



ENVIRONMENTAL, SOCIAL, HEALTH AND SAFETY (MANAGEMENT) PLAN FOR THE REHABILITATION AND UPGRADE OF NAPTIN KAINJI REGIONAL TRAINING CENTRE

**UNDER THE PROGRAM: "ENHANCING VOCATIONAL TRAINING
DELIVERY FOR THE NIGERIAN POWER SECTOR**



DECEMBER, 2025



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LIST OF ABBREVIATIONS AND ACRONYMS

Abbreviation Meaning

AFD	Agence Française de Développement (French Development Agency)
ARAP	Abbreviated Resettlement Action Plan
BOD	Biochemical Oxygen Demand
CBD	Convention on Biological Diversity
CBT	Computer-Based Training
CEC	Cation Exchange Capacity
CEDAW	Convention on the Elimination of All Forms of Discrimination against Women
COD	Chemical Oxygen Demand
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
Do	Dissolved Oxygen
EA	Environmental Assessment
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ESF	Environmental and Social Framework
ESHS	Environmental, Social, Health and Safety
ESHS-MP	Environmental, Social, Health and Safety Management Plan
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management Specialist
ESS	Environmental and Social Standards
ESO	Environmental and Social Officer
EVD	Ebola Virus Disease
FEPA	Federal Environmental Protection Agency
FGN	Federal Government of Nigeria
FMEnv	Federal Ministry of Environment
FME	Federal Ministry of Education
FPSU	Federal Project Support Unit
GBV	Gender-Based Violence
GRM	Grievance Redress Mechanism
H ₂ S	Hydrogen Sulphide
HIV/AIDS	Human Immunodeficiency Virus / Acquired Immune Deficiency Syndrome
HSE	Health, Safety and Environment
ICT	Information and Communication Technology



Abbreviation Meaning

IDA	International Development Association
IFC	International Finance Corporation
ITCZ	Inter-Tropical Convergence Zone
IUCN	International Union for Conservation of Nature
LAN	Local Area Network
LGA	Local Government Area
LGAs	Local Government Authorities
M&E	Monitoring and Evaluation
MDGs	Millennium Development Goals
NAPTIN	National Power Training Institute of Nigeria
NESREA	National Environmental Standards and Regulations Enforcement Agency
NH ₃	Ammonia
NiMet	Nigerian Meteorological Agency
NISEPA	Niger State Environmental Protection Agency
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
OHS	Occupational Health and Safety
PAD	Project Appraisal Document
PIM	Project Implementation Manual
PM _{2.5}	Particulate Matter ≤ 2.5 microns
PM ₁₀	Particulate Matter ≤ 10 microns
PPE	Personal Protective Equipment
RAMP-2	Second Rural Access and Mobility Project
RTC	Regional Training Centre
SDGs	Sustainable Development Goals
SEA	Sexual Exploitation and Abuse
SEA/SH	Sexual Exploitation and Abuse / Sexual Harassment
SEPA	State Environmental Protection Agency
SH	Sexual Harassment
SLO	Social and Livelihood Officer
SO ₂	Sulphur Dioxide
SPM	Suspended Particulate Matter
SPIU	State Project Implementation Unit
STDs	Sexually Transmitted Diseases
STIs	Sexually Transmitted Infections
TDS	Total Dissolved Solids
TOR	Terms of Reference



Abbreviation Meaning

TPH	Total Petroleum Hydrocarbons
TSS	Total Suspended Solids
UNFCCC	United Nations Framework Convention on Climate Change
VAPP	Violence Against Persons (Prohibition) Act
VOCs	Volatile Organic Compounds
WB	World Bank
WHO	World Health Organization



EXECUTIVE SUMMARY

ES1: Background

The Federal Government of Nigeria (FGN), through the National Power Training Institute of Nigeria (NAPTIN), has received financing from the Agence Française de Développement (AFD) for the implementation of the programme titled “Enhancing Vocational Training Delivery for the Nigeria Power Sector.” The overarching objective of the programme is to strengthen technical and vocational capacity within Nigeria’s power sector by upgrading existing training facilities, improving training delivery systems, and equipping personnel with modern, industry-relevant skills.

As part of this programme, the Rehabilitation and Upgrade of the NAPTIN Kainji Regional Training Centre (RTC) in New Bussa, Borgu Local Government Area of Niger State has been proposed. The project includes civil works rehabilitation of existing infrastructure as well as the supply, installation, testing, and commissioning of modern training equipment. The intervention is confined to the existing NAPTIN premises and does not involve land acquisition or resettlement.

In line with Nigerian environmental regulations, World Bank and AFD Environmental and Social Safeguard Standards, this Environmental, Social, Health and Safety Management Plan (ESHS-MP) has been prepared to identify potential environmental and social risks and to define appropriate mitigation, monitoring, and institutional measures to ensure environmentally sound, socially responsible, and safe project implementation.

ES2: Objectives of the Environmental, Social, Health and Safety Management Plan

The primary objective of the ESHS Management Plan is to ensure that potential environmental, social, health, and safety risks associated with the rehabilitation and upgrade of the NAPTIN Kainji RTC are effectively identified, managed, and mitigated throughout the project lifecycle.

Specifically, the ESHS-MP aims to:

- Identify potential adverse environmental, social, health, and safety impacts of the rehabilitation works;
- Propose mitigation and enhancement measures consistent with national regulations, AFD safeguards, and international best practices;
- Define institutional roles and responsibilities for ESHS implementation, monitoring, and reporting;
- Promote occupational health and safety for workers and contractors;
- Protect community health and safety during construction and operation phases; and
- Enhance the sustainability and social benefits of the upgraded training facility.

ES3: Description of the Study Area

The NAPTIN Kainji Regional Training Centre is located in New Bussa, Borgu Local Government Area of Niger State, within the Kainji Hydropower Complex, approximately 5 km from the Kainji Dam on the River Niger.

Niger State lies within the north-central zone of Nigeria and is characterized by a tropical continental climate with distinct wet and dry seasons. Average annual rainfall in the project area is approximately 1,100 mm, while temperatures range from about 20.5°C to 34.9°C. The surrounding environment is semi-urban, comprising educational facilities, staff residential quarters, hydropower infrastructure, and local communities such as Fakun.

A baseline environmental and social study was conducted in October 2025 to establish pre-project conditions and provide a benchmark for impact management. The assessment covered meteorology/climate, ambient air quality, noise levels, soils, surface water and sediments, and social conditions.

Key baseline findings include:

- **Climate and meteorology:** Long-term rainfall (1994-2024) shows a wet season beginning around March and peaking around June, with lower rainfall in the dry months; relative humidity is highest between June and September and lowest during the Harmattan period.
- **Ambient air quality:** Measured parameters (including CO, NO₂, SO₂, PM_{2.5} and PM₁₀) were within applicable FMEnv and World Bank/IFC guideline limits, indicating good baseline air quality.
- **Noise environment:** Noise measurements across residential and industrial receptors were generally low and within regulatory thresholds, indicating a quiet acoustic environment.
- **Soil quality:** Soil pH values were within acceptable ranges and heavy metals were below guideline limits; microbiological results indicated no faecal contamination.
- **Surface water and sediment quality:** Surface water quality results were generally acceptable and supportive of aquatic life, with most parameters within standards; sediment results indicated stable, non-contaminated conditions.

Overall, baseline conditions indicate that the project area is environmentally stable, and any construction-related impacts are expected to be temporary and manageable with effective ESHS controls.

ES4: Policy, Legal, Regulatory and Institutional Framework

The project is guided by relevant national, state, and international environmental and social frameworks. Key instruments include the Environmental Impact Assessment (EIA) Act CAP E12 LFN 2004, Federal Ministry of Environment regulations, Niger State environmental laws, World Bank and AFD Environmental and Social Safeguard Standards.

The project has been classified as Category B (Moderate Risk) under AFD's environmental and social risk categorization, indicating that potential adverse impacts are site-specific,



reversible, and manageable through appropriate mitigation measures. Although not financed by the World Bank, the World Bank Environmental and Social Standards (ESS1–ESS10) have been applied as benchmarks for good international practice.

ES5: Summary of Main Findings of the Study

The assessment identified both positive and negative environmental and social impacts associated with the rehabilitation and upgrade works.

Positive Impacts include:

- Improved training infrastructure and learning environment;
- Enhanced technical capacity for Nigeria’s power sector workforce;
- Short-term employment opportunities for skilled and unskilled local labour;
- Improved occupational health and safety standards within the training centre; and
- Strengthened institutional capacity of NAPTIN.

Potential Negative Impacts include:

- Temporary air pollution (dust and emissions) from construction activities;
- Noise generation from construction equipment;
- Generation of construction and demolition waste;
- Occupational health and safety risks to workers;
- Community health and safety risks due to increased movement of vehicles and equipment;
- Labour-related risks, including Gender-Based Violence (GBV), Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH), and communicable diseases.

These impacts are expected to be localized, short-term, and reversible, and can be effectively managed through implementation of the ESHS.

ES6: Environmental and Social Management Plan and Monitoring Budget

The ESHS-MP includes mitigation and monitoring measures for all identified impacts across pre-construction, construction, installation, and operational phases. The Plan defines responsibilities, monitoring indicators, reporting requirements, and cost estimates for implementation. Adequate budgetary provisions have been made to cover mitigation measures, capacity building, monitoring, and contingency actions to ensure effective ESHS performance throughout project execution.

ES7: ESHS Mitigation and Training Measures

Mitigation measures include:

- Dust suppression and air quality control;
- Noise management and work scheduling;
- Waste segregation, handling, and disposal;
- Provision and enforcement of Personal Protective Equipment (PPE);
- Occupational Health and Safety (OHS) training;
- Codes of Conduct addressing GBV and SEA/SH risks;



- Establishment of a functional Grievance Redress Mechanism (GRM);
- Capacity building for contractors and NAPTIN staff on ESHS requirements.

ES8: Institutional Arrangements for ESHS Implementation and Monitoring

Overall responsibility for ESHS implementation rests with NAPTIN through the Project Implementation arrangements, supported by contractors and supervising consultants. Regulatory oversight and monitoring will be provided by the Federal Ministry of Environment (FMEnv) and Niger State Environmental Protection Agency (NISEPA). Clear roles and reporting lines are established to ensure compliance with ESHS requirements.

ES9: Stakeholder Consultation

Stakeholder consultations were conducted with NAPTIN management, staff, trainees, regulatory agencies, and host communities. The consultations provided opportunities for information disclosure, identification of concerns, and incorporation of stakeholder inputs into the ESHS-MP. Issues raised included occupational safety, noise, waste management, and community safety, all of which have been addressed in the Plan.

ES10: Disclosure

This ESHS Management Plan will be disclosed in accordance with national regulatory requirements and AFD disclosure policies. Copies will be made available at relevant government offices, NAPTIN facilities, and other designated public locations to ensure accessibility to stakeholders and the general public.



CHAPTER ONE

INTRODUCTION

1.1 Project Background

The Federal Government of Nigeria, through the National Power Training Institute of Nigeria (NAPTIN), has received financing from the Agence Française de Développement (AFD) for the implementation of the Programme: “Enhancing Vocational Training Delivery for the Nigeria Power Sector.” The overarching objective of this programme is to strengthen the technical and vocational capacity of the Nigerian power sector by upgrading existing training facilities, improving training delivery, and equipping personnel with the requisite skills to support sustainable power sector growth.

As part of this programme, the Rehabilitation and Upgrade of the NAPTIN Kainji Regional Training Centre, including the Supply, Installation, Testing and Commissioning of Training Equipment, has been proposed. The intervention is aimed at improving the infrastructure, learning environment, and technical capability of the Kainji Training Centre to meet international standards and effectively deliver demand-driven vocational training for the power sector workforce.

The project activities are designed to achieve the following objectives:

- Enhance the quality, efficiency, and relevance of technical training delivery within the power sector;
- Improve the capacity of NAPTIN to train skilled technicians and engineers who can support Nigeria’s power generation, transmission, and distribution systems;
- Strengthen institutional sustainability through improved infrastructure, management systems, and training equipment;
- Promote occupational health and safety standards within the training environment.

The project is comprised of interrelated components that include:

- Civil works: Rehabilitation and upgrade of training classrooms, workshops, laboratories, hostels, and administrative buildings at the Kainji Regional Training Centre.
- Procurement of equipment: Supply, installation, testing, and commissioning of modern training tools, laboratory equipment, and simulation devices.
- Institutional strengthening: Capacity building for trainers and management staff to ensure sustainable operation and maintenance of upgraded facilities.

The proposed civil works and equipment installation activities, while beneficial, have the potential to result in environmental, social, health, and safety (ESHS) impacts if not properly managed. These include risks associated with construction waste, occupational health and safety, noise and dust emissions, and possible community interactions during implementation.

Accordingly, this Environmental, Social, Health and Safety (ESHS) Management Plan (ESHS-MP) has been prepared to identify potential ESHS risks associated with the rehabilitation and



upgrade works, and to propose appropriate mitigation measures. The ESHS-MP serves as a decision-support tool to guide project implementation in accordance with national environmental regulations, AFD's environmental and social safeguard and world bank requirements, and international best practices.

The ESHS-MP will therefore ensure that the rehabilitation and upgrade of the NAPTIN Kainji Regional Training Centre are carried out in a manner that promotes environmental sustainability, safeguards the health and safety of workers and surrounding communities, and enhances the social and institutional benefits of the project.

1.2 Rationale for the ESHS Management Plan

The primary objective of this Environmental, Social, Health and Safety (ESHS) Management Plan is to assess the potential environmental, social, health, and safety impacts associated with the proposed rehabilitation and upgrade works at the NAPTIN Kainji Regional Training Centre, and to propose appropriate measures for enhancing the positive impacts while preventing, minimizing, or mitigating potential adverse effects. The Plan further defines the institutional responsibilities for implementation, monitoring, and reporting, in line with relevant Nigerian environmental and social regulations, the National Environmental Standards and Regulations Enforcement Agency (NESREA) Guidelines, and the Agence Française de Développement (AFD) Environmental and Social Safeguard Standards.

The proposed rehabilitation and upgrade works are expected to yield substantial long-term socio-economic benefits, including improved learning infrastructure, enhanced technical capacity for power sector professionals, and increased employment opportunities. However, these activities may also result in certain adverse environmental and social impacts if not properly managed. The anticipated risks include, but are not limited to:

- Generation of both hazardous and non-hazardous waste from demolition, renovation, and construction activities;
- Noise and dust emissions from construction equipment and vehicular movement;
- Air pollution and possible emissions from the operation of mobile and stationary equipment;
- Occupational Health and Safety (OHS) risks to workers and contractors during civil works and equipment installation;
- Risks of traffic accidents due to increased movement of materials, equipment, and personnel to and from the site;
- Labour-related risks, including Gender-Based Violence (GBV), Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH), potential increase in communicable diseases (e.g., STIs/STDs), and risks associated with child labour or labour influx;
- Community health and safety risks during construction and operation phases.

These potential impacts are expected to be site-specific, temporary, reversible, and manageable through the implementation of appropriate mitigation and monitoring measures. Therefore, the ESHS Management Plan has been developed as a proactive



instrument to guide the project team in ensuring compliance with applicable national environmental protection laws, AFD environmental and social safeguard policies, and international best practices in environmental and occupational health management.

The ESHS Management Plan outlines:

- The identified environmental, social, health, and safety impacts associated with the project;
- Specific mitigation and enhancement measures to address these impacts;
- The institutional arrangements, roles, and responsibilities for implementation;
- The cost estimates for implementing and monitoring mitigation measures; and
- A comprehensive monitoring framework to ensure continuous environmental and social performance evaluation throughout project execution.

Ultimately, the ESHS Management Plan provides a structured framework for integrating environmental, social, and occupational health considerations into every phase of the project lifecycle, thereby promoting sustainable rehabilitation and upgrade of the NAPTIN Kainji Regional Training Centre in alignment with Nigeria's environmental policies and the AFD's sustainability principles.

1.3 Scope of the ESHS Management Plan

The scope of this ESHS Management Plan (ESHS-MP) covers the entire lifecycle of the project from pre-construction to construction/rehabilitation, installation, commissioning, and operational phases. It includes:

- Assessment of potential environmental, social, health, and safety risks;
- Identification of mitigation and enhancement measures;
- Specification of institutional roles and responsibilities;
- Monitoring and reporting frameworks; and
- Estimated costs for implementation of ESHS measures.

The Plan is consistent with the Environmental Impact Assessment (EIA) Act Cap E12 LFN 2004 and relevant world bank and AFD safeguard procedures for projects classified as Category B (Moderate Risk) meaning potential adverse impacts are limited, reversible, and can be effectively managed.

CHAPTER TWO

POLICY, LEGAL ADMINISTRATIVE AND INSTITUTIONAL FRAMEWORK

2.1 Applicable Environmental and Social Laws and Regulations

This section presents a summary of the key international, national, and institutional policies, laws, and regulations relevant to the proposed Rehabilitation and Upgrade of the NAPTIN Kainji Regional Training Centre, including the supply, installation, testing, and commissioning of training equipment under the “*Enhancing Vocational Training Delivery for the Nigeria Power Sector*” programme financed by the Agence Française de Développement (AFD).

The project shall be implemented in full compliance with Nigerian environmental and social regulatory frameworks, applicable AFD Environmental and Social Safeguard Standards (2025), and other relevant international conventions to which Nigeria is a signatory. These frameworks collectively ensure that the project activities are environmentally sound, socially responsible, and aligned with the principles of sustainable development.

2.1.1 Environmental Laws and Guidelines Guiding Environmental Management in Nigeria

The environmental management of the Rehabilitation and Upgrade of the NAPTIN Kainji Regional Training Centre will be implemented in full compliance with the national and state environmental regulatory systems of Nigeria, supported by the provisions of AFD’s Environmental and Social Risk Management Policy (2025). The table below summarizes the key national and state-level legal and policy frameworks relevant to this project.

Table 2.1 National and State-Level Legal Frameworks Relevant to the Assignment

Regulatory Framework	Description / Relevance to the Project
Policies	
National Policy on the Environment (1989, revised 2016)	Provides the overall framework for sustainable environmental management in Nigeria. It calls for integrating environmental concerns into development planning and sectoral policies.
National Policy on Occupational Safety and Health (revised 2020)	Approved by the Federal Executive Council in 2020, this policy guides voluntary compliance on occupational health and safety and underpins workplace safety programs during project execution.
National Gender Policy (2006)	Establishes a framework for gender inclusion and mainstreaming in development programs, ensuring gender equity in project participation and benefits.
Sexual Harassment (SH) Policy	Seeks to prevent and address sexual harassment and other forms of gender-based misconduct, promoting a safe work and training environment for all staff and students.
Acts	
Environmental Impact Assessment (EIA) Act CAP E12 LFN 2004	The EIA Act mandates environmental assessment for all new projects likely to have significant environmental effects. Rehabilitation works such as those at the NAPTIN Kainji Centre fall under Category II, requiring a site-specific ESMP focused on mitigation and management measures.

Nigerian Labour Act (2004)	Consolidates laws governing employment relations, protection of workers' rights, and regulation of contracts, wages, and working conditions.
Employees' Compensation Act (2010)	Provides for compensation to employees for injuries, disability, or death sustained in the course of employment, supporting worker welfare during construction and operation.
Violence Against Persons (Prohibition) Act (VAPP) 2015	Prohibits all forms of violence and provides remedies for victims. The Act reinforces safeguards against Gender-Based Violence (GBV), Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) risks associated with project labour influx.
Regulations	
National Environmental (Sanitation and Wastes Control) Regulations 2009	Promotes sustainable sanitation and waste-management practices. It regulates handling, treatment, and disposal of solid and hazardous wastes during construction and operation.
National Environmental (Soil Erosion and Flood Control) Regulations S.I. No. 12 of 2011	Establishes standards and best practices to minimize erosion, siltation, and sedimentation from earth-moving and construction activities.
National Environmental (Air Quality Control) Regulations 2014	Sets limits for gaseous emissions and prescribes control measures to minimize air pollution from machinery, generators, and construction processes.
National Environmental (Noise Standards and Control) Regulations 2009	Defines permissible noise limits 60 dB(A) day and 40 dB(A) night for construction activities to protect human health and community well-being.
National Environmental (Construction Sector) Regulations S.I. No. 19 of 2011	Requires all construction projects to employ best available technology and pollution-control practices. It mandates preparation of an EIA / ESMP prior to commencement of construction or rehabilitation works.
State Environmental Protection Laws	The relevant State Ministry of Environment (Niger State) enforces state-level environmental policies and issues site-specific permits and monitoring approvals for rehabilitation activities.

Relevance to the NAPTIN Kainji Project

The above policies and laws collectively establish the environmental and social management framework for the project. Compliance will:

- Ensure that the rehabilitation and upgrade works are conducted responsibly and sustainably;
- Safeguard the health, safety, and welfare of workers and surrounding communities;
- Prevent or minimize adverse environmental impacts such as waste generation, air/noise emissions, and soil degradation; and
- Align the project with both national legal requirements, world Bank and AFD's 2025 Environmental and Social Safeguard Standards.

2.1.2 Environmental Laws and Regulations Guiding Environmental Management in Niger State

At the sub-national level, environmental management in Niger State is governed by laws and regulations that complement national policies to promote sustainable development and

protect the state's natural resources. These legal instruments empower relevant ministries and agencies to enforce environmental standards and monitor the impacts of developmental activities.

The proposed Rehabilitation and Upgrade of the NAPTIN Kainji Regional Training Centre will therefore comply with the following Niger State environmental laws and institutional frameworks:

- **Niger State Environmental Protection Agency (NISEPA) Law, 1992 (as amended)**

Establishes the Niger State Environmental Protection Agency (NISEPA), which is responsible for the protection, improvement, and management of the state's environment. The law mandates NISEPA to issue environmental compliance permits, enforce waste management regulations, and monitor construction and industrial activities to prevent pollution.

- **Niger State Urban and Regional Planning Law, 2010**

Provides for orderly physical development in the state, including the regulation of building construction, rehabilitation, and land use. It ensures that all development projects comply with planning and environmental standards.

- **Niger State Environmental Sanitation Law, 2003 (as amended 2018)**

Aims to promote public health and environmental cleanliness by regulating solid waste disposal, sanitation, and environmental hygiene practices within the state. It mandates proper waste collection and disposal during construction and operation phases.

- **Niger State Waste Management and Environmental Protection Edict, 1999**

Establishes procedures for sustainable waste management practices, including solid, liquid, and hazardous waste generated from government and private projects.

- **Niger State Climate Change Policy Framework (2022)**

Provides strategic direction for mitigating and adapting to climate change impacts within the state. It encourages low-carbon infrastructure and energy-efficient systems, relevant to the power and training sectors.

- **Violence Against Persons (Prohibition) Law of Niger State, 2020**

Domesticates the national VAPP Act and provides comprehensive protection against all forms of gender-based violence (GBV), including Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH). It is relevant for ensuring gender and social safeguards during project implementation.

2.2 International and Institutional Policy and Legal Framework

Over the past three decades, the global development agenda has increasingly emphasized sustainability, building upon key milestones such as the Rio Declaration on Environment and Development (1992), the Millennium Development Goals (MDGs), and the United Nations Sustainable Development Goals (SDGs). This paradigm shift recognizes the interdependence between environmental protection, economic progress, and social well-being.

In line with these global commitments, international financial institutions including Agence Française de Développement (AFD) require that all supported projects adhere to robust environmental and social standards. AFD's Environmental and Social Risk Management Policy (2025) ensures that project design, implementation, and operation integrate sustainability principles while promoting positive social outcomes and minimizing adverse environmental impacts.

At the national level, the Federal Ministry of Environment (FMEnv) and relevant State Ministries of Environment have enacted laws and regulations focused on environmental protection, pollution control, and resource conservation. These statutes mandate that all major public or private projects undergo an environmental and social assessment process prior to implementation. Consequently, the preparation of this Environmental, Social, Health and Safety (ESHS) Management Plan is in accordance with both national and international environmental assessment requirements.

Key International Conventions and Agreements Relevant to the Project

Nigeria is a signatory to numerous international conventions and protocols that promote environmental sustainability, biodiversity conservation, and cultural heritage protection. The following are particularly applicable to the proposed project:

- International Union for Conservation of Nature (IUCN) Guidelines (1996): Provides global best practices for environmental protection and biodiversity management.
- Convention on Biological Diversity (CBD, 1992): Promotes the conservation and sustainable use of biological resources.
- Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention, 1979): Ensures the protection of migratory species and their habitats.
- Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention, 1972): Provides for the preservation of cultural and natural sites of outstanding universal value.
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989): Regulates the movement and disposal of hazardous waste to prevent adverse effects on human health and the environment.
- United Nations Framework Convention on Climate Change (UNFCCC, 1992): Aims to stabilize greenhouse gas concentrations and encourage climate-resilient development.
- Stockholm Convention on Persistent Organic Pollutants (2001): Controls the production, use, and disposal of toxic chemicals.
- Paris Agreement on Climate Change (2015): Reinforces global commitment to limit temperature rise and foster low-carbon, climate-resilient growth.

AFD Institutional Framework

AFD's Environmental and Social Risk Management Policy (2025) integrates environmental protection and social inclusion into its financing operations. The key objectives are to:



- Ensure that funded projects do not cause significant harm to people or the environment;
- Promote stakeholder engagement and transparency throughout the project lifecycle;
- Support projects that advance climate action and contribute to the Sustainable Development Goals (SDGs); and
- Encourage clients to align with internationally recognized standards such as the IFC Performance Standards and the World Health Organization (WHO) guidelines for occupational and community health and safety.

AFD's standards provide a comprehensive framework that complements Nigeria's environmental regulatory system, ensuring that the proposed rehabilitation and upgrade of the NAPTIN Kainji Regional Training Centre meet both national compliance and international best practice requirements.

Agence Française de Développement (AFD) Environmental and Social Safeguard Standards

The Agence Française de Développement (AFD) requires that all financed projects integrate environmental and social considerations into their design, planning, and implementation processes. These standards ensure that development interventions are sustainable, inclusive, and consistent with international good practice, particularly the Sustainable Development Goals (SDGs) and the Paris Climate Agreement (2015).

Each project financed by AFD undergoes a preliminary Environmental and Social (E&S) risk screening based on its type, scale, sensitivity, location, and potential impacts. The screening process categorizes projects according to their environmental and social risk levels, as follows:

- Category A (High Risk): Projects likely to have significant, diverse, irreversible, or unprecedented adverse environmental and social impacts.
- Category B (Moderate/Substantial Risk): Projects with limited, site-specific, and reversible environmental and social impacts that can be effectively mitigated through standard management measures.
- Category C (Low Risk): Projects expected to have minimal or negligible environmental and social impacts.
- Category D (Financial Intermediary): Projects where AFD financing is provided through intermediaries (e.g., banks or funds) that on-lend or invest in sub-projects with varying risk levels.

Based on this classification, the Rehabilitation and Upgrade of the NAPTIN Kainji Regional Training Centre has been assigned a Category B (Moderate Risk) rating. This categorization reflects that the project's potential adverse impacts such as noise, dust, waste generation, and occupational health and safety risks are site-specific, reversible, and manageable through the application of appropriate mitigation measures and monitoring.

Accordingly, this Environmental, Social, Health, and Safety Management Plan (ESHS-MP) has been developed to ensure compliance with AFD's Environmental and Social Safeguard

Standards (2025) and relevant Nigerian environmental legislation.

2.1.3 Applicability of World Bank Environmental and Social Standards (ESS)

The World Bank Environmental and Social Framework (ESF) provides ten Environmental and Social Standards (ESS1-ESS10) that represent global best practice for identifying and managing environmental and social risks. Although this project is not financed by the World Bank, the ESS are applied in this ESHS document as a benchmark for ensuring robust environmental and social performance throughout the rehabilitation and upgrade of the NAPTIN Kainji Regional Training Centre. The applicability of the ESS to the proposed project is presented in Table 2.2.

