing Memorandum of Understanding (MoU) between NAWEC and DoF related to reforestation (Annex 6)
- Prior to the commencement of construction, a detailed identification and mapping of sensitive or vulnerable tree species will be conducted jointly with the contractor. This will ensure that all trees marked for preservation are clearly documented and protected from falling.
- Ascertain where within the 50m x 50m allocated land plot the borehole drilling location can be placed to reduce any potential impact and avoid the need for tree cutting
- A comprehensive inventory of all trees impacted by the project will be maintained. This inventory will form the basis for the implementation of the reforestation and ecological restoration plan.
- A Memorandum of Understanding (MoU) to be signed with the Ministry of Forestry includes a tree replacement commitment at a 1-to-4 ratio (i.e., four trees planted for every one tree removed), prioritizing native and ecologically valuable species.
- Obtaining the necessary logging permits from the forest service
- Focus on the reforestation of species
- Protect the vegetation from the machinery on drilling platforms
- Sensitize construction site staff and prohibit tree cutting
- Workers must be educated and warned by the Contractor to avoid forested areas, extracting wood, hunting, and burning activities, which will degrade the forests and other vegetation.
- There must be constant supervision of works to ensure only necessary sites are cleared of vegetation
- Construction workers must protect natural resources and wildlife; thus, they should be educated on guidelines relating to the hunting of wild animals
- Hunting and eating of bush meat by all workers, particularly imported workers, will be prohibited and alternatives such as fish, and domestic animals encouraged; offenders will be disciplined in any of the following ways:
 - *informal warning*
 - *formal warning*
 - *loss of up to one week's salary*

- *suspension of employment (without payment of salary), for a minimum period of 1 month up to a maximum of 6 months*
- *termination of employment*
- *There should be a labor Grievance Mechanism (GM) to ensure that employees can report anonymously if needed to prevent risks of reprisals. The labor GM should be included in the Contractors ESMP (C-ESMP) and as part of the bidding documents.*

5.4.3. Impact on socioeconomical environment

5.4.3.1. Impacts on land use and community access

The proposed project sites will be enclosed with fencing to secure the borehole infrastructure during drilling works. Each site enclosed within a 50 m x 50 m (2,500 m²) fenced area during drilling works.

As previously noted, the borehole sites located in Brikama, Sukuta, the Airport, and Serekunda are situated entirely within existing NAWEC premises. These locations are already designated for utility infrastructure and do not intersect with third-party properties, nor do they impact local livelihoods or community activities. As such, the potential for land use conflict or displacement in these areas is negligible.

In contrast, the proposed sites within **Salagi Forest Park** fall within buffer zones of forested land. As noted, Salagi is a nationally designated **Forest Park**, intended—among other purposes—to conserve and protect national forest biodiversity. Consequently, no human activity is permitted within the forest's protected perimeter.

Field assessments of the DSA 1 and DSA 2 borehole locations confirmed the absence of sensitive flora or fauna, with the exception of one large Mandingo cola tree (*Cola cordifolia*). This species is currently listed as Least Concern on the IUCN Red List. Nevertheless, it is recommended that this particular specimen be preserved during construction activities.

In the Sifoe area, field investigations revealed traces of prior human activity at several locations. These activities are believed to have occurred before the area was occupied by the army and have since ceased. Following the departure of the former president, the Gambia Armed Forces established a permanent presence in the area. This military presence has significantly restricted access by surrounding communities, resulting in reduced human pressure and improved forest cover compared to many other parts of the West Coast Region (WCR).

Although the area is not fully enclosed by physical barriers, the military's occupation has effectively limited community access and resource use. Importantly, the zone designated for the 10 boreholes has not been used by local populations for firewood collection, medicinal plant harvesting, or other subsistence activities since the establishment of the military presence.

During stakeholder consultations, it was noted that part of the forest is being earmarked for an Army Training School. Consequently, all planned activities within the Sifoe Forest/Farm—including those under the WASIB Project—require prior clearance from Army Headquarters in Banjul. This has been acquired as demonstrated through the land allocation documents (Annex 5).

Table 40 : Impact on land use and community access

Nature of the impact	Effect of the impact	Sensitivity level of the component	Level of impact intensity	Importance of the impact
POSITIVE	DIRECT	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE
NEGATIVE	INDIRECT	MINOR	MINOR	MINOR
		MODERATE	MODERATE	MODERATE
		MAJOR	MAJOR	MAJOR

Mitigation measures

- The final locations of the boreholes have been carefully selected to avoid zones of high community dependence. Locations for drilling will be further refined within the 50m x 50m plot to avoid tree cuttings.

5.4.3.2. Impacts on Safety of workers and communities

Excavation and earthmoving operations during drilling are feared for workers if adequate training and sensitization have not been given.

Other safety risks are:

- There is a risk of using children as workers during project implementation, particularly during preconstruction for site clearance and drilling. Children playing near and around work sites may be abused verbally, physically, or sexually, in addition to the risk of worksite accidents occurring.

- Communicable diseases of most concern are sexually transmitted diseases (STDs), and HIV/AIDS due to influx of workers to the Project site or living within the communities.
- Community stability risks that may result from labor influx include Sexual Exploitation, Abuse and Harassment (SEA/SH), and Violence Against Children (VAC) particularly with the use of child labor, sexual and other harassment by workers.

Table 41 : Impact on workers and communities during construction

Nature of the impact	Effect of the impact	Sensitivity level of the component	Level of impact intensity	Importance of the impact
POSITIVE	DIRECT	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE
NEGATIVE	INDIRECT	MINOR	MINOR	MINOR
		MODERATE	MODERATE	MODERATE
		MAJOR	MAJOR	MAJOR

Mitigation measures

- Information of residents on the risks incurred also through sex and age-appropriate material and methodologies,
- Staff awareness (Toolbox, ¼ HSE)
- Preliminary risk analysis and implementation of all mitigation measures before the start of the activity
- Establishment of a work permit for critical activities like the drilling of the borehole equipment
- Advanced and positional signaling of work axes
- Workers should be trained in good practices and contingency measures prior to the start of works. Integrate staff training, especially drivers on defensive driving, given the real road traffic risk
- They must also be sensitized on how accidents or incidents can affect Project implementation, the measures they must follow and fines in case of non-compliance
- Warning and safety signs must be used before commencement and during the works to inform and warn the public of risks and means of avoidance
- Danger of accidents and injuries from utilities and other equipment and machinery during the pre-construction phase shall be monitored vigorously; to prevent and protect the communities from harm, the contractor shall mount safety cordons and danger signs at strategic locations
- Communities must be informed to stay away from work sites to avoid dust inhalation prior to works
- Sourcing of workers, especially unskilled labor shall be from local communities to avoid imported labor, as much as possible
- The “Code of Conduct and Action Plan for Implementing ESHS and OHS Standards, and Preventing SEA/SH and Violence Against Children (VAC)” will also be included in contracts including explicit references for monitoring, enforcement, and compliance
- Worksites will be well lit and have separate well-lit facilities for men and women, including separate toilets in separate locations, toilets have locks that can be locked from the inside (even though the presence of women will be very limited during drilling phase)
- Awareness campaigns/orientation covering but not limited to SEA/SH, HIV/AIDS/STDs transmission risks shall be carried out for workers and host communities
- The workforce shall be sourced locally to reduce the need for importation of workers. Employing local workers enhances community cohesion as the local workers know the community, culture, and norms which may also help decrease risks to GBV, SEA, spread of STDs and so on
- Nonetheless, to prevent STDs, it is essential that Contractors are required through the contracts to educate their workers on the risks and prevention methods before, and constantly during works. In addition to implementing measures on sensitization and education on the dangers and mitigation

measures to address STIs, there will also be strict monitoring to ensure adherence to the relevant codes of conduct.

- *Other methods include:*
 - *NAWEC and Contractors providing surveillance and active screening and treatment of workers*
 - *Ensuring the Contractor routinely reviews the Codes of Conduct and SEA/SH Action Plan for Implementing ESHS and OHS Standards and Preventing Sexual Exploitation, Abuse and Harassment and Violence Against Children with Project workers, including mandatory reviews with new workers to a Project site to ensure all workers understand behavior expectations and GBV/SEA risks, including sexual harassment. The Social Safeguards Specialist of the Project will attend sensitization meetings to ensure they are taking place.*
 - *The Code of Conduct are meant to:*
 - *Create awareness of the ESHS and OHS expectations on the project*
 - *Create common awareness about GBV, SEA and VAC*
 - *Ensure a shared understanding that GBV, SEA and VAC have no place in the project*
 - *Create a clear system for identifying, responding to, and sanctioning GBV, SEA.*

Mitigation of Sexual Exploitation, Abuse and Harassment Risks and Risks Related to Violence against Children

- Children must not be employed by the Project (paid or unpaid), and the Project must comply with all relevant local legislation, including labor laws in relation to child labor and the World Bank's safeguard policies on child labor and minimum age.
- Communities need to be informed about the start of all works, at least 5 days before, and the need for them to keep children away from the sites.
- Specifically, the project should ensure that the *Code of Conduct and future Action Plan for Implementing ESHS and OHS Standards and Preventing Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH), and Violence Against Children (VAC)* are included in the Project's bidding documents. The Codes of Conduct are meant to:
 - i. Create awareness of the ESHS and OHS expectations on the Project
 - ii. Create common awareness about GBV, SEA/SH and VAC
 - iii. Ensure a shared understanding that GBV, SEA/SH and VAC have no place in the Project
 - iv. Create a clear system for identifying, responding to, and sanctioning GBV and VAC incidents

5.4.3.3. Noise and vibration

The construction phase of the work will undoubtedly cause noise pollution, particularly for field work activities site staff and residents. The noise will be caused by the equipment (crane, drilling equipment, sawing equipment, generator, transport ...). The noise and vibrations associated with the project will mainly be noticed during the following stages: the movement of the construction machines, the operation of the generators, the drilling, etc.

The movements and noise of heavy equipment during earthworks are sources of noise. These nuisances are an inconvenience for the workers. Exposure to noise over a long period of time could cause hearing impairment.

Table 42 : Impact on Noise and Vibration during construction

Nature of the impact	Effect of the impact	Sensitivity level of the component	Level of impact intensity	Importance of the impact
POSITIVE	DIRECT	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE
NEGATIVE	INDIRECT	MINOR	MINOR	MINOR
		MODERATE	MODERATE	MODERATE
		MAJOR	MAJOR	MAJOR

Mitigation measures

- Choose equipment that meets the limit of 85 db at 01 meter
- Wear of hearing protection for construction site and operating personnel
- Use generators meeting the standard of 85 db at 01 meter
- Maintain pneumatic tools, machinery, and equipment to maintain the noise level generated at an acceptable value
- Make the neighborhood aware of the noise generated by the works and the measures put in place even though the works will be far from settlements in almost all the sites because the majority are in NAWEC existing sites (Brikama, Serrekunda, Sukuta), and the rest of the drilling areas are in Government land like the airport, the buffer zone of the Salaji Park or the Sifoe forest where noise will disturb the biodiversity. Work should avoid sensitive hours like early morning and late afternoon or night.

5.4.3.4. Production of construction waste

Drilling will induce the production of cuttings in the form of mixed sludge with rock debris (cuttings) which will indispose especially the workers in charge of the works; the residents closest to the sites will be the most affected.

In addition, the work of clearing and preparing the site before drilling, excavation, earthworks will produce significant amounts of waste. This waste can be of different types: inert waste rocks, topsoil, PVC pipe residues, soiled packaging, solvents, hydrocarbon tanks, etc.

Wastewater will also be produced in sanitary facilities at fixed and mobile site facilities as well as used oils from light mechanical maintenance. These different types of waste will need to be properly managed in accordance with national regulations and treatment infrastructures available in the Greater Banjul Area.

Table 43 : Impact on Construction Waste

Nature of the impact	Effect of the impact	Sensitivity level of the component	Level of impact intensity	Importance of the impact
POSITIVE	DIRECT	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE
NEGATIVE	INDIRECT	MINOR	MINOR	MINOR
		MODERATE	MODERATE	MODERATE
		MAJOR	MAJOR	MAJOR

Mitigation measures

For the management of used oils, waterproof areas will have to be set up within the fixed site installations to receive sealed bottoms for the storage of used oils. Quantities of stored oil should be collected at regular intervals and routed to treatment companies licensed by the National Environment Agency. Wastewater management must also be properly managed to protect staff against fecal hazards and to prevent any form of contamination of soil and surface water.

For mobile site installations, mobile toilets will have to be made available by contractors as well as a hand washing device. The sludge may be stored in prefabricated plastic pits which will be emptied regularly by a water-treatment truck.

- Identification and classification (hazardous or not, solid, gaseous, or liquid) and estimate the likely type of waste to be generated such as cleared vegetation, packaging, excess aggregate, and disused equipment etc.
- Hazardous wastes (used oil) will be generated, proper procedures must be taken regarding their storage, collection, transportation, and disposal as indicated in the Hazardous Chemicals and Pesticides Control and Management Act, 1994 and in IFC HSE guidelines
- Using the cleared vegetation, as firewood within the communities
- Reusing the solid waste (such as topsoil wastes) generated from the excavation works as backfill while the rest will be disposed of in designated areas.

- Other solid wastes (such as cement bags, metallic pieces, wooden planks, and leftover aggregate material and debris) will be disposed of according to the National Environment Management Act, 1994 and Antilittering Regulations, 2007.
- Recommending that the work contracts include waste management measures such as those described in World Bank's Environmental, Health, and Safety (EHS) Guidelines (1.6 Waste Management).
- Identifying and demarcation of approved disposal areas, clearly indicating the specific materials that can be deposited in each; waste must not be discarded within, or close to Community Forests.
- All waste management options must be in a sound manner that does not affect human health and the environment.
- The Contractor developing a well-organized internal supervision and monitoring system to ensure waste reduction and proper management through full implementation of the waste management plan.

5.4.3.5. Impacts on Cultural Heritage

At the cultural level, there are no archaeological sites, cemeteries or places of worship that could be disturbed by work in the project area. However, in case of fortuitous discovery of cultural heritage during the works, it is up to the contractor to stop the work and immediately notify the relevant departments by following chance finds procedures.

Table 44 : Impact on Cultural Heritage

Nature of the impact	Effect of the impact	Sensitivity level of the component	Level of impact intensity	Importance of the impact
POSITIVE	DIRECT	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE
NEGATIVE	INDIRECT	MINOR	MINOR	MINOR
		MODERATE	MODERATE	MODERATE
		MAJOR	MAJOR	MAJOR

Mitigation measures

In case of discovery of remains:

- Stop work
- Circumscribe and protect the discovery area
- Notify the appropriate services immediately
- Implementation of the chance findings procedure

Chance Finds Procedures are in the Annex.

5.4.3.6. Impacts related to Public Health and Safety

The expected traffic at the drilling sites will be modest and can be broken down as follows:

- Return trips for the drill rig
- Site personnel (approximately 2 vehicles per day)
- Other work/delivery vehicles (approximately 2 trucks per day)

Road risks will mainly be located on major roads leading to the drilling sites. Secondary roads leading to the site are relatively isolated and less accident-prone.

Strict restrictions must be put in place to prohibit access by the public to work sites, materials, and equipment. Communities must be given prior notice before commencement of the works to inform and warn the public of risks and means of avoidance. Communities like the ones of Serrekunda, Kity, Brikama, Sukuta must be informed to stay away from work sites. But it is good to recall that these sites belong to NAWEC or the Government. Settlements are from these facilities. Forest of Sifoe and Salaji are being used by communities without permission because Salaji is a Park access is controlled by the Department of Forestry and Sifoe is being used by the Army and access is also forbidden. To prevent road traffic accidents, work supervisors must ensure speed limits are controlled and operators of vehicles and heavy equipment well trained in other measures to mitigate

the potential health risks in traffic and vehicular movement. Apart from the boreholes in Serrekunda where traffic can congest, the remaining areas have very limited traffic. Also, given the type of work, equipment and movement of vehicle and engine will be very light with approximately two to three trips per day to bring or evacuate equipment and material to and from the sites.

Table 45 : Impact related to Public Health and Safety during construction phase

Nature of the impact	Effect of the impact	Sensitivity level of the component	Level of impact intensity	Importance of the impact
POSITIVE	DIRECT	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE
NEGATIVE	INDIRECT	MINOR	MINOR	MINOR
		MODERATE	MODERATE	MODERATE
		MAJOR	MAJOR	MAJOR

Mitigation measures

- The Contractors must emphasize safety aspects among drivers
- Drivers' skills should be tested and improved through training, including training on defensive driving
- Contractors should adopt limits for trip duration and preparing driver rosters to avoid overtiredness
- Drivers must avoid dangerous routes and busy times of day to reduce the risk of accidents, especially for the road going to Serrekunda and Brikama boreholes where traffic can be congested
- Contractors should maintain regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure
- Institute fines and penalties for non-compliance, including deduction of wages, suspension, or even dismissal for habitual errant Project drivers
- There should be effective site management, including signage, lighting, and warning signs, including restriction of access by unauthorized personnel.

5.4.3.7. Impact on Occupational Health and Safety Risks

The workforce shall be sourced locally to reduce the need for importation of workers. Employing local workers will make them take more responsibility for their actions and will reduce promiscuousness. Knowing the community, culture, and norms will also help decrease risks to GBV, SEA/SH, and spread of STDs.

Occupational Health and Safety is an important source of impacts and accidents during work implementation. It is essential that Contractors are required through the contracts to educate their workers on the risks and prevention methods before, and constantly during works. In addition to implementing measures on sensitization and education on the dangers and mitigation measures to address STIs, there will also be strict monitoring to ensure adherence to the relevant codes of conduct.

Table 46 : Impact on Occupational Health and Safety

Nature of the impact	Effect of the impact	Sensitivity level of the component	Level of impact intensity	Importance of the impact
POSITIVE	DIRECT	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE
NEGATIVE	INDIRECT	MINOR	MINOR	MINOR
		MODERATE	MODERATE	MODERATE
		MAJOR	MAJOR	MAJOR

Mitigation measures

The following measures will be implemented to mitigate workers' health and safety risks during construction. Specifically, biological risks (wildlife attacks) can be addressed by:

- Providing information to the staff on preparedness
- Training on response
- Provision of first aid kits
- Provision of knowledge on the closest health facilities for additional expert care

- Training and safety information should generally be provided to management, supervisors, workers, and occasional visitors to areas of risk and hazard. Specifically, there must be on-the-job training, and knowledge of procedures to reduce risks, including coordination and supervision.
- Workers should be trained in good practices and contingency measures prior to the start of works as well as on the contents of the Code of Conduct
- All workers employed by the Contractor for the Project must be informed of the associated hazards and risks. A basic occupational training program and specialty courses should be provided as needed to ensure that workers are aware to the specific hazards of individual work assignments.
- The Contractor must provide proper working conditions for labor, including adequate well-lit and sex-segregated toilets, drinking water, areas for rest and having meals, lighting (especially for camps) and waste disposal facilities. Consideration must also be given to these facilities at peak sites and times when the demand is higher.
- The Contractor should support in providing medical care to workers, particularly for health conditions occurring during work. This may include health insurance, transportation costs to health facilities and medical fees in the workers contracts.
- The Contractor should adopt and implement a health and safety program which entails:
 - Effectively identifying and correcting unsafe conditions routinely
 - Protection of the workers and the public from dangers arising from construction activities
 - Prevention of events resulting in potential injury to workers, the public, or the environment
 - Fire extinguishers, personal protective equipment and first aid kits should be provided, and training given on how to use them
 - Reporting of incidents is also essential for the review and improvement of safety procedures
 - A tailor-made Accident Prevention Plan (APP) must be prepared and implemented by the Contractor. At the minimum, the Plan must consist of the following elements:
 - i. Management Policy Statement
 - ii. Authority and Accountability
 - iii. Goals and Objectives
 - iv. Employee Commitment and Responsibilities
 - v. Employee Involvement
 - vi. Disciplinary Policy
 - vii. Record Keeping
 - viii. Safety and Health Surveys and Inspection/Program
 - ix. Safety and other Related Meetings
 - x. Safety and Health Training
 - xi. Safety Audit and Inspection
 - xii. Accident hazard and risk assessment
 - xiii. Accident and Hazard Investigation
 - xiv. Accident Reporting and Investigation
 - xv. Review and Revision of Components
- Despite the accident prevention plan and due diligence, incidents may occur, and an Emergency Measures Plan in case of accidents will be implemented to address:
 - i. General measures

- ii. Internal Operation Plan (POI)
- iii. Circulation and movements on the sites
- iv. Individual and collective protection equipment
- v. Special instructions for the use and movement of vehicles
- vi. Works' inspection and maintenance program
- vii. Fire protection measures
- viii. Training and exercise procedures

5.5. Impacts in the operation phase of the works

These activities will be covered in depth in the next phase of the ESIA which will cover the water transmission infrastructure work and operation phases.

5.6. Summary of the mitigation measure during drilling phases

Table 47 : Mitigation measures proposed for the construction and works exploitation phases

PHASE	POTENTIAL IMPACTS	MITIGATION MEASURES
Construction	Soil structure contamination and modification	-Regular maintenance of construction machinery, -Taking measures to prevent leakage of pollutants, -Prohibition of the emptying of construction equipment on site - Set up a waste oil collection tank - Waterproof waste oil recovery sites
	Pollution of confined groundwater	-Systematic evacuation of non-reusable toxic waste material -Parking, at night and at the end of the week, construction -Provide tight spaces for machine washing with a decanting and oil recovery system
	Alteration of air quality and Atmospheric Pollution	-Regular watering of the site -Limit the maximum speed allowed on construction tracks -Wearing dust masks for site staff and site operations personnel
	Degradation of the plant cover and Disturbance of photosynthesis	-Replant the trees and flora recovered from the local ecosystem, after the end of construction -Effective involvement of Water and Forests Departments in project monitoring - Regular watering of the site -Covering on trucks carrying sand and materials
	Accident risks	-To operate a system of armor of the excavations -Mandatory Port of Personal Protective Equipment -Good stowage of the loads handled -Maintenance of traffic lanes -Staff training in handling
	Social risk as spread of diseases, social unrest between project workers and surrounding communities, risk of SEA/SH and VAC	-Create awareness of the ESHS and OHS expectations on the Project -Create common awareness about GBV, SEA/SH and VAC to local communities as well as train workers on CoC contents and key SEA/SH concepts, -Ensure a shared understanding that GBV, SEA/SH and VAC have no place in the Project through the SEA/SH Action Plan, training, awareness and CoC signature -Create a clear system for identifying, responding to, and sanctioning GBV and VAC incidents through clear SEA/SH procedures -Developing and disseminating a Code of Conduct that outlines prohibited SEA/SH related behaviors,

PHASE	POTENTIAL IMPACTS	MITIGATION MEASURES
		-Grievance Mechanism awareness to all project affected parties

6. Environmental and Social Management Plan

The Section presents the Environmental and Social Management Plan (ESMP) which defines the basic management and monitoring measures that are needed to identify whether: a) impacts remain in conformance with predictions and applicable standards; and b) mitigation measures are effectively addressing impacts, and compensatory measures and offsets are reducing effects to the extent predicted. It is also to ensure compliance with the World Bank policies and The Gambia laws.

6.1. Objectives of The ESMP

The Objectives of this ESMP are to:

- Ensure environmental and social sustainability of the WASIB Project
- Provide a project specific environmental and social management guide to support the Consultant/NAWEC team during implementation
- Identify responsibilities for the various environmental and social management actions
- Provide an estimated budget for mitigation measures to ensure environmental and social issues and financial requirements are incorporated at the planning stage
- Provide direction and guidance to the contractors whose focus is usually getting technical works done
- Ensure the project is implemented according to environmental laws of The Gambia and environmental and social policies of the WB

6.2. ESMP Implementation and Monitoring Arrangements

6.2.1. Roles and Responsibilities for ESMP Implementation

Implementation of this ESMP is the responsibility of the Contractor and NAWEC Project Team. Most of the mitigation measures are the responsibility of the Contractor who will be carrying out the works according to the C-ESMP that will be based on the Project ESMP.

The Consultant/ NAWEC team will be responsible for overall follow-up, and to ensure that the ESMP is fully implemented with the support of the Environmental and Social Specialist. Specifically, the Consultant/ NAWEC team will include clauses in the Contractor's agreements that will ensure compliance, and coordination with the GM, among others.

Communities will also have the responsibility of ensuring that people avoid work sites and report to NAWEC or relevant authorities, issues of concern related to the Project; the WASIB Project Team and Contractor will engage the community regularly as an oversight measure in this regard and conduct sensitization sessions to ensure communities are aware of reporting measures and understand Project risks.

As the Secretariat of the EIA Working Group⁸, and supported by its members, NEA will be responsible for the overall external monitoring of the ESMP implementation; in collaboration with the WASIB Project Team ESS,

⁸ The EIA Working Group is one of nine multisector technical groups located at NEA. Nationally, NEA is the custodian of the ESIA process and is supported by a multisector EIA Working Group which comprises the public sector, private sector and civil society, and at the regional level, it is represented by the EIA/ANR (Agriculture and Natural Resources) Working Group sub committees of the Technical Advisory Committees (TAC). A major responsibility of the EIA Working Group (whether at central or regional level), is to provide support to the NEA in assuring the quality and integrity of the EIA process. Specifically, it:

they will monitor compliance with the national regulations and World Bank policies as they relate to the environmental and social aspects of this Project. In addition to the permanent members in the EIA Working Group, other institutions on ad hoc basis will include those specialized in social aspects such as the Women's Bureau, Department of Social Welfare, Department of Labor, and Department of Health Services, amongst others.

6.2.1.1. Institutional arrangement

The breakdown of the institutional arrangement for the ESMP implementation is as follows:

a) WASIB Project Implementation Team

The WASIB will consist of the following, among others:

- Project Coordinator/Manager
- Environmental and Social Specialist (ESS)
- Water Engineer (WE)
- Procurement Specialist
- GBV/Gender Specialist
- Monitoring and Evaluation Specialist (M&ES)

The NAWEC Team will oversee the implementation of this Project, including the ESMP. Its other responsibilities will include:

- Ensuring alignment of the environmental and social safeguards standards applied to the Project
- Working with the technical and procurement teams to ensure that contract documents contain environmental and social safeguard clauses that Contractors must fully implement
- Coordinating internal monitoring and evaluation of the ESMP based on monitoring plans
- Coordinating Project related grievance redress activities
- Where applicable, facilitating Project related activities of partner stakeholders

b) National Environment Agency

The NEA will be responsible for monitoring of the implementation of the ESMP, particularly the environmental component regarding the national legislation on Environment. According to Section 31 of the EIA Regulations 2014, NEA will monitor routinely to guide and audit the progress of the ESMP implementation to ensure compliance with national laws; NEA's mandate is to monitor the national environment, and so in collaboration with the project's safeguards specialists, can also monitor compliance with the Bank's policies as they relate to this Project. The monitoring visits should be at least once quarterly, to provide technical advice and support in project implementation.

Provides expert advice on the EIA process and review impact statements and ESMPs upon receiving requests

Approves impact statements and ESMPs

Conducts periodical environmental audits

Ensures that public consultations as part of the EIA process are done

6.2.1.2. Specific Roles and Responsibilities of Project Personnel

a) Project Coordinator (PC)

The PC will oversee the implementation of the Project, and consequently the ESMP and will have the responsibility for ensuring that implementation of the ESMP is carried out as required under the national law and the World Bank's Procedures.

b) Environmental and Social Specialist (ESS)

The ESS is responsible for validating the ESMP and obtaining the environmental compliance certificate and publishing the ESMP. The ESS will make sure that all environmental and social measures outlined in the ESMP are integrated in the bidding documents and in the companies' contracts. He will also ensure the approving of the contractors' C-ESMP.