Table 2.2: Applicability of World Bank Environmental and Social Standards (ESS) to the Project

ESS	Title / Objective	Relevance to the Project	Key Compliance / Management Measures
ESS1	Assessment and Management of Environmental and Social Risks and Impacts	Highly relevant. Rehabilitation works may generate dust, noise, waste, traffic interference and occupational risks.	Preparation and implementation of this ESHS Management Plan; integration of mitigation into design and contracts; ESHS monitoring and reporting; corrective actions.
ESS2	Labour and Working Conditions	Applicable. Construction workers and contractors will be engaged.	Adherence to fair labour practices; provision of PPE; site-specific OHS Plan; worker GRM; prohibition of child/forced labour; Codes of Conduct for SEA/SH prevention.
ESS3	Resource Efficiency and Pollution Prevention and Management	Applicable. Works will generate waste and use materials, energy and water.	Waste segregation and proper disposal; spill prevention; air quality control; avoidance of soil/water contamination; efficient resource use.
ESS4	Community Health and Safety	Applicable. Fakun Community and NAPTIN trainees/staff may be exposed to noise, dust, traffic and worker-community interactions.	Community Health and Safety Plan; fencing and access control; traffic management; Codes of Conduct; emergency preparedness; communication of work schedules to community.
ESS5	Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Not triggered. All works occur within NAPTIN's existing premises.	Confirmation of land ownership; ensure no displacement or restriction of access occurs.
ESS6	Biodiversity Conservation and Sustainable Management of Living Natural Resources	Limited relevance. Minor vegetation disturbance may occur within the compound.	Avoid unnecessary clearing; protect existing trees; restore disturbed areas; prevent contamination of natural drainage.
ESS7	Indigenous Peoples/Sub-Saharan African Historically Underserved Communities	Not triggered. No Indigenous Peoples are present at the project site or surroundings.	No actions required under ESS7.
ESS8	Cultural Heritage	Potentially applicable. Chance finds may occur during excavation or demolition.	Implement Chance Finds Procedure; stop work immediately on discovery; notify cultural authorities; preserve items as directed.

ESS9	Financial Intermediaries	Not applicable.	No actions required.
ESS10	Stakeholder Engagement and Information Disclosure	Highly applicable. Engagement with NAPTIN staff, trainees, Fakun Community and government agencies is required.	Implement stakeholder engagement activities; maintain project GRM; conduct consultations; disclose relevant ESHS information; document feedback and responses.

2.1.4 Comparison of Nigerian EA Law and World Bank Environmental & Social Standards

The Nigerian Environmental Impact Assessment (EIA) Act (CAP E12 LFN 2004), supplemented by Federal Ministry of Environment (FMEnv) regulations and State Environmental Protection Agency guidelines, provides the national legal foundation for environmental assessment and project permitting. The World Bank ESF, through ESS1–ESS10 (and earlier OP/BP safeguard policies), establishes comprehensive requirements for managing environmental and social risks. Table 2.3 compares Nigerian EA requirements with the World Bank ESF to ensure harmonised application for the NAPTIN Kainji project.

Table 2.3: Comparison of Nigerian EA Requirements and World Bank Environmental and Social Standards

Aspect	Nigerian EA Law / FMEnv Requirements	World Bank Environmental & Social Standards (ESS)
Mandatory Environmental Assessment	EA/EIA is mandatory for projects likely to have significant adverse impacts; FMEnv issues EIA approval.	ESS1 requires environmental and social risk assessment for all projects with moderate or substantial risks.
Screening & Risk Categorisation	Categorizes projects as Category I, II, or III based on impact magnitude; Category I/II require EA/ESMP.	Classifies projects as High, Substantial, Moderate or Low Risk. Previously: Category A, B, C or FI. Assessment level aligns with risk profile.
Scope of Assessment	Strong focus on biophysical environment; social impacts considered but less detailed.	ESS1–ESS10 require integrated assessment of environmental, social, labour, community health & safety, SEA/SH, and cultural heritage issues.
Stakeholder Engagement	Public notice, comment periods, and sometimes public hearings are required.	ESS10 requires continuous, inclusive, documented engagement and a project-level GRM throughout the project lifecycle.
Pollution and Emissions Control	Governed by FEPA/FMEnv Guidelines on air, water and noise pollution.	ESS3 requires pollution prevention based on Good International Industry Practice and the World Bank EHS Guidelines, typically more stringent.
Labour and OHS Requirements	Governed by Labour Act and OHS laws; enforcement varies.	ESS2 introduces strict labour rights, OHS requirements, worker GRM, no child/forced labour, and SEA/SH-sensitive Codes of Conduct.
Land Acquisition & Compensation	Compensation based mainly on legal ownership and market value; livelihood restoration less emphasized.	ESS5 requires avoidance/minimization of displacement, livelihood restoration, and compensation at full replacement cost, regardless of legal title (not triggered for this project).



Environmental, Social, Health and Safety (ESHS) Management Plan for the Rehabilitation and Upgrade of NAPTIN Kainji Regional Training Centre.



Cultural Heritage Protection	NCMM Act requires reporting and protection of archaeological or cultural discoveries.	ESS8 requires a Chance Finds Procedure, community involvement, and formal protection measures.
Disclosure Requirements	EIA documents disclosed at FMEnv, State MoE, LGAs and in national newspapers for public review.	ESS10 requires accessible disclosure and documentation of responses; WB-financed projects require disclosure on the Bank's website.
Environmental & Social Management Plans	ESMP required for projects with adverse impacts; focuses on mitigation measures and institutional responsibilities.	ESS1 requires a comprehensive ESMP/ESHS-MP integrating mitigation, monitoring, responsibilities, costs, capacity building, and performance indicators.



CHAPTER THREE

PROJECT DESCRIPTION

3.1 Introduction

The National Power Training Institute of Nigeria (NAPTIN) operates as the apex institution responsible for developing human capital for the Nigerian Power Sector. Its Kainji Regional Training Centre (RTC), located in New Bussa, Borgu Local Government Area of Niger State, plays a vital role in providing technical and vocational training for power generation, transmission, and distribution personnel across the country.

Over time, the Kainji RTC has faced significant challenges due to aging infrastructure, obsolete training equipment, and inadequate facilities, which have constrained its ability to deliver effective training programs aligned with modern power sector technologies. These limitations affect both the quality of training delivery and the safety, comfort, and efficiency of trainees and instructors.

In response, the Federal Government of Nigeria (FGN), with financing from the Agence Française de Développement (AFD) under the programme “Enhancing Vocational Training Delivery for the Nigeria Power Sector,” is implementing the Rehabilitation and Upgrade of the NAPTIN Kainji Regional Training Centre and the Supply, Installation, Testing, and Commissioning of Training Equipment.

The project aims to modernize infrastructure, enhance training facilities, and integrate industry-standard electrical and mechanical systems to strengthen Nigeria’s technical capacity in the power sector. Once completed, the upgraded facility will provide improved learning environments, support advanced technical programs, and promote sustainable operations consistent with AFD’s environmental and social safeguard standards.

3.2 Description of the Proposed Project

The proposed rehabilitation and upgrade works will be carried out within the existing NAPTIN Kainji RTC premises located within the Kainji Power Complex, approximately 5 km from the Kainji Dam and Hydro Power Plant. The training centre occupies a developed site comprising multiple buildings, workshops, and utilities that have deteriorated due to prolonged use and lack of maintenance.

The project will involve the rehabilitation of existing structures, upgrade of mechanical and electrical systems, and installation of new training and administrative equipment. The rehabilitation will not involve expansion beyond the existing property boundary, and no land acquisition or resettlement is anticipated.

3.2.1 Existing Facilities

The existing facilities within the training centre include:

- Administrative block and offices
- Classrooms and lecture theatres
- Electrical and mechanical workshops



- Laboratories for instrumentation, control, and renewable energy training
- Student hostels and staff quarters
- Power supply and distribution systems (including backup generators)
- Water supply boreholes and storage tanks
- Drainage networks and access roads

These facilities have significantly deteriorated, requiring comprehensive structural, electrical, and mechanical rehabilitation to restore full functionality.

3.2.2 Proposed Rehabilitation and Upgrade Works

The rehabilitation and upgrade project will include the following major components:

1. Structural Rehabilitation and Civil Works

- Repair of cracked walls, damaged columns, and foundations.
- Replacement of deteriorated roofing, ceilings, and floor finishes.
- Rehabilitation of external works including access roads, drainage, and landscaping.
- Rehabilitation of workshops, classrooms, and hostel facilities.

2. Mechanical and Electrical Upgrades

- Installation of new electrical wiring, fittings, and panels to meet current safety standards.
- Upgrade of workshop power systems for training on transmission, distribution, and renewable energy modules.
- Replacement of plumbing networks, sanitary fixtures, and water supply systems.
- Installation of air-conditioning and ventilation systems for classrooms and laboratories.

3. Training Equipment Supply, Installation, Testing and Commissioning

- Procurement and installation of modern training simulators, switchgear panels, transformer models, protective relay systems, and metering equipment.
- Commissioning of renewable energy training equipment, including solar photovoltaic systems and energy efficiency demonstration units.
- Installation of safety tools, personal protective equipment, and laboratory furniture.

4. Information and Communication Technology (ICT) Systems

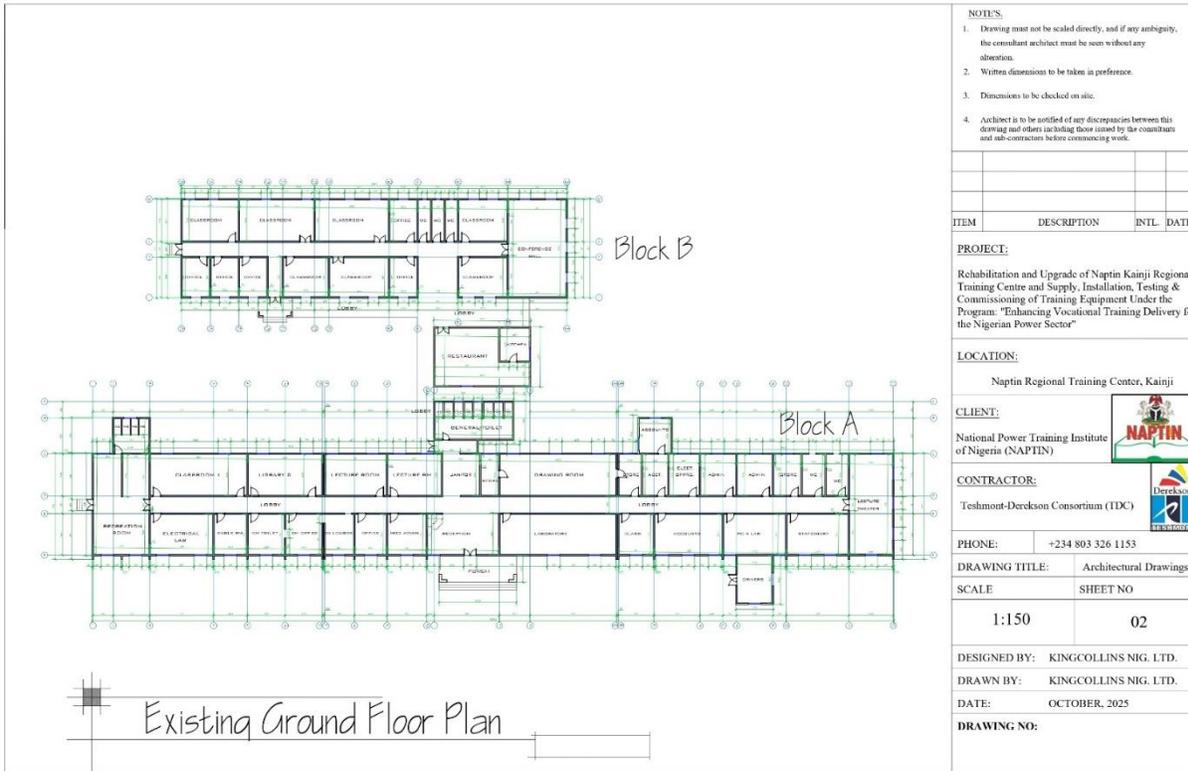
- Establishment of a Computer-Based Training (CBT) Laboratory.
- Installation of a campus-wide Local Area Network (LAN) and internet infrastructure.
- Integration of digital learning and simulation software.



Plate 3.1: 3D Front View of NAPTIN Kainji Regional Training Centre



Plate 3.2: Site Plan Layout

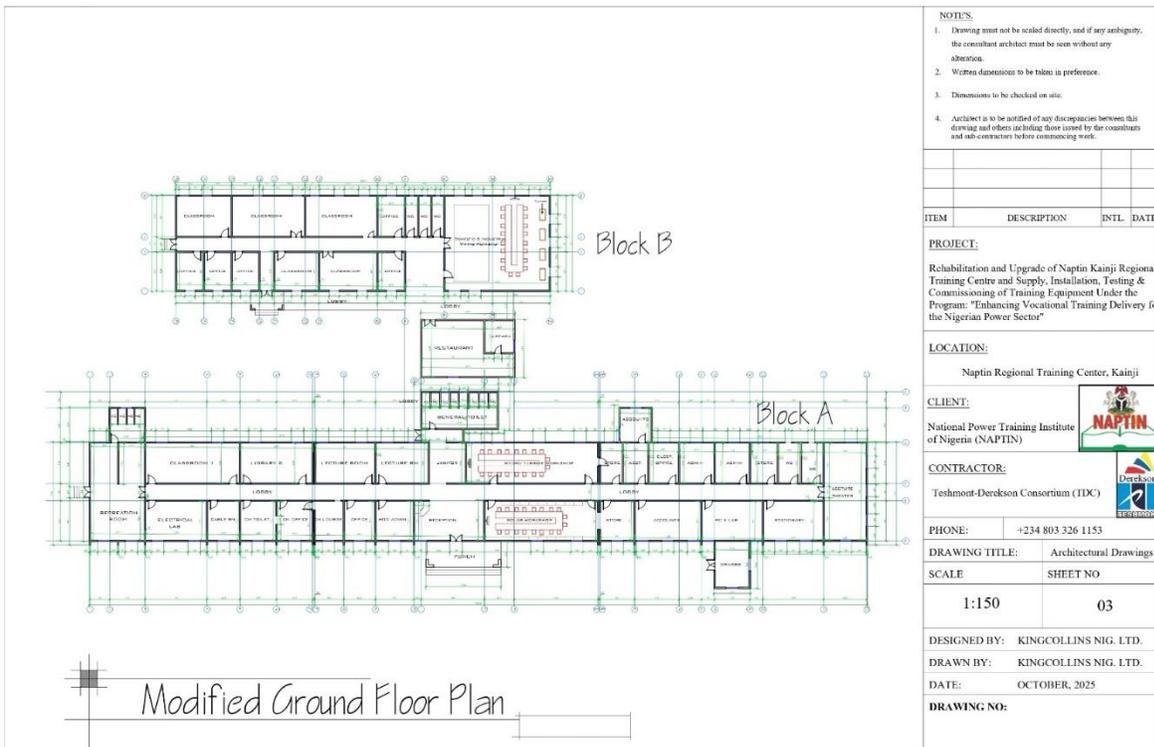


NOTES:

- Drawing must not be scaled directly, and if any ambiguity, the consultant architect must be seen without any alteration.
- Written dimensions to be taken in preference.
- Dimensions to be checked on site.
- Architect is to be notified of any discrepancies between this drawing and others including those issued by the consultants and sub-contractors before commencing work.

ITEM	DESCRIPTION	INTL.	DATE
PROJECT:			
Rehabilitation and Upgrade of Naptin Kainji Regional Training Centre and Supply, Installation, Testing & Commissioning of Training Equipment Under the Program: "Enhancing Vocational Training Delivery for the Nigerian Power Sector"			
LOCATION:			
Naptin Regional Training Center, Kainji			
CLIENT:			
National Power Training Institute of Nigeria (NAPTIN)			
CONTRACTOR:			
Teshmont-Derekson Consortium (TDC)			
PHONE:		+234 803 326 1153	
DRAWING TITLE:		Architectural Drawings	
SCALE		SHEET NO	
1:150		02	
DESIGNED BY: KINGCOLLINS NIG. LTD.			
DRAWN BY: KINGCOLLINS NIG. LTD.			
DATE: OCTOBER, 2025			
DRAWING NO:			

Plate 3.3: Existing Ground Floor Plan

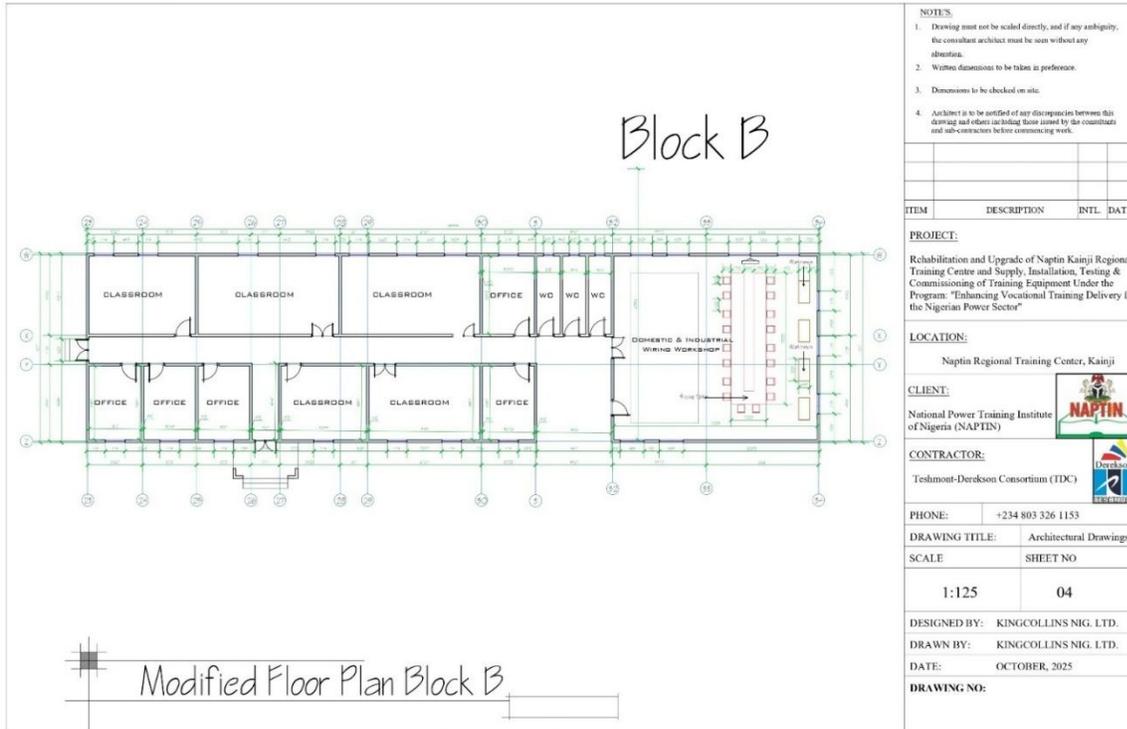


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PHONE:		+234 803 326 1153	
DRAWING TITLE:		Architectural Drawings	
SCALE		SHEET NO	
1:150		03	
DESIGNED BY: KINGCOLLINS NIG. LTD.			
DRAWN BY: KINGCOLLINS NIG. LTD.			
DATE: OCTOBER, 2025			
DRAWING NO:			

Plate 3.4: Modified Ground Floor Plan

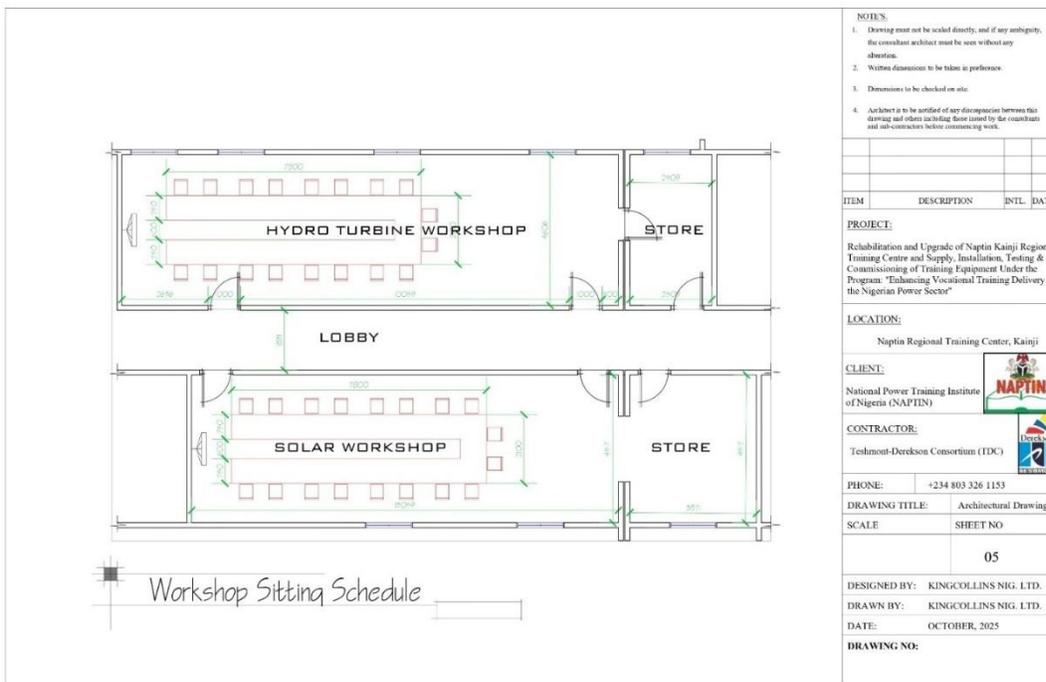


NOTES:

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- Written dimensions to be taken as preference.
- Dimensions to be checked on site.
- Architect is to be notified of any discrepancies between this drawing and others including those issued by the consultants and sub-contractors before commencing work.

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Naptin Regional Training Center, Kainji			
CLIENT:			
National Power Training Institute of Nigeria (NAPTIN)			
CONTRACTOR:			
Teshmont-Derekson Consortium (TDC)			
PHONE:		+234 803 326 1153	
DRAWING TITLE:		Architectural Drawings	
SCALE		SHEET NO	
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DESIGNED BY: KINGCOLLINS NIG. LTD.			
DRAWN BY: KINGCOLLINS NIG. LTD.			
DATE: OCTOBER, 2025			
DRAWING NO:			

Plate 3.5: Modified Floor Plan Block B



NOTES:

- Drawing must not be scaled directly, and if any ambiguity, the consultant architect must be seen without any alteration.
- Written dimensions to be taken as preference.
- Dimensions to be checked on site.
- Architect is to be notified of any discrepancies between this drawing and others including those issued by the consultants and sub-contractors before commencing work.

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National Power Training Institute of Nigeria (NAPTIN)			
CONTRACTOR:			
Teshmont-Derekson Consortium (TDC)			
PHONE:		+234 803 326 1153	
DRAWING TITLE:		Architectural Drawings	
SCALE		SHEET NO	
		05	
DESIGNED BY: KINGCOLLINS NIG. LTD.			
DRAWN BY: KINGCOLLINS NIG. LTD.			
DATE: OCTOBER, 2025			
DRAWING NO:			

Plate 3.6: Workshop Sitting Schedule

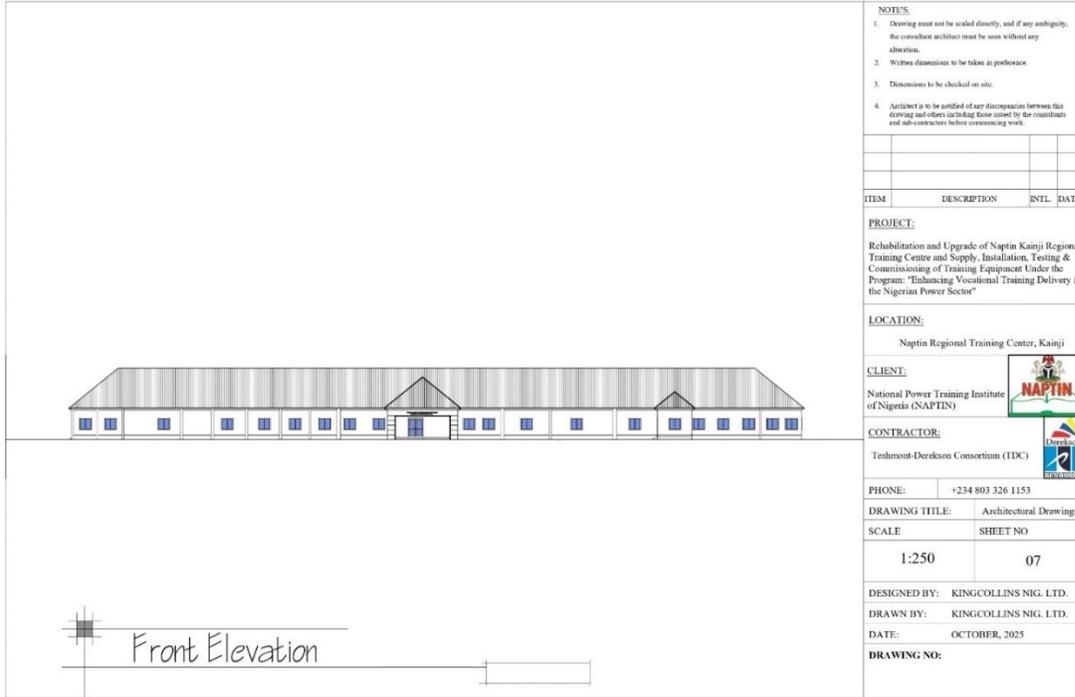


Plate 3.7: Front Elevation

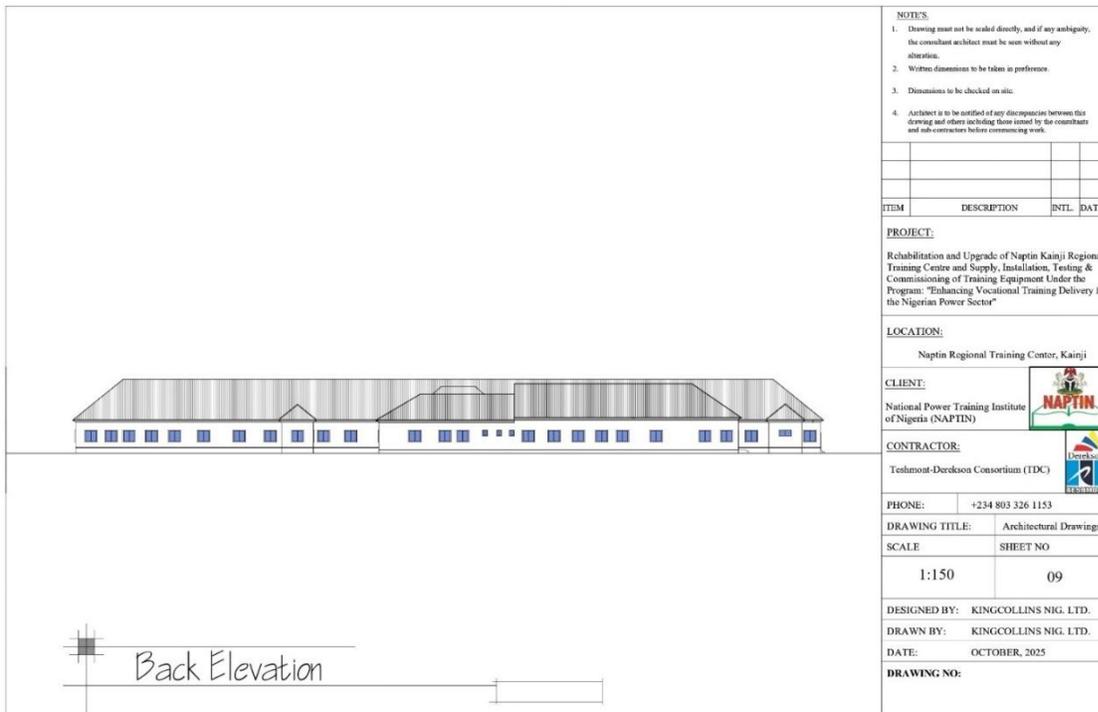
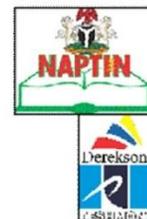
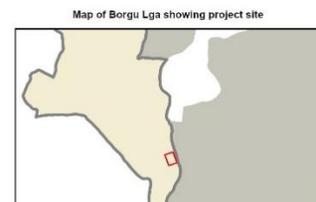
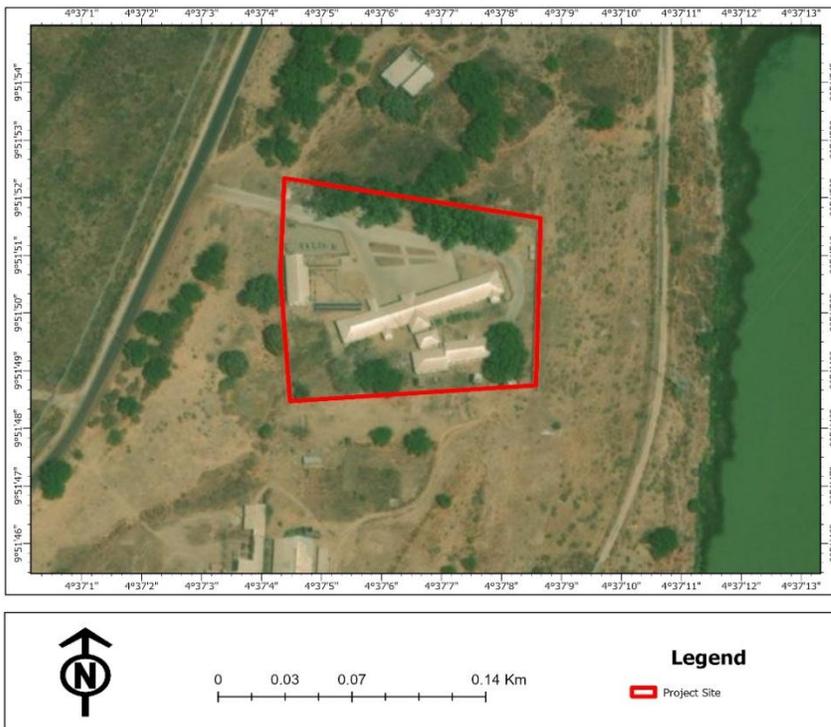


Plate 3.8: Back Elevation



Plate 3.9: Modified Power Layout

PROJECT TITLE: REHABILITATION AND UPGRADE OF NAPTIN KAINJI REGIONAL TRAINING CENTRE AND SUPPLY INSTALLATION TESTING & COMMISSIONING OF TRAINING EQUIPMENT UNDER THE PROGRAM: ENHANCING VOCATIONAL TRAINING DELIVERY FOR THE NIGERIAN POWER SECTOR



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Figure 3.1: Satellite Imagery Map showing the Location of the Project Site

3.3 Project Activities and Phases

The project will be implemented in three main phases, each involving specific tasks and labour requirements.