The ESS will provide day-to-day management for all environmental and social issues and activities including implementation of the ESMP, in collaboration with NEA. He will prepare progress reports for submission to NAWEC Project and the Agence Française de Développement. He will also directly oversee the implementation of the capacity building of stakeholders on environmental and social safeguard.

c) Water Engineer (WE)

The WE will integrate 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 works breakdown structure or execution plan.

In collaboration with the ESS and other relevant members of the WASIB Project Team (including the Procurement Specialist and Financial Management Specialist) the WE 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.

- d) **Monitoring and Evaluation Specialist (M&ES)** Monitoring and evaluation activities are fundamental components of the ESMP to be carried out throughout the Project cycle. Monitoring of the ESMP implementation is normally the responsibility of the Consultant and NAWEC team, whereas evaluation is undertaken by an external entity. The M&E Specialist will coordinate internal monitoring and evaluation of ESMP implementation based on the monitoring plan. Table 30 summarizes the above write-up on the roles and responsibilities for the implementation of this ESMP.

Table 48: Summary of Roles and Responsibilities in ESMP Implementation

No.	Steps/Activities	Responsible	Collaborating Partners	Service Provider
Preparation of the works Contract documents, ESMP etc. in accordance with the national legislation/procedure (considering the World Bank's policy requirements)				
1	Preparation and approval of the Bidding documents/ Contracts	ESS; PC; WE	NAWEC and AFD	Consultant/ NAWEC
	Internal monitoring of ESMP implementation	ESS; PC; WE	ESS	Consultant/ NAWEC
	Report validation and issuance of the permit (when required)	ESS	ESS; NEA	Consultant; Agence Française de Développement
	Disclosure of the document	PC	NEA; NAWEC Management and AFD	Consultant/ NAWEC

No.	Steps/Activities	Responsible	Collaborating Partners	Service Provider
2.	(i) Integrating the mitigation measures of the construction phase and E&S clauses in the bidding document prior to being advertised, including SEA/SH action plan/requirements (ii) Ensuring that the contractor integrates relevant ESMP measures in the works breakdown structure or execution plan / C-ESMP	ESS	ESS; NAWEC; PSC; AFD; Engineer; Contractor	Contractor; NEA
3.	Implementation of the other safeguards' measures, including environmental monitoring (when relevant) and sensitization activities	ESS	WE; M&E; NEA and EIA Working Group; General public	Consultants Other relevant public institutions
4.	Oversight of safeguards implementation (internal)	ESS/PC	M&ES;	NAWEC MD and Management
	Reporting on project safeguards performance and disclosure	PC	M&ES; ESS; PSC	NAWEC MD and Management
	External oversight of the project safeguards compliance and performance	EIA Working Group/NEA	PC; M&ES; ESS-; AFD	NAWEC MD and Management
5.	Building stakeholders' capacity in safeguards management	ESS	PC; SSS; NEA; AFD	Consultant Other qualified public institutions

6.2.2. Institutional Training and Sensitization

It will be necessary to strengthen the capacity of members of NAWEC staff (including the ESS, etc.) on the safeguards and procedures. This will require organizing training workshops in the same manner as the on-going Training Program for NAWEC staff. Capacity building of NAWEC and other collaborating institutions to be started before the works begin.

In addition, public sensitization on the Project will be carried out to prevent complaints and conflicts, and to highlight community roles in promoting issues related to public health and safety. At this early stage WASIB should be focus on the capacity building of its staff. The main stakeholders will benefit from the capacity building in the next phase of the Project when the whole scope will be implemented.

Table 49: Capacity Enhancement Program for Effective ESMP Implementation

No	Identified Activity	Expected Output	Target Beneficiary	Budget (US \$)
Institutional Capacity – Technical skills development and awareness creation				
1	Capacity building of relevant NAWEC staff (2 days of training for 5 individuals included in TA contract)	Environmental and social safeguard issues understood including operationalizing and monitoring the GM Roles and responsibilities of NAWEC staff towards implementing the ESMP understood	NAWEC Senior Management Team and other relevant technical officers (E.g., Water department).	3,000
Public Sensitization - Education, communication, and information provision				
3	Public sensitization to raise awareness on the Project issues (such as project risks and benefits, developments, progress, GBV, SEA, VAC and GM etc.) through relevant radio and meetings as appropriate 5 meeting included TA contract	Increased community participation on environmental and social affairs related to the Project	General public, specifically communities where the Project will be implemented	5,500
TOTAL				8,500

6.2.3. Monitoring

Once the Project commences, including implementation of accompanying mitigation measures, monitoring must be carried out by the different stakeholders to ensure effectiveness in maintaining environmental and social sustainability. Monitoring will act as an oversight mechanism to remind and push the one responsible for mitigation that they are under guard and enforcement action may be executed upon them for any breaches.

Issues to be monitored include activities that have been identified earlier to have potential significant negative impacts on the environment and socio-economic parameters, and their corresponding mitigation actions. Routine monitoring may also identify new issues that have arisen due to changes (at the sites, or in Project design or activities) that will need alternative mitigation measures. Thus, appropriate mitigation will be developed accordingly.

Internal monitoring will be the responsibility of the Environmental and Social Specialist within the Consultant team, in addition to ensuring compliance with the World Bank's social and environmental policies.

The recommended arrangements and roles for implementing the ESMP will also be evaluated for completeness, and improvements suggested where necessary.

The NEA and other relevant institutions identified in the ESMP will monitor for compliance with requirements under Gambian law. Selected relevant TAC (Technical Advisory Committee) placed under the Governor of each region constituted with decentralized ministries in the regions) members (including the representatives of NEA and NAWEC who will provide leadership and technical support respectively) will conduct monitoring visits to the Project sites. TAC members whose sectoral expertise will not be useful, nor add value to the process, will not be included in the TAC monitoring team. This arrangement will ease coordination and lower expense on resources.

A monitoring plan with frequency and indicators is further outlined in Table 50, and an estimate for the cost of mitigation has also been provided in Table 51.

Table 50 : ESMP Monitoring Program

	Mitigation outputs to be monitored	Responsibility for mitigation	Monitoring Responsibility	Time to monitor	Monitoring frequency	Monitoring indicators
1	Protection of forest trees and effect on the environment, landscape, drainage, and wildlife	Contractor / NAWEC	NEA/DOF	During and after works	Monthly during implementation	No. of forest trees felled No. of forest trees pruned No. of wildlife species impacted No. of sensitization meetings on forest and biodiversity No. of nesting grounds protected Tree replacement plan implemented No. of reports of illegal activities
2	Protection against Gender Based Violence and Sexual Exploitation and Abuse	Community NAWEC	ESS with support from the Women's Bureau and Department of Social Welfare	Before and during project implementation	Quarterly	No. of sensitization meetings on the content of the code of conduct No. of women participating in consultations % of women PAPs addressed No. of community sensitization meetings where GBV/SEA and discrimination are discussed No. of meetings on GM % Personnel who have signed the CoC Number and type of complaints through the GMGM including SEA/GBV Number and type of complaints relating to discrimination exclusions from benefits and inequality (for example based on vulnerability such as sex, age, etc.) Number of women hired in the Project
3	Protection from Violence Against Children	Contractor / NAWEC	NAWEC WASIB ESS	Before and during project	Quarterly	No. of reports of child labor / abuse No. of women participating in consultations % Of children PAPs addressed

	Mitigation outputs to be monitored	Responsibility for mitigation	Monitoring Responsibility	Time to monitor	Monitoring frequency	Monitoring indicators
						No. of Community sensitization meetings where VAC issues are discussed No. of meetings on GM % Of personnel signing the Code of Conduct No. of reports of children involved in Project related accidents referred to assistance
4	Public and worker health and safety	Contractor	NAWEC ESS/NEA Beneficiaries	During land preparation, construction, and operation	Quarterly	No. of accidents related to the Project activities No. of health education / sensitization sessions No. of reports on works during nighttime No. of heavy vehicle/machinery left broken down No. of complaints /reports on lack of measures to address air polluting emissions No. of dust suppression equipment No. of protective gear provided to workers
5	Proper waste management	Contractor	NAWEC ESS/NEA	During works and operation	Quarterly	No. of waste dumps on and around sites No. of sensitization meetings on waste management No. of contracts that included waste management clauses Waste management plans developed No. of reports/complaints on waste management issues
6	Employ local labor	Contractor/ NAWEC	WASIB Project Team ESS /NEA/Labor Department	Before works and during works	Annually	No. of people employed from the local communities No. of contracts that specify use of local labor
7	Consultation and participation of beneficiaries	Contractor/ NAWEC	NEA/ WASIB Project Team ESS	Before and during works	Biannually	No. of consultative meetings with beneficiaries No. of complaints on lack of consultation

	Mitigation outputs to be monitored	Responsibility for mitigation	Monitoring Responsibility	Time to monitor	Monitoring frequency	Monitoring indicators
						No. of minutes /reports of consultations No. of persons in attendance

6.2.4. Reporting

As monitoring of the ESMP implementation falls under the general monitoring and evaluation system of the Project, its reporting should be synchronized. This will ensure efficient reporting and communication of the ESMP related issues to all relevant stakeholders for holistic management, particularly where changes for improvement are recommended.

It is recommended that the NEA submits annual reports to NAWEC (through the Consultant) on its monitoring of the ESMP implementation.

Where incidents or accidents occur that require immediate action, NEA shall report to NAWEC immediately, and NAWEC should in turn notify the Agence Française de Développement as soon as possible. Severe and serious incidents/accidents must be notified in the 24 hours/48 hours after being informed about the incident. An incident report will be provided to AFD, responding to questions in annex.

The Consultant and NAWEC, according to its work plan, shall submit all reports to the Agence Française de Développement for review.

6.2.5. Environmental Auditing

According to Part VI of the EIA Regulations, 2014, environmental audits should be carried out by the Project and the NEA. A systematic environmental audit shall evaluate predictions made during the ESMP study and determine the level of implementation of proposed mitigation measures. The audit may also identify potential impacts that have arisen due to any modification in planned design or activities, or changes to environmental and social parameters.

The Project may carry out self-audit to include review of its activities, the Project ESMP implementation, monitoring reports and any subsequent improvement measure, capacity, and communication between the affected stakeholders amongst others.

Whilst the self-audit is a routine activity of the Consultant, an independent environmental and social audit will be carried out midway during implementation of the ESMP and upon project completion, preferably by an external auditor to avoid conflict of interest.

Environmental Inspectors of the NEA are also empowered to carry out audits in their own time, with the aim of confirming that all mitigation measures are complied with, and any breach pursued for appropriate redress.

6.2.6. Budget for Implementation of the ESMP

The proposed budget for implementation of the ESMP is US\$ 48,500 as indicated in table below.

Table 51: Estimated Budget to Implement the ESMP

No.	Activity	Time Frame	Budget (US\$)	Responsibility implement measure	Responsibility to coordinate
1	Capacity Building				
	Capacity building of relevant NAWEC staff on environmental and social safeguards and their roles (International E&S training cost USD3,000 per year for Social, Environment and GBV Specialists)	Annually during project implementation	3,000	WASIB Project Team ESS	Consultant/NAWEC Management
	Public sensitization to raise awareness on the Project issues through relevant radio / TV programs and meetings	First and second quarter of the project implementation	5,500	WASIB Project Team ESS	Consultant/NAWEC Management/NEA
2	ESMP Implementation, Monitoring, Evaluation and Reporting				
	Implementation of the mitigation measures (This will pay per diem, fuel and transport reimburse for other stakeholders mobilized)	Annually during all phases (construction, operations, and maintenance)	5,000	WASIB Project Team ESS	NAWEC/Consultant
	Regular environmental and social monitoring of the implementation of mitigation measures and the activities.	Project implementation period	5,000	NEA/Consultant	NAWEC/Consultant
	Audit of environmental and social measures (Cost of annual audit)	During and after construction	10,000	Independent Consultant	NAWEC/NEA
3	Operation of the GM				
	Field investigations logistics and transport refund for GRC members	Project implementation period	5,000	GRC	NAWEC ESS
	Compensatory reforestation plan				
	Compensatory reforestation plan (based on 25% are coverage of 2,500 m ² per well for a total of 12 wells - 10 for Sifoe and 2 for Sukuta at a unit rate of 2USD/m ²)	Project implementation period	15 000	Forestry Department a compensatory reforestation plan	NAWEC in agreement with MoU
	TOTAL		48,500		

The starting depends on the bidding process which is in its final stage.

6.3. Matrix on the Mitigation of the Identified Potential Negative Impacts

Erreur ! Source du renvoi introuvable. illustrates the proposed mitigation measures for the potential impacts identified during all Project activities; specific mitigation measures have also been highlighted for the various activities

Responsibilities for specific mitigation measures, period of expected mitigation, and responsibility for monitoring have been identified.