Phase 1: Structural Framework

Activities	Skilled Labour	Unskilled Labour
Demolition and removal of damaged sections	4	6
Substructure and masonry work	6	8
Reinforced concrete works (columns, slabs, beams)	8	6
Roof carpentry and roofing installation	6	4

Phase 2: Finishing Works

Activities	Skilled Labour	Unskilled Labour
Plastering, tiling, and painting	10	6
Ceiling installation (gypsum/acoustic)	4	2
Door and window fitting (metal/wood/glass)	6	2
Plumbing and electrical installation	8	4
Furniture, workstation, and fixture installation	6	3

Phase 3: External Works and Landscaping

Activities	Skilled Labour	Unskilled Labour
Drainage and surface water management	4	8
Horticulture, tree planting, and landscaping	2	6
Construction of waste management and soak-away systems	4	6

Total Estimated Labour Requirements:

Approximately 69 skilled and 55 unskilled workers are expected during peak construction, with priority given to local employment.

3.4 Material Sourcing

All construction materials will be sourced locally within Niger State where feasible, in compliance with sustainable procurement principles.

Key materials include cement, sand, aggregates, iron rods, timber, roofing sheets, paints, plumbing fittings, and electrical accessories.

The contractor will:

- Obtain wood from licensed sawmills.
- Avoid sourcing sand from unreclaimed or illegal borrow pits; and
- Source water for construction activities from non-community boreholes or approved



municipal sources to prevent pressure on local resources.

3.5 Staging Area and Site Management

The staging area for the project comprising storage yards, workshops, and site offices will be established within the existing NAPTIN compound to minimize external interference.

Criteria for selecting and managing the staging area include:

- Sufficient distance from training classrooms and residential hostels;
- Not located within ecologically sensitive or vegetated zones;
- Properly fenced with restricted access;
- Equipped with sanitary facilities and potable water for workers; and
- Managed to minimize noise, dust, and waste impacts on ongoing training activities.

The contractor shall obtain all necessary local permits for site use and ensure proper rehabilitation of the staging area after project completion.

3.6 Utilities and Support Infrastructure

The project will upgrade key utilities including:

- Electricity Supply: Reconnection to the Kainji Dam power source, installation of new transformers and distribution boards.
- Water Supply: Borehole rehabilitation and installation of overhead storage tanks.
- Waste Management: Construction of new septic systems, solid waste bins, and waste segregation units.
- Drainage: Repair and lining of stormwater drain to prevent erosion and flooding.

3.7 Expected Project Benefits

The rehabilitation and upgrade will deliver multiple economic, social, and environmental benefits:

- Improved quality of technical training for Nigeria's power workforce;
- Creation of short-term local employment and economic opportunities;
- Enhanced safety, functionality, and environmental compliance of the facility;
- Strengthened institutional capacity of NAPTIN for sustainable vocational training delivery;
- Promotion of gender inclusion and equitable access to training programs.

CHAPTER FOUR DESCRIPTION OF THE PROJECT ENVIRONMENT

4.1 Overview of the Project Area

The proposed Rehabilitation and Upgrade of the NAPTIN Kainji Regional Training Centre is located in New Bussa, Borgu Local Government Area (LGA), Niger State, Nigeria. The project site lies within the premises of the existing NAPTIN Kainji Training Centre, which forms part of the larger Kainji Hydropower Complex, situated near the Kainji Dam on the River Niger.

Niger State is geographically positioned between latitudes 8°20'N and 11°30'N and longitudes 3°30'E and 7°20'E, making it the largest state in Nigeria by landmass. It is bordered by Kwara State and Kogi State to the south, Kaduna State to the northeast, Zamfara State to the north, and the Republic of Benin to the west.

New Bussa, where the project is located, serves as the administrative headquarters of Borgu LGA. It was established after the construction of the Kainji Dam (1968), which led to the relocation of the original Bussa town that was submerged by the Kainji Reservoir. The town and its surroundings form a semi-urban settlement characterized by hydroelectric facilities, educational institutions, and residential areas for staff of the Kainji Hydroelectric Power Station and related agencies.

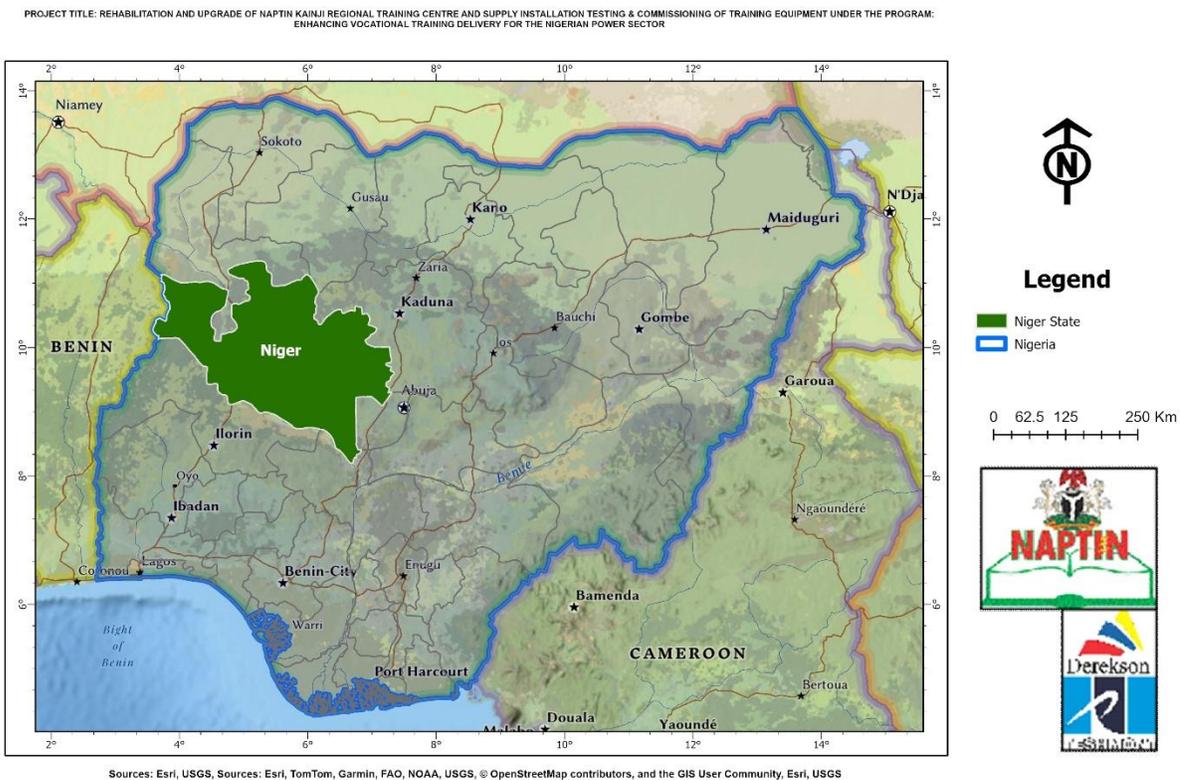


Figure 4.1: Administrative Map of Nigeria Showing Niger State

PROJECT TITLE: REHABILITATION AND UPGRADE OF NAPTIN KAINJI REGIONAL TRAINING CENTRE AND SUPPLY INSTALLATION TESTING & COMMISSIONING OF TRAINING EQUIPMENT UNDER THE PROGRAM: ENHANCING VOCATIONAL TRAINING DELIVERY FOR THE NIGERIAN POWER SECTOR

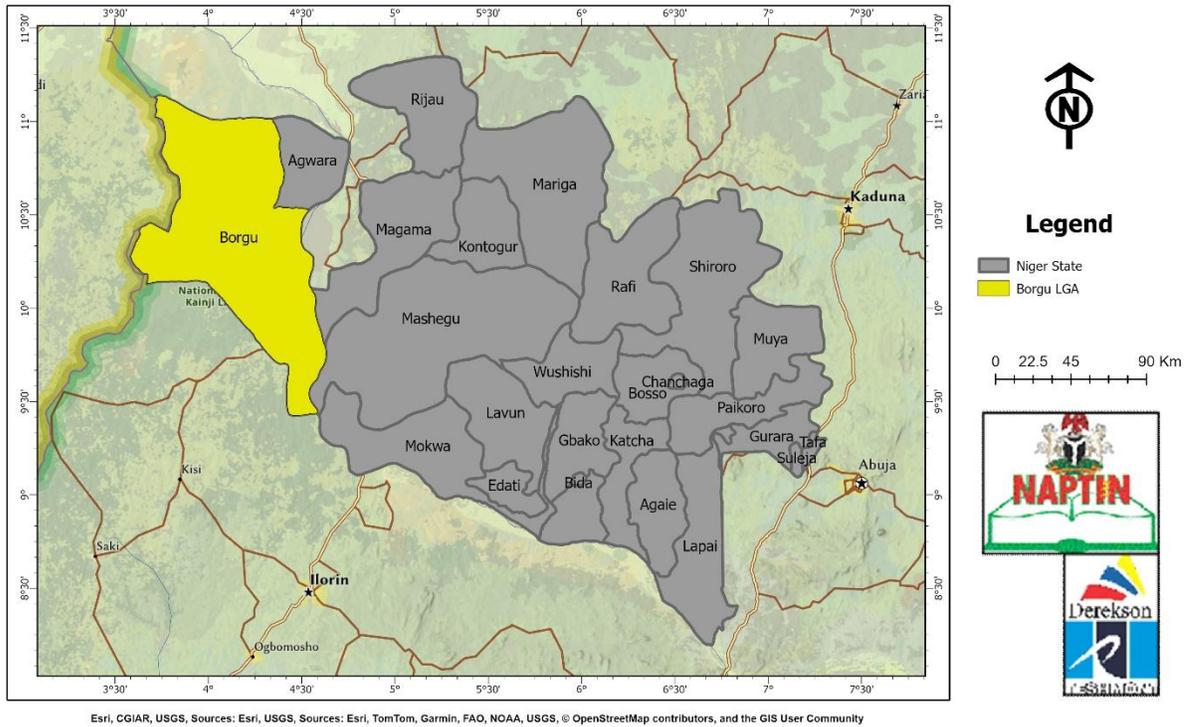


Figure 4.2: Administrative Map of Niger State Showing Borgu LGA

4.2 Biophysical Environment of the Project Area

An environmental baseline survey was carried out between 22nd - 23rd October, 2025 to assess the prevailing environmental and social conditions of the NAPTIN Kainji Regional Training Centre and its environs in New Bussa, Borgu LGA, Niger State.

The purpose was to obtain accurate field information on existing physical, biological, and socioeconomic characteristics of the project area. The study covered both primary data collection (through field sampling, stakeholder consultations, and direct measurements) and secondary data (from literature, meteorological records, and institutional reports).

The fieldwork aimed to:

- Establish baseline environmental conditions before rehabilitation works;
- Identify potential environmental sensitivities and receptors;
- Evaluate human activities within and around the project site; and
- Provide a scientific basis for assessing and mitigating anticipated impacts.

Parameters studied included air quality, noise levels, soil quality, surface and groundwater characteristics, meteorology, vegetation composition, and socioeconomic settings.

The collected data were analyzed in line with national environmental guidelines (FMEnv standards) and World Bank Environmental and Social Safeguard Standards (2025). Table 3.1 shows the coordinate of the sampling points.

Table 4.1: Geographical Coordinates of the Sampled Stations

Code	Location Description	Data Coordinate	
		Latitude(N)	Longitude(E)
<i>Air Quality (AQ)/Meteorology(M)/Noise(N)</i>			
AQ/M/NS1	Project Site	9.864245	4.618980
AQ/M/NS2	Project Site	9.863982	4.619014
AQ/M/NS3	Project Site	9.863768	4.618938
AQ/M/NS4	Project Site	9.863566	4.619003
AQ/M/NS5	Project Site	9.863535	4.618456
AQ/M/NS6	Project Site	9.863509	4.617995
AQ/M/NS7	Project Site	9.863803	4.617931
AQ/M/NS8	Project Site	9.864265	4.617912
AQ/M/NS9	Project Site	9.86443	4.617948
AQ/M/NS10	Project Site	9.864332	4.618527
AQ/M/NS11 Control	Project Site	9.864116	4.618756
<i>Soil Sample (SS)</i>			
SS1	Project Site	9.864245	4.618980
SS2	Project Site	9.863982	4.619014
SS3	Project Site	9.863566	4.619003
SS4	Project Site	9.863535	4.618456
SS5	Project Site	9.863803	4.617931
SS6 Control	Fakun	9.864332	4.618527
<i>Surface Water (SW)</i>			
SW1/SED1	Upstream (River Niger)	9.861973	4.614985
SW2 /SED2	Midstream (River Niger)	9.860427	4.615268
SW3/SED3 (Control)	Downstream Control at Fakun (River Niger)	9.853949	4.614830

AQ/NS= Air Quality/Noise Station; SS= Soil Sample; GW= Groundwater; SW/SED= Surface Water/Sediment Sample

Source: NAPTIN Kainji Field Survey, 2025

4.2.1 Climate and Meteorology

Air Temperature

The NAPTIN Kainji project area experiences consistently high temperatures throughout the year, typical of its tropical continental climate and location within the Southern Guinea Savanna zone. Long-term climatological data (1994-2024) obtained from the Nigerian Meteorological Agency (NiMet, 2024) indicate monthly minimum temperatures ranging between 20.5°C and 24.2°C, and monthly maximum temperatures between 30.0°C and 34.9°C. The hottest months are February and March, coinciding with the peak of the dry season, while the lowest temperatures are generally recorded in July, during the height of the rainy season.

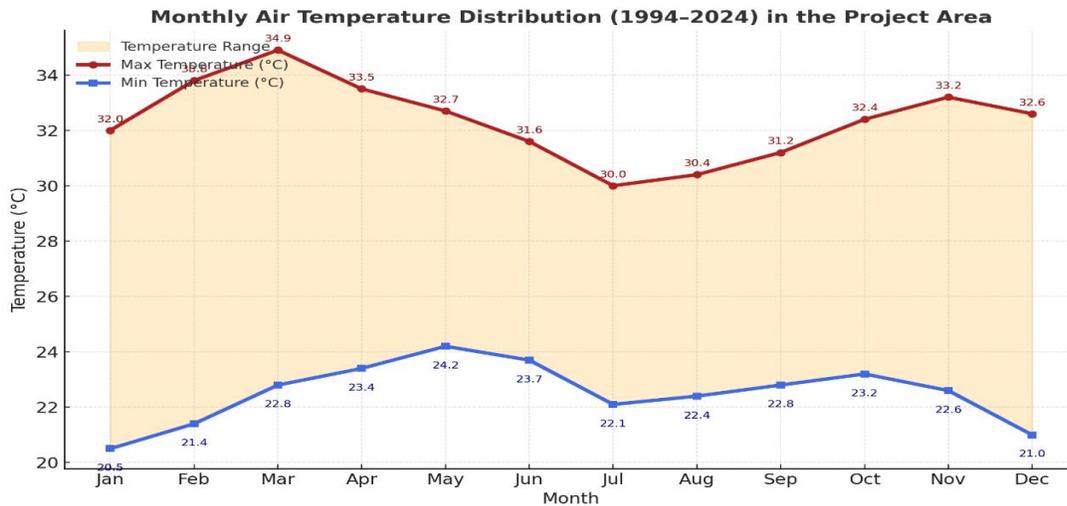


Figure 4.3: Monthly Air Temperature Distribution (1994–2024) in the Project Area
(Source: NiMet, 2024)

Rainfall

The NAPTIN Kainji project area experiences a tropical continental climate typical of the Southern Guinea Savanna zone, with distinct wet and dry seasons largely influenced by the movement of the Inter-Tropical Convergence Zone (ITCZ). Long-term climatic data from the Nigerian Meteorological Agency (NiMet, 2024) show an average annual rainfall of approximately 1,100 mm, distributed unevenly throughout the year. The rainfall pattern begins gradually in March (about 42 mm) and intensifies sharply from April (90 mm) to May (160 mm), reaching its peak in June with an average of 220 mm. Rainfall remains relatively high in July (180 mm), declines temporarily in August (90 mm) due to the short “August break,” and rises again to a secondary peak in September (140 mm). Precipitation then decreases in October (80 mm) and drops significantly in November (20 mm), reaching its lowest levels between December and February (5-12 mm).

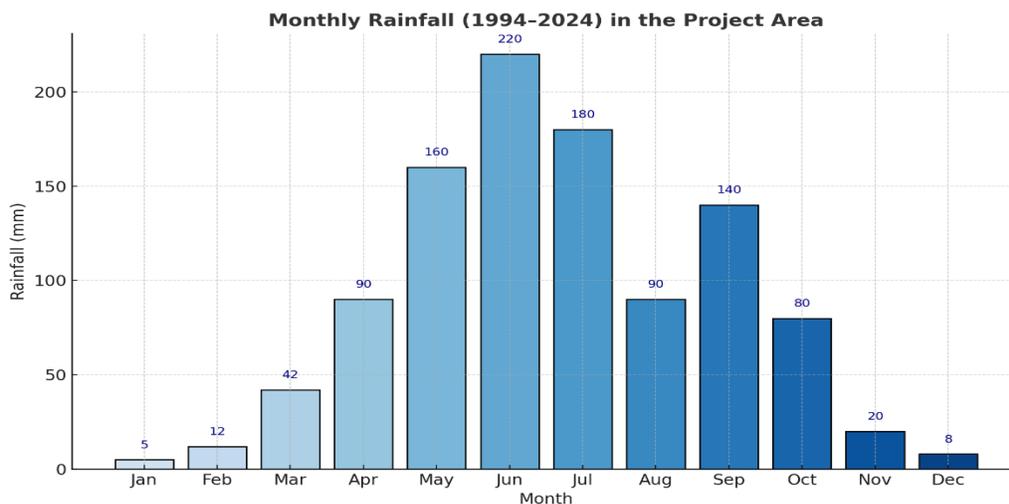


Figure 4.4: Average Monthly Rainfall (1994–2024) in the Project Area
(Source: NiMet, 2024)

Relative Humidity

Relative humidity within the NAPTIN Kainji project area varies seasonally in line with the region’s tropical continental climate and rainfall pattern. Long-term climatological data (1994-2024) from the Nigerian Meteorological Agency (NiMet, 2024) indicate that morning (09:00 hrs) relative humidity ranges between 70% and 84%, while afternoon (15:00 hrs) values range from 58% to 76%. The highest humidity occurs between June and September, coinciding with the peak of the rainy season, while the lowest levels are observed between December and February during the dry Harmattan period.

These fluctuations are primarily influenced by rainfall intensity, temperature, and prevailing wind direction. High humidity during the wet months promotes vegetation growth, metal corrosion, and mould formation, while low humidity in the dry months increases dust emissions, evaporation rates, and heat stress.

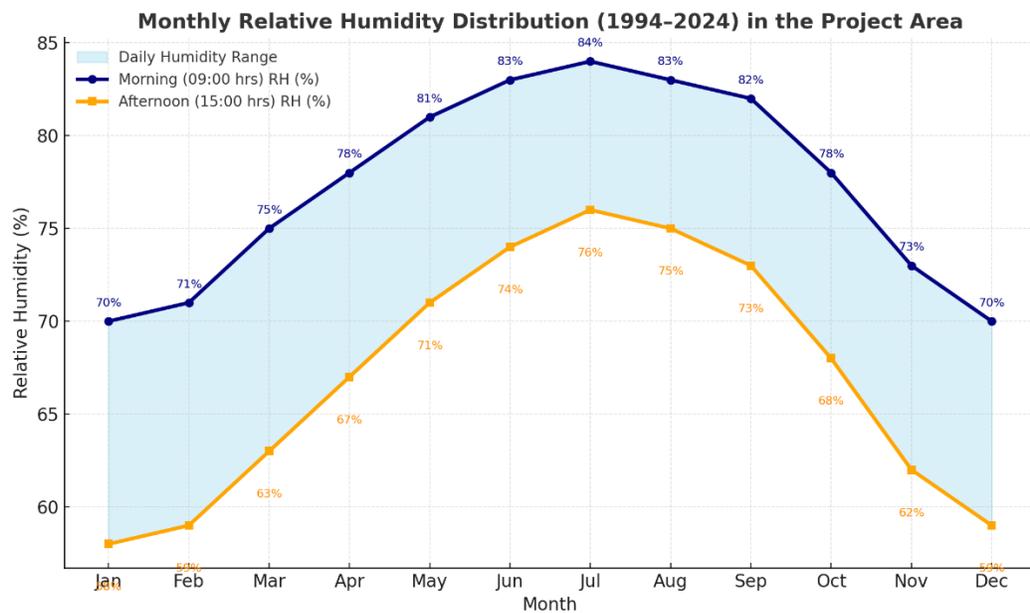


Figure 4.5: Monthly Relative Humidity Distribution (1994–2024) in the Project Area
(Source: NiMet 2024)

Sunshine Pattern

The project area experiences high solar radiation throughout the year due to its tropical continental location, with marked seasonal variations corresponding to rainfall and cloud cover patterns. Sunshine duration is governed by the movement of the Inter-Tropical Convergence Zone (ITCZ) and the alternating wet and dry seasons. Long-term climatological data (1994-2024) from the Nigerian Meteorological Agency (NiMet, 2024) show that average monthly sunshine duration ranges from 4.5 to 8.8 hours per day. The maximum sunshine occurs between November and March during the dry season, with monthly averages reaching up to 8-9 hours/day, while the minimum values (4-5 hours/day) are recorded between July and September, coinciding with increased cloudiness and rainfall

intensity.

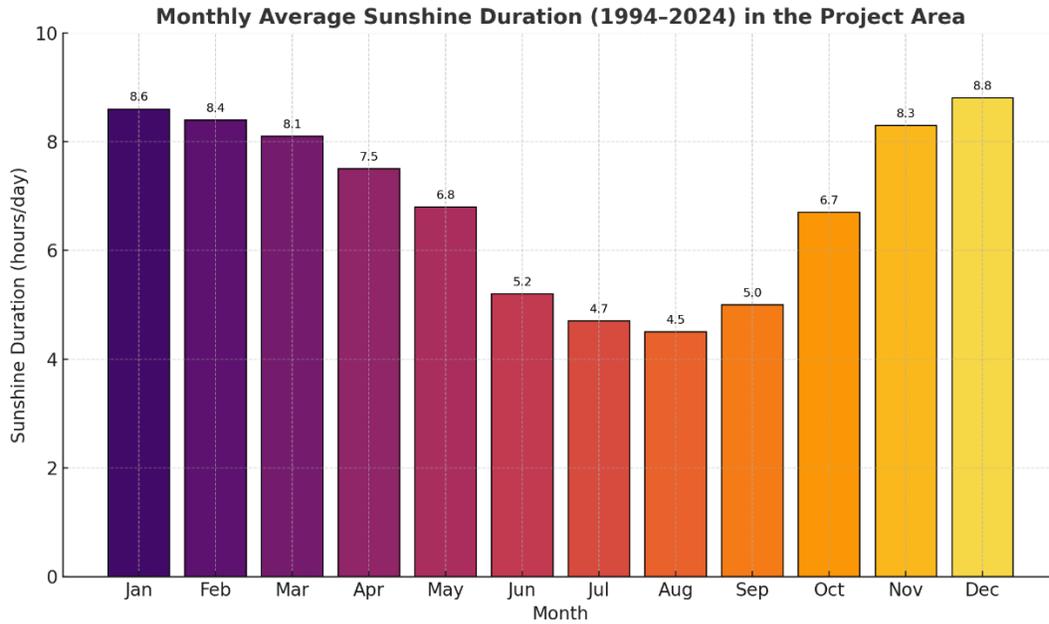


Figure 4.6: Monthly Average Sunshine Duration (1994–2024) in the Project Area
(Source: NiMet 2024)

Wind Speed and Direction

The wind regime of the NAPTIN Kainji project area is primarily influenced by the seasonal migration of the Inter-Tropical Convergence Zone (ITCZ), resulting in alternating south-westerly maritime and north-easterly continental airflows. Long-term climatological records show that average surface wind speeds range between 2.0 m/s and 3.1 m/s, with peak values occurring between July and August, coinciding with the height of the rainy season.

Prevailing wind directions are south-westerly during the wet months (April–October), bringing moist air from the Atlantic Ocean, and north-easterly during the dry Harmattan period (November–March), characterized by dry, dust-laden winds from the Sahara. Field measurements taken during the site investigation recorded 1.1 m/s wind speed from the south-east and 1.6 m/s from the south-west, with intermittent calm periods observed typical of inland, semi-sheltered environments.

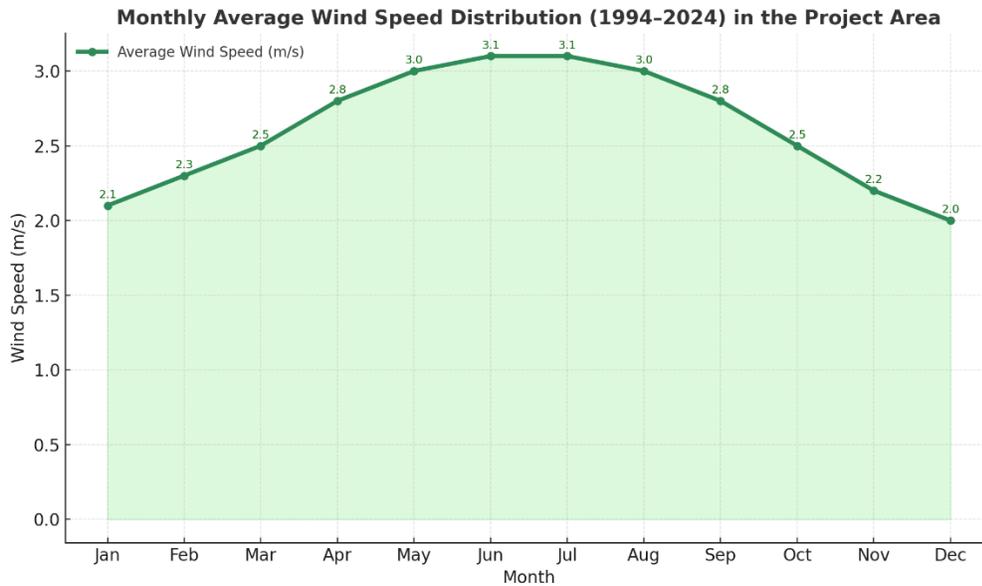


Figure 4.7: Monthly Average Wind Speed Distribution (1994–2024) in the Project Area

(Source: NiMet 2024)

The wind direction pattern reflects the region’s tropical continental climate, governed by the seasonal oscillation of the Inter-Tropical Convergence Zone (ITCZ). The wind rose diagram (Figure 4.8) illustrates two dominant prevailing directions:

- South-Westerly Winds (Maritime Tropical Air Mass): Predominant between April and October, corresponding to the rainy season. These winds originate from the Atlantic Ocean, bringing moisture-laden air that contributes significantly to the region’s precipitation and moderate temperatures.
- North-Easterly Winds (Continental Tropical Air Mass): Active between November and March, representing the Harmattan period. These winds carry dry, dusty air from the Sahara Desert, resulting in reduced visibility, lower humidity, and increased dust dispersion.

Other wind directions (north, east, west, south, and their intercardinal points) occur less frequently, accounting for minor localized wind flows due to topographic influences around the Kainji Lake basin.

On average, the south-westerly component accounts for about 30% of the total annual wind flow, followed by north-easterly winds (≈10-12%), with other directions collectively contributing less than 15%. The mean annual wind speed remains moderate (2.0-3.1 m/s), with occasional calm conditions typical of inland environments.

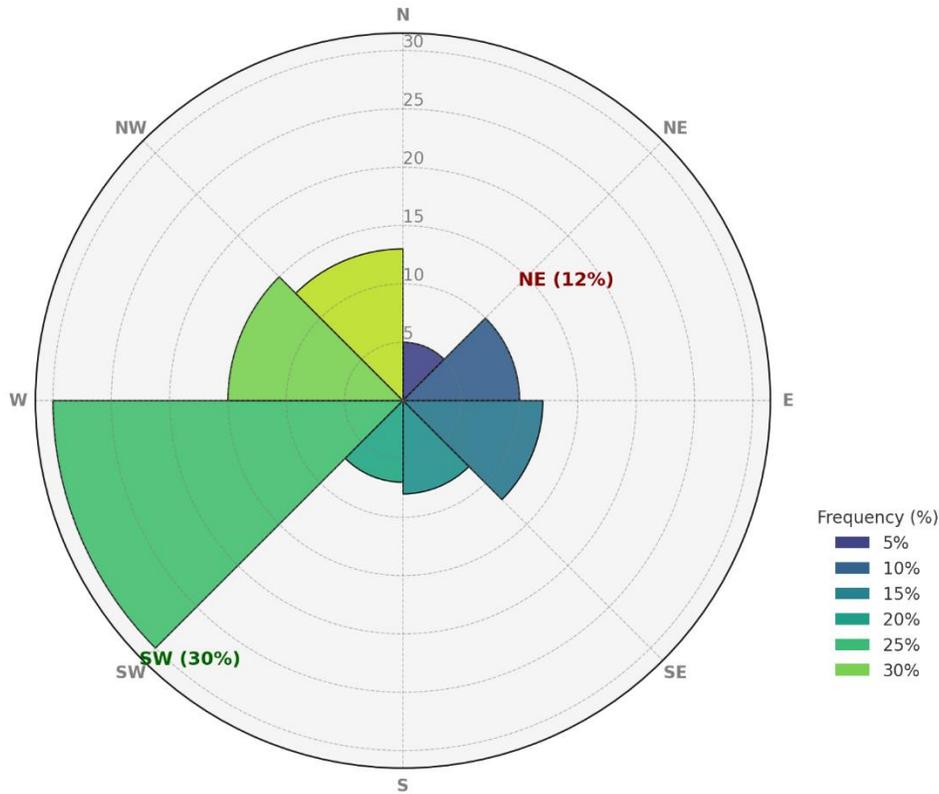


Figure 4.8: Wind Direction Rose Diagram (1994-2024) in the Project Area
(Source: Nigerian Meteorological Agency, NiMet 2024)

Micro-Climatic Studies

The micro-climatic characteristics of the project area reflect the broader climatic regime of north-central Nigeria, characterized by alternating wet and dry seasons under the influence of the Inter-Tropical Convergence Zone (ITCZ). Field measurements conducted during the environmental baseline survey correspond closely with long-term climatological data reported by the Nigerian Meteorological Agency (NiMet, 2024), confirming the consistency of local atmospheric conditions with regional norms. Results presented in Table 4.2 indicate slight spatial variability across sampling stations, primarily due to site elevation, surface cover, and localized airflow patterns.

Table 4.2: Meteorological Fieldwork Results – NAPTIN Kainji Project Area

S/N	Temp (°C)	Dew Point (°C)	Wet Bulb (°C)	Relative Humidity (%RH)	Atmospheric Pressure (HPA)	Wind Speed (m/s)
AQ/M/NS1	33.40	16.20	18.50	45.30	1013.90	0.40
AQ/M/NS2	32.20	14.90	17.90	45.80	1012.40	0.60
AQ/M/NS3	30.80	15.80	18.30	46.90	1013.50	1.00
AQ/M/NS4	33.30	15.30	18.30	44.00	1013.70	0.70
AQ/M/NS5	31.30	15.60	18.50	45.00	1013.60	1.00
AQ/M/NS6	31.50	15.70	18.30	45.30	1013.40	1.50
AQ/M/NS7	31.90	15.60	17.40	45.40	1013.80	0.80

S/N	Temp (°C)	Dew Point (°C)	Wet Bulb (°C)	Relative Humidity (%RH)	Atmospheric Pressure (HPA)	Wind Speed (m/s)
AQ/M/NS8	31.60	16.40	18.00	45.00	1013.50	0.80
AQ/M/NS9	31.50	15.00	19.10	45.60	1013.60	1.00
AQ/M/NS10	32.20	15.20	18.00	45.20	1012.90	1.10
AQ/M/NS11 Control	31.60	15.30	19.30	46.50	1013.70	1.50

Source: NAPTIN Kainji Field Survey, 2025

4.2.2 Air Quality

In-situ baseline air quality assessment was conducted at the NAPTIN Kainji Regional Training Centre and its immediate surroundings to determine existing ambient air quality conditions prior to project implementation. Eleven (11) sampling points were strategically selected to represent the project influence area, including one control location (upwind of the site). The parameters measured include Nitrogen Oxides (NO₂/NO_x), Sulphur Dioxide (SO₂), Carbon Monoxide (CO), Hydrogen Sulphide (H₂S), Ammonia (NH₃), Volatile Organic Compounds (VOCs), and Suspended Particulate Matter (SPM).

All air quality measurements were conducted using the MultiRAE Pro Model PGM-6248 multi-gas monitor, which was calibrated and certified prior to field deployment.

Each instrument was auto-zeroed before every test run, in accordance with the manufacturer's protocol and FMEnv quality assurance standards.

Table 4.3: Sampling and Analytical Methods

Parameter	Method / Equipment	Detection Range	Resolution
NO _x (as NO ₂)	In-situ electrochemical sensor (MultiRAE Pro)	0–20 ppm	0.1 ppm
SO ₂	In-situ electrochemical sensor	0–20 ppm	0.1 ppm
CO	Non-dispersive infrared (NDIR) single gas analyzer	0–200 ppm	1 ppm
NH ₃	In-situ electrochemical sensor	0–20 ppm	0.1 ppm
H ₂ S	Electrochemical sensor	0–200 ppm	0.1 ppm
VOCs	Photoionization detector (PID)	0–200 ppm	0.1 ppm
SPM (Dust)	Gravimetric method / portable sampler	0–1000 µg/m ³	1 µg/m ³

Source: NAPTIN Kainji Field Survey, 2025

Table 4.4: Results of Ambient Air Quality Measurement

Sample Point	CO Ppm	SO ₂ Ppm	NO ₂ Ppm	H ₂ S ppm	CO ₂ ppm	VOCs Ppm	Noise (dB)	SPM (µg/m ³)	
								PM _{2.5}	PM ₁₀
AQ ₁ (Air + Noise + Met)	1.00	<0.001	0.01	<0.001	380	<0.001	44.20	4.40	8.10
AQ ₂ (Air + Noise + Met)	2.00	<0.001	0.01	<0.001	373	<0.001	43.70	4.00	8.30
AQ ₃ (Air + Noise + Met)	1.00	<0.001	<0.001	<0.001	387	<0.001	46.60	5.20	8.40
AQ ₄ (Air + Noise + Met)	1.00	<0.001	<0.001	<0.001	383	<0.001	45.70	6.10	7.60
AQ ₅ (Air + Noise + Met)	2.00	<0.001	<0.001	<0.001	379	<0.001	44.20	5.40	8.20
AQ ₆ (Air + Noise + Met)	2.00	<0.001	<0.001	<0.001	374	<0.001	45.70	6.40	7.70
AQ ₇ (Air + Noise + Met)	1.00	<0.001	<0.001	<0.001	388	0.01	43.00	5.30	7.70
AQ ₈ (Air + Noise + Met)	1.00	<0.001	<0.001	<0.001	384	0.01	43.30	6.90	8.80
AQ ₉ (Air + Noise + Met)	2.00	<0.001	<0.001	<0.001	381	0.02	44.20	5.40	8.30

Sample Point	CO Ppm	SO ₂ Ppm	NO ₂ Ppm	H ₂ S ppm	CO ₂ ppm	VOCs Ppm	Noise (dB)	SPM (µg/m ³)	
								PM _{2.5}	PM ₁₀
AQ ₁₀ (Air + Noise + Met)	1.00	0.01	<0.001	<0.001	384	<0.001	43.20	5.00	7.50
AQ ₁₁ (Air + Noise + Met) Control at Fakun Community	1.00	<0.001	0.01	<0.001	383	<0.001	46.00	6.30	9.10
FME_{env} Limit	10.0	0.01	0.04-0.06	0.008	NA	0.2-5.0	90	25	NA
World Bank / IFC Limit	9 ppm (8-hr avg)	200 µg/m³ (~0.076 ppm, 1 hr)	200 µg/m³ (~0.11 ppm, 1 hr)	150 µg/m³ (~0.11 ppm, 30 min)	Not Specified	Not Specified	70 dB (industrial area)	25 µg/m³ (24 hr)	150 µg/m³ (24 hr)

Legend: NA = Not Applicable; Point C = Control Point.

Source: NAPTIN Kainji Field Survey, 2025

Table 4.5: Applicable Standards

Parameter	Observed Range (AQ1-AQ11)	FME _{env} Limit	World Bank / IFC EHS Limit (Ambient Air)	Compliance Status
CO	1.00 – 2.00 ppm	10 ppm (1 hr avg.)	10 mg/m ³ (~9 ppm, 8 hr avg.)	Within Limit
NO ₂	<0.001 – 0.01 ppm	0.04–0.06 ppm (annual avg.)	200 µg/m ³ (~0.11 ppm, 1 hr avg.)	Within Limit
SO ₂	<0.001 – 0.01 ppm	0.01 ppm (annual avg.)	125 µg/m ³ (~0.047 ppm, 24 hr avg.)	Within Limit
SPM / PM ₁₀	7.50 – 9.10 µg/m ³	600 µg/m ³	150 µg/m ³ (24 hr avg.)	Within Limit
PM _{2.5}	4.00 – 6.90 µg/m ³	25 µg/m ³	25 µg/m ³ (24 hr avg.)	Within Limit
NH ₃	Not Measured	0.2 ppm	Not Specified	Not Available
H ₂ S	<0.001 ppm	0.008 ppm (24 hr avg.)	150 µg/m ³ (~0.11 ppm, 30 min avg.)	Within Limit
VOC	<0.001 – 0.02 ppm	0.2 ppm	Not Specified	Within Limit
Noise	43.0 – 46.6 dB	80 dB	70 dB (industrial)	Within Limit
CO ₂	373 – 388 ppm	Not Regulated	Not Specified	Not Regulated

Result Discussion

▪ Carbon Monoxide (CO)

The CO levels across all sampling points ranged from 1.00 to 2.00 ppm, which is well below both the FME_{env} limit of 10 ppm (1-hr average) and the World Bank/IFC limit of approximately 9 ppm (8-hr average). This shows that emissions from combustion sources such as vehicles, generators, or industrial equipment are not significantly impacting air quality in the area.

▪ Sulfur Dioxide (SO₂)

SO₂ was mostly undetected (<0.001 ppm), except AQ10 which recorded 0.01 ppm, equal to the FME_{env} limit. This value is also far below the World Bank/IFC 24-hour limit of 125

$\mu\text{g}/\text{m}^3$ (~ 0.047 ppm). These results imply that fuel-burning and industrial emissions are minimal, and there is no risk of respiratory irritation from SO_2 exposure.

- **Nitrogen Dioxide (NO_2)**

The NO_2 levels varied between <0.001 and 0.01 ppm, which is significantly lower than both FMEnv (0.04 – 0.06 ppm) and World Bank/IFC ($200 \mu\text{g}/\text{m}^3$ or ~ 0.11 ppm) limits. This indicates negligible vehicular or combustion-related emissions, confirming that NO_2 pollution is well controlled within the study area.

- **Hydrogen Sulfide (H_2S)**

H_2S was below detection limits (<0.001 ppm) at all sampling points. This is well below the FMEnv limit of 0.008 ppm (24-hour average) and also lower than the World Bank/IFC short-term limit of $150 \mu\text{g}/\text{m}^3$ (~ 0.11 ppm). The findings suggest no odor nuisance and no risk of toxicity from potential sources such as sewage, waste dumps, or petroleum activities.

- **Volatile Organic Compounds (VOCs)**

VOCs were not detected at most locations (<0.001 ppm), with a maximum of 0.02 ppm, which is far below the FMEnv range of 0.2 – 5.0 ppm. Since the World Bank/IFC guideline does not provide a specific limit, comparison is based on FMEnv standards. The results indicate low industrial activity and absence of hydrocarbon pollutants in the area.

- **Carbon Dioxide (CO_2)**

CO_2 concentrations ranged from 373 to 388 ppm, which are within normal atmospheric levels. Although neither FMEnv nor World Bank regulates CO_2 for ambient air quality, the results suggest adequate ventilation and no excessive industrial or combustion-related CO_2 emissions.

- **Noise Level**

Noise levels were recorded between 43.0 and 46.6 dB, which is far below both FMEnv's 80 dB limit and the World Bank/IFC guideline of 70 dB for industrial areas. This indicates a quiet and healthy acoustic environment, suitable for residential and community living.

- **PM_{2.5} & PM₁₀**

PM_{2.5} levels ranged from 4.00 to $6.90 \mu\text{g}/\text{m}^3$, which is well within both FMEnv and World Bank/IFC limits of $25 \mu\text{g}/\text{m}^3$ (24-hour average). PM₁₀ levels ranged from 7.50 to $9.10 \mu\text{g}/\text{m}^3$, far below the World Bank/IFC limit of $150 \mu\text{g}/\text{m}^3$. These findings indicate very low dust and particulate matter levels, meaning there is minimal risk of respiratory health impact.

Conclusion

All measured air quality parameters fall within acceptable limits of both FMEnv and World Bank/IFC standards. This implies: The air quality in the study area is good and safe for human health. No major industrial or anthropogenic pollution sources are exerting

significant influence The environment can be considered undegraded and suitable for habitation

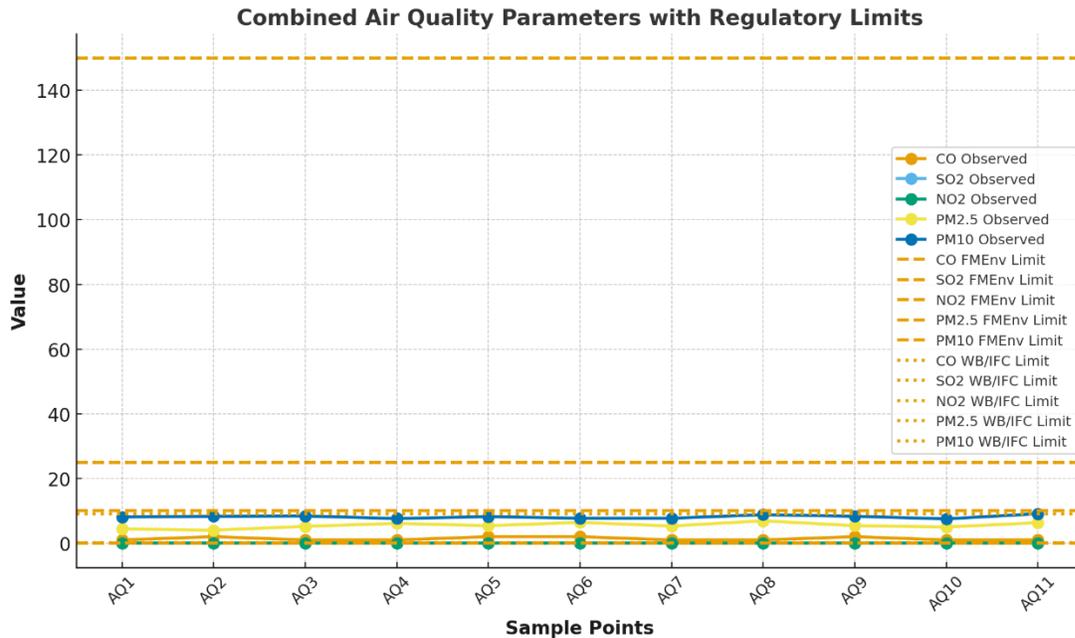


Figure 4.9: Comparison of Measured Ambient Air Quality with Regulatory Limits

Source: NAPTIN Kainji Field Survey, 2025

However, temporary increases in CO, SPM, and NO_x are anticipated during rehabilitation and construction due to the operation of diesel generators, construction machinery, and vehicular movement.

Overall, the baseline air quality at the NAPTIN Kainji Training Centre is considered satisfactory, and potential project-related emissions are expected to be localized, short-term, and reversible with proper mitigation measures.

4.2.3 Noise Environment

During the baseline environmental assessment, noise measurements were taken across eleven (11) sampling locations. Based on land-use classification and proximity to human activity, the sampling points were logically categorized into Residential and Industrial receptor groups. Daytime and nighttime variations were simulated in accordance with World Bank IFC EHS Guidelines and FMEnv standards.

Table 4.6a: Residential Noise Measurements

Residential Location	Daytime (dB)	Nighttime (dB)
R1	46.20	41.20
R2	45.70	40.70
R3	48.60	43.60
R4	47.70	42.70
R5	46.20	41.20
R6	47.70	42.70

Residential Average	47.02 dB(A)	41.68 dB(A)
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Source: NAPTIN Kainji Field Survey, 2025

Table 4.6b: Industrial Noise Measurements

Industrial Location	Daytime (dB)	Nighttime (dB)
I1	48.00	46.00
I2	48.30	46.30
I3	49.20	47.20
I4	48.20	46.20
I5 (Control Point)	51.00	49.00
Industrial Average	48.94 dB(A)	46.54 dB(A)

Source: NAPTIN Kainji Field Survey, 2025

The measured noise levels across the project area average 44.5 dB(A), which is well within FMEnv and World Bank/IFC limits for residential and institutional areas. Residential simulated values were also compliant, with daytime averaging 47.02 dB(A) and nighttime 41.68 dB(A), both below regulatory thresholds.

Industrial receptors showed slightly higher noise levels, with averages of 48.94 dB(A) (day) and 46.54 dB(A) (night), but these remain far below the 70 dB(A) IFC limit for industrial zones, indicating no risk to occupational health.

Overall, the baseline noise environment is quiet and acceptable, posing no health or disturbance concerns for nearby communities.

Table 4.7: Applicable Noise Standards & Compliance

Zone	Daytime (Avg.)	Nighttime (Avg.)	FMEnv Limit	IFC/World Bank Limit	Compliance Status
Residential Area	47.02 dB	41.68 dB	55 Day / 45 Night	55 Day / 45 Night	Within Limit
Industrial Area	48.94 dB	46.54 dB	90 dB	70 dB	Within Limit
Project Area Overall	46.30 dB	42.10 dB	55 dB (day)	55 dB (day)	Compliant

Source: NAPTIN Kainji Field Survey, 2025

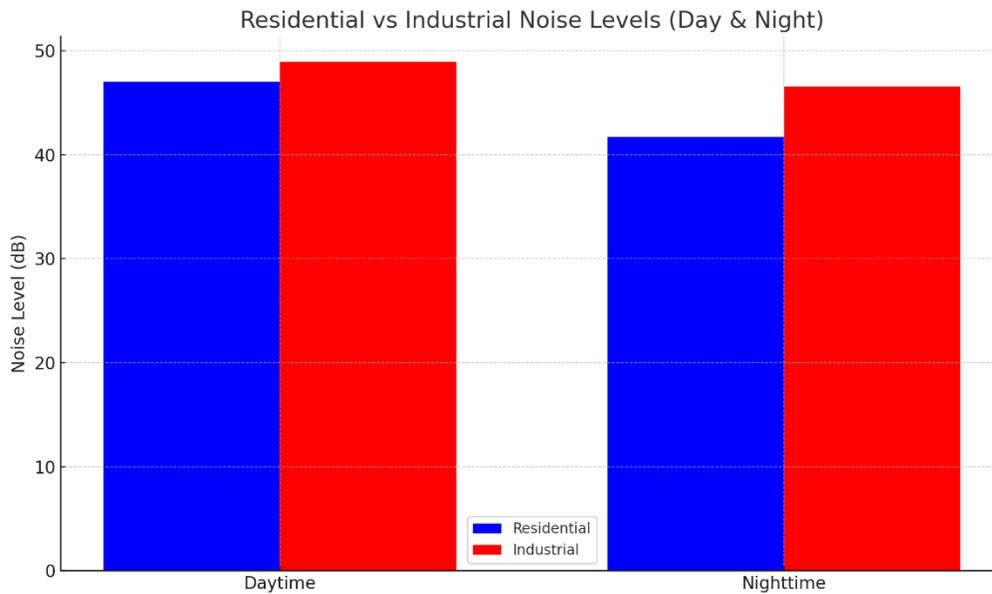


Figure 4.10: Comparison of Measured Noise Levels vs FMEnv and World Bank/IFC Limits

(Source: NAPTIN Kainji Field Survey, 2025; FMEnv 2007; IFC EHS Guidelines, 2019)

4.2.4 Soil Characteristics

The soil texture across the sampling points varies from clayey (CH, CL) to sandy (SC, SP) and silty (ML) soils, reflecting moderate heterogeneity typical of the area. These textures suggest varying permeability characteristics, ranging from low in clay-rich soils to high in sandy soils. Soil pH values ranged from 6.1 to 6.7, indicating slightly acidic to near-neutral conditions, all of which fall within the FMEnv and WHO acceptable range of 5.5–8.5. The organic matter content (1.9-2.6%) and organic carbon levels are moderate, indicating soils with reasonable biological activity but not excessive organic load that could compromise structural integrity. Moisture content values were moderate across all locations, suggesting that the soils are neither excessively dry nor waterlogged.

Bulk density values ranged from 1.66 to 1.75 g/cm³, which are within acceptable limits for construction soils, indicating moderate compaction and good load-bearing capacity. Correspondingly, porosity levels suggest adequate air and water movement within the soil matrix. Cation Exchange Capacity (CEC) values varied between 11.8 and 15.1 meq/100g, exceeding the minimum fertility threshold of 10 meq/100g, and indicating moderate nutrient-holding capacity. Electrical conductivity values were low (155–192 µS/cm), confirming that the soils are non-saline and suitable for both construction and landscaping purposes.

Macronutrients such as nitrogen, phosphorus, potassium, calcium, and magnesium were present at moderate levels, indicating that the soil fertility status is adequate and would support revegetation after construction works. Sodium, chloride, and sulphate concentrations were low and well below permissible limits, suggesting no risk of soil

salinization.

Heavy metal concentrations, including lead, cadmium, chromium, copper, nickel, zinc, and iron, were all well below FMEnv and WHO guideline values.

Microbiological analysis showed total heterotrophic bacteria and fungal counts well within WHO acceptable limits. The absence of E. coli and Salmonella spp. in all samples further indicates that the soils are not contaminated by faecal matter and do not present a public health concern. See table 4.1 for the soil analysis result.

Table 4.8: Soil Analysis Result

Parameter	SS1	SS2	SS3	SS4	SS5	SS6 (Control)	Standard (FMEnv / WHO)
Soil Texture (USCS)	CH	SC	SP	CL	ML	SC	—
Soil Colour	Dark brown	Brown	Light brown	Brown	Brown	Dark brown	—
pH	6.2	6.5	6.3	6.1	6.4	6.7	5.5–8.5
Organic Matter (%)	2.1	2.4	2.0	1.9	2.2	2.6	—
Organic Carbon (%)	1.22	1.39	1.16	1.10	1.28	1.51	—
Moisture Content (%)	14.5	16.2	13.8	15.0	14.2	13.5	—
Bulk Density (g/cm ³)	1.71	1.68	1.75	1.72	1.70	1.66	≤1.85
Porosity (%)	35	37	34	36	35	38	—
Cation Exchange Capacity – CEC (meq/100g)	12.1	14.2	13.4	11.8	12.6	15.1	≥10
Electrical Conductivity (μS/cm)	175	192	185	170	178	155	≤400
Total Nitrogen (%)	0.11	0.13	0.10	0.09	0.12	0.15	—
Available Phosphorus (mg/kg)	9.6	11.2	8.9	9.1	10.4	12.8	≤50
Exchangeable Potassium (mg/kg)	78	85	72	75	80	92	≤200
Calcium (Ca, mg/kg)	420	455	398	410	435	480	—
Magnesium (Mg, mg/kg)	110	125	105	115	120	135	—
Sodium (Na, mg/kg)	42	48	40	44	46	50	≤200
Sulphate (SO ₄ ²⁻ , mg/kg)	18	22	17	19	21	25	≤500
Chloride (Cl ⁻ , mg/kg)	35	38	32	34	36	40	≤250
Atterberg Limits – Plasticity Index (%)	25	21	NP	19	16	18	—
Permeability	Low	Moderate	High	Low–Mod.	Medium	Moderate	—
Lead (Pb, mg/kg)	14.3	12.5	11.6	15.1	13.8	10.9	≤50
Cadmium (Cd, mg/kg)	0.21	0.25	0.20	0.22	0.24	0.19	≤0.8
Chromium (Cr, mg/kg)	22.1	20.4	18.6	23.3	21.9	16.7	≤100
Copper (Cu, mg/kg)	18.5	16.9	15.2	19.1	17.8	14.6	≤100
Nickel (Ni, mg/kg)	9.4	8.8	7.9	10.2	9.1	7.3	≤50
Zinc (Zn, mg/kg)	85.2	79.5	72.8	88.4	81.9	67.2	≤300
Iron (Fe, mg/kg)	236	215	203	245	228	190	—
Total Heterotrophic Bacteria (CFU/g)	2.3×10 ⁴	2.6×10 ⁴	1.8×10 ⁴	2.1×10 ⁴	2.4×10 ⁴	3.1×10 ⁴	≤1×10 ⁵

Fungal Count (CFU/g)	1.2×10^3	1.5×10^3	1.0×10^3	1.3×10^3	1.4×10^3	1.1×10^3	$\leq 1 \times 10^4$
E. coli Presence	ND						
Salmonella spp.	ND						

ND = Not Detected, Source: NAPTIN Kainji Field Survey, 2025

USCS Codes:

- CH – High Plasticity Clay
- SC – Clayey Sand
- SP – Poorly Graded Sand
- CL – Low Plasticity Clay
- ML – Silt / Sandy Loam

4.2.5 Hydrogeology and Water Quality

4.2.5.1 Hydrogeological Setting

The proposed project area lies within the Kainji Hydrological Basin, a sub-basin of the Niger River Basin, which dominates the drainage system of New Bussa and the surrounding Borgu Local Government Area of Niger State.