Table 52: Potential Impacts and Corresponding Mitigation Measures

Activity / Issue	Potential Negative Impacts	Proposed Mitigation Measures	Mitigation Responsibility	Mitigation Period / Timeline	Monitoring Responsibility	Budget (\$US)9
CONSTRUCTION WORKS (LAND PREPARATION, EXCAVATION AND CONSTRUCTION OF BOREHOLES)						
Land clearance and preparation	Loss of vegetation in Kity and Sukuta Salagi Forest Park	Remove vegetation around borehole sites only as necessary	Contractor	Before and during works	DOF and NAWEC	-
		Cover area around the borehole foundations to facilitate revegetation	Contractor	During and after works	NAWEC	Contractor's budget
	Destruction of forest trees and effect on the environment, landscape, drainage, and wildlife	Compensatory reforestation will be developed and implemented in collaboration with the forestry department.	NAWEC	Before beginning of works	DOF	15 000
		Seek approval from DOF before forest trees are felled	Contractor	Before and during works	NAWEC and TAC with DOF leading the process	-
		Keep records (types and quantities) of all 'forest trees' to be felled				
		Educate and warn workers to avoid burning activities				
		Hunting by imported workforce will be prohibited:	Contractor	Before, during and after works	NAWEC/TAC	-

9 (No value = included in WASIB's safeguards activities)

Mitigation measures that are to be done by within the WASIB project have no budget attached as costs are included in the safeguards activities;

other measures without values have no mitigation costs such as community leaders encouraging women to participate in decision making, and reporting of illegal activities such as illegal falling of forest trees

Activity / Issue	Potential Negative Impacts	Proposed Mitigation Measures	Mitigation Responsibility	Mitigation Period / Timeline	Monitoring Responsibility	Budget (\$US)9
		All employees, including volunteers and sub-contractors encouraged to anonymously report suspected or actual acts of hunting/killing of wild animal by a fellow worker				
		Disciplinary measures must be applied	Contractor	During works	NAWEC/TAC	Contractor's budget
		The endangered and threatened species must be protected by enforcing more vigorously the relevant laws and regulations that prohibit its killing	Contractor/DOF	Before and during works	DOF/NEA/ NAWEC Environmental and Social Specialist	Contractor's budget
		Avifauna nesting grounds and migratory paths are to be protected	Contractor	Before and during works	DPWM NAWEC/ Environmental and Social Specialist	-
	Soil compaction from vehicles / machinery destroying land and causing erosion	Use only approved and existing routes	Contractor	During works	Regional TACs / Communities	-
		Do not establish new routes to access sites	Contractor	During works	Regional TACs / Communities	-
		Grade existing routes to improve surface drainage	Contractor	During works	Regional TACs / Communities	Contractor's budget
	Destruction and loss of cultural, historical, or archaeological sites	Inform relevant parties of the Chance Find Procedures and apply where applicable	NAWEC/ Contractor	Before and during works	NCAC, NAWEC Social Safeguards Specialist	-
		Consult with community to help identify any other cultural or spiritual sites of importance	Contractor	Before and during works	NCAC/ Regional TACs / Communities	-
	All Construction Activities	Nuisance from noise, vibration, and air pollution from dust or hydrocarbon non-combustion emissions	NAWEC Contractor	In contract before works, and during works	NAWEC Safeguards Specialist / TACs / Communities	-

Activity / Issue	Potential Negative Impacts	Proposed Mitigation Measures	Mitigation Responsibility	Mitigation Period / Timeline	Monitoring Responsibility	Budget (\$US)9
(During all land preparation and construction activities)		Works shall only be carried out during daytime	Contractor	During works	Regional TACs / Communities	-
		Use dust suppression measures such as dampening	Contractor	During works	Regional TACs	-
		Provide masks and necessary protective gear to workers with the aim of preventing dust related health problems and other dust nuisances	Contractor	During works	Regional TACs	Contractors' budget
		Use well-serviced equipment and machinery; avoid overloading that strains the engines	Contractor	During works	Regional TACs	Contractor's budget
		Trucks transporting sand and gravel must be covered to prevent dust and flying debris	Contractor	During works	Regional TACs	Contractor's budget
		Ensure that engines of vehicles and machinery are not idle for prolonged periods unnecessarily	Contractor	During works	Regional TACs	Contractor's budget
	Effects of improper management of wastes (solid and liquid/used oils, machine parts, and domestic and sanitary waste, excess materials left on sites, cement bags, etc.) on land, water, fauna, and public health	Develop a waste management plan including types of waste, expected quantities and frequency, proposed storage and disposal procedures and responsibilities, etc.	Contractor	Develop plan before works, and implement during works	NEA /NAWEC Environmental Safeguards Specialist	
		Do not burn any type of waste	Contractor	All phases	Regional TACs / Communities	-
		Set an internal supervision and monitoring system to ensure waste reduction and management	Contractor	Before, and implement during works	NEA / NAWEC Environmental Safeguards Specialist	Contractor's budget

Activity / Issue	Potential Negative Impacts	Proposed Mitigation Measures	Mitigation Responsibility	Mitigation Period / Timeline	Monitoring Responsibility	Budget (\$US)9
		Waste must be collected and stored for disposal or treatment at approved sites as per waste management plan	Contractor	During works	NEA / NAWEC Environmental Safeguards Specialist	-
		Clean waste such as cleared vegetation, packaging and rubble shall be given to workers or communities for reuse and recycling	Contractor	During works	NEA / NAWEC Environmental and Social Specialist	-
		Ensure waste management issues are incorporated in Agreements with the Contractors	NAWEC/Consultant	Before works	NAWEC Environmental and Social Specialist	-
	Unpleasing landscape and impact on aesthetics	Remove excess and unused materials and equipment from work sites	Contractor	During works	NEA / NAWEC Environmental and Social Specialist	-
		Replace lost vegetation cover	NAWEC /DOF	During and after works	Regional TACs	For MOU budget
	Risks to public health and safety during construction (at boreholes sites, trenches, within beneficiary communities etc.), from imported diseases, VAC, SEA, GBV, and work site hazards, etc.	Restrict and monitor public access to the work sites	Contractor/ communities	During the works	NAWEC	-
		Integrate staff training especially drivers on defensive driving	Contractor	Before and during works	NAWEC	-
		Cover up the trucks, to prevent wind blowing away sand and gravel to generate dust	Contractors	In contract before works and during works	Regional TACs	Contractor's budget
		Initiate sensitization and education programs for communities and workers on the dangers and mitigation measures to address STIs	NAWEC Contractor	In contract before works and during works	NAWEC Environmental and Social Specialist	Included in Works/TA budget
		Carry out active monitoring of workers (screening, testing, and analysis of such recorded data, etc.) to take timely action through treatment and health education to prevent spread of diseases	Contractor	Before and during works	Regional TACs with Department of Health Services leading	Contractor's budget

Activity / Issue	Potential Negative Impacts	Proposed Mitigation Measures	Mitigation Responsibility	Mitigation Period / Timeline	Monitoring Responsibility	Budget (\$US)9
		Ensure surroundings are safe and secure for all (implement health and safety plan, coordinate, inform, supervise and monitor)	Contractor	Before and during works	Regional TACs with Department of Health Services leading	Contractor's budget
		Employ local unskilled workers to enhance community cohesion as local workers will know the community better, its culture, norms, and values, which may also help in reducing the risks of GBV, VAC and STIs.	Contractor	Before and during works	NAWEC	-
	Risk of violence against children and women	Ensure enforcement and adherence to Codes of Conduct for addressing VAC, GBV, and SEA, including regular monitoring and awareness building of the Codes of Conduct	Contractor	Before and during works	Regional TACs, Communities / Department of Labor	Contractor's budget
		Do not employ or exploit children for project works	Contractor	Before and during works	Regional TACs, Communities / Department of Labor	-
		Conduct community sensitization meetings on the need for everybody to benefit from project activities irrespective of gender (inclusive access to benefits)	NAWEC/ Project Affected Community Leaders	Before works	Regional TACs where NAWEC is co-opted as a member	Included in TA
		Ensure awareness of the GM and its SEA/SH related procedures	NAWEC	Before and during operation	NAWEC Environmental and Social Specialist	-
		Monitor risks for escalating tensions	Affected communities	All phases	NAWEC Environmental and Social Specialist	-
		Encourage women and other vulnerable groups to raise their concerns safely and anonymously, if they so choose.	NAWEC Project Affected Communities	All phases	NAWEC Environmental and Social Specialist	-
		Encourage women to enlist for employment in project activities without any impediments put in their way	Contractor	All phases	NAWEC Environmental and Social Specialist	Contractor's budget

Activity / Issue	Potential Negative Impacts	Proposed Mitigation Measures	Mitigation Responsibility	Mitigation Period / Timeline	Monitoring Responsibility	Budget (\$US)9
		Contractor to develop a hiring plan that would include hiring labor from within the community giving equal opportunity to men and women Enforce and monitor Codes of Conduct for workers and all those involved in the project Sensitize about the Codes of Conduct for workers and community Ensure survivor-centered approach to address GM as per the procedures in the GM (and Codes of Conduct) Conduct periodic training of employees on the codes of conduct and related procedures				
		Include the above measures in bidding documents including, codes of conduct for GBV, SEA/SH and VAC, for contractors to enforce on their employees	NAWEC	Before works	NAWEC Environmental and Social Specialist	-
	Risks to health and safety of workers (work related stress, heat stress, mechanical accidents, human conflict, wildlife attacks, poor handling techniques, diseases etc.).	Provide induction and training on the job, safety issues and other relevant ESMP requirements	Contractor	Before and during works	NAWEC	Contractor's budget
		Make the hiring medical examination for all workers compulsory	Contractor	Before and during works	NAWEC	Contractor's budget
		Sensitize on interpersonal relationship management between and among workers and community members; set codes of conduct	Contractor	Before and during works	NAWEC	Contractor's budget
		Provide appropriate protective gear (helmets, masks, safety goggles, hand gloves and rubber boots, etc.) to workers	Contractor	Before and during works	WASIB Project's Social Safeguards Specialist / Regional TACs	Contractor's budget

Activity / Issue	Potential Negative Impacts	Proposed Mitigation Measures	Mitigation Responsibility	Mitigation Period / Timeline	Monitoring Responsibility	Budget (\$US)9
		Provide fire extinguishers and first aid kits including training on their use	Contractor	Before and during works	NAWEC Environmental and Social Safeguards Specialists / Regional TACs	Contractor's budget
		Provide constant supervision and record and report incidents to address causes for preventing recurrence and promoting improvement	Contractor	During works	NAWEC Environmental and Social Safeguards Specialists / Regional TACs	Contractor's budget

Considering the evaluation of the potential impacts of the Project, and the recommended mitigation measures, it is concluded most of the adverse environmental impacts are short-term, localized, and small scale, and can be mitigated through this ESMP. With full implementation of the ESMP in a timely manner, the beneficiaries will be better-off with the Project than without it.

7. Stakeholder mapping and engagement

7.1. STAKEHOLDER IDENTIFICATION AND ANALYSIS

Overall, the very purpose of stakeholder identification is to determine groups and individuals likely to be directly or indirectly affected (positively or negatively) or to have an interest in the project. In order to develop an effective plan, the identification of stakeholders takes account of the interests of the stakeholders in the project, participation needs, level of vulnerability, expectations in terms of participation and priorities of the stakeholders.

Project stakeholders are defined as individuals, groups, or other entities who:

- (i) are impacted or likely to be impacted directly or indirectly, positively or adversely, by the Project (also known as ‘affected parties’). This includes project beneficiaries; and
- (ii) may have an interest in the Project (‘interested parties’). They include individuals or groups whose interests may be affected by the Project and who have the potential to influence the Project outcomes in any way.

Cooperation and negotiation with the stakeholders throughout the project development process often also require the identification of persons within the groups who act as legitimate representatives of their respective stakeholder group, i.e., the individuals who have been entrusted by their fellow group members with advocating the groups’ interests in the process of engagement with the project. Community representatives may provide helpful insight into the local settings and act as main conduits for dissemination of the Project-related information and as a primary communication/liaison link between the Project and targeted communities and their established networks. Verification of stakeholder representatives (i.e., the process of confirming that they are legitimate and genuine advocates of the community they represent) remains an important task in establishing contact with the community stakeholders. Legitimacy of the community representatives can be verified by talking informally to a random sample of community members and getting their views on who can be representing their interests in the most effective way.

7.2. Methodology

To identify the stakeholders, the following activities were undertaken:

- a) Meetings with different public institutions and the main project stakeholders
- b) Review of the relevant literature
- c) Consultations with the direct and indirect stakeholders.
- d) **Affected Parties** –These are stakeholders likely to be affected by the WASIB project because of actual impacts or potential risks to their physical environment, health, security, cultural practices, well-being, or livelihoods and may include individuals or groups, including local communities, persons, groups and other entities within the project area of influence that are directly influenced (actually or potentially) by the project and/or have been identified as most susceptible to change associated with the project, and who need to be closely engaged in identifying impacts and their significance, as well as in decision-making on mitigation and management measures. This group includes Project Affected People (PAPs) who may be negatively impacted by the project’s development through loss of land, livelihoods, or from potential nuisance’s (noise, dust, traffic) or other social-cultural impacts. It also includes project beneficiaries, i.e. the communities that will benefit from the water generated and distributed by the WASIB project.
- e) **Other Interested Parties** – refers to individuals, groups, or organizations with an interest in the WASIB water distribution performance it will produce, which may be because of the project location, its characteristics, its impacts, or matters related to public interest. For example, these parties may include regulators, government officials, the private sector, the scientific community, academics, unions, women’s organizations, other civil society organizations, and cultural groups.

- f) **Vulnerable Groups** – persons who may be disproportionately affected or further disadvantaged by the project(s) as compared with any other groups due to their vulnerable status^{5F10}, and that may require special engagement efforts to ensure their equal representation in the consultation and decision-making process associated with the project.

7.3. Affected Parties

Affected Parties include landowners of WASIB affected areas, local communities living in and around the boreholes' sites and the water transmission infrastructure. Table 3 below, provides the affected parties in terms of those likely to be affected negatively directly and others likely to be affected positively.