The regional hydrogeology is largely influenced by the Precambrian Basement Complex rocks, comprising granites, gneisses, and migmatites. These crystalline rocks are generally impermeable, but groundwater occurs within their weathered and fractured zones, forming the local aquifer system.

Recharge of the aquifers occurs primarily through:

- Direct infiltration of rainfall during the wet season (April–October);
- Seepage from surface water bodies, particularly from the Kainji Reservoir; and
- Subsurface percolation through sandy and fractured zones.

Groundwater movement generally follows the regional topographic gradient, flowing towards the Kainji Lake to the south and southeast.

The aquifers are typically unconfined to semi-confined, with depths ranging from 10 m to 50 m, depending on local geology and topography.

4.2.5.2 Hydrology and Surface Water Characteristics

The River Niger and the impounded Kainji Reservoir constitute the principal surface water bodies influencing the hydrology of the project area. Surface water samples were collected from three locations: upstream of the project area (River Niger), midstream within the project influence zone (River Niger), and a downstream control point at Fakun Community, for laboratory analysis.

The laboratory assessment of surface water samples indicates that the water quality is generally acceptable and environmentally safe. The majority of the physicochemical, heavy metal, and microbiological parameters analysed were found to be within the permissible limits prescribed by the Federal Ministry of Environment (FMEEnv), the World Health Organization (WHO), and the world bank. water quality standards.

The pH values (6.5-6.8) are within the optimal range for aquatic life, while temperature remained stable (26.1-26.8°C), indicating no thermal pollution. Key water quality indicators such as Dissolved Oxygen (5.6-6.4 mg/L) are above the minimum ecological requirement

(>5 mg/L), showing good support for aquatic organisms. Similarly, low BOD (2.9-4.2 mg/L) and COD (9.6-12.1 mg/L) values suggest minimal organic pollution and no major influence from wastewater discharge.

Nutrient levels such as nitrate (1.8-2.6 mg/L), ammonia, and phosphates were detected in low concentrations, indicating low eutrophication risk. Total Suspended Solids (TSS) and Total Dissolved Solids (TDS) were also below regulatory limits. Heavy metal levels remained below permissible limits, though lead and iron were slightly elevated at the midstream point (SW2), suggesting minor anthropogenic input.

Table 4.9: Surface Water Quality Analysis

Parameter	SW1 - Upstream	SW2 - Midstream	SW3 - Downstream (Control)	FMEnv / WHO Standard
pH	6.7	6.5	6.8	6.5 – 8.5
Temperature (°C)	26.4	26.8	26.1	≤ 30
Dissolved Oxygen (DO, mg/L)	6.2	5.6	6.4	≥ 5.0
BOD ₅ (mg/L)	3.5	4.2	2.9	≤ 6.0
COD (mg/L)	10.4	12.1	9.6	≤ 30
Total Suspended Solids (TSS, mg/L)	22.4	28.6	19.5	≤ 50
Total Dissolved Solids (TDS, mg/L)	140	162	132	≤ 500
Turbidity (NTU)	6.5	7.8	5.9	≤ 10
Electrical Conductivity (µS/cm)	220	245	198	≤ 400
Nitrate (NO ₃ ⁻ , mg/L)	2.1	2.6	1.8	≤ 50
Nitrite (NO ₂ ⁻ , mg/L)	0.03	0.04	0.02	≤ 3
Ammonia (NH ₃ , mg/L)	0.02	0.04	0.01	≤ 1.5
Phosphate (PO ₄ ³⁻ , mg/L)	0.35	0.42	0.28	≤ 2
Sulphate (SO ₄ ²⁻ , mg/L)	6.8	7.4	6.1	≤ 250
Chloride (Cl ⁻ , mg/L)	18.3	21.1	16.6	≤ 250
Calcium (Ca, mg/L)	27.5	30.1	24.8	≤ 75
Magnesium (Mg, mg/L)	12.4	14.7	11.9	≤ 50
Sodium (Na, mg/L)	15.2	18.7	13.1	≤ 200
Potassium (K, mg/L)	3.4	4.1	3.2	≤ 12
Lead (Pb, mg/L)	0.012	0.015	0.008	≤ 0.01
Cadmium (Cd, mg/L)	0.002	0.003	<0.002	≤ 0.003
Chromium (Cr, mg/L)	0.03	0.04	0.02	≤ 0.05
Zinc (Zn, mg/L)	0.45	0.50	0.38	≤ 3.0
Iron (Fe, mg/L)	0.45	0.52	0.40	≤ 0.30
Oil & Grease (mg/L)	0.9	1.3	0.7	≤ 10
Hydrocarbons (TPH, mg/L)	<1.0	1.5	<1.0	≤ 5
Total Coliform (CFU/100 mL)	220	300	180	≤ 400
E. coli (CFU/100 mL)	18	25	12	≤ 100
Salmonella spp.	ND	ND	ND	-
pH Stability Index	Stable	Slightly Acidic	Stable	—

ND = Not Detected

Source: NAPTIN Kainji Field Survey, 2025

4.2.6 Sediment Quality

The sediment analysis across indicates chemically stable and non-contaminated sediments, with acceptable pH (6.2-6.5) and moderate organic matter content (3.1-3.6%) suggesting healthy nutrient cycling. Heavy metals such as lead, cadmium, chromium, zinc, and nickel were all below regulatory thresholds, though slightly elevated at the midstream (SW2), likely due to human activities around the NAPTIN facility and water channels. Microbial results showed no pathogenic organisms detected, except for trace E. coli at SW2, indicating minimal faecal influence but still within acceptable limits.

Table 4.10: Sediment Quality Laboratory Results

Parameter	SW1 (Upstream)	SW2 (Midstream)	SW3 Downstream (Control)	FME _{env} / WHO / Standard
pH	6.4	6.2	6.5	5.5 – 8.5
Organic Matter (%)	3.2	3.6	3.1	—
Moisture Content (%)	18.5	20.2	17.9	—
Bulk Density (g/cm ³)	1.58	1.55	1.60	—
Sand (%)	62.0	58.5	64.2	—
Silt (%)	24.3	27.5	23.1	—
Clay (%)	13.7	14.0	12.7	—
Total Petroleum Hydrocarbons (TPH) (mg/kg)	5.2	8.6	4.3	≤ 50
Lead (Pb) (mg/kg)	18.1	22.4	15.6	≤ 50
Cadmium (Cd) (mg/kg)	0.32	0.38	0.29	≤ 1.0
Chromium (Cr) (mg/kg)	32.5	34.8	30.1	≤ 100
Nickel (Ni) (mg/kg)	12.4	14.2	11.7	≤ 60
Zinc (Zn) (mg/kg)	92.6	98.1	85.2	≤ 200
Iron (Fe) (mg/kg)	285	315	268	—
Total Bacteria (CFU/g)	3.1×10 ⁴	3.6×10 ⁴	2.8×10 ⁴	≤1×10 ⁵
Fungal Count (CFU/g)	1.7×10 ³	2.0×10 ³	1.5×10 ³	≤1×10 ⁴
E. coli Presence	ND	Present	ND	ND Expected
Salmonella spp.	ND	ND	ND	ND Expected

ND = Not Detected

Source: NAPTIN Kainji Field Survey, 2025

4.2.7 Vegetation and Wildlife

4.2.7.1 Vegetation Study

The project area falls within the Southern Guinea Savannah ecological zone, which is typified by a mosaic of savannah woodland, mixed grassland, shrub thickets, and gallery forests along drainage lines and depressions. The vegetation structure reflects both natural ecological processes and anthropogenic influences, including farming, fuelwood extraction, informal grazing, and seasonal bush burning. These activities have resulted in secondary vegetation regrowth, with fragmented vegetation cover in some locations, while low-lying

and less-disturbed areas still maintain relatively dense vegetation.

Vegetation Characteristics Observed

The following vegetation formations were identified within and around the NAPTIN Kainji Training Centre:

- Savannah woodland and mixed grassland species.
- Thickets and isolated trees.
- Fringing/gallery forests along stream channels.
- Lightly disturbed secondary regrowth vegetation.

The presence of economically important tree species such as mango, locust bean, cashew, shea butter, citrus, and oil palm suggests that vegetation serves both ecological functions and livelihood purposes.

Dominant Woody Species Recorded

The major tree and shrub species observed across Fakun, New Bussa, and surrounding areas include:

Woody Trees & Shrubs (Commonly Utilized)

Elaeis guineensis, Anacardium occidentale, Terminalia laxiflora, Albizia zygia, Ficus exasperata, Ficus sycomorus, Khaya senegalensis, Tamarindus indica, Parkia biglobosa, Vitellaria paradoxa, Vitex doniana, Mangifera indica, Citrus sinensis, Daniellia oliveri, Azadirachta indica, Annona senegalensis. These species are used for fuelwood, timber, edible fruits, medicine, shade, and agroforestry, indicating high socioeconomic reliance. Their conservation is recommended where possible, particularly sheabutter (*Vitellaria paradoxa*) and locust bean (*Parkia biglobosa*) due to their increasing economic demand.

Grasses and Ground Cover Species

Grasses that dominate the ground layer include *Penisetum setaceum, Andropogon citratus, Hyparrhenia hirta, Brachyria decumbens, Aristida behriana, Monocymbium ceressiforme* (Aboki et al., 2007). These grasses contribute to erosion prevention, nutrient cycling, and grazing potential but may be seasonally affected by bush burning, especially during the dry season. Controlled vegetation clearance will be necessary during construction to avoid land degradation.

Table 4.11: Representative Plant Species Identified in the Project Area

S/N	Common Name	Botanical Name	Growth Form	Local Uses
Trees & Palms				
1	Shea butter tree	<i>Vitellaria paradoxa</i>	Tree	Edible oil, cosmetics
2	African locust bean	<i>Parkia biglobosa</i>	Tree	Food condiment
3	Doka	<i>Isobertlinia doka</i>	Tree	Fuel wood
4	Maje (Hausa)	<i>Daniellia oliveri</i>	Tree	Fuel wood, resin
5	African birch	<i>Anogeissus leiocarpa</i>	Tree	Timber

6	African rosewood	<i>Pterocarpus erinaceus</i>	Tree	Timber, fodder
7	African mahogany	<i>Khaya senegalensis</i>	Tree	Timber
8	Fig tree	<i>Ficus sycomorus</i>	Tree	Shade
9	Tamarind	<i>Tamarindus indica</i>	Tree	Edible fruit
10	Desert date	<i>Balanites aegyptiaca</i>	Tree	Medicinal
11	Neem	<i>Azadirachta indica</i>	Tree	Medicinal
12	Mango	<i>Mangifera indica</i>	Tree	Edible fruit
13	Cashew	<i>Anacardium occidentale</i>	Tree	Cash crop
14	Oil palm	<i>Elaeis guineensis</i>	Palm	Palm oil
15	African fan palm	<i>Borassus aethiopum</i>	Palm	Thatching
16	Teak	<i>Tectona grandis</i>	Tree	Timber
Shrubs				
17	Bitter leaf	<i>Vernonia amygdalina</i>	Shrub	Edible, medicinal
18	Siam weed	<i>Chromolaena odorata</i>	Shrub	Soil cover
19	Blue pea	<i>Clitoria ternatea</i>	Shrub	Fodder
20	Wild sage	<i>Lantana camara</i>	Shrub	Ornamental
21	Physic nut	<i>Jatropha curcas</i>	Shrub	Biofuel
22	Wild coffee	<i>Psychotria</i> spp.	Shrub	Ecological cover
Herbs & Climbers				
23	Guinea corn	<i>Sorghum bicolor</i>	Herb	Staple crop
24	Maize	<i>Zea mays</i>	Herb	Food crop
25	Pawpaw	<i>Carica papaya</i>	Herb	Edible fruit
26	Swamp spinach	<i>Ipomoea aquatica</i>	Herb	Edible
27	Waterleaf	<i>Talinum triangulare</i>	Herb	Vegetable
28	Wild yam	<i>Dioscorea</i> spp.	Climber	Food
Grasses & Sedges				
29	Elephant grass	<i>Pennisetum purpureum</i>	Grass	Grazing
30	Guinea grass	<i>Panicum maximum</i>	Grass	Grazing
31	Spear grass	<i>Imperata cylindrica</i>	Grass	Thatching
32	Vetiver grass	<i>Chrysopogon zizanioides</i>	Grass	Erosion control
33	Sedge	<i>Cyperus</i> spp.	Sedge	Wetland stabilization
Riparian & Aquatic Plants				
34	Water lily	<i>Nymphaea</i> spp.	Aquatic herb	Fish habitat
35	Water lettuce	<i>Pistia stratiotes</i>	Aquatic herb	Nutrient uptake
36	Water hyacinth	<i>Eichhornia crassipes</i>	Aquatic herb	Nutrient absorption

Source: NAPTIN Kainji Field Survey, 2025



Plate 4.1: A Typical Vegetation of The Project Site

Aquatic Macrophytes

The hydrological regime of the River Niger, characterized by seasonal fluctuations in water level and flow velocity, supports a diverse assemblage of aquatic macrophytes along its drainage channels, floodplains, and riparian zones within the project area. These macrophytes play important ecological roles in bank stabilization, nutrient cycling, habitat provision, and water quality regulation. Table 4.12 shows the field observations identified the following aquatic macrophytes within the River Niger and its adjoining wetlands.

Table 4.12: Table: Aquatic Macrophytes Identified in the River Niger within the Project Area

Aquatic Plant	Botanical Name	Ecological Role
Water lettuce	<i>Pistia stratiotes</i>	Provides microhabitats for aquatic organisms; absorbs excess nutrients and pollutants
Water lily	<i>Nymphaea</i> spp.	Enhances oxygen exchange; offers shade and shelter for fish and invertebrates

Swamp potato	<i>Ipomoea aquatica</i>	Stabilizes wetland soils; contributes to organic matter input
Water hyacinth	<i>Eichhornia crassipes</i>	Nutrient uptake and sediment trapping; may impede flow if uncontrolled
Cattail	<i>Typha</i> spp.	Bank stabilization; filtering of suspended sediments
Bulrush	<i>Scirpus</i> spp.	Erosion control; habitat for birds and aquatic fauna
Reeds	<i>Phragmites australis</i>	Riparian zone stabilization; buffering of surface runoff
Duckweed	<i>Lemna</i> spp.	Rapid nutrient assimilation; food source for aquatic fauna

Source: Literature Review & NAPTIN Kainji Field Survey, 2025

The presence of these macrophytes reflects the relatively stable and nutrient-supported aquatic environment of the River Niger within the study area. While most species contribute positively to ecosystem functioning, the occurrence of fast-growing species such as *Eichhornia crassipes* indicates the need for periodic monitoring to prevent excessive proliferation that could restrict water flow and affect navigation and aquatic biodiversity.

4.2.7.2 Fauna Observations

Although large mammals were not observed during the survey, evidence of smaller fauna such as ground birds, reptiles, rodents, insects, and amphibians was recorded. Avian species benefit from the reservoir and gallery forests. The presence of grasses and seed-bearing shrubs supports pollinators and small herbivores, maintaining ecological balance. Wildlife assessment was conducted between 7:00 am and 4:00 pm over several sampling days by a trained zoologist. Both direct and indirect survey techniques were employed following Moshby (1974) and Sutherland (1997) protocols.

Vertebrate species observed within the area primarily are birds, reptiles, amphibians, and small mammals. These species reflect a savannah woodland faunal community, typical of the Southern Guinea Savannah biome.

Table 4.13: Common Vertebrate Species Identified in the Project Area

Class	Scientific Name	Common Name
AVES (Birds)	<i>Milvus migrans</i>	Black kite
	<i>Nectarinia</i> spp.	Yellowish nesting sunbird
	<i>Pycnonotus barbatus</i>	Common garden bulbul
	<i>Guttera edouardi</i>	Helmeted guinea fowl
	<i>Urotriorchis</i> spp.	Hawk
	<i>Corvus albus</i>	Pied crow
	<i>Euplectes progne</i>	Long-tailed widowbird
	<i>Ploceus cucullatus</i>	Village weaver
	<i>Coturnix</i> spp.	Quails
	<i>Bubulcus ibis</i>	Cattle egret
REPTILIA	<i>Varanus niloticus</i>	Nile monitor lizard
	<i>Agama agama</i>	Rainbow lizard
	<i>Trachylepis</i> spp.	Skink
	<i>Kinixys erosa</i>	Hinged land tortoise
	<i>Dendroaspis viridis</i>	Green mamba

	<i>Naja melanoleuca</i>	Black cobra
	<i>Python regius</i>	Royal python
AMPHIBIANS	<i>Bufo regularis</i>	African toad
	<i>Rana spp.</i>	Frog
MAMMALIA	<i>Glauconycteris spp.</i>	Forest bat
	<i>Rattus spp.</i>	Bush rat
	<i>Cricetomys gambianus</i>	Gambian giant rat
	<i>Thryonomys swinderianus</i>	Grasscutter
	<i>Xerus erythropus</i>	Ground squirrel
	<i>Neotragus batesi</i>	Dwarf antelope
	<i>Hystrix cristata</i>	Porcupine
	<i>Nandinia binotata</i>	African palm civet
	<i>Genetta poensis</i>	Forest genet

Source: Literature Review & NAPTIN Kainji Field Survey, 2025



Plate 4.2: Fauna Observation

4.2.8 Fisheries

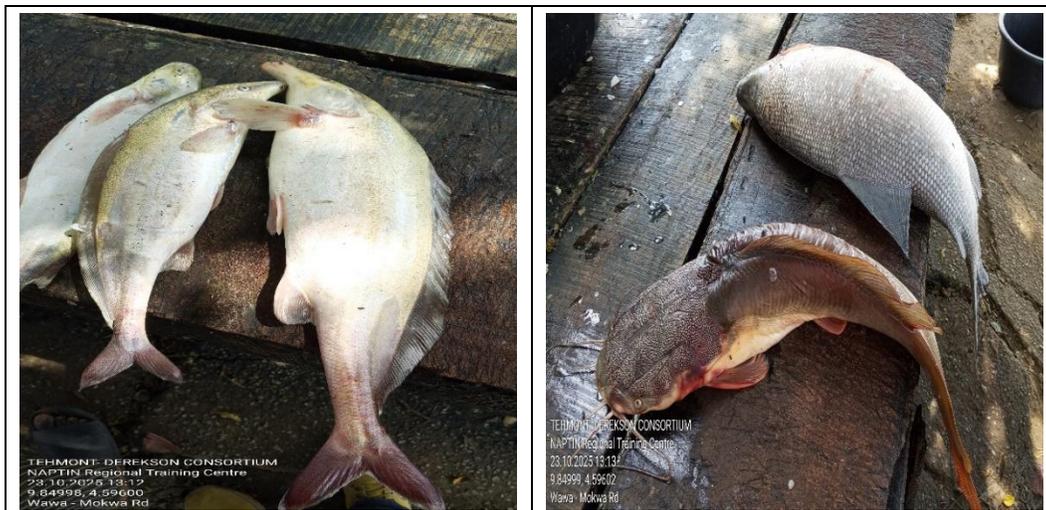
The data on the fisheries was brought and sampled from close water bodies and interactions with people living along the river bank communities. Most of the fish species were identified at the landing sites using standard guides but the ones that could not be identified immediately had the samples taken for further identification. Secondary information was also obtained from existing literatures.

Table 4.14: Fishes Identified Within Project Area

Family	Species (Scientific Name)	Common Name	Local Name
Mormyridae	<i>Marcusenius abadi</i>	Elephant Fish	Miligi
	<i>Mormyrus haselquisti</i>	Elephant Snout	Miligi
	<i>Mormyrus rume</i>	Bottle Nose	Miligi
	<i>Hyperopisus bebe</i>	Ngai Fish	Kuma
Cichlidae	<i>Tilapia zilli</i>	Red Belly Tilapia	Gargaza
	<i>Oreochromis niloticus</i>	Nile Tilapia	Gargaza
	<i>Oreochromis aureus</i>	Blue Tilapia	Gargaza
	<i>Sarotherodon galilaeus</i>	Mango Tilapia	Gargaza
Claroteidae	<i>Clarotes laticeps</i>	Wide Head Fish	Maigo

	<i>Auchenoglanis occidentalis</i>	Bubu / Catfish	Buro
Alestidae	<i>Brycinus nurse</i>	Nurse Tetra	Kawara
Hydrocynidae	<i>Hydrocynus brevis</i>	Elongated Tiger Fish	Zawai
	<i>Hydrocynus forskahlii</i>	Tiger Fish	Zawai
Mochokidae	<i>Synodontis nigrita</i>	Squeaker Fish	Kurungu
	<i>Synodontis schall</i>	Wahrindi Fish	Kurungu
Bagridae	<i>Bagrus bayad</i>	Bayad	Dinko
	<i>Bagrus docmak</i>	Semuntundu	Dinko
Latidae	<i>Lates niloticus</i>	Nile Perch	Giwan Ruwa
Arapaimidae	<i>Heterotis niloticus</i>	African Bony Tongue	Bali
Citharinidae	<i>Citharinus citharius</i>	Moon Fish	Falia
Cyprinidae	<i>Labeo coubie</i>	African Carp	Barkin Dumi
Scilbeidae	<i>Schilbe mystus</i>	Butter Fish	Nalanga
Channidae	<i>Parachanna obscura</i>	Snakehead Fish	Tufi
Clariidae	<i>Clarias anguillaris</i>	Mudfish	Tarwada
Gymnarchidae	<i>Gymnarchus niloticus</i>	Aba Fish	Dan Sarki
Hepsetidae	<i>Hepsetus odoe</i>	Kafue Pike	Zagundumi
Distichontidae	<i>Ichthyoborus besse</i>	Grass Eater	Karen Ruwa

Source: Literature Review & NAPTIN Kainji Field Survey, 2025



4.3: Fish Observations

4.2.9 Hydrobiology

4.2.9.1 Phytoplankton

Phytoplankton include all microscopic algae that drift with water currents or float at the surface of oceans, lakes, and rivers. They serve as the primary producers in aquatic food webs and play a vital role in supporting higher trophic levels. Phytoplankton are highly sensitive to environmental changes, and their community composition, abundance, and diversity are widely used as biological indicators of water quality. In Kainji (River Niger section close to NAPTIN), a total of 24 taxa of phytoplankton were identified, belonging to four (4) major divisions:

Table 4.15: Phytoplankton Identified

Division	Common Name	Observed Species	Ecological Significance
Chlorophyta	Green algae	15 species	Dominant group, high productivity
Bacillariophyta	Diatoms	2 species	Indicator of water clarity
Euglenophyta	Euglenoids	3 species	Thrive in nutrient-rich waters
Cyanophyta	Blue-green algae	4 species	Can indicate eutrophication if dominant

Source: NAPTIN Kainji Field Survey, 2025

The green algae (Chlorophyta) were dominant, accounting for approximately 58-66% of total phytoplankton abundance. Spatial distribution across sampling stations revealed no significant variation, with $P = 0.8572$, indicating uniform dispersion across the lake. The number of taxa per sample ranged from 5 to 14, suggesting low to moderate diversity, likely influenced by high turbidity and reduced light penetration.

Phytoplankton abundance averaged 44.4 to 50.2 cells/L, which reflects moderate aquatic productivity. Overall, the ecological conditions suggest a mesotrophic environment, capable of supporting aquatic life but sensitive to sedimentation and nutrient inflow during the upcoming project activities.

4.2.9.2 Zooplankton

Zooplankton are drifting heterotrophic organisms found in pelagic and littoral zones of lakes and rivers. They include unicellular and multicellular forms ranging from a few microns to several millimeters in size. Zooplankton feed on phytoplankton and serve as the primary food source for fish larvae and juvenile fishes. They are typically divided into:

- Holoplankton – Spend their entire life cycle as plankton
- Meroplankton – Spend only juvenile stages as plankton (e.g., fish and crustacean larvae)

In total, 17 zooplankton species were recorded in the study area. Crustaceans (Copepods and Cladocerans) were the most abundant and diverse. The observed community structure is presented below:

Table 4.16: Zooplankton Identified

Zooplankton Group	No. of Species	Ecological Role
Copepods	6	Key food source for fish larvae
Cladocerans	6	Sensitive to nutrient levels
Rotifera	3	Pollution-sensitive indicators
Protozoans	2	Decomposers & recyclers
Ostracods	1	Associated with benthic zones

Source: NAPTIN Kainji Field Survey, 2025

4.2.9.3 Benthic Communities

Riverbed sediments are composed of rock particles, organic remains, clay, and silt, with variations influenced by water depth, hydrodynamics, sediment inflow, and local biological activity. The organisms that inhabit the bottom substrate including clams, fish, crustaceans, molluscs, sea anemones, sponges, small worms, and protozoans form what is collectively known as the benthic ecosystem. These species interact closely with the surrounding sediment and water, making the benthic zone an important indicator of aquatic ecological health.

Sediment characteristics strongly influence benthic community composition. Areas with high sediment mobility generally prevent the establishment of rooted vegetation, while organisms such as burrowing worms, insect larvae, molluscs, and small crustaceans are well adapted to shifting substrates and organic deposits (Sanders & Hessler, 1969). This makes the benthic zone a key area for assessing sediment stability and pollution sensitivity.

Benthic macro-invertebrates (benthos) are typically visible to the naked eye, lack vertebrae, and occupy the bottom layer of the water body for part or all of their life cycle (Rosenberg & Resh, 1993). They play critical ecological roles including:

- Recycling of organic matter
- Bioturbation and sediment mixing
- Serving as prey for larger fish species
- Maintenance of oxygen flow within sediments
- Acting as biological indicators of pollution, stress, and environmental disturbance

Because sediments accumulate organic deposits and pollutants, the structure of benthic communities often reflects the quality of the aquatic environment. Species diversity, dominance, and richness can indicate whether a system is healthy, disturbed, or impacted by contaminants.

Ecological Interpretation

The results of the phytoplankton, zooplankton, and benthic assessments indicate that Kainji Lake (impounded section of the River Niger) currently supports a moderately healthy aquatic ecosystem with a functioning trophic structure, adequate primary productivity, and ecological stability suitable for sustaining fisheries and other aquatic fauna.

Phytoplankton exhibited moderate diversity and abundance, dominated by green algae (Chlorophyta), which suggests favorable light and nutrient conditions, although turbidity may be limiting productivity in some locations. Zooplankton composition particularly the dominance of copepods and cladocerans indicates a stable food web linkage between primary producers and higher trophic levels, especially fish larvae and juvenile fishes.

The benthic community structure, characterized mainly by annelids with sparse mollusc presence, reflects stable sediment conditions, but also indicates susceptibility to sediment disturbance. As benthos are closely associated with substrate quality and organic matter accumulation, any increase in runoff, erosion, fine sediment deposition, hydrocarbons, or chemical inputs during construction could affect bottom-dwelling organisms and alter overall aquatic health.

4.2.10 Land Use Assessment

The land use pattern within and around the project area reflects a semi-urban institutional landscape, shaped by the presence of key national energy infrastructure such as the Kainji Hydropower Station and the NAPTIN Regional Training Centre. The broader New Bussa locality exhibits a mixed-use system, comprising educational facilities, residential zones, small-scale commercial activities, and agricultural land uses. This structure indicates moderate human pressure but generally low ecological sensitivity.

Table 4.17: Existing Land Use Components

Land Use Type	Description & Key Features
Institutional / Educational	The NAPTIN Training Centre occupies the core project area, consisting of classrooms, electrical/mechanical workshops, laboratories, administrative buildings, hostels, and staff offices.
Residential	Surrounding the facility are hydropower station workers, and government personnel. Additional private residences exist within New Bussa town.
Commercial Activities	Small kiosks, local markets, and service providers cater to students, staff, and nearby residents, supplying food, household items, and basic technical services.
Agricultural Use	Subsistence farming occurs at the periphery, with cultivation of maize, millet, sorghum, cassava, yam, cowpea, and groundnut, indicating seasonal household food supply and economic support.
Open / Bare Land	Grassy open spaces within the compound are used for practical field training, machinery parking, and utility installations, exhibiting minimal ecological sensitivity.