Table 53: Summary of Stakeholders showing their roles and interest in the project

Group/Parties	Stakeholders
Affected Parties	People affected by the Project: landowners, female groups, agricultural laborers, local community from affected areas villages, and vulnerable groups, project beneficiaries.
Interested Parties	Central Government: Ministry of Petroleum and Energy, National Water and Electricity Company Limited, Ministry of Environment, Climate Change and Natural Resources, National Environment Agency, Ministry of Finance and Economic Affairs, Public Utilities Regulatory Authority, Ministry of Lands and Regional Government and its Physical Planning and Housing Department, Department of Forestry, Ministry of Agriculture, Department of Parks and Wildlife Management, Ministry of Health and Social Welfare and its Department of Health Services, National Council for Arts and Culture, Department of Women's Affairs, Department of Youth and Sport, and National Disaster Management Agency, the private sectors and all those who depends on water for their business or activities. Local Government Officials: Governor of West Coast Region and Combo different Chiefs. Community Leaders and Representatives of Affected Groups in Districts and Settlements: Seyfos (Districts), Alkalos, Village Development Committees, active NGOs, Religious bodies, Youth Groups, and Cultural groups. Other water actors: NAWEC, PURA, MoPE, MoFEA, AFD. Private Sector: Private sector actors (national and international) who would be interested in contracts associated with the project (studies, construction, supervision, audits etc..)

7.4. Disadvantaged and Vulnerable Groups

Vulnerability may stem from a person's origin, sex, gender identity, sexual orientation, age, health condition, economic deficiency and financial insecurity, disadvantaged status in the community (e.g., minorities or fringe groups), or dependence on other individuals or natural resources, etc. Due to their status, they may not be adequately consulted about the project partly because of their inability to attend meetings or failure to understand the language that the meeting is being conducted. These and other factors can combine to reduce their access to potential project benefits. This category will therefore require specific measures and/or assistance

¹⁰ Vulnerable status may stem from, among other things, an individual's, or group's race, national, ethnic, or social origin, color, sex, sexual orientation, gender identity, language, religion, political or other opinion, property, age, culture, literacy, sickness, physical or mental disability, poverty or economic disadvantage, and dependence on unique natural resources.

to address their vulnerability to certain risks, including SEA/SH and VAC. Within the Project, the vulnerable or disadvantaged groups will include, but are not limited to, the following:

- Sex workers
- Female-headed households,
- People living with HIV/AIDS and other chronic diseases
- Women leading business
- Women farmers
- Farmers including women farmers
- Persons living with disability in the project areas
- Elderly (65 years old for the male and female persons in project areas)

To ensure adequate engagement with the vulnerable individuals and groups often requires the application of specific measures and assistance aimed at facilitating their participation in project-related decision-making so that their awareness of and input to the overall process are commensurate to those of the other stakeholders.

7.5. Summary of project stakeholder needs

Table 4: below presents a summary of the needs of different groups of stakeholders in terms of language, means of communication and any special needs.

Table 54: Summary of project stakeholder needs

Stakeholder Groups	General Composition	Language requirements	Preferred means of communication (e-mail, phone, radio, letter)	Special needs (Access, meeting times etc.)
Government Ministries & Technical Depts.	Comprise advisers/ experts in Energy, finance, local government authorities, trade, gender, and youth affairs	English	Letters, emails, meetings/workshops & video conferencing	Need to have advance notice for meetings and should preferably take place during working days
Media	Several outlets including print and electronic, (radio, newsprint, and television)	English Local Languages	Mails, emails meetings & video conferencing	Need to have advance notice for meeting and should preferably take place during working hours
Local Communities in the Greater Banjul Area	Men, women, young people, and the elderly who live in villages and neighbourhoods bordering areas where boreholes and water transmission infrastructure are being built.	Local languages	Prospectus, fliers, Communication through radios and television, community meetings, Creation of WhatsApp group	Information in local languages through private/community radios

Stakeholder Groups	General Composition	Language requirements	Preferred means of communication (e-mail, phone, radio, letter)	Special needs (Access, meeting times etc.)
Disadvantaged and Vulnerable groups	Comprise women, the elderly, and persons with disabilities, persons suffering from HIV/AIDS and other chronic diseases, sex workers	Local languages	Prospectus, fliers, Communication through radios and television Creation of WhatsApp group, focus group meetings with groups of vulnerable peoples, community meetings	Targeting with special assistance of NGOs Information in local languages through private/community radios
Contractors and service providers	These include firms to carry out the construction works and provide supplies etc.	English and local languages	Letters, emails, meetings, announcements through the media, informational sessions on project opportunities	Need to give information wide publicity through media when tenders are placed.

7.6. STAKEHOLDER ENGAGEMENT PLAN (SEP)

7.6.1. Purpose and Timing of Stakeholder Engagement Plan

Stakeholder engagement is an inclusive and iterative process conducted throughout the project life cycle. It is a process that enables the project to engage beneficiaries and stakeholders regularly to improve the environmental and social sustainability of the Project, enhance project acceptance, and make a significant contribution to successful project design and implementation.

7.6.2. Proposed strategy for consultation

The proposed strategy for consultation is described in the following table.

Table 55: Proposed strategy for consultation

Project stage	Topic of consultation / message	Method used	Timetable	Target stakeholders	Responsibilities
IMPLEMENTATION PHASE					
Development and Sensitization of E&S instruments	- SEP, RAP, and ESMP requirements - GM procedures including SEA/SH reporting - Messages on SEA/SH and VAC risk mitigation and response - Role of the communities	- Meetings - Workshops - Community/local radios - Traditional notifications including drama groups, town criers - Separate meetings with community women in small groups facilitated by a woman - Billboards	At the start of the project and throughout the implementation	- Local communities - Vulnerable groups including women (sex workers, child vendors) - Village development committees - Governors - Community elders-chiefs and Alkalos - SEA/SH service providers	NAWEC/
Information & Sensitization about ESIA & RAP	- ESIA, ESMP, RAP - Start date of civil work	Meetings Workshops	At the start of the project and throughout the implementation	Government technical departments Governor	NAWEC/ Contractors, and Consultants

Project stage	Topic of consultation / message	Method used	Timetable	Target stakeholders	Responsibilities
Preparation and implementation	- Impacts, mitigation measures - SEA/SH and VAC Action Plan - Cut of date, compensation measures - Assistance of PAP & vulnerable persons	Community/local radios Traditional notifications drama groups, town criers Separate meetings with community women in small groups facilitated by a woman Billboards		Local communities Vulnerable groups including women (sex workers, child vendors) Village development committees Community elders-chiefs and Alkalos SEA/SH service providers	

7.6.3. Proposed strategy to incorporate the view of vulnerable groups

The project will carry out targeted stakeholder engagement with vulnerable groups to understand their concerns and needs in terms of accessing information on the project. These will include arranging special meetings with them at a more convenient place and time (not during mosque day, or during time women are at the market or busy with child rearing duties, accommodating methods and places to ensure elderly and persons with disabilities are included, safe/confidential spaces for women, led by women, etc.). Similarly, women and girls, for instance, should be independently consulted in safe and enabling environments and grouped by age ranges with female facilitators leading the group discussions, especially in the case of sensitive topics such as SEA/SH risk and sex workers. During the project phase it is also recommended to closely work with NGO specialized in working with vulnerable groups so that the right approach will be taken to incorporate their views and concerns. For the physically challenged persons with visual and hearing impairment, for example this may require providing transportation to the meeting venue and having the information translated into sign language.

7.6.4. Reporting back to stakeholders

The Ministry of Petroleum and Energy through the NAWEC will document all program activities, and the consolidated reports will be made available to the stakeholders and the relevant authorities. As necessary during project implementation, the SEP will be periodically revised and updated to ensure that the information presented therein is consistent and is the most recent. The review will also assess whether the identified methods of engagement remain appropriate and effective in relation to the project context and specific phases of the development. Any major changes to WASIB related activities will be reflected in the SEP.

7.6.5. Information on public engagement activities undertaken by the Project will be conveyed to the stakeholders through publication of the reports on the project website, social media, WASIB office etc. Communication plan

The proposed stakeholder engagement strategy presented above will help increase awareness raising among the stakeholders, particularly amongst the most vulnerable about the project and its activities and their roles in its implementation. To ensure an effective delivery system, NAWEC will develop a communication plan that takes account of the stakeholders' needs and preferences in terms of information during the implementation.

7.7. Resources and Responsibilities for implementing stakeholder engagement activities

7.7.1. Resources

The environmental and social Specialist recruited by NAWEC will be in charge of stakeholder engagement activities and the team will oversee the consultation/communication activities of the SEP to be carried out by the Consultants, the contractors and the Project itself.

7.7.2. Management functions and responsibilities for managing the Stakeholder Engagement Plan

Overall responsibility for the project will lie with the Ministry of Petroleum and Energy and NAWEC, which will host the WASIB Project Management Unit that will be responsible for the day-to-day management and coordination of project activities. The MOPE, NAWEC, and the WASIB for this project. Given the magnitude of WASIB activities, it is required to improve the PIU's ability to manage the environmental and social risks (including SEA/SH risks) of the project.

- **The Consultant and NAWEC** will oversee the day-to-day management of the project. This includes coordinating and overseeing implementation of this SEP and communication activities
- **The environmental and social team of the WASIB project** will be directly responsible for coordinating the implementation of the stakeholder engagement activities, in consultation with other members of the PIU.
- **The E&S Specialist** will be responsible for the coordinating the implementation of the GM
- The media (both print and electronic as well as private or public) in close collaboration with the Project Team will carry information about the project to the wider public

The stakeholder engagement activities will be documented through:

- Monthly/quarterly reports
- MOPE and NAWEC websites, (social media, including Facebook page, and other sites), radio (both national and local) and television
- Letters and press releases
- Billboards

The Stakeholder engagement plan will be incorporated in the Project Implementation Manual and the Annual Work Plan and Budget.

The success of the implementation of this ESIA/ESMP and by extension the overall project sustainability will depend on how these groups are engaged during project preparation and implementation. To ensure that an enabling platform for consultation is prepared, the ESIA team consulted all the identified stakeholders; they were followed up with phone calls and visits to their offices and venues of meetings.

7.7.3. Institutional consultations

Consultations with key national institutions were undertaken in the form of meetings (Key Informant Interviews) using mainly unstructured methods. The stakeholders consulted for this project included: the NAWEC/WASIP Project at Fajara; National Environment Agency (NEA); Department of Parks and Wildlife Management (DPWM); Department of Forestry (DoF); Department of Water Resources (DWR); National Roads Authority (NRA); Office of the Governor of West Coast Region; CEO of Brikama Area Council; etc. **Appendix 5.2** shows the institutions and communities consulted. Figures below show the meetings with the national regulatory institutions.



Figure 48 : Consultation with officials of NEA and Forestry Department in Brikama (WCR)



Figure 49 : Consulting with Governor



Figure 50 : WCR - Meeting the Director General - NRA

7.7.4. Consultations with stakeholder communities

The host communities, including Sifoe, Nyofeleh, Busuranding Sinchu Alhaji, etc. are the primary stakeholders who will be directly impacted by the proposed project. In this regard, some of the communities were consulted through community meetings, focus group discussions, and administering of semi structured questions with individuals operating small scale business along the proposed pipelines routes. **Figure below shows the Consultants discussing with roadside auto mechanics in Brikama city.**



Figure 51 : Consulting roadside auto mechanics in Brikama city

As with all others consulted, the project components and activities were discussed at the meetings, emphasizing the potential negative and positive impacts as well as proposed mitigative measures for the negative impacts. Vital information about the entire project areas were elicited from community members during the meetings. Everyone present was encouraged to participate actively and given sufficient time for each participant to express his/her views on the issues. An important aspect of the project that was provided at the meetings was the Project's Greivance Resolution Mechanism (GRM), the framework that provides the communities the possibility to address their grievances including during resettlement exercises. Figures bellow show part of the community meetings at Nyofeleh and Sifoe. Fears and concerns raised during the various meetings were noted to be included in the project design.

7.7.5. Stakeholders' opinions about the project

All the stakeholders met unanimously expressed their happiness for the project to have increased access to clean and safe water. Since "water is life", meaning without water, no life, having clean water will have positive impacts on their health. In addition, they will be able to water their small ruminants.



Figure 52 : Meeting at Nyofeleh



Figure 53 : Community meeting at Sifoe

8. Grievance Mechanism

8.1. Purpose

A Grievance Mechanism is necessary for addressing the concerns of the PAPs. It is anticipated that some of these concerns may include eligibility criteria, and compensation entitlements for loss of livelihood or use of land, complaints from project workers or from affected community members. The grievance mechanism will be also able to safely and ethically manage allegations related to Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH), including the development of clear procedures clearly mainstreamed in every phase of the GM. An appropriate response protocol is implemented by NAWEC for other projects under implementation. For the sake of efficiency, WASIB project should be aligned to those Grievance Mechanism process rather than developing a new one.

The project-level GM mechanism for addressing grievances includes the following principles:

- Provision for the establishment of a grievance redress committee (see GRC members below)
- Multiple grievance uptake locations and multiple channels for receiving grievances which are adapted to the different groups, including the most vulnerable and confirmed by them during consultations as safe and accessible.
- Fixed service standards for grievance resolution, include adjudication process and management of claims related to Gender-Based Violence (GBV), including SEA/SH and Violence Against Children (VAC) Prompt and clear processing guidelines (including reviewing procedures and monitoring system)
- A time frame for responding to grievances and a relevant notification system for the cases of SEA/SH.
- A reliable and effective reporting and recording system. A separate procedure is required that enables efficient, safe, and ethical reporting for SEA/SH complaints as described in section.
- Procedure for assessing the grievance and keeping all relevant parties informed, including GBV survivors for SEA/SH-related complaints.
- Grievance escalation model

The Grievance Mechanism was designed with the objective of solving disputes at the earliest possible time before they escalate. Agence Française de Développement ESS 5 emphasizes that the affected parties and interested parties should be heard and as such, they must access a fair, transparent, and accessible means to address their concerns and views related to the project. Furthermore, the mechanism should be effective in addressing concerns at project-level so that future incidents including those related to SEA/SH are reduced, and grievances are not referred through the court system for resolution, especially since the court system may not be financially accessible to all and may add cost and time burdens. However, all affected persons will have access to use the court system if they prefer. In addition, in situations where a grievance falls within the penal code, specific coordination should be established with relevant authorities on the matter.