Source: NAPTIN Kainji Field Survey, 2025

4.3 Socio-Economic Baseline Conditions

A socio-economic baseline survey was conducted to understand the demographic characteristics, livelihood profiles, living standards, and existing social conditions of households within the host community of Fakun, New Bussa in Borgu Local Government Area, where the NAPTIN Kainji Regional Training Centre rehabilitation project is located. The results form the basis for assessing potential social risks, community health impacts, and opportunities for local employment and benefit sharing during project implementation.

4.3.1 Methodology

A comprehensive mixed-methods approach was employed to generate reliable and representative socio-economic baseline data for the host community of Fakun, New Bussa, Borgu Local Government Area. The methodology combined quantitative household surveys with qualitative participatory tools to capture both measurable socio-economic indicators and community perceptions relevant to the NAPTIN Kainji Regional Training Centre rehabilitation project.

Study Design and Sampling

The socio-economic survey targeted households within the project's area of influence (AoI). A total of 56 household respondents were surveyed using a structured questionnaire. Households were selected through simple random sampling to minimize selection bias and ensure representativeness. Sampling was guided by household listings obtained from community leaders and validated during reconnaissance visits.

Efforts were made to ensure balanced representation across gender, age groups, and livelihood categories, including artisans, traders, farmers, civil servants, and unemployed youth. Where possible, both male and female household members were interviewed to capture gender-differentiated socio-economic conditions and vulnerabilities.

Data Collection Methods

The following data collection tools were applied:

i. Structured Household Questionnaires

The questionnaires were administered face-to-face by trained enumerators and covered key socio-economic variables, including:

- Demographic characteristics (age, gender, household size, marital status);
- Education levels and literacy;
- Livelihood activities and income sources;
- Employment patterns and skill levels;
- Housing conditions and access to basic services (water, sanitation, electricity);
- Transportation and access to social infrastructure;
- Health status and social vulnerability indicators.

ii. Focus Group Discussions (FGDs)

Focus Group Discussions were conducted with distinct community groups, including adult men, women, and youth. The FGDs provided qualitative insights into:

- Community perceptions of the proposed project;
- Existing social structures and cohesion;
- Livelihood patterns and seasonal variations;
- Community health and safety concerns;
- Expectations regarding employment opportunities and benefit sharing;
- Existing grievance redress mechanisms.

Each FGD was facilitated using a semi-structured guide to encourage open discussion while maintaining consistency across groups.

iii. Key Informant Interviews (KIIs)

Key Informant Interviews were held with selected community leaders and stakeholders, including traditional leaders, community elders, youth representatives, and women leaders.

The KIIs focused on:

- Community governance and leadership structures;
- Land tenure and land use practices;
- Social norms, cultural practices, and conflict resolution mechanisms;
- Historical development trends and previous project experiences;
- Perceived social risks and opportunities associated with the project.

Data Quality Assurance and Analysis

To ensure data reliability and validity:

- Enumerators received prior training on survey tools, ethical conduct, and local context;
- Questionnaires were pre-tested and refined before full deployment;
- Data were cross-checked through triangulation of household survey results, FGDs, and KIIs.

Quantitative data were analyzed using descriptive statistics to establish baseline socio-economic indicators, while qualitative data were analyzed thematically to identify recurring issues, risks, and opportunities relevant to project implementation.

4.3.2 Socio-Economic Survey

A socio-economic baseline survey was conducted in Fakun community, New Bussa, within the project Area of Influence (AoI), to support compliance with the World Bank Environmental and Social Framework (ESF). The baseline provides reference conditions against which project-related social impacts, community health and safety risks, labour dynamics, and stakeholder engagement outcomes will be monitored during the rehabilitation and upgrade of the NAPTIN Kainji Regional Training Centre.

Table 4.18: Socio-Economic Characteristics of Fakun Community

Variable	Category	Percentage (%)	Interpretation / ESIA Relevance
Sex Distribution	Male	73.21	High male representation indicates strong availability of local labour for construction and rehabilitation works, particularly for skilled and semi-skilled tasks.
	Female	26.79	Women are primarily engaged in petty trading, farming support, and household management; targeted inclusion strategies may enhance women’s participation in project benefits.
	Total	100	Gender-disaggregated data supports inclusive impact assessment and gender-responsive mitigation planning.
Age Distribution	18–30	12.50	Presence of youth population suggests potential for apprenticeship and short-term employment opportunities during project execution.
	31–50	64.29	Dominant productive age group, indicating a readily available workforce for construction, maintenance, and ancillary services.
	51–70	23.21	Older adults may play advisory roles in community governance and influence acceptance of the project.
	71+	0.00	Low elderly dependency reduces direct project

			vulnerability impacts on aged persons.
	Total	100	Majority of respondents fall within economically productive age brackets, supporting local labour engagement.
Marital Status	Single	16.07	Represents potential job-seeking youth who may benefit from short-term project employment.
	Married	75.00	Predominance of family households implies that project benefits and disruptions may have household-level implications.
	Widowed	8.93	Identified as a vulnerable group requiring special social consideration during project implementation.
	Divorced/Separated	Nil	—
	Total	100	Household-based social impacts and benefit-sharing measures are relevant.
Educational Level	No Formal Education	55.36	Low literacy levels may limit access to skilled employment; simplified communication and on-the-job training will be required.
	Primary Education	19.64	Basic literacy supports participation in unskilled and semi-skilled project activities.
	WASC/SSCE	17.86	Indicates moderate secondary education capacity suitable for supervisory support roles.
	Tertiary Education	1.79	Very limited availability of highly skilled labour locally; skilled personnel may be sourced externally.
	Arabic/Vocational	5.36	Reflects informal skills that can be strengthened through targeted capacity-building programs.
	Total	100	Education profile underscores the need for skills enhancement and safety training.
	Monthly Household Income	< ₦10,000	8.93
₦11,000–₦40,000		60.71	Majority earn low but stable income, mainly from farming and trading.
₦41,000–₦60,000		17.86	Emerging middle-income group with potential to benefit from project-induced economic opportunities.
₦60,000–₦100,000		7.14	Small proportion of relatively stable earners.
₦100,000+		5.36	Minor group of higher-income earners, often traders or business owners.
Total		100	Income levels indicate a predominantly low-income economy that may benefit from employment and local procurement.
Household Size	1–3 persons	12.50	Smaller household units present but limited.
	4–6 persons	46.43	Typical household size, reflecting moderate dependency levels.
	7–9 persons	26.79	Larger households suggest higher dependency ratios and increased vulnerability.
	10+ persons	14.29	Extended family structures present, increasing demand for social services.
	Total	100	Large household sizes imply heightened sensitivity to livelihood disruptions.
Livelihood Pattern	Farmers	67.86	Dominant livelihood, primarily subsistence farming; project scheduling should consider farming seasons.

	Traders	16.79	Trading activities may benefit from increased economic activity during construction.
	Public Sector	5.36	Includes employment with NAPTIN and hydropower facilities.
	Fishermen	10.00	Several fishermen.
	Others	Nil	—
	Total	100	Livelihoods are largely land-based and informal, requiring livelihood-sensitive project planning.
Means of Transportation	Bus/Car	58.93	Road transport is essential for mobility, access to markets, and services.
	Motorcycle	33.93	Common among youths and traders; raises road safety considerations during construction.
	Bicycle/Others	7.14	Limited alternative transport options.
	Total	100	Improved access roads may enhance mobility but require traffic safety management.
Conflict Resolution Mechanisms	Community Leadership	45	Traditional leadership plays a central role in dispute resolution.
	Association Executives	35	Social groups provide functional grievance channels.
	Religious Institutions	10	Used for mediation and counselling.
	Civil Service/Police	10	Formal institutions used as last resort.
	Total	100	Existing local grievance structures can support project GRM design.
Health Services Access	Government Health Centre	42	Primary healthcare access exists but may be overstretched during project implementation.
	Chemist/Pharmacy	35	Secondary health access for minor ailments.
	Private Clinic	15	Limited private healthcare availability.
	Trado-Medical Centre	8	Continued reliance on traditional medicine.
	Total	100	Health facilities may require strengthening to manage project-related health risks.

Source: NAPTIN Kainji Field Survey, 2025

4.3.3 Key Social and Livelihood Findings

1. Agriculture remains the dominant livelihood activity, with over 67% of respondents engaged in small-scale farming of crops such as maize, yam, millet, and vegetables, indicating a strong reliance on natural resources and seasonal agricultural production.
2. Most households earn between ₦1500-9000 per day, reflecting economic vulnerability; however, the project has the potential to stimulate local economic growth through improved infrastructure, market access, and direct employment opportunities.
3. A significant proportion of respondents (76.79%) fall within the working-age population, suggesting that the community has adequate labour capacity for both skilled and unskilled roles during project implementation.
4. More than 78% of respondents have lived in the community for over 10 years, demonstrating long-term residency, social stability, and strong local familiarity with environmental and social conditions.

- Low literacy levels were observed, with over half of respondents having no formal education, indicating the need for sensitization, safety training, and capacity-building programs to ensure effective participation in the project.

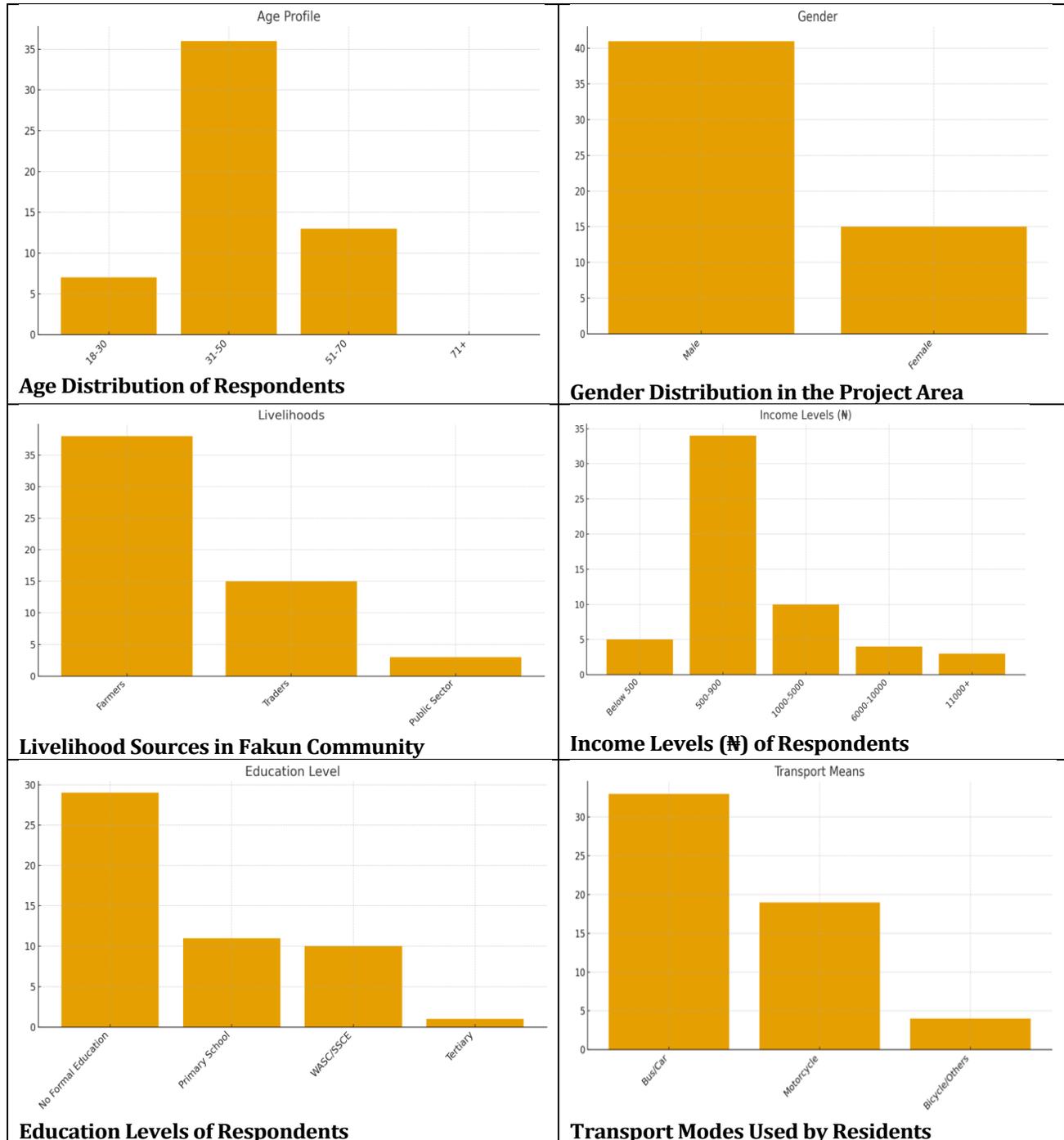


Figure 4.11: Bar Charts of Socio-Economic Characteristics of the Project Area

CHAPTER FIVE

GRIEVANCE REDRESS MECHANISM

5.1 Introduction

The Grievance Mechanism (GM) is an integral component of this project, designed to address and resolve concerns, complaints, and disputes that may arise during the project's implementation. The Grievance Redress Mechanism (GRM) for this project serves as a structured, transparent, and responsive system for addressing concerns, complaints, or disputes arising from project implementation. It ensures that all stakeholder's especially affected persons have accessible channels to voice their concerns without fear of retaliation.

The GRM aligns with World Bank ESS10 (Stakeholder Engagement and Information Disclosure) and FMEnv Social Safeguard requirements. It will be activated throughout the project lifecycle, including pre-construction, construction/rehabilitation, and operational phases.

5.2 Objectives of the GRM

The GRM aims to:

- Provide a timely, effective, and transparent process for resolving complaints.
- Strengthen community–project relationships through continuous engagement.
- Prevent escalation into social conflict or legal disputes.
- Support ESHS compliance and documentation for monthly reporting.
- Address environmental, social, health, and labour-related grievances.

5.3 Expected Response When Grievances Arise

Stakeholders should expect the following upon submission of a grievance:

1. Respectful and courteous treatment at all times.
2. Acknowledgment of the grievance within 48 hours.
3. Allocation of a unique tracking/reference number.
4. Fair and objective investigation of the issue.
5. Resolution/closure within 14 working days, where possible.
6. Full confidentiality for complainants (including anonymous submissions).
7. Regular updates on the grievance status until closure.

5.4 GRM Reporting Channels

Complaints may be submitted formally or informally via:

Table 5.1: GRM Reporting Channels

Channel	Availability/Method
Phone Call / WhatsApp	Dedicated GRM Line
Email Submission	safeguards.naptinproject@gmail.com
Suggestion/Complaint Boxes	Located at site entrance & community hall

Physical Submission	GRM Desk at Site Office
Community GRM Representative	Village Head / Youth Leader / Women Leader
Project Website / Online Form	(where available)

5.5 Key Risks That May Trigger Grievances

Potential sources of grievance under the ESHS scope include:

- Disruption of access due to equipment and construction works
- Use or competition for community water sources
- Noise and air pollution from machinery
- Delay in project implementation
- Waste disposal concerns
- Temporary disruption of livelihood activities
- Worker–community interaction risks (e.g., GBV/harassment)
- Non-compliance with agreed community terms
- Occupational health and safety concerns

5.6 GRM Structure – Levels of Complaint Resolution

Table 5.2: Grievance Redress Channels & Resolution Pathway

Level	Source of Complaint	Who Receives Complaint	Action Required	Grievance Redress Committee (GRC) Members
Level 1 – Community Level	General complaints at site/community	GRM Desk Officer / Social Safeguard Officer	Log complaint & convene CGRC	Village leader, youth rep., women rep., project rep.
Level 2 – PIU Level	Unresolved cases from Level 1	PIU Social Safeguard Lead	Review & resolve	Social Safeguard Lead, Project Manager
Level 3 – PIU Management Level	Escalated / complex cases	Project Coordinator (PC)	Resolution or mediation	PC + Safeguards Team
Level 4 – State Mediation Level	When local remedies fail	State Multi-Door Courthouse	Mediation / ADR	Legal mediation channels
Level 5 – Formal Legal Action	Last resort option	Local Courts	Legal adjudication	Nigerian judicial system

5.7 Standard GRM Flow Process

1. Complaint Received & Recorded
2. Acknowledgement within 48 Hours
3. Verification & Investigation
4. Proposed Resolution
5. Grievance Committee Review (if needed)

6. Feedback to Complainant
7. Implementation of Action
8. Closure & Documentation
9. Monthly GRM Summary Report Submitted

PROCESS AND PROPOSED TIMELINE FOR GRIEVANCE REDRESS	
Receipt of Grievance	1 day
Completion of the grievance form	1 day
Entry of the complaint into the grievance logbook/registration	1 day
Preliminary assessment of grievance: Internal evaluation of the severity of the complaint	2 days
Written acknowledgment of the receipt of the grievance. If key information is missing from the grievance, request for further information	1 – 7 days
Investigation and resolution of grievance	1-10 days
Response letter and registration in GRM database/Template. If the solution is accepted, resolution (including any payments) and closure of the case	Within 3 weeks
If the proposal is not accepted by the complainant, referral to the Higher-Level Committee	4 weeks after registration of the grievance
Resort to judicial measures	At any stage in the process though complainant would be persuaded to exercise patience until thorough utilization of the mediation path.

Fig. 5.1: Principal Steps in the Grievance Redress Management Process

5.8 Measures for Gender-Based Violence (GBV)

The World Bank and Agence Française de Développement (AFD) are committed to preventing and appropriately responding to incidences of Sexual Exploitation and Abuse (SEA), Sexual Harassment (SH), and all forms of Gender-Based Violence (GBV) within the projects they support. Managing allegations of this nature requires a survivor-centered approach, due to the sensitivity of such cases, the risk of stigmatization, social rejection, psychological harm, and the reluctance of survivors to come forward.

For the Rehabilitation and Upgrade of NAPTIN Kainji Regional Training Centre, a Gender-

Based Violence Grievance Mechanism (GBV-GM) has been integrated into the wider Grievance Redress System to ensure that any individual who experiences GBV in connection with the project can report safely, receive support, and be referred to appropriate service providers.

Considering that this sub-project involves civil works and possible influx of workers into the Fakun host community, there is a moderate risk of SEA/SH if preventive systems are not implemented. Therefore, a dedicated GBV-GM has been established, separate from the general GRM, with strict confidentiality protocols and ethical reporting channels.

The remit of the GBV-GM is to:

1. Establish direct linkages between survivors and approved GBV service providers.
2. Enable access to the domestic legal system, only with survivor consent.
3. Allow a trained GBV team to assess allegations related to the project and facilitate further action, including support, investigation, and/or referral to legal authorities.

Complaints under this mechanism may be initiated from any community within the project area and may be submitted verbally, in writing, via phone, or through designated officers. Upon receipt, the GBV-GM ensures immediate referral for professional support, prioritizing the survivor's dignity, safety, confidentiality, and choice.

5.9 Procedures in Handling GBV-GM Complaints

A. Intake:

SEA/SH complaints may be submitted through any of the project's GRM channels, including the GBV Desk Officer, in-person submission, or approved phone lines. The intake personnel must not interrogate or pressure the complainant unless they are specifically trained in survivor-centered approaches. Confidentiality and safety must be prioritized at all times.

B. Sorting:

The GBV Desk Officer or the Gender Specialist must inform the survivor of any mandatory reporting requirements that may apply under Nigerian law. The officer then requests informed consent to record anonymous, non-identifiable data, such as:

- Type of incident
- Whether the alleged perpetrator is linked to the project
- Age and sex of survivor (if voluntarily given)
- Whether referral to support services was accepted
- No identifiable data should be recorded if consent is withheld.

C. Clarification:

Survivors must be informed that the GBV-GM is administrative, not judicial. They retain the right to report directly to the police or seek legal assistance at any time. They must be informed of their rights to control the type of information shared, and select who may receive such information. Mandatory reporting laws must be explained before any information is disclosed.

D. Referral:

Upon consent, the survivor is immediately referred to certified GBV service providers. The Ministry of Women Affairs in Niger State maintains a registry of approved service providers, including medical, psychosocial, legal aid, and protection services. The GBV Desk Officer must provide full information on available support options and how to access them.

E. Verification/Investigation:

Where the survivor agrees to proceed, the GBV Case Team will assess whether the allegation is related to the project. If so, the accused may be invited to appear before the GBV Panel constituted via the PIU, with support from the Gender Lead. Where guilt is established, sanctions must be enforced in accordance with employment contracts, Nigerian labour law, World Bank safeguards, and AFD social protection principles.

F. Accountability:

Survivors may choose to seek accountability through the World Bank mechanism or the domestic legal system. They must be informed that the project GRM does not provide compensation and is not a legal court. Participation is voluntary, and survivors may withdraw at any time.

G. Resolution and Closure:

A complaint may be closed if:

- The survivor confirms that adequate support has been provided, or
- The survivor opts not to continue the case.

If the survivor proceeds, and sanctions are enforced, only then may the GBV officer formally close the case.

H. Monitoring and Evaluation:

Anonymous, non-identifiable data regarding GBV cases will be recorded and included in monthly ESHS reporting only with survivor consent. No names, locations, or personal identifiers should appear in any report.

I. Feedback:

Survivors must receive feedback at key stages:

- Upon receipt of complaint
- Upon referral to service providers
- If investigation begins or ends
- Before communicating outcomes to the accused

Feedback must always prioritize safety and confidentiality.

5.10 GBV-GM Governance

A trained GBV Focal Officer within the Social Safeguards Unit has been appointed to handle GBV-related grievances. Upon receiving a complaint, the officer must refer it to the Gender



Lead at the PIU within 24 hours. All actions must comply with ESS Requirements, AFD Safeguards, Nigerian law, and must be documented without revealing survivor identity.

5.11 Monitoring and Evaluation

To avoid escalation or community dissatisfaction, monitoring of GBV-related grievances will be carried out regularly throughout the project cycle. The Project Safeguards Unit, together with GRM Desk Officers, will ensure that all complaints are handled promptly, ethically, and in compliance with World Bank and AFD minimum safeguard standards.

CHAPTER SIX

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

6.1 Introduction

The rehabilitation and upgrade of the NAPTIN Kainji Regional Training Centre presents a critical opportunity to enhance the capacity and effectiveness of Nigeria's power-sector training infrastructure. As with any major construction, rehabilitation, or facility-upgrade initiative, it is essential to identify, assess, and manage the environmental, social, health, and safety implications that may arise during project implementation.

This chapter presents the Environmental and Social Management Plan (ESMP), which outlines the strategies, procedures, and mitigation measures that will guide the project toward responsible and sustainable execution. The ESMP provides a proactive and integrated framework aimed at preventing, minimizing, and managing potential risks and impacts associated with construction activities, facility upgrades, and operational transitions at the Centre.

The objective of this ESMP is not only to ensure technical excellence in the rehabilitation works but also to promote the well-being of workers, trainees, nearby communities, and the surrounding environment. Compliance with national regulations, industry best practices, and international safeguards will be central to the project's implementation approach.

Ultimately, the success of the Rehabilitation and Upgrade of the NAPTIN Kainji Regional Training Centre will be measured not only by the improved infrastructure delivered, but also by the project's contribution to:

- environmental protection and resource efficiency,
- safe and healthy working conditions,
- positive social outcomes for stakeholders, and
- strengthened institutional resilience.

Through this ESHS Management Plan, the project commits to responsible stewardship of the environment, meaningful engagement with people, and the creation of a safe, inclusive, and sustainable training facility for the nation's power sector.

6.2 Identification of Impacts

Ensuring the overall environmental and social success of the entire sub-project, this impact assessment methodology prioritizes the use of tools like impact identification, prediction, and the mitigation of potential adverse effects associated with different phases of the project. A risk assessment matrix is employed as a valuable tool to assess the potential consequences of various environmental and social factors related to the proposed rehabilitation project. This approach was chosen for its effectiveness in evaluating risk levels through the matrix, thereby aiding in the identification of necessary control measures for each distinct environmental and social aspect.

Table 6.1: Risk Assessment Matrix

		Probability				
Consequences		A	B	C	D	E
	1	H	H	H	H	M
	2	H	H	H	M	M
	3	H	H	M	M	L
	4	M	M	M	L	L
	5	M	L	L	L	L

H = High (RED), M = Medium (YELLOW), L = Low (GREEN).

Table 6.2: Risk Matrix Explanation

Probability / Likelihood			Consequence		
A	Almost Certain.	Expected to occur, quite common.	1	Major	Major environmental harm. e.g., major pollution incident causing significant damage or potential to health or the environment. Fines and prosecution likely
B	Likely	Will probably occur, has happened	2	Significant	Long-term or serious Environmental damage. Numerous complaints were received. Potential for prosecution. Loss of reputation
C	Possible	Might occur at some time	3	Moderate	Moderate environmental impact. Will cause complaints. Possible fine
D	Unlikely	Could occur at some time although unlikely	4	Minor	Minimal environmental harm. Potential for complaints. Fine unlikely.
E	Rare	Might occur at some time in exceptional circumstances.	5	Insignificant	Little or no environmental harm. Little potential for fines

Table 6.3 Ranking Assessment Matrix Results

Aspect	Potential Impact Description	Probability	Consequence	Risk Ranking
PRE-REHABILITATION PHASE				
Physical Site Appearance	Degraded visual amenities due to untidy rehabilitation site and presence of plant and equipment.	C	5	Low
Mobilization to Site	Dust and noise pollution due to increased vehicular movement in the area. Soil compartment due to movement/stacking of equipment.	B	5	Low
Air Quality	Dust generation through rehabilitation works leads to a decrease in air quality.	C	5	Low
Noise and vibration	Temporarily elevated noise emissions during pre-rehabilitation exercise	B	5	Low
REHABILITATION PHASE				
Air Quality	Dust generation through rehabilitation works leads to a decrease in air quality.	C	5	Low
Waste Management	Potential contamination of land and water due to inappropriate handling and disposal of waste materials	D	4	Low
Noise and vibration	Temporarily elevated noise emissions during pre-rehabilitation exercise	B	5	Low
Soil Contamination	Discharge of materials into soil that would cause contamination	E	3	Low
Underground and Surface water Quality	Discharge of contaminants either solid or liquid that can contaminate either underground or surface water sources rendering them unfit for desired usage	D	4	Low
OPERATIONAL PHASE				
Waste Management	Potential contamination of land and water due to inappropriate handling and disposal of waste materials	D	3	Medium
Socio-economic	Safety and access impacts associated with the rehabilitation activities. Amenity Impact on Stakeholders	D	4	Low
Flora and	Spread of exotic species	E	4	Low

fauna				Low
Cumulative impacts	Cumulative impacts on environment and community due to cumulative rehabilitation projects in the immediate vicinity	D	4	

The proposed Rehabilitation and Upgrade of the NAPTIN Kainji Regional Training Centre is expected to generate substantial benefits for the surrounding communities, NAPTIN staff, trainees, and the nation’s power sector at large. While the rehabilitation activities will be conducted primarily within the Training Centre’s premises, the nature of civil works including the use of heavy machinery, construction equipment, earthworks, material handling, and the presence of a contracted workforce may give rise to varying degrees of environmental, social, health, and safety impacts.

The following sections provide a detailed description of the potential positive and negative Environmental, Social, Health and Safety (ESHS) impacts associated with the proposed rehabilitation works. These impacts have been identified to guide the development of appropriate mitigation, enhancement, and management measures throughout the project lifecycle.

6.2.1 Identification of Positive and Negative Impact

Some of the Project activities are expected to have environmental and social impacts that are manageable through standards and codes of practice. This sub-project has been subjected to environmental and/or social reviews as the key management tool for identifying opportunities for lowering the negative impacts of the Project.