For issues regarding SEA/SH and VAC-related claims, please see the procedures set forth below and the Response Protocol, which will be developed prior to the beginning of activities.

8.2. Resources and Responsibilities for Implementing Stakeholder Engagement Activities

8.2.1. Human Resources and Implementation

The NAWEC appointed community liaison officers (CLO) **Baboucar Corr** to conduct stakeholder outreach during project implementation and respond to any grievances or complaints that may arise. The CLO will act as key points of contact to bring project grievances from affected persons, stakeholders, construction workers, residents, and community members to the Grievance Redress Committee (GRC). The CLOs will be responsible for making sure the recommendations of the GRC are implemented during ESMP and RAP implementation and directing contractors to make any appropriate adjustments to their work. The CLO will also verify that it has been implemented and reach out to the complainants to ensure there are no outstanding issues to address, and the complainant is satisfied. For SEA/SH related complaints, there will be a separate protocol related to follow-up that is currently being developed. The contractor shall take actions to address grievances in line with the ESMP, areas of responsibility as per the Code of Conduct, and national law.

8.2.2. Management Functions and Responsibilities

During the implementation phase of the Project, the mechanism for grievance redress will include:

- Provision for the establishment of a grievance redresses committee (already completed by NAWEC with a sitting allowance budgeted for the GRC members Multiple grievance uptake locations and multiple channels for receiving grievances [NAWEC hotline 1266, NAWEC website and Facebook, NAWEC WhatsApp, NAWEC office, Alkalo/VDC]) which are adapted to the different groups, including the most vulnerable who may not have access to communication technology, electricity, may be illiterate or have disabilities.
- Fixed service standards for grievance resolution, include adjudication process
- Prompt and clear processing guidelines: including reviewing procedures and monitoring system (see flow chart on GM chapter)
- A time frame for responding to grievances
- A reliable and effective reporting and recording system (grievance register, complaints logbook – both hard copy and e-copy) (See annex for grievance log for non-SEA/SH complaints)
- Procedure for assessing and responding to the grievance
- For SEA/SH cases, a protocol to refer GBV survivors to appropriate care and managing sensitive data to be developed and successively annexed to this document once it has been approved by the Bank.

8.3. Roles and responsibilities

- a. **The Grievances Redress Committee (GRC):** (the membership of the GRC is below **Project Level Grievance Mechanism**) will be responsible for receiving and resolving grievance in a fair, objective, accountable, effective, timely and accountable manner. All concerns or complaints raised by project affected persons (PAPs) in the communities during all phases of the project lifecycle. The broad Responsibilities of the GRC include:
 - Developing and publicizing the grievance management procedures
 - Receiving, reviewing, investigating, and keeping track of grievances
 - Adjudicating grievances
 - Capacity building of all actors working in the GM, and among contractors and community of how the GM works
 - Monitoring and evaluating the fulfillment of agreements achieved through the grievance mechanism.

Community liaison officer (CLO): The NAWEC will appoint the community liaison officer (CLO) **Baboucarr Corr**. His contact information will be published and communicated via public announcements and information sharing about the project, (radio, television, newspapers, mosques, etc.), to conduct stakeholder outreach during project implementation and respond to any grievances or complaints that may arise. The CLO will act as the key point of contact to bring project grievances from project affected people, construction workers, residents, and community members to the GRC. The CLO will be responsible for making sure the recommendations of the GRC are implemented and directing NAWEC during ESMP and RAP implementation, and contractors to make any appropriate adjustments to their works. The contractor shall take actions to address grievances in line with contracts arrangements, relevant signed codes of conduct, as well as national law.

In addition to the community liaison officer, the project will make available grievance forms in every village (Alkalo or VDC) as an accessible venue for filing a grievance. In collaboration with the communication and IT team, NAWEC Hotline will be also available to receive complaints anonymously. Every end of month, NAWEC liaison officer will collect forms filled out to submit them to the GRC.

For illiterate persons, NAWEC liaison officer or VDC will assist them to write and submit complaints. To be sure that adequate confidentiality will be kept, the Project will issue a form to be filled out by the VDC, liaison officer and other Project's staff agreeing to confidentiality and ethical and accurate depiction of the grievance. This is in addition to Codes of Conduct which will be signed by all workers in the project, including the Consultant and NAWEC.

- b. The contractor:** During the implementation, contractors will work in the respect of the World Bank standards on Environmental, Social, Health and Safety (ESHS) and Occupational Health and Safety (OHS) in the workplace and on their relationship with affected communities. The application of these Codes of Conduct will help ensure the Project meets its ESHS and OHS objectives, as well as preventing and/or mitigating the risks of GBV and VAC on the project and in the local communities. Contractors should make sure these Codes of Conduct are adopted by those working on the project and are meant to:

- Create awareness of the ESHS and OHS expectations on the project
- Create common awareness about GBV and VAC and ensure a shared understanding that they have no place in the project; and create a clear system for identifying, responding to, and sanctioning GBV and VAC incidents as per GM dedicated procedures on SEA/SH complaints to be further developed.

One code of conduct will be enforced and monitored for compliance.

The code of conduct will be explained and displayed in the work sites, workers and affected communities will be sensitized prior to works start and during all the Project implementation life (Sensitization campaign every month for the affected communities and every week for workers). Every new worker will receive a training on these subjects before they start working and will receive a copy to be signed. The contractor liaison officer will work closely with NAWEC/Consultant safeguards team to notify the GRC of all complaints and special cases which affect the codes of conduct. It will also partner with Power Webb to develop special procedures for SEA/SH cases.

8.4. Objectives

The key objectives of the GM are:

- Record, categorize and prioritize the grievances according to severity and immediacy of the issue, and provide timely, fair, accountable resolution to grievances at the project level
- Settle the grievances via consultation with all stakeholders (and inform stakeholders of the solutions, obtain their views on the outcome, and ensure they understand possible next steps to escalate if they are not satisfied with the outcome)
- Forward any unresolved cases to the relevant authority if relevant
- Regularly analyze grievances to assess if there are systemic issues in the project that should be addressed to mitigate the same types of issues being reported.
- To be responsive and transparent with the complainant by relaying information about the status, progress and results of the case and receive feedback from them and record this feedback.

- Have a systematic and clear record of tracking the resolution of complaints (both for SEA/SH and non-SEA/SH cases – both having separate procedures for record keeping)

The GM operates within the existing legal, cultural and community context framework of The Gambia. However, the GM process include taking into consideration WB procedures and recommendations. The details of each level of Grievance Mechanism are described as follows.

8.5. Community Level Grievance Mechanism

Local communities have existing traditional and cultural grievance mechanisms. It is expected that some minor disputes at the community level may be resolved using these mechanisms, without the involvement of the Project, contractor(s), and or Government representatives at local and national level. This does not hold true for allegations related to sexual exploitation and abuse and community sensitization should really reinforce this point. The extended family, village and/or chiefs may be involved at this level. For example, if there is a complaint that the contractor recruited someone to work in the project from among community members, but a person may feel that the process was unclear or unfair. This can be dealt with at the local level by explaining what the process was and if necessary, making commitments to address a concern if some community members were not aware of the process by engaging in a community consultation. Also, if the contractor wants to compensate the community for using their sand, gravel or because of the impact of its activity is causing a disturbance, (i.e., dust dispersion), those grievances can be solved at the community level, without the GRC, if the community so chooses, bearing in mind that the World Bank's Operational Policies apply as it relates to fair compensation.

8.6. Project Level Grievance Mechanism

Many projects related grievances during the works are minor and site-specific. Often, they revolve around nuisances generated during construction such as noise, dust, vibration, workers disputes, etc. They can be resolved easily on site.

However, regarding disputes that include differences between households over land, or boundaries, even on issues triggered indirectly by the Project during its lifecycle, the GM will involve Chiefs, Alkalo, the Project, landowner(s) concerned, and if required, the representative from the Ministries of Local Government and land and the one of Petroleum and Energy.

Composition and membership of the GRC:

A Project Liaison Officer, Baboucarr Corr who is situated within NAWEC will be designated to receive, review, record, and address project related complaints. Two times per week, the safeguards team will collect complaints to submit to the GRC.

The GRC meets at least once per month, depending on the number and type of complaints received as well as the urgency of the complaint, it may meet on an ad hoc basis.

The Alkalo, VDC and Contractor Liaison Officer will contact the WASIB project safeguards team in case a complaint is not resolved within one week. After receiving the alert, the Project Grievance Redress Committee will review available information and verify the claim. The complainant will be notified that further information is being collected and keep those person/persons informed about the status.

These complaints will be submitted to the Project Grievance Redress Committee. It is represented by its permanent member:

- Rep Brikama Area Council
- Baboucarr Corr, NAWEC safeguards team
- Chief Kombo Central
- Rep Chief Kombo North
- Rep Chief Kombo South
- Forestry Department, Ministry of Environment, Natural Resources and Climate Change

- WASIB Project Coordinator
- National Environmental Agency, Ministry of Environment, Natural Resources and Climate Change
- TANGO (NGO)
- Lands and Survey Ministry of local Government and Lands

The GRC will include non-permanent member depending on the community affected or where the complaint come from. For example, if the complaint come from Jabang or Latrya, the VDC and Alkalo or Imam of that area will become non-permanent member during that GRC meeting to statute on the complaint regarding their community.

8.7. Procedures

The community will be informed and sensitized about the use and existence of the GM (through radio notices, TV, communities, community signage, Imam/religious leaders) of the various uptake options where complaints can be submitted (for example, to the Alkalo, VDC, the NAWEC office, the NAWEC website, hotline, and social media).

Notices and signage will be erected at all sites providing the public information on the Project and summarizing the GM process, including contact details of the relevant Project Liaison Officer, Contractor Liaison Officer or Community Liaison Officer. Everybody will be able to lodge a complaint at multiple uptake locations and the methods (grievance forms submitted to the Project, in person, telephone, email, NAWEC website, hotline) or via the contractor or VDC. All possible complainants should be free to lodge a complaint in one or as many of the uptake stations note above.

A Complaints Register will be at the WASIB project office but also with contractors, VDC or Alkalo, who will log the: i) details and nature of the complaint (include categorization of sensitive/urgent, non-sensitive); ii) the complainant name and their contact details if known; iii) date the complaint was received; iv) corrective actions taken in response to the complaint; v) the date the response was made available to the community (without identifying personal details) and the complainant; vi) the resolution; vii) the response of the complainant if response was acceptable to them or not; viii) the name of the person who received the complaint and location/method the complaint was lodged. This information will be included in NAWEC's WASIB progress reports to the AFD.

Escalation of Grievances: if the complaint is not resolved to the satisfaction of the aggrieved party by the Grievance Redress Committee, it will then be referred by the NAWEC Project Coordinator to the National Steering Committee (NSC).

The NAWEC National Steering Committee (NSC) is composed of:

- Chair, Permanent Secretary Ministry of Petroleum and Energy
- Permanent Secretary of Ministry of Women Affairs
- National Environmental Agency
- PCU Ministry of Finance and Economic Affairs
- Ministry of Finance and Economic Affairs
- Managing Director of NAWEC
- NAWEC WASIB Project Coordinator
- Director of Petroleum, Water and Electricity Regulation at Public Utility Regulation Authority
- Permanent Secretary Ministry of Lands and Local Government
- Permanent Secretary Office of the President
- Permanent Secretary Ministry of Women's and Social Welfare

The NSC (will meet at least once per quarter) will be required to address the concern within 30 days if the request for escalation was made.

Should measures taken by the National Steering Committee fail to satisfy the complainant, the aggrieved party is free to take his/her grievance to the Gambia judicial court (District Tribunals or Magistrates Court).

8.8. Procedures for management of SEA/SH-related complaints

8.8.1. Step I: Uptake

The Children's Act protects all the children in The Gambia without discrimination. The best interest of the child should be the primary consideration in any matter that affects or concerns a child. Everyone has a duty to report to either the Police or Department of Social Welfare, any case of child abuse or the violation of the right of any child that he or she knows about. It is against the law to sexually abuse or exploit a child in any form or even encourage it, to keep a brothel or allow a child to be in your brothel (The children's Act 2005).

A complainant who wishes to lodge a SEA/SH-related grievance may use any trusted channel available to her or him to file a complaint with the project GM. The project will identify secure, confidential, and accessible entry points through which survivors will feel safe and comfortable making reports (e.g., telephone service provider, community-based structure, Community-based focal points, or Regional Monitors for SEA/SH cases etc.). Complainants may also use contractor grievance processes to file SEA/SH claims, but once filed with the contractor, the claims will be referred for verification to the project GM operator (The Social Safeguards Specialist) since they all work together.

A complaint intake form will be developed to be completed by the project GM operator through the various uptake channels listed above after having obtained the survivor's verbal consent to proceed with the grievance. The GM operator, however, will still obtain written consent from the survivor with the help of the community-based focal point to fill out the complaint intake form and to share information with the appropriate service providers if necessary. If the complainant has not yet been referred for services, the intake actor will confirm whether the survivor wishes to receive support, and if so, obtain the survivor's consent to be referred for appropriate care and connect the survivor with locally available providers or arrange for remote support where needed. Medical, psychosocial, and legal aid services should at least be made available, other services as well if possible (e.g., socio-economic, security and legal). The project will map GBV services available. The hard copies of the intake and verification forms will be stored in a safe and secure locker whilst the soft copies will be stored on the computer of the GM Operator and locked with a password.

If the survivor chooses to be referred for services only and not to file a complaint, then the survivor's wishes must be respected; the service provider can then ask if the survivor consents to share basic case information to assist the project to track the cases that choose not to access the GM. The survivor always retains the right to be referred for services whether there is a link established between the project and the incident in question.