The rehabilitation works will have environmental and social impacts, which may be negative or positive. Some of the potential positive and negative impacts are as shown below:

Table 6.4: Identified Positive and Negative Impacts

A. POSITIVE IMPACTS

Environmental	Social
<ul style="list-style-type: none"> • Improved site aesthetics and overall environmental outlook. • Replacement of hazardous building materials such as asbestos roofing and ceilings, thereby reducing long-term pollution risks. • Reduction in potential pollution sources due to modernized materials and rehabilitation practices. • Possible enhancement of biodiversity 	<ul style="list-style-type: none"> • Improved working environment and occupational conditions for NAPTIN staff. • Increased access to reliable data and statistics for informed policy and decision-making in the State. • Employment creation for skilled and unskilled youths during rehabilitation (direct and indirect jobs).

<p>around the site via landscaping and controlled vegetation recovery.</p>	<ul style="list-style-type: none"> • Stimulation of local economic activities from procurement of locally sourced rehabilitation materials. • Boost in socio-economic activities around the project area. • Enhancement of technical capacity and research for State development. • Promotes innovation, data-driven research, and technological advancement.
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B. NEGATIVE IMPACTS (AND THEIR RANKING)

Environmental Impacts	Ranking	Social / Health & Safety Impacts	Ranking
Noise and vibrations from rehabilitation equipment and machinery	Low	Negative social perception of presence of non-local workers	Low
Ambient air deterioration from dust and vehicle emissions	Low	Labour influx may trigger Gender-Based Violence (GBV), Sexual Exploitation and Abuse (SEA)	Low
Asbestos dust exposure (carcinogenic risk during removal)	Low	Social conflict between workers and community members	Low
Pollution from improper disposal of generated waste (including asbestos)	Low	Child labour risk if not properly monitored	Low
Fuel and oil spillages from machinery	Low	Poor working conditions due to cheap labour preference by contractors	Low
Destruction of vegetation during tree trimming and minor clearing	Low	Grievances between workers and community members	Low
Potential soil contamination from waste disposal	Low	Occupational accidents and work-related injuries	Low
Temporary disruption of local biodiversity	Low	Risk of communicable diseases (STDs/STIs, HIV/AIDS)	Medium
Air quality reduction from dust-generating activities	Low	Increased traffic and road safety issues during material transportation	Low

Exposure of workers to unsafe work conditions	Low	Competition for water sources with nearby communities (possible conflict)	Low
-	-	Influx of students and workers after rehabilitation leading to housing/pressure on social amenities	Low
-	-	Abandonment or improper management of waste leading to long-term health/environmental problems	

6.3 Environmental and Social Management Plan

The Environmental and Social Management Plan (ESMP) has been carefully structured to prevent, mitigate, and manage potential adverse impacts that may arise during the rehabilitation and upgrade of the NAPTIN Kainji Regional Training Centre. The ESMP ensures that all project activities are carried out in a manner that safeguards the environment, protects workers and nearby communities, and promotes sustainable and socially responsible development outcomes.

This plan incorporates clearly defined mitigation measures and monitoring arrangements designed to minimize environmental, social, health, and safety (ESHS) risks across all phases of the project. It outlines essential parameters to be monitored, methods and locations of measurement, performance indicators with defined targets or acceptance criteria, monitoring frequency, estimated budgets, and the roles and responsibilities for implementation. These comprehensive elements are summarized in Table 6.5, corresponding to the specific stages of the project lifecycle.

The ESMP has been developed in accordance with:

- National environmental and social regulatory requirements,
- World Bank Environmental and Social Standards (ESS), and
- IFC/World Bank Environmental, Health and Safety (EHS) Guidelines,

ensuring adherence to international best practices for managing environmental and social risks in construction and facility rehabilitation projects.

Key Components of the ESMP

The ESMP provides measures to be implemented during the pre-rehabilitation, rehabilitation/construction, and post-rehabilitation/operational phases. It includes the following core elements:

1. Identification of Potential Environmental and Social Risks
2. Mitigation Measures
3. Monitoring Parameters



4. Monitoring Methods and Frequency
5. Targets / Performance Indicators
6. Responsible Institution / Party
7. Estimated Budget
8. Applicable Project Phase

These components are consolidated into Table 6.5, which provides the detailed ESMP matrix, outlining each identified impact along with the corresponding mitigation measures, monitoring strategy, responsible institutions, and cost estimates.

TABLE 6.5: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP), MITIGATION AND MONITORING PLAN

Phase	Project Activity	Potential Environmental & Social Impacts	Mitigation Measures	Responsibility (Mitigation)	Monitoring Indicators / Parameters	Monitoring Methods	Monitoring Frequency	Responsibility (Monitoring)	Estimated Cost (USD)
Pre-Rehabilitation Phase	Site clearing, site preparation & contractor mobilization	<ul style="list-style-type: none"> Dust emissions (SPM, PM_{2.5}/PM₁₀) Nuisance to staff/trainees Exhaust fumes Visibility reduction 	<ol style="list-style-type: none"> Water sprinkling on exposed surfaces. Cover trucks carrying loose materials. Pre-mobilization vehicle emission checks. Enforce no-idling policy. 	Contractor	<ul style="list-style-type: none"> Visible dust levels PM reading (if possible) % vehicles with maintenance/VET records 	<ul style="list-style-type: none"> Visual inspection Review of vehicle logs 	Weekly	ESO; PIU	800
Pre-Rehabilitation	Movement & parking of heavy machinery	<ul style="list-style-type: none"> Soil compaction Damage to green areas Localized erosion Landscape disturbance 	<ol style="list-style-type: none"> Designate and mark equipment routes. Restrict movement to marked paths. Provide gravel pads for heavy equipment. Restore compacted/damaged areas. 	Contractor	<ul style="list-style-type: none"> Marked routes visible Evidence of soil damage 	<ul style="list-style-type: none"> Walk-through inspection Photographs 	Monthly	ESO; NAPTIN Facility Unit	900
Pre-Rehabilitation	Labour recruitment & influx	<ul style="list-style-type: none"> Community tension Pressure on services Potential conflict Labour grievances 	<ol style="list-style-type: none"> Prioritize local labour. Transparent hiring via community leaders. Provide welfare facilities 	Contractor; PIU	<ul style="list-style-type: none"> % local workers No. of labour grievances 	<ul style="list-style-type: none"> Employment record review GRM log 	Quarterly	Social Safeguards Officer; CLO	1500

Phase	Project Activity	Potential Environmental & Social Impacts	Mitigation Measures	Responsibility (Mitigation)	Monitoring Indicators / Parameters	Monitoring Methods	Monitoring Frequency	Responsibility (Monitoring)	Estimated Cost (USD)
			(water, toilets). 4. Establish Labour GRM.						
Pre-Rehabilitation	Traffic & logistics planning	<ul style="list-style-type: none"> Increased traffic Safety risks Congestion Accidents 	<ol style="list-style-type: none"> Implement Traffic Management Plan. Install warning & speed-limit signs. Schedule deliveries outside peak hours. Use flagmen during heavy deliveries. 	Contractor	<ul style="list-style-type: none"> Traffic signs installed No. of traffic incidents 	<ul style="list-style-type: none"> Route inspection Incident log review 	Weekly during deliveries	PIU; Local Traffic Dept.	1000
Construction / Rehabilitation Phase	Operation of equipment, generators, mixers, cutting, demolition	<ul style="list-style-type: none"> Dust & fumes Noise nuisance Poor air quality Worker exposure 	<ol style="list-style-type: none"> Spray water during dust-generating activities. Store cement in covered places. Maintain generator silencers/filters. Provide PPE (masks). 	Contractor	<ul style="list-style-type: none"> PPE usage rate Equipment maintenance logs 	<ul style="list-style-type: none"> Routine inspections Log review 	Weekly	ESO; PIU	1500
Construction / Rehabilitation Phase	Excavation, earthworks & stockpiling	<ul style="list-style-type: none"> Erosion Drain blockage Sedimentation Runoff pollution 	<ol style="list-style-type: none"> Limit excavation to planned areas. Stabilize exposed soil. Keep stockpiles away from 	Contractor	<ul style="list-style-type: none"> Erosion evidence Stockpile condition 	<ul style="list-style-type: none"> Visual inspection Rainfall-triggered checks 	Weekly	ESO; PIU	1200

Phase	Project Activity	Potential Environmental & Social Impacts	Mitigation Measures	Responsibility (Mitigation)	Monitoring Indicators / Parameters	Monitoring Methods	Monitoring Frequency	Responsibility (Monitoring)	Estimated Cost (USD)
			drains. 4. Install sandbags/silt traps.						
Construction / Rehabilitation Phase	Fuel, oil, paint & chemical handling	<ul style="list-style-type: none"> • Soil/water contamination • Chemical exposure • Fire hazards • Groundwater pollution 	<ol style="list-style-type: none"> 1. Use bunded chemical/fuel storage. 2. Provide spill kits and drip trays. 3. Train workers on chemical safety. 4. Keep MSDS on site. 	Contractor	<ul style="list-style-type: none"> • Storage condition • No. of spills 	<ul style="list-style-type: none"> • Site inspection • Spill log review 	Monthly	ESO; PIU	1400
Construction / Rehabilitation Phase	Construction & domestic waste	<ul style="list-style-type: none"> • Littering • Blocked drains • Land pollution • Pest infestation 	<ol style="list-style-type: none"> 1. Provide labelled waste bins. 2. Segregate waste. 3. Ban open burning/dumping. 4. Hire licensed waste collectors. 	Contractor	<ul style="list-style-type: none"> • Waste segregation • Cleanliness level 	<ul style="list-style-type: none"> • Site inspection • Disposal ticket review 	Weekly	ESO; Waste Authority	1200
Construction / Rehabilitation Phase	Noise & vibration	<ul style="list-style-type: none"> • Disturbance to staff/trainees • Training disruption • Community complaints • Nuisance 	<ol style="list-style-type: none"> 1. Conduct noisy work only during daytime. 2. Maintain mufflers/silencers. 3. Use temporary noise barriers. 4. Notify NAPTIN before 	Contractor	<ul style="list-style-type: none"> • Noise levels • No. of complaints 	<ul style="list-style-type: none"> • Noise checks • Complaint logs 	Weekly	ESO; PIU	1000



Environmental, Social, Health and Safety (ESHS) Management Plan for the Rehabilitation and Upgrade of NAPTIN Kainji Regional Training Centre.



Phase	Project Activity	Potential Environmental & Social Impacts	Mitigation Measures	Responsibility (Mitigation)	Monitoring Indicators / Parameters	Monitoring Methods	Monitoring Frequency	Responsibility (Monitoring)	Estimated Cost (USD)
			loud work.						
Construction / Rehabilitation Phase	Occupational Health & Safety (OHS)	<ul style="list-style-type: none"> Falls Injuries Electrocution Equipment accidents 	<ol style="list-style-type: none"> Enforce PPE use. Conduct toolbox talks. Use safe scaffolding/ladders. Provide first-aid kits & trained first-aiders. 	Contractor	<ul style="list-style-type: none"> PPE compliance rate Incident rate 	<ul style="list-style-type: none"> OHS inspections Incident review 	Weekly & after incidents	HSE Officer; PIU	2000
Construction / Rehabilitation Phase	Workforce/community interaction (SEA/SH & health)	<ul style="list-style-type: none"> SEA/SH risks Communicable diseases Misconduct Community tension 	<ol style="list-style-type: none"> Enforce signed Code of Conduct. Monthly SEA/SH awareness. Provide anonymous GBV/SEA reporting channels. Restrict workers from entering hostels. 	Contractor; PIU	<ul style="list-style-type: none"> No. of SEA/SH cases No. of trainings 	<ul style="list-style-type: none"> GRM review Stakeholder feedback 	Monthly	Social Safeguards Officer; GBV Focal Person	1200
Construction / Rehabilitation Phase	Potential asbestos presence (if found during rehab)	<ul style="list-style-type: none"> Asbestos inhalation Hazardous waste Environmental contamination Long-term health risk 	<ol style="list-style-type: none"> Stop work immediately if ACM suspected. Call certified asbestos handler. Use wet/controlled removal methods. 	Contractor (Licensed)	<ul style="list-style-type: none"> ACM plan in place Waste manifest 	<ul style="list-style-type: none"> Visual inspection Documentation review 	As needed	ESO; State Environmental Agency	1500



Environmental, Social, Health and Safety (ESHS) Management Plan for the Rehabilitation and Upgrade of NAPTIN Kainji Regional Training Centre.



Phase	Project Activity	Potential Environmental & Social Impacts	Mitigation Measures	Responsibility (Mitigation)	Monitoring Indicators / Parameters	Monitoring Methods	Monitoring Frequency	Responsibility (Monitoring)	Estimated Cost (USD)
			4. Double-bag and properly label ACM waste.						
Operation Phase	Demobilization & final clean-up	<ul style="list-style-type: none"> Residual waste Stains & debris Damaged grounds Blocked drains 	<ol style="list-style-type: none"> Remove all debris & temporary structures. Clean equipment/storage areas. Restore compacted soil. Re-vegetate disturbed land. 	Contractor; PIU	<ul style="list-style-type: none"> Cleanliness Restored areas 	Final inspection	Once	ESO; Facility Unit	600
Operation	Routine operation of facility	<ul style="list-style-type: none"> Routine waste Housekeeping issues Hygiene concerns Pest risks 	<ol style="list-style-type: none"> Provide waste bins. Maintain waste collection schedule. Monthly housekeeping checks. Hygiene sensitization for trainees/staff. 	NAPTIN Management	<ul style="list-style-type: none"> Cleanliness level Waste collection regularity 	Routine inspection	Monthly	Facility/OHS Unit	800/yr
Operation	Building equipment & maintenance	<ul style="list-style-type: none"> Equipment breakdown Asset deterioration Safety concerns User dissatisfaction 	<ol style="list-style-type: none"> Preventive maintenance plan. Maintenance logbook. Train facility maintenance team. Provide fault-reporting system. 	NAPTIN Management	<ul style="list-style-type: none"> Breakdown frequency Maintenance logs 	<ul style="list-style-type: none"> Log review Physical checks 	Quarterly	Facility Unit	1000/yr



Environmental, Social, Health and Safety (ESHS) Management Plan for the Reconstruction and Upgrade of NAPTIN Kainji Regional Training Centre.



Phase	Project Activity	Potential Environmental & Social Impacts	Mitigation Measures	Responsibility (Mitigation)	Monitoring Indicators / Parameters	Monitoring Methods	Monitoring Frequency	Responsibility (Monitoring)	Estimated Cost (USD)
Operation	Community interface (traffic, noise, GRM)	<ul style="list-style-type: none"> • Complaints • Miscommunication • Traffic issues • Community tension 	<ol style="list-style-type: none"> 1. Maintain GRM. 2. Bi-annual community meetings. 3. Enforce vehicle speed limits. 4. Provide timely feedback to community. 	NAPTIN Management	<ul style="list-style-type: none"> • No. of grievances • Meeting minutes 	<ul style="list-style-type: none"> • GRM review • Consultations 	Bi-annual	PIU; NAPTIN Management	600/yr

TOTAL ESMP COST (YEAR 1): = USD 18,200

6.4 Institutional Responsibilities & Accountabilities

The successful implementation of the Environmental and Social Management Plan (ESMP) for the Rehabilitation and Upgrade of the NAPTIN Kainji Regional Training Centre depends on the coordinated participation of several institutions, agencies, and project stakeholders. Each institution has a defined mandate to support the environmental, social, health, and safety performance of the Project throughout its lifecycle.

Table 6.6 below describes the institutional arrangement, roles, and responsibilities for ESMP implementation, monitoring, reporting, and overall compliance.

Table 6.6: Institutional Arrangement for Implementation and Monitoring

Institution	Responsibilities
Project Implementation Unit (PIU) – NAPTIN Headquarters	<ul style="list-style-type: none"> • Overall coordination of environmental, social, health and safety (ESHS) aspects of the project. • Ensure safeguards due diligence in compliance with World Bank ESS and national regulations. • Oversee Contractors and Supervising Consultants on ESHS performance. • Maintain project-level reporting, documentation, incident management, and corrective actions.
Federal Ministry of Environment (FMEnv)	<ul style="list-style-type: none"> • Review and clearance of the ESMP in line with national regulatory requirements. • Facilitate stakeholder engagement and public disclosure of the ESMP. • Provide technical oversight and participate in periodic environmental monitoring. • Ensure compliance with Nigeria’s Environmental Impact Assessment (EIA) Act and subsidiary regulations.
Niger State Ministry of Environment (NSMOE)	<ul style="list-style-type: none"> • Monitor and evaluate ESMP implementation within Niger State. • Conduct compliance inspections at the NAPTIN Kainji project site. • Enforce state-level environmental protection policies and guidelines.
Niger State Environmental Protection Agency (NISEPA)	<ul style="list-style-type: none"> • Oversee pollution control measures (air quality, wastewater, noise, sanitation). • Ensure compliance with hazardous waste and solid waste regulations. • Participate in routine monitoring of environmental parameters.
Ministry of Women Affairs and Social Development, Niger State	<ul style="list-style-type: none"> • Provide access to state GBV/SEA/SH referral services, including survivor-centred support. • Lead community awareness on SEA/SH prevention and response. • Support the PIU in managing SEA/SH risks by linking with accredited service providers. • Assist with training sessions for Contractors, workers, and community groups.
Contractors	<ul style="list-style-type: none"> • Implement all mitigation measures contained in the ESMP.

	<ul style="list-style-type: none"> Enforce Occupational Health and Safety (OHS) requirements on site. Maintain compliance with BOQ specifications and material standards. Submit monthly ESHS performance reports.
Supervising Consultants	<ul style="list-style-type: none"> Provide independent oversight of contractors' work and ESHS compliance. Conduct routine site inspections and audits. Verify that engineering designs and mitigation measures are implemented correctly. Certify progress reports and escalate non-compliance to the PIU.
Local NGOs/Community-Based Organizations (CBOs)	<ul style="list-style-type: none"> Assist with community sensitization and awareness campaigns. Participate as third-party monitors where applicable. Support the management of SEA/SH, community health, and grievance resolution activities. Assist vulnerable groups in accessing relevant project information and services.

6.5 Capacity Building for Implementation and Monitoring of the ESHS

Public consultations and institutional assessments conducted during preparation of the ESMP identified several capacity gaps that may affect effective implementation of Environmental, Social, Health and Safety (ESHS) actions. These gaps relate particularly to weak enforcement mechanisms, limited safeguards experience, and inadequate monitoring capacity among the PIU, Contractors, and relevant Niger State Ministries/Agencies.

To ensure full compliance with the ESMP and the World Bank Environmental and Social Standards (ESS1-ESS10), targeted capacity strengthening is essential. Table 6.7 below outlines the proposed ESHS training programme to be delivered before and during the rehabilitation works.

Table 6.7: Time Table for Implementation and Monitoring Trainings

S/N	Training Content	Who to Train	Duration	When	Training Responsibility	Revised Cost (₦)
Implementation Trainings						
1	Environmental & Social Safeguards Training <ul style="list-style-type: none"> World Bank ESS requirements Contractor ESMP/C-ESMP obligations Code of Conduct (CoC), 	Contractor Management & Workers; PIU Safeguards Team; NAPTIN Centre Management	1 Day	Pre-rehabilitation & Quarterly Refresher	PIU Safeguards & Gender Team	₦400,000

	sanctions & enforcement • GRM operation and reporting					
2	Rehabilitation Health, Safety and Environment (HSE) Training • Hazard identification in rehabilitation works • Incident causation, reporting and investigation • Site-specific OHS procedures • PPE requirements & enforcement • Safe driving & traffic control • Drug and alcohol control	Contractors' Management & Workers; Supervising Consultants; PIU OHS Team	1 Day	Pre-rehabilitation & Quarterly Refresher	PIU Safeguards/OHS Specialists	₦450,000
3	SEA/SH, GBV and VAC Training • SEA/SH prevention and response in line with World Bank standards • Contractor obligations under GBV Action Plan • Reporting channels, survivor-centered referral pathways • Behavioural protocols for workers	Contractor Management & Workers; PIU; NAPTIN Social Desk	1 Day	Pre-rehabilitation & Quarterly Refresher	Accredited NGO/GBV Service Provider	₦350,000 (service contract)
Monitoring Trainings						
4	Hazardous Waste, Chemical & Asbestos Management Training • Identification and handling of	Niger State Ministry of Environment; NISEPA; NAPTIN Facility Unit; PIU ESHS Team	1 Day	Pre-rehabilitation & Quarterly	External Environmental Consultant	₦300,000



	hazardous waste • Safe asbestos handling procedures • Emergency spill response • Waste manifesting & record keeping • Environmental monitoring techniques					
TOTAL						1,500,000

6.6 Implementation Schedule

An Implementation Schedule is an essential component of project planning and environmental and social management. It outlines the sequence, duration, and timing of activities required to ensure that the Environmental and Social Management Plan (ESMP) and is implemented effectively throughout the rehabilitation lifecycle of the NAPTIN Kainji Regional Training Centre.

The Implementation Schedule ensures that all Environmental, Social, Health and Safety (ESHS) mitigation measures, monitoring activities, reporting obligations, and institutional responsibilities are coordinated and executed at the appropriate time.

The Implementation Schedule presented in Table 6.8 details the specific actions to be undertaken during the Pre-Rehabilitation Phase, the Rehabilitation/Construction Phase, and the Post-Rehabilitation Phase. It assigns responsibilities to the appropriate institutions and provides a clear timeline for monitoring and reporting activities.

Table 6.8: Implementation Schedule

S/N	Activity Description	Responsibility	Pre-Rehabilitation Month (1 Month)				Rehabilitation / Construction Phase Month (8 Months)								Post-Rehabilitation 1 month	
			1st week	2nd week	3rd week	4th week	1st month	2nd month	3rd month	4th month	5th month	6th month	7th month	8th month		
			4 Week													
1	End of ESHS Disclosure Period	PIU														
2	Inclusion of Environmental & Social Requirements in Bid Documents	PIU														
3	Allocation of Budget for ESHS Implementation	PIU														
4	Review & Approval of Contractor C-ESHS	PIU														
5	Finalization of Engineering Designs	PIU / Engineering Design Consultant														
6	ESHS Training (Safeguards, OHS, SEA/SH, Waste & Hazardous Waste Management)	PIU / Consultants														
7	Contractor Mobilization to Site	Contractor														
8	Site Clearing & Preparatory Works	Contractor														
9	Rehabilitation / Construction Works	Contractor														
10	Implementation of All E&S Mitigation Measures	Contractor														
11	Supervision/Implementation	PIU / Supervising Consultant														
12	Monitoring & Reporting	PIU / NSMoE / NISEPA														
13	Environmental & Social Risk Management Training	PIU / Consultant														
14	Environmental & Social Audit (Final Audit)	PIU / Accredited Consultant														

6.7 Contractual Measures

For the successful rehabilitation and upgrade of the NAPTIN Kainji Regional Training Centre, all Contractors must comply with the full suite of Environmental, Social, Health and Safety (ESHS) requirements, which include but are not limited to the Environmental and Social Management Plan (ESMP). The ESMP is one component of the broader ESHS system that governs project implementation, monitoring, and compliance.

To ensure that ESHS responsibilities are fully embedded into project execution, the PIU shall incorporate the contractual measures shown in Table 6.9 into all bidding documents, contract agreements, and contractor obligations. These measures ensure that compliance with ESHS standards becomes a legally enforceable requirement and forms part of performance-based contract management.

Table 6.9: Contractual Measures

Action	Remarks
All ESHS requirements including ESMP, OHS Plan, Labour Management Procedures, Waste Management Plan, SEA/SH Action Plan, Traffic Management Plan, Emergency Preparedness Plan must be included in tender documents and contract conditions.	Non-inclusion of ESHS requirements in the bidding proposal leads to automatic disqualification. Contractors must demonstrate capability, resources, and systems to implement the full ESHS requirements.
The Contractor must prepare a comprehensive Contractor ESHS Management Plan (C-ESHSMP), within which the C-ESMP is a component.	The C-ESHSMP must integrate: environmental mitigation, OHS, labour management, SEA/SH mitigation, community health & safety, pollution prevention, hazardous waste and asbestos handling, emergency response, and risk management procedures.
All ESHS mitigation costs must be included clearly in the Contractor’s financial bid.	Bids must explicitly show costs for PPE, safety gear, trainings, spill kits, waste disposal, community engagement, SEA/SH compliance, monitoring, incident reporting, and any other ESHS obligations.
C-ESHSMP must be reviewed and approved by the PIU before Contractor mobilization.	No construction may commence until the PIU confirms full alignment with the ESMP, ESMF, national regulations, IFC/WB EHS Guidelines, and World Bank ESS standards.
Contractors must establish an ESHS Management System for the site.	Must include: ESHS staffing, daily inspections, toolbox meetings, hazard identification, risk assessments, safety briefings, emergency preparedness, documentation and reporting, community relations, and site supervision.
Contractors must implement an OHS Plan aligned with the IFC/WB General EHS Guidelines.	Must address: fall protection, excavation safety, electrical safety, working at heights, confined space entry, hot works, lock-out/tag-out systems, first-aid and

	emergency response.
Contractors must implement Waste and Hazardous Materials Management Plans.	Includes: asbestos management, banded storage, spill response, waste segregation, licensed disposal, waste manifesting, hazardous substance inventory, and training of workers.
SEA/SH Codes of Conduct (Contractor, Manager, Individual) must be signed and enforced.	Codes must address: SEA/SH prohibition, reporting channels, community protection, worker behavioural expectations, project boundaries, sanctions, confidentiality, and referral pathways.
Contractor must ensure that all workers sign Individual Codes of Conduct.	Each worker must receive induction on ESHS obligations, acceptable behaviour, disciplinary rules, SEA/SH standards, OHS requirements, and grievance reporting procedures.
Manager's Code of Conduct must emphasize ESHS supervision and labour welfare.	Must address: worker compensation, conflict resolution, worker grievance support, communication protocols, disciplinary systems, ethical recruitment, and accountability for ESHS violations.
Contractors must cooperate fully with PIU, Supervising Consultant, and State MDAs for ESHS monitoring.	Includes: granting site access, responding to non-compliance notices, providing monthly ESHS reports, and implementing corrective actions.
Contractors must maintain ESHS documentation for audit and verification.	Includes: incident logs, near-miss reports, SEA/SH grievances (non-identifying), visitor logs, training attendance, OHS inspection records, monitoring data, and worker payroll records (for labour compliance).
Penalties for ESHS non-compliance must be clearly stated and enforceable.	Penalties may include: payment deductions, suspension of works, removal of personnel, mandatory retraining, or contract termination.
Subcontractors must comply with the same ESHS requirements.	The Contractor remains wholly responsible for ensuring subcontractor compliance, including training, CoC signing, incident reporting, and ESHS supervision.

Supporting Frameworks for ESHS Contractual Measures

These ESHS instruments must guide all Contractor obligations:

Within this ESHS Management Document

- Environmental and Social Management Plan (ESMP)
- Waste Management Plan
- Project Codes of Conduct (SEA/SH, Manager, Worker)

- Community Health & Safety Guidelines
- Traffic & Logistics Management Requirements
- Site OHS Requirements

Provided in the Project ESMF

- ESHS General Conditions for Construction Contracts
- Labour Management Procedures (LMP)
- SEA/SH Prevention and Response Procedures
- Grievance Redress Mechanism (GRM) for workers and community
- Emergency Preparedness and Response Procedures
- Environmental and Social Screening and Risk Classification Procedures

6.8 Disclosure of the ESHS Document

Following the review and clearance of this ESHS document by the Agence Française de Développement (AFD), the Project Implementation Unit (PIU) shall disclose the approved document at designated public locations within Niger State. In line with the Nigerian EIA Law, the disclosure shall also be announced in one local and one national newspaper, as guided by the Federal Ministry of Environment (FMEnv).

The public disclosure period shall last for twenty-one (21) working days, during which stakeholders may review the document and provide feedback. Evidence of newspaper publication and public display shall be submitted to FMEnv and used to facilitate disclosure on the external website.

The PIU will collaborate closely with FMEnv to ensure all statutory disclosure requirements are met and the process is completed in accordance with national and guidelines.

6.9 Measures for Non-Compliance with the ESHS Requirements

To ensure effective implementation of the Environmental, Social, Health and Safety (ESHS) requirements including the ESMP component appropriate measures shall be applied where non-compliance is identified. The PIU, Supervising Consultant, and relevant regulatory authorities shall enforce the following actions as necessary:

- **Corrective Actions:** Immediate rectification of non-compliance through defined corrective measures, restoration of affected areas, or modification of work procedures.
- **Warnings and Non-Compliance Notices:** Issuance of written warnings or formal notices requiring corrective actions within a specified timeframe.
- **Penalties and Financial Deductions:** Application of contractual penalties, including payment deductions, for repeated or significant non-compliance.
- **Suspension of Work:** Temporary suspension of specific activities or full site operations until corrective actions are completed and verified.
- **Enforcement Orders:** Directives issued by regulatory authorities (FMEnv, NSMoE, NISEPA) mandating compliance actions, monitoring, or documentation.
- **Legal or Administrative Sanctions:** Initiation of civil or criminal proceedings for serious or persistent violations of environmental, social, labour, or safety

regulations.

- **Revocation of Permits or Site Access:** Withdrawal of approvals, permits, or Contractor access rights where violations pose risks to public safety, workers, or the environment.
- **Community Notifications:** Informing affected communities where non-compliance may pose risks to health, safety, livelihoods, or local environmental resources.
- **Compensation or Remediation:** Implementation of community or environmental compensation measures where impacts have occurred as a result of non-compliance.
- **Revision of ESHS Instruments:** Updating or strengthening the C-ESHSMP or ESMP where recurring issues arise, including adjustments to mitigation measures and monitoring requirements.
- **Enhanced Oversight:** Increased site supervision, audits, and reporting requirements for Contractors with repeated non-compliance.

6.10 Monitoring Indicators for the ESMP

6.10.1 Objective

This section outlines the monitoring indicators that will be used to assess the effectiveness of the Environmental and Social Management Plan (ESMP) during the Rehabilitation and Upgrade of the NAPTIN Kainji Regional Training Centre. Monitoring is a vital component of ESMP implementation, ensuring that environmental, social, health, and safety objectives are achieved and that any deviations are identified and addressed promptly. The indicators below will guide performance tracking throughout the project lifecycle.

6.10.2 Monitoring Indicators

Table 6.10: Monitoring Indicators for the ESMP

S/N	Indicator	Remark
Environmental Monitoring Indicators		
1	Air Quality	Regular measurement of particulate matter (PM ₁₀ , PM _{2.5}), volatile organic compounds (VOCs), and other pollutants within and around the construction site, compared against FME _{nv} and World Bank thresholds.
2	Water Quality	Periodic monitoring of nearby water bodies and drainage systems to detect contamination, turbidity changes, or alterations in water chemistry.
3	Noise Levels	Continuous or periodic measurement of noise during construction to ensure compliance with national and World Bank standards and minimize disturbance to staff and the host community.
4	Waste Management	Tracking the volume, type, and disposal method of waste generated; monitoring segregation rates and safe disposal of hazardous materials.
5	Biodiversity	Routine checks for disturbance to vegetation, wildlife, or sensitive habitats within the project area.
Social Monitoring Indicators		
1	Community Feedback	Routine engagement with host communities, documentation of feedback, and identification of concerns requiring mitigation.
2	Employment and Training	Monitoring local employment levels, labour distribution, and the number of workers trained on ESHS, OHS, SEA/SH, and project-specific requirements.
3	Health and Safety	Regular assessment of worker and community safety conditions, including incident rates, near misses, PPE compliance, and emergency preparedness.
4	Access to Services	Evaluating whether construction activities restrict access to essential services (e.g., water points, training facilities, walkways) and ensuring



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		timely restoration of access.
5	Compliance with Regulations	Tracking adherence to Nigerian environmental laws, labour regulations, development control requirements, AFD and World Bank ESS obligations.
6	Complaint Resolution	Monitoring the effectiveness of the Grievance Redress Mechanism (GRM), including the number of complaints received, resolved, and pending.
7	Reporting and Review	Generating periodic ESHS monitoring reports for submission to AFD; using monitoring results to review and update the ESMP as necessary.

CHAPTER SEVEN

PUBLIC AND STAKEHOLDER CONSULTATIONS

7.1 Introduction

Public and stakeholder consultations are fundamental to the effective implementation of the Environmental, Social, Health and Safety (ESHS) Management Plan for the Rehabilitation and Upgrade of the NAPTIN Kainji Regional Training Centre. Meaningful stakeholder engagement ensures that those who may be directly or indirectly affected by the project are adequately informed, consulted, and given an opportunity to contribute to project decision-making processes.

For this project, consultations were carried out with NAPTIN management and staff, site users, relevant government agencies, and most importantly, members of the Fakun Community in New Bussa, which is the immediate host community. Fakun Community is located within close proximity to the training centre and is expected to experience both the benefits and temporary disturbances associated with rehabilitation works.

The consultation process was participatory, iterative, and conducted in accordance with World Bank Environmental and Social Standard 10 (ESS10): Stakeholder Engagement and Information Disclosure. The process ensured inclusive engagement with women, youths, elderly persons, persons with disabilities, small business operators, and community-based groups.

To obtain balanced perspectives, consultations were carried out through community meetings, focus group discussions, institutional visits, and interviews. Key concerns, expectations, and community priorities were documented and integrated into this ESHS document, the ESMP, and the Grievance Redress Mechanism (GRM).

7.2 Strategy for the Consultation Process

The strategy adopted for public consultation was designed to ensure transparency, inclusiveness, respect for cultural norms, and effective mobilization of stakeholders. The following strategic steps guided the process:

1. Preliminary Engagements and Notification

Prior to detailed consultations, an initial notification was sent to:

- Fakun Community traditional leaders
- Borgu Local Government officials
- NAPTIN management
- Niger State Ministry of Environment
- Niger State Environmental Protection Agency (NISEPA)

This notification introduced the project concept and requested support for mobilizing relevant community members and institutions.

2. Site Visits and Observations

Multiple site visits were undertaken to:

- Inspect the existing facilities and infrastructure
- Identify potential environmental and social impacts
- Understand community interactions with the training centre

- Observe traffic patterns, access routes, drainage, and waste disposal issues

These observations provided context for more focused discussions.

3. Stakeholder Identification and Prioritization

Stakeholders were categorized as:

- Directly affected persons (NAPTIN users, local vendors, Fakun residents)
- Indirectly affected persons (transporters, suppliers, neighbouring areas)
- Institutional stakeholders (government agencies, service providers)

4. Community Mobilization and Sensitization

Fakun Community leaders assisted in:

- Mobilizing residents for group meetings
- Ensuring representation of vulnerable groups

5. Engagement Techniques

Consultation methods included:

- Community meeting at the palace
- Focus group discussions (women, youths, elders)
- Key informant interviews
- Interactive question-and-answer sessions
- Documentation and feedback recording

These sessions provided safe spaces for open dialogue and encouraged community members to express concerns freely.

7.3 Stakeholder Identification and Categorization

Stakeholders were identified based on their level of influence, interest, and potential impact from the rehabilitation activities.

Primary Stakeholders

- Fakun Community in New Bussa
 - Households living near the training centre
 - Youths and unemployed adults seeking job opportunities
 - Women involved in small-scale trade around the centre
- NAPTIN Administrative, Academic, and Technical Staff
- Vulnerable community members:
 - Elderly persons,
 - Persons with disabilities,
 - Low-income residents
- Local vendors and service providers who depend on the centre's daily activities

Secondary Stakeholders (Indirectly Affected or Supportive)

- Niger State Ministry of Environment
- Niger State Environmental Protection Agency (NISEPA)
- Borgu Local Government Authority
- Federal Ministry of Environment (FMEnv)
- Local NGOs and CBOs

- Security agencies operating in the area

Table 7.1: Summary of the Consultation Meetings

Item	Description
Date of consultation	October 2025
Locations	Fakun Community Meeting Area
Languages used	Hausa, Nupe, English
Introduction	Stakeholders were briefed on the objectives, benefits, and temporary impacts of the rehabilitation project. NAPTIN and community leaders emphasized collaboration and open communication throughout implementation.
Perception and expectations	Fakun residents expressed strong support for the project. They emphasized that improved training facilities would attract trainers, students, and job opportunities to the area.
Concerns raised	Noise during demolition/construction <ul style="list-style-type: none"> - Waste and dust management - Interaction between workers and students/youths - Traffic congestion from heavy vehicles - SEA/SH and safety concerns, especially for young women in the area - Employment opportunities for local people
How concerns were addressed	The project team clarified mitigation measures, local labour prioritization, environmental controls, GRM procedures, Codes of Conduct for workers, and the commitment to timely information-sharing.
Community commitments	<ul style="list-style-type: none"> - Support project security and monitoring - Cooperate in reporting grievances - Assist in controlling waste disposal practices - Provide cultural and local insights during implementation
Recommendations	<ul style="list-style-type: none"> - Maintain communication channels - Provide consistent updates during works - Ensure strict enforcement of workers' Codes of Conduct - Engage local labour where possible



CHAPTER EIGHT

SUMMARY AND RECOMMENDATIONS

The rehabilitation and upgrade of the NAPTIN Kainji Regional Training Centre have been assessed through the Environmental, Social, Health and Safety (ESHS) framework, including the ESMP component. Potential environmental and social impacts were identified through field inspections, consultations, and technical reviews. Appropriate mitigation and monitoring measures have been developed to address these impacts and ensure that project implementation remains safe, environmentally sound, and socially responsible.

Overall, the assessment shows that the project will not result in any major or irreversible impacts. The few temporary impacts expected during rehabilitation such as dust, noise, waste generation, and worker-community interaction can be effectively managed through the mitigation measures presented in this document.

The project offers clear long-term benefits, including improved training infrastructure, enhanced safety conditions, opportunities for local employment, and strengthened technical capacity for the national power sector. The host community, Fakun Community in New Bussa, is expected to benefit socially and economically from project activities.

Recommendations

- Community members should be adequately informed about project activities and timelines through continuous sensitization.
- Rehabilitation works should be implemented in an environmentally sustainable and socially inclusive manner.
- All mitigation and monitoring measures in the ESMP should be strictly adhered to by the Contractor and PIU.
- Institutional roles and responsibilities outlined in this ESHS document should be followed to ensure effective oversight.
- The long-term social, economic, and institutional benefits far outweigh the temporary impacts associated with project construction.

The project is therefore considered environmentally and socially acceptable for implementation.

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ANNEX ONE

SAMPLE COMPANY CODE OF CONDUCT

Prevention of Gender-Based Violence (GBV), Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH), and Violence Against Children (VAC)

1. Introduction and Statement of Commitment

This Company Code of Conduct (CoC) forms an integral part of the Environmental, Social, Health and Safety (ESHS) requirements for the Rehabilitation and Upgrade of the NAPTIN Kainji Regional Training Centre.

The Company is firmly committed to creating and maintaining a work and community environment in which Gender-Based Violence (GBV), Sexual Exploitation and Abuse (SEA), Sexual Harassment (SH), and Violence Against Children (VAC) are strictly prohibited and will not be tolerated under any circumstances.

This Code establishes the minimum standards of behaviour, responsibilities, and accountability mechanisms applicable to all persons engaged in the Project, with the objective of preventing harm, protecting vulnerable persons, and ensuring compliance with national laws and international good practice.

2. Scope of Application

This Code of Conduct applies to, without exception:

- All employees of the Company;
- All contractors, subcontractors, consultants, suppliers, and service providers;
- All temporary workers, casual labourers, and volunteers;
- All project locations, including worksites, offices, storage areas, worker accommodation (if any), and surrounding host communities;
- All interactions with trainees, staff of NAPTIN, community members, and other stakeholders; and
- All conduct related to the Project, whether occurring during or outside official working hours.

3. Definitions

- Gender-Based Violence (GBV): Any harmful act directed at an individual based on gender, including physical, sexual, psychological, or economic harm.
- Sexual Exploitation and Abuse (SEA): Any actual or attempted abuse of a position of vulnerability, power, or trust for sexual purposes.

- Sexual Harassment (SH): Any unwelcome sexual advance, request for sexual favour, or other verbal or physical conduct of a sexual nature.
- Violence Against Children (VAC): All forms of physical, emotional, or sexual abuse, neglect, or exploitation of persons under the age of 18.
- Child: Any person under the age of 18 years.

4. Core Principles and Standards of Behaviour

All persons covered by this Code commit to the following principles:

4.1 Respect, Dignity, and Non-Discrimination

All individuals shall be treated with respect and dignity, regardless of:

- Gender, age, marital status;
- Race, ethnicity, language, religion;
- National or social origin;
- Disability, health status, or any other personal characteristic.

Any act of GBV, SEA/SH, or VAC constitutes a violation of this principle.

4.2 Prohibited Conduct

The following behaviours are strictly prohibited at all times:

- Demeaning, threatening, abusive, humiliating, intimidating, or harassing language or actions;
- Sexually suggestive comments, gestures, jokes, or behaviour;
- Unwanted physical contact or invasion of personal space;
- Use of authority, influence, or power to exploit or intimidate others;
- Any culturally inappropriate behaviour towards community members or trainees.

4.3 Zero Tolerance for GBV, SEA/SH, and VAC

The Company adopts a zero-tolerance policy toward all forms of GBV, SEA/SH, and VAC.

- Such acts constitute gross misconduct and are grounds for disciplinary action, including suspension, termination of employment or contract, and removal from the Project.
- This applies regardless of whether the conduct occurs:
 - On the project site;
 - In project offices or facilities;
 - In surrounding communities; or
 - In private locations where the conduct is linked to project activities.

5. Protection of Children

- Sexual contact or sexual activity with any person under the age of 18 is strictly prohibited, including through digital or electronic means.
- Mistaken belief regarding the age of a child is not a defence.
- Consent by a child is not a defence, regardless of national age-of-consent laws.
- Grooming, attempted grooming, or any behaviour intended to facilitate sexual abuse of a child is prohibited.

6. Sexual Exploitation and Abuse

- Sexual favours in exchange for money, employment, grades, services, training opportunities, protection, or any form of benefit are strictly prohibited.
- Any sexual relationship between project personnel and community members that involves unequal power dynamics or perceived obligation is prohibited.
- Such acts are considered non-consensual under this Code.

Definition of Consent

Consent is defined as a freely given, informed, and voluntary agreement. Consent cannot be obtained through force, threats, deception, coercion, abuse of power, or manipulation. Children under 18 cannot give consent.

7. Reporting Obligations

7.1 Reporting by Workers and Stakeholders

- All project personnel are strongly encouraged to report suspected or actual incidents of GBV, SEA/SH, or VAC.
- Reports shall be made through the Project Grievance Redress Mechanism (GRM) or other designated confidential reporting channels.

7.2 Mandatory Reporting by Supervisors

- Managers and supervisors have a mandatory duty to report any suspected or actual incidents.
- Failure to report constitutes a breach of this Code.

8. Survivor-Centred Response

The Company commits to a survivor-centred approach, ensuring that:

- Survivors' safety, dignity, confidentiality, and choices are prioritised;

- Survivors are referred promptly to appropriate medical, psychosocial, and legal support services;
- Information is shared strictly on a need-to-know basis;
- The GRM does not investigate or adjudicate GBV cases, but monitors response actions and compliance with this Code.

All actions shall comply with applicable Nigerian laws, including mandatory reporting requirements for cases involving children.

9. Institutional Arrangements and Implementation Measures

To ensure effective implementation of this Code, the Company shall:

1. Require all managers to sign a Manager’s Code of Conduct;
2. Require all project personnel to sign an Individual Code of Conduct;
3. Display Codes of Conduct prominently at worksites, offices, and common areas;
4. Translate Codes into languages understood by the workforce;
5. Appoint a GBV/SEA/SH Focal Person for the Project;
6. Participate in any GBV/SEA/SH coordination mechanisms required by the Client;
7. Develop and implement a GBV/SEA/SH Action Plan, including:
 - Reporting procedures via the GRM;
 - Confidentiality and accountability measures; and
 - Response protocols for survivors and alleged perpetrators.

10. Training and Awareness

- All personnel shall receive mandatory induction training on this Code before commencing work.
- Regular refresher and toolbox trainings shall be conducted throughout project implementation.
- Training records shall be maintained as part of ESHS documentation.

11. Acknowledgement and Acceptance

I hereby acknowledge that I have read and understood this Company Code of Conduct on Preventing Gender-Based Violence, Sexual Exploitation and Abuse/Sexual Harassment, and Violence Against Children.

I understand my responsibilities and agree to comply fully with the standards contained herein. I acknowledge that failure to comply may result in disciplinary action and/or legal consequences.

ANNEX TWO

WASTE MANAGEMENT PLAN (WMP)

1. INTRODUCTION

This Waste Management Plan (WMP) has been prepared as an integral component of the Environmental, Social, Health and Safety (ESHS) documentation for the Rehabilitation and Upgrade of the National Power Training Institute of Nigeria (NAPTIN), Kainji Regional Training Centre.

The rehabilitation and upgrade works will generate various categories of solid and liquid wastes during site preparation, construction, rehabilitation, equipment installation, and ancillary activities. If not properly managed, these wastes could result in adverse environmental, health, and safety impacts, including soil and water contamination, air pollution, public health risks, and occupational hazards.

This WMP provides a systematic, practical, and enforceable framework for the identification, segregation, handling, storage, transportation, treatment, and final disposal of wastes generated during project implementation. It is designed to ensure compliance with applicable Nigerian environmental regulations and alignment with international good practice, including World Bank Group Environmental, Health and Safety (EHS) Guidelines.

2. OBJECTIVES OF THE WASTE MANAGEMENT PLAN

The objectives of this Waste Management Plan are to:

- Identify the types and sources of waste expected to be generated during the rehabilitation and upgrade works;
- Establish procedures for safe and environmentally sound waste handling, from generation to final disposal;
- Prevent contamination of land, surface water, groundwater, and air;
- Protect the health and safety of workers, trainees, and surrounding communities;
- Promote waste minimization, reuse, and recycling where practicable;
- Ensure compliance with national environmental laws and institutional requirements; and
- Define clear roles, responsibilities, and monitoring arrangements for waste management.

3. REGULATORY AND INSTITUTIONAL CONTEXT

Waste management activities under this project shall comply with the following, as applicable:

- Federal Ministry of Environment (FMEEnv) guidelines and regulations;
- Niger State Environmental Protection Agency (NISEPA) requirements;
- National Environmental Standards and Regulations Enforcement Agency (NESREA) regulations;
- Relevant local government waste management provisions; and

- World Bank Group Environmental, Health and Safety (EHS) Guidelines.

All waste disposal shall be carried out only at government-approved and licensed waste management facilities.

4. FUNDAMENTAL PRINCIPLES OF WASTE MANAGEMENT

To ensure practical and effective handling of both solid and liquid wastes, the project shall adhere to the following fundamental waste management principles:

1. **Waste Identification and Classification:** All wastes generated shall be identified and classified according to type, source, and potential hazard.
2. **Waste Minimization:** Waste generation shall be minimized through efficient material use, proper storage, and good housekeeping practices.
3. **Segregation at Source:** Waste streams shall be segregated at source to prevent cross-contamination and facilitate appropriate treatment or disposal.
4. **Safe Storage and Handling:** Wastes shall be stored in suitable, labelled, and covered containers to prevent leakage, spillage, or exposure.
5. **Controlled Transportation:** Waste transportation shall be carried out using appropriate vehicles and licensed handlers.
6. **Authorized Disposal:** Disposal shall only occur at approved facilities and designated areas.
7. **Environmental Protection:** Waste management activities shall prevent pollution of soil, water, and air.

5. GENERAL WASTE MANAGEMENT MEASURES

The following general waste management measures shall apply throughout the project lifecycle:

- Sensitization and training of all workers and contractors on waste management requirements;
- Awareness creation on the environmental and health consequences of improper waste handling;
- Provision of adequate waste collection bins at strategic locations across the site;
- Use of plastic liners and covered bins to prevent odour, littering, and pest infestation;
- Daily housekeeping and site clean-up procedures;
- Prohibition of indiscriminate dumping or burning of waste;
- Immediate clean-up of any accidental spills or waste dispersion.

6. WASTE TYPES AND MANAGEMENT MEASURES

6.1 General (Domestic and Construction) Waste

General waste includes food waste, packaging materials, paper, plastics, scrap materials, rubble, and construction debris.

Management Measures:

- Adequate garbage bins shall be provided at offices, workshops, and worker areas;
- Food waste shall be collected separately and disposed of regularly to avoid odour and vermin;
- Construction debris shall be collected and stored at designated temporary holding areas;
- Solid wastes shall not be disposed of in drains, watercourses, or open land;
- All general waste shall be transported to approved waste disposal facilities.

6.2 Oil and Hydrocarbon Waste

Oil waste includes used engine oil, lubricants, grease, oily rags, and filters generated from equipment maintenance.

Management Measures:

- All maintenance activities shall be conducted in designated and demarcated maintenance areas;
- Maintenance areas shall be located at least 15 metres from rivers, streams, lakes, or wetlands;
- Used oils shall be collected in labelled, leak-proof containers;
- Oil-contaminated materials shall be stored separately;
- Used oil shall be transferred to licensed recyclers or disposal facilities;
- Dumping of oil on land or into water bodies is strictly prohibited.

6.3 Wastewater and Liquid Waste

Wastewater may arise from equipment washing, concrete works, and domestic activities.

Management Measures:

- Wastewater shall be managed to prevent contamination of soil and water;
- Sediments and sludge shall be removed and disposed of appropriately;
- Untreated wastewater shall not be discharged into the environment;
- Temporary drainage controls shall be installed where necessary.

6.4 Vegetative Waste

Vegetative waste includes cleared vegetation, tree cuttings, grass, and organic debris.

Management Measures:

- Vegetation clearing shall be limited strictly to approved areas;

- Clearing shall be carried out in accordance with environmental standards to minimize ecosystem disturbance;
- Vegetative waste shall be reused (e.g., mulching) where feasible;
- Disposal shall be at approved locations;
- Open burning of vegetative waste shall not be allowed without regulatory approval.

7. SITE MANAGEMENT AND EROSION CONTROL

To minimize indirect impacts associated with waste and site disturbance:

- Erosion control barriers shall be installed around excavations and disposal areas;
- Access routes shall be clearly demarcated and enforced;
- Water spraying shall be used to control dust on exposed surfaces;
- Drainage systems shall be maintained to prevent sediment transport.

8. ROLES AND RESPONSIBILITIES

- **Contractor:** Primary responsibility for implementing this WMP and ensuring compliance.
- **Project ESHS Team:** Oversight, monitoring, inspections, and enforcement.
- **NAPTIN Management:** Institutional oversight and coordination.
- **Workers:** Compliance with waste segregation and disposal instructions.

9. MONITORING AND REPORTING

- Routine inspections shall be conducted to assess waste management performance;
- Non-compliance shall be documented and corrective actions enforced;
- Waste management performance shall be included in ESHS reports.

10. EMERGENCY RESPONSE

- Spill response procedures shall be established for oil or hazardous waste spills;
- Spill kits shall be available at maintenance areas;
- All spills shall be reported and cleaned up immediately.

ANNEX THREE

ANNEX 3 - ENVIRONMENTAL, SOCIAL, HEALTH AND SAFETY MANAGEMENT OF THE WORKSITE

1 ESHS SPECIFICATIONS

1.1 Essential ESHS issues of worksite management

The ESHS topics to be included in Environmental and Social Impact Assessment study of the project, which present a major risk for the worksite's management are specified in the following table.

<i>Topic</i>	<i>To be included (YES/NO)</i>
a) ESHS resources and facilities and ESHS monitoring organization	YES
b) Project Areas management (site offices, , storage areas, sanitary facilities)	YES
c) Health & Safety on worksites/Traffic safety	YES
d) Local recruitment and ESHS trainings of local staff (capacity building), ESHS trainings of Subcontractors and local partners (transfer of knowledge)	No
e) Traffic management	No.
f) Hazardous products	No.
g) Wastewater (effluents)	No
h) Protection of water resources	No
i) Atmospheric emissions, noise and vibrations	No.
j) Waste management	YES
k) Biodiversity: protection of fauna and flora	NO
l) Site rehabilitation and revegetation	NO
m) Erosion and sedimentation	No
n) Control of infectious and communicable diseases (COVID-19, HIV/AIDS, malaria, etc.)	No.

1.2 ESHS requirements not applicable under this Contract

The ESHS norms, standards and discharge limit values recommended by the specialised international organisations affiliated to the United Nations shall apply to the Contract:

Yes / No **X**

[In the case of a project rated B¹ by AFD, check "No". Only the country's regulations are applicable.

The following Clauses of the ESHS Specifications shall not apply to this Contract and shall not be priced by the Bidder under the specific ESHS Cost Schedule.

<i>Non-Applicable Clause</i>	<i>Description</i>
Norms, standards, and discharge limit values recommended by the specialised international organisations affiliated to the United Nations, as described in ESHS Specifications	In any case, the Contractor shall be required to comply with applicable norms, standards, and discharge limit values according to the regulations of the country where the work is performed
Health care centre and medical personnel Emergency medical evacuations Access health care	The Contractor will be required to obtain an agreement with a nearby hospital to evacuate and treat staff in case of an accident. Qualified First Aiders and first aid equipment shall still be made available on site

1.3 General

Throughout the present ESHS Specifications (hereinafter called "the ESHS Specifications"), a reference to Conditions of Contract, abbreviated by CC, means a reference to both the General Conditions of Contract and the Particular Conditions of Contract. Readers should apply due care, when being referred to a specific Clause to:

- Read first the Clause text from the General Conditions of Contract.
- Then check whether this text has been amended by the Particular Conditions of Contract, and if so, to which extent.

As per CC – Priority of Documents, when interpreting the Contract, the terms of the Particular Conditions of Contract prevail over those found in the General Conditions of Contract.

Any term in these ESHS Specifications which is identical to a term in the Conditions of Contract shall have the same meaning as the one defined in the Conditions of Contract.

Any term in capital letters in these ESHS Specifications is defined in CC – Definitions.

1.4 Responsibilities and Liabilities

In conjunction with his/her obligations defined under the Contract, **the Contractor will plan, execute and document construction works pursuant to the Environment, Social, Health and Safety (ESHS) Specifications.**

The Contractor is liable for all damages to natural resources caused by the execution of the Works, or the methods used for execution, unless it is established that the execution or methods were necessary, according to the provisions of the Contract or Engineer's instruction.

Under the Contract and as introduced by the ESHS Specifications, the term "Project Area" means:

- The land where work will be carried out; or
- The land necessary for the implantation of construction facilities (work camp, workshops, offices, storage areas, concrete production plants) and including special access roads; or
- Quarries for aggregates, rock material and riprap; or
- Borrow areas for sand and other selected material; or
- Stockpiling areas for backfill material or other demolition rubble; or
- Any other location specifically designated in the Contract as a Project Area
- The term "Project Area" encompasses any individual Project Area or all Project Areas

- For the sake of clarity, Project Area is a different concept than Site
- Project Area defines an area within which the Contractor is to comply with environmental, social, health and safety obligations defined in the ESHS Specifications
- Site is the places where the Permanent Works are to be executed and to which Works and materials are to be delivered, and where right of access to, and possession of, is to be given by the Employer to the Contractor. The Employer is under no similar obligation for any area located outside the Site, even if within the Project Area, where access is at Contractor's risk
- In term of physical footprint, the Site is included in the Project Area. The Project Area is then of greater geographical extent than the Site.

The ESHS Specifications refer to the entire area of influence for the Works:

- Protection of the natural environment (water, air, soil, vegetation, biological diversity) in areas within any Project Area and its surroundings, i.e., including but not limited to access roads, quarries, borrow areas, stockpiling of backfill material, camps, or storage areas
- Health and safety conditions to be maintained for the Contractor's personnel and any other person present on the Project Areas, or along access routes
- Working practices and the protection of people and populations living near the Project Area but exposed to the general disturbance caused by works.

Subcontractors:

- The ESHS Specifications apply to the Contractor and unless explicitly agreed with the Engineer, all Subcontractors used for the execution of the Works. Pursuant to the CC, the Contractor is fully liable for all actions, non-compliance and negligence by Subcontractors, their representatives, employees, and workers, to the same degree as it would be held liable for its own actions, non-compliance or negligence or that of its own representatives, employees or workers.

Applicable regulations:

- The Contractor must identify all regulations in relation