Where selected, the actors are usually trained on how to receive and refer SEA/SH cases in accordance with survivor care principles, how to apply active listening techniques, and how to escalate complaints to the GM Operator safely and confidentially as they are illiterates. Any information collected about a survivor, or the alleged perpetrator must be recorded and maintained separately from other grievance documentation, in a secure and lockable space, with strictly limited access.

Where a complaint is referred to the national level, the laws and procedures of the Judiciary System of the Gambia will be followed.

8.8.2. Step II: Sort and process

Once the complaint has been formally received by the GM operator, with informed survivor consent, the GM focal point will verify that the complainant has been offered the opportunity to receive services, and if not, ensure that the survivor is referred for necessary services upon obtaining the survivor's informed consent.

The complaint will then be triaged as a SEA/SH complaint and the coordinator for the verification structure notified that a SEA/SH complaint has been received and will need review. The GM focal point will also notify the appropriate Consultant and NAWEC focal point, who in turn will inform the World Bank project lead, within a 24-hour period that a SEA/SH complaint has been received. The GM focal point need only share the nature of the case, the age and sex of the complainant (if known), whether there is a link with the project, and whether the survivor has been referred for services. **Absolutely no identifying information for the survivor or the alleged perpetrator may be shared with either the Consultant, NAWEC or AFD focal points.**

8.8.3. Step III: Acknowledge receipt

The GM focal point should ensure that the complainant receives a document acknowledging formal receipt of the SEA/SH grievance within three days of the complaint being filed. Delivery of the acknowledgement to the complainant will depend upon how the complaint was initially received; if, ideally through a service provider, then all communication with the survivor can be done through the service provider.

8.8.4. Step IV: Verification process

The verification process for a SEA/SH grievance will be handled by a separate structure established through the GM operator. The verification structure will be in the form of a committee, number of members to be determined before starting of the project activities.

These members will be specially trained in the management and review of SEA/SH complaints, the importance of a survivor-centered approach, as well as guiding principles for survivor care and management of SEA/SH data and claims. If permitted by the survivor, a representative from a service provider will participate in the verification committee in order to provide advocacy on behalf of the survivor and ensure that survivor care principles are respected throughout the process.

Once convened, the verification committee will review available information about the SEA/SH claim in question, the nature of the claim, and whether there is a link with the project. The committee will also make its recommendations to the alleged perpetrator's employer or manager as to appropriate disciplinary sanctions per the code of conduct, type of incident, and the appropriate labor laws and regulations. Potential disciplinary sanctions for alleged perpetrators can include, but are not limited to, informal or formal warnings, loss of salary, and suspension or termination of employment. The committee must complete the verification process and render its decision within ten calendar days of receipt of the complaint.

It should be noted that the objective of the verification process is to examine only whether there is a link between the project and the reported SEA/SH incident and to assure accountability by recommending appropriate disciplinary measures. The verification process establishes neither the innocence nor the guilt of the alleged perpetrator as only the judicial system has that capacity and responsibility. In addition, all final decisions regarding disciplinary actions will rest solely with the employer or manager of the alleged perpetrator; the verification committee can make only its recommendations.

Members of the verification committee will be chosen in accordance with the following principles of:

- Competence in their capacity to perform the committee's work;
- Transparency in the choice of the committee members in accordance with clearly defined criteria
- Confidentiality of all involved parties, which must be respected by committee members; and
- Impartiality of its chosen members, who can participate and perform their work without conflicts of interest.

8.8.5. Step V: Monitor and evaluate

Monitoring of the SEA/SH complaints will be important to ensure that all complainants are offered appropriate service referrals, that informed consent is obtained in all cases for both filing of grievances and service referrals, and that all grievances are handled safely and confidentially, and in a timely manner. The project GM operator should exchange information in a safe and ethical way information with service providers in order to ensure safe and confidential sharing of case data as well as appropriate closures of SEA/SH cases.

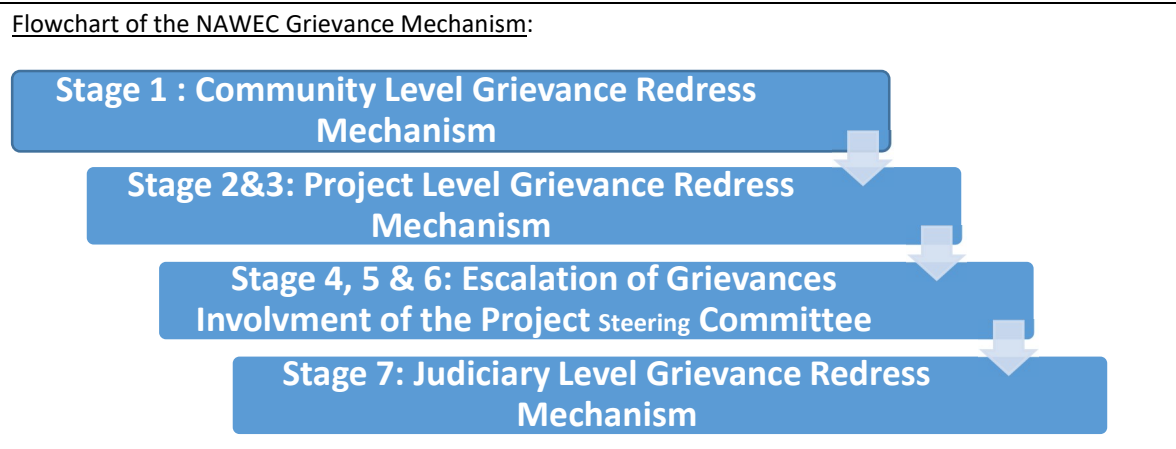
8.8.6. Step VI: Feedback to involved parties

Once the verification process has been concluded, the result of the process shall be communicated first to the survivor within 14 calendar days, ideally through the service provider if applicable, to allow the survivor and relevant advocates the appropriate amount of time to ensure adequate safety planning as needed. Once the survivor has been informed, the alleged perpetrator can be informed of the result as well.

If either party disagrees with the result, s/he is permitted to appeal the verification committee's decision via the GM appeals process and must file an appeal within 14 days of receipt of the verification result.

A SEA/SH Response protocol and GBV mapping will be developed and when ready, it will be annexed to the GM.

Figure 54 : The GM process



Stage	Process	Duration
1	The CLO will collect all complaints two times per week, he will also endeavor to resolve it immediately. Where AP is not satisfied, the CSS or CLO will refer the AP to the Project's Liaison Officer (PLO). For complaints that were satisfactorily resolved by the CSS/CLO, he/she will inform the Focal Point who will log the grievance and the actions that were taken. Before construction starts, the complainant will address his/her complaint directly to the project via the Project Liaison Officer (or Alkalos or VDCs who will be the representative of the Project Contact Person or Community Liaison Officer) who will submit the case to the GRC.	Anytime
2	On receipt of the complaint, the Project CLO will endeavor to resolve it immediately. If unsuccessful, he/she then notifies WASIB Project Coordinator	Immediately after logging grievance
3	The WASIB Project Coordinator will endeavor to address and resolve the complaint and inform the aggrieved party via the Grievance Redress Committee. If it is a land-related issue, the Project Coordinator and the GRC will advise the NAWEC Managing Director, to engage the Ministry of Land and Local Government. The WASIB Project Coordinator will also refer to the NAWEC MD other unresolved grievances for his/her action.	
4	If the matter remains unresolved, or complainant is not satisfied with the outcome at the project level (GRC), the WASIB Project Coordinator or NAWEC MD, will then refer the matter to the National Steering Committee (NSC) for a resolution.	1 week
5	If it remains unresolved or the complainant is dissatisfied with the outcome proposed by the NSC, he/she is free to refer the matter to physical planning or the Ministry of Local Government and lands if it is land matters.	Anytime
6	Land related issue; NAWEC MD may seek the assistance of the Physical Planning MD and Permanent Secretary of Ministry of Lands and Local Government.	Immediately after stage 3
7	If the issue remains unresolved through the Minister of Lands' decision, then the ultimate step will be for the Courts or Land Court respectively to deliberate. Any such decisions are final.	Anytime

9. Conclusion

The WASIB Project in The Gambia is expected to generate temporary and long-term employment, economic development from improved services dependent on reliable water and consequently improved livelihoods. There will also be significant impacts on human health and wellbeing from the provision of clean, reliable water, which is also an important contribution to the fight water related diseases.

Despite the potential benefits, the WASIB is likely to create occupational health and safety risks such as traffic accidents, imported contagious diseases; violence against vulnerable groups, sexual exploitation, and child employment; destruction of cultural/historical sites of importance.

Negative environmental impacts include air and surface water pollution, vegetation clearing and destruction of forest trees with its indirect impact on dependent wildlife, land degradation causing erosion and invasion of environmentally sensitive protected areas that destroy biodiversity.

It is recommended that the contractor develops the Contractors ESMP to specify and guide all mitigation measures related to the construction. This will include proper management of waste, avoidance of forests and avoidance of hunting, legal sourcing of earth materials and use of well serviced equipment and machinery that produces less emission. To mitigate the identified negative impacts, the Consultant and NAWEC will ensure that the contractors' agreements stipulate the ESMP requirements, and that efficient monitoring takes place.

The total estimated cost for the ESMP implementation is US\$ 48,500 (Forty-eight thousand and five hundred dollars).

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Annexes

Antea Group

Understanding today.
Improving tomorrow.

Annex 1. Code of Conduct for implementing ESHS and OHS Standards Preventing Gender Based Violence and Violence Against Children

IMPLEMENTING ESHS AND OHS STANDARDS

PREVENTING GENDER BASED VIOLENCE AND VIOLENCE AGAINST CHILDREN

a) COMPANY CODE OF CONDUCT

The company is committed to ensuring that the project is implemented in such a way which 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 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, sub-contractors, 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 sub-contractors and suppliers, without exception:

General

1. The company—and therefore all employees, associates, representatives, sub-contractors, and suppliers—commits to complying with all relevant national laws, rules, and regulations.
2. The company commits to full implementing its 'Contractors Environmental and Social Management Plan' (CESMP).
3. The company commits to treating 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. Acts of GBV and VAC are in violation of this commitment.
4. The company shall ensure that interactions with local community members are done with respect and non-discrimination.
5. Demeaning, threatening, harassing, abusive, culturally inappropriate, or sexually provocative language and behavior are prohibited among all company employees, associates, and its representatives, including sub-contractors and suppliers.
6. The company will follow all reasonable work instructions (including regarding environmental and social norms).
7. The company will protect and ensure proper use of property (for example, to prohibit theft, carelessness, or waste).

Health and Safety

8. The company will ensure that the project's occupational health and safety (OHS) Management Plan is effectively implemented by company staff, as well as sub-contractors and suppliers.
9. The company will ensure that all person's 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.
10. The company will:
 - i. Prohibit the use of alcohol during work activities.
 - ii. Prohibit the use of narcotics or other substances which can always impair faculties.

11. 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

12. 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.
13. All forms of GBV and VAC, including grooming are unacceptable, regardless of whether they take place on the work site, the work site surroundings, at worker's 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 favorable treatment dependent on sexual acts—or other forms of humiliating, degrading or exploitative behavior are prohibited.
14. 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.
15. Unless there is full consent¹¹ 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 workplace are prohibited. This includes relationships involving the withholding/promise of actual provision of benefit (monetary or non-monetary) to community members in exchange for sex—such sexual activity is considered “non-consensual” within the scope of this Code.
16. In addition to company sanctions, legal prosecution of those who commit acts of GBV, or VAC will be pursued if appropriate.
17. All employees, including volunteers and sub-contractors 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.
18. Managers are required to report and act to address suspected or actual acts of GBV and/or VAC as they have a responsibility to uphold company commitments and hold their direct reports responsible.

Implementation

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

19. All managers sign the project's 'Manager's Code of Conduct' detailing their responsibilities for implementing the company's commitments and enforcing the responsibilities in the 'Individual Code of Conduct'.
20. 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.
21. Displaying the Company and Individual Codes of Conduct 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.
22. Ensure that 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.
23. 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).
24. Ensuring that an effective GBV and VAC Action Plan is developed in consultation with the GCCT which includes as a minimum:

¹¹ **Consent** is defined as the informed choice underlying an individual's free and voluntary intention, acceptance, or agreement to do something. No consent can be found when such acceptance or agreement is obtained using threats, force or other forms of coercion, abduction, fraud, deception, or misrepresentation. In accordance with the United Nations Convention on the Rights of the Child, the World Bank considers that consent cannot be given by children under the age of 18, even if national legislation of the country into which the Code of Conduct is introduced has a lower age. Mistaken belief regarding the age of the child and consent from the child is not a defence.

- i. **GBV and VAC Allegation Procedure** to report GBV and VAC issues through the project Grievance Mechanism (Section 4.3 Action Plan);
 - ii. **Accountability Measures** to protect confidentiality of all involved (Section 4.4 Action Plan); and,
 - iii. **Response Protocol** applicable to GBV and VAC survivors and perpetrators (Section 4.7 Action Plan).
25. That the company effectively implements the agreed final GBV and VAC Action Plan, providing feedback to the GCCT for improvements and updates as appropriate.
26. 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 the project's GBV and VAC Codes of Conduct.
27. 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 mandated by this Company Code of Conduct may result in disciplinary action.

Company name:

Signature: Printed Name:

Title:

Date:

b) Manager's Code of Conduct

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, managers 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 at the workplace and in the local community. These responsibilities include but are not limited to:

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 workspace. Examples of areas include waiting, rest and lobby areas of sites, canteen areas and health clinics.
 - ii. Ensuring 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', including acknowledgment that they have read and agree with the Code of Conduct.
 - ii. Staff lists and signed copies of the Individual Code of Conduct are provided to the OHS Manager, the GCCT, and the client.
 - iii. Participate in training and ensure that staff also participate as outlined below.
 - iv. Put in place a mechanism for staff to:
 - a) report concerns on ESHS or OHS compliance, and;
 - b) confidentially report GBV or VAC incidents through the Grievance Mechanism (GM)
 - 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 your 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, sub-contractor, supplier or 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, take preventive measures against GBV and VAC, to investigate allegations thereof, or to take corrective actions when GBV or VAC has occurred, shall not only constitute grounds for 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 reported to the Police, the client, and the World Bank immediately.
8. Report and act according to the response protocol (Section 4.7 Response Protocol) any suspected or actual acts of GBV and/or VAC as managers have a responsibility to uphold company commitments and hold their direct reports responsible.
9. Ensure that any major ESHS or OHS incidents are reported to the client and the supervision engineer immediately.

Training

10. The managers are responsible to:
 - i. Ensure that the OHS Management Plan is implemented, with suitable training required for all staff, including sub-contractors and suppliers; and,
 - ii. Ensure that staff have a suitable understanding of the CESMP and are trained as appropriate to implement the CESMP requirements.
11. 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.
12. 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 training.
13. 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:
 - i. OHS and ESHS; and,

- ii. GBV and VAC required of all employees.
- 14. 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 increased risk of GBV and VAC.

Response

- 15. Managers will be required to take appropriate actions to address any ESHS or OHS incidents.
- 16. With regard to GBV and VAC:
 - i. Provide input to the GBV and VAC Allegation Procedures (Section 4.2 Action Plan) and Response Protocol (Section 4.7 Action Plan) developed by the GCCT as part of the final cleared GBV and VAC Action Plan.
 - ii. Once adopted by the Company, managers will uphold the Accountability Measures (Section 4.4 Action Plan) set forth in the GBV and VAC Action Plan to maintain the confidentiality of all employees who report or (allegedly) perpetrate incidences of GBV and VAC (unless a breach of confidentiality is required to protect persons or property from serious harm or where required by law).
 - iii. If a manager develops concerns or suspicions regarding any form of GBV or VAC by one of his/her direct reports, or by an employee working for another contractor on the same work site, s/he is required to report the case using the GM.
 - iv. Once a sanction has been determined, the relevant manager(s) is/are 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
 - v. If a Manager has a conflict of interest due to personal or familial relationships with the survivor and/or perpetrator, he/she must notify the respective company and the GCCT. The Company will be required to appoint another manager without a conflict of interest to respond to complaints.
 - vi. Ensure that any GBV or VAC issue warranting Police action is reported to the Police, the client, and the World Bank immediately
- 17. Managers failing 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 enacted by the company's CEO, Managing Director, or equivalent highest-ranking manager. Those measures may include:
 - i. Informal warning.
 - ii. Formal warning.
 - iii. Additional Training.
 - iv. Loss of up to one week's salary.
 - v. Suspension of employment (without payment of salary), for a minimum period of 1 month up to a maximum of 6 months.
 - vi. Termination of employment.
- 18. 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 actions 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 therein 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 mandated by this Manager's Code of Conduct may result in disciplinary action.

Company name:

Signature: Printed Name:

Title:

Date:

c) Individual Code of Conduct

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

The company considers that failure to follow ESHS and OHS standards, or to partake in GBV or VAC activities—be it on the work site, the work site surroundings, at workers' camps, or the surrounding communities—constitute acts of gross misconduct and are 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. Will always wear my personal protective equipment (PPE) 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 (CESMP).
4. Implement the OHS Management Plan.
5. Adhere to a zero-alcohol policy during work activities, and refrain from the use of narcotics or other substances which can always impair faculties.
6. Consent to Police background check.
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. Not use language or behavior towards 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 (e.g., looking somebody up and down; kissing, howling or smacking sounds; hanging around somebody; whistling and catcalls; giving personal gifts; making comments about somebody's sex life; etc.).
10. Not engage in sexual favors—for instance, making promises or favorable treatment dependent on 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. Mistaken belief regarding the age of a child is not a defense. Consent from the child is also not a defense or excuse.
12. Unless there is the full consent¹² by all parties involved, I will not have sexual interactions with members of the surrounding communities. This includes relationships involving the withholding or promise of actual provision of benefit (monetary or non-monetary) to community members in exchange for sex—such sexual activity is considered “non-consensual” within the scope of this Code.
13. Consider reporting through the GM or to my manager any suspected or actual GBV or VAC by a fellow worker, whether employed by my company or not, or any breaches of this Code of Conduct.

¹² **Consent** is defined as the informed choice underlying an individual's free and voluntary intention, acceptance, or agreement to do something. No consent can be found when such acceptance or agreement is obtained using threats, force or other forms of coercion, abduction, fraud, deception, or misrepresentation. In accordance with the United Nations Convention on the Rights of the Child, the World Bank considers that consent cannot be given by children under the age of 18, even if national legislation of the country into which the Code of Conduct is introduced has a lower age. Mistaken belief regarding the age of the child and consent from the child is not a defence.

Regarding 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 unaccompanied children unrelated to my family into my home unless they are at immediate risk of injury or in physical danger.
16. Not use any computers, mobile phones, video, and digital cameras 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.
18. Refrain from hiring children for domestic or other labor below the minimum age of 14 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 (See Annex 2 for details).

Use of children's images for work related purposes

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

21. Before photographing or filming a child, assess and endeavor to comply with local traditions or restrictions for reproducing personal images.
22. Before photographing or filming a child, obtain informed consent from the child and a parent or guardian of the child. As part of this I must explain how the photograph or film will be used.
23. Ensure photographs, films, videos, and DVDs present children 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 sexually suggestive.
24. Ensure images are honest representations of the context and the facts.
25. Ensure file labels do not reveal identifying information about a 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. 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 inconsistent with this Individual Code of Conduct or failure to act mandated by this Individual Code of Conduct may result in disciplinary action and may affect my ongoing employment.

Company name:

Signature: Printed Name:

Title:

Date:

Project Staff 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, following the project's occupational health and safety (OHS) requirements, and preventing gender-based violence (GBV) and violence against children (VAC) is important, but also dealing with the complaints received from People Affected by the Project (PAP).

MOBSE considers that failure to follow ESHS and OHS standards, or not respecting PAP privacy in dealing with their complaints received via letter, phone calls, emails or social media constitute acts of gross misconduct and are therefore grounds for sanctions, penalties, or potential termination of employment. Prosecution by the Police of those who commit GBV, VAC or do not respect privacy of the PAP may be pursued if appropriate.

I agree that while working on the project I will:

26. Attend and actively partake in training courses related to ESHS, OHS, HIV/AIDS, GBV and VAC as requested by my employer.
27. Will always wear my personal protective equipment (PPE) when at the work site or engaged in project related activities.
28. Take all practical steps to implement the contractor's environmental and social management plan (CESMP).
29. Implement the OHS Management Plan.
30. Adhere to a zero-alcohol policy during work activities, and refrain from the use of narcotics or other substances which can always impair faculties.
31. Consent to Police background check.
32. 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.
33. Not use language or behavior towards women, children or men that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate.
34. 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 (e.g., looking somebody up and down; kissing, howling or smacking sounds; hanging around somebody; whistling and catcalls; giving personal gifts; making comments about somebody's sex life; etc.).
35. Not engage in sexual favors—for instance, making promises or favorable treatment dependent on sexual acts—or other forms of humiliating, degrading or exploitative behavior.
36. Not participate in sexual contact or activity with children—including grooming or contact through digital media. Mistaken belief regarding the age of a child is not a defense. Consent from the child is also not a defense or excuse.
37. Diligently treat complaints received from PAP by respecting their privacy.

38. Unless there is the full consent¹³ by all parties involved, I will not have sexual interactions with members of the surrounding communities. This includes relationships involving the withholding or promise of actual provision of benefit (monetary or non-monetary) to community members in exchange for sex; such sexual activity is considered “non-consensual” within the scope of this Code.
39. Consider reporting through the GM or to my manager any suspected or actual GBV or VAC by a fellow worker, whether employed by MOBSE, FIOH or not, or any breaches of this Code of Conduct.

Regarding children under the age of 18:

40. Wherever possible, ensure that another adult is present when working in the proximity of children.
41. Not invite unaccompanied children unrelated to my family into my home unless they are at immediate risk of injury or in physical danger.
42. Not use any computers, mobile phones, video, and digital cameras 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).
43. Refrain from physical punishment or discipline of children.
44. Refrain from hiring children for domestic or other labor below the minimum age of 14 unless national law specifies a higher age, or which places them at significant risk of injury.
45. 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.
46. Take appropriate caution when photographing or filming children (See Annex 2 for details).

Use of children's images for work related purposes

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

47. Before photographing or filming a child, assess and endeavor to comply with local traditions or restrictions for reproducing personal images.
48. Before photographing or filming a child, obtain informed consent from the child and a parent or guardian of the child. As part of this I must explain how the photograph or film will be used.
49. Ensure photographs, films, videos, and DVDs present children 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 sexually suggestive.
50. Ensure images are honest representations of the context and the facts.
51. Ensure file labels do not reveal identifying information about a child when sending images electronically.

Sanctions

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

8. Informal warning.
9. Formal warning.
10. Additional Training.
11. Loss of up to one week’s salary.
12. Suspension of employment (without payment of salary), for a minimum period of 1 month up to a maximum of 6 months.
13. Termination of employment.
14. Report to the Police if warranted.

¹³ **Consent** is defined as the informed choice underlying an individual’s free and voluntary intention, acceptance, or agreement to do something. No consent can be found when such acceptance or agreement is obtained using threats, force or other forms of coercion, abduction, fraud, deception, or misrepresentation. In accordance with the United Nations Convention on the Rights of the Child, the World Bank considers that consent cannot be given by children under the age of 18, even if national legislation of the country into which the Code of Conduct is introduced has a lower age. Mistaken belief regarding the age of the child and consent from the child is not a defence.

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 inconsistent with this Individual Code of Conduct or failure to act mandated by this Individual Code of Conduct may result in disciplinary action and may affect my ongoing employment.

Company name:

Signature: Printed Name:

Title:

Date:

Annex 2. Potential Procedures for Addressing GBV and VAC

Accountability Measures to maintain confidentiality can be achieved through the following actions:

1. Inform all employees that confidentiality of GBV/VAC survivors' personal information is of utmost importance.
2. Provide the GCCT with training on empathetic and non-judgmental listening.
3. Take disciplinary action, including and up to dismissal, against those who breach survivor's confidentiality (this is unless a breach of confidentiality is necessary to protect the survivor or another person from serious harm, or where required by law).

GBV and VAC Allegation Procedures should specify:

1. Who survivors can seek information and assistance from.
2. The process for community members and employees to lodge a complaint through the GM should there be alleged GBV or VAC.
3. The mechanism for how community members and employees can escalate a request for support or notification of violence if the process for reporting is ineffective due to unavailability or non-responsiveness, or if the employee's concern is not resolved.

Financial and Other Supports to survivors can include:

1. No/low interest loans.
2. Salary advances.
3. Direct payment of medical costs.
4. Coverage of all medical costs related specifically to the incident.
5. Upfront payments for medical costs to later be recouped from the employee's health insurance.
6. Providing or facilitating access to childcare.
7. Providing security upgrades to the employee's home.
8. Providing safe transportation to access support services or to and from accommodation.

Based on the rights, needs, and wishes of the survivor, survivor support measures to ensure the safety of the survivor who is an employee can include¹⁴:

1. Changing the perpetrator or survivor's span of hours or pattern of hours and/or shift patterns.
2. Redesigning or changing the perpetrator or survivor's duties.
3. Changing the survivor's telephone number or email address to avoid harassing contact.
4. Relocating the survivor or perpetrator to another work site/ alternative premises.
5. Providing safe transportation to and from work for a specified period.
6. Supporting the survivor to apply for an Interim Protection Order or referring them to appropriate support.
7. Taking any other appropriate measures including those available under existing provisions for family friendly and flexible work arrangements.

Leave options for survivors that are employees can include:

¹⁴ It is critical that a survivor centered approach be adopted. The survivor should be fully involved in the decision making. Except for exceptional circumstances the perpetrator should be required to take appropriate actions to accommodate the survivor (e.g. move, change hours, etc.), rather than the survivor changing.

1. An employee experiencing GBV should be able to request paid special leave to attend medical or psychosocial appointments, legal proceedings, relocation to safe accommodation and other activities related to GBV.
2. An employee who supports a person experiencing GBV or VAC may take care givers leave, including but not limited to accompanying them to court or hospital, or to take care of children.
3. Employees who are employed in a casual capacity may request unpaid special leave or unpaid care givers leave to undertake the activities described above.
4. The amount of leave provided will be determine by the individual's situation through consultations with the employee, the management and the GCCT where appropriate.

Potential Sanctions to employees who are perpetrators of GBV, and VAC 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.

Referral to the Police or other authorities as warranted.

Annex 3. Chance Find Procedures

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

- 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 Project Manager/PCU of the findings who in turn will immediately notify the National Council for Arts and Culture for the necessary, assessment, recording and determination of 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.

Annex 4. Grievance Logbook excluding SEA/SH cases

Cas e no.	Date Claim Receive d	Name of Person Receivin g Complai nt	Where/ho w the complaint was received	Name & contact details of complaina nt (if known)	Type of grievance (land/compensati on, contractor, project/E&S issue, community conflict, etc.)	Content of the claim (include all grievances , suggestion s, inquiries)	Was Receipt of Complaint Acknowledge d to the Complainant ? (Y/N – if yes, include date,	Expecte d Decisio n Date	Decision Outcome (Include names of participan ts and date of decision)	Was Decision communicate d to complainant ? Y/N If yes, state when and via what method	Was the complaina nt satisfied with the decision? Y/N State the decision.	Any follow up action ?

Annex 5. Land acquisition documents

Annex 6. MoU between NAWEC/DOF

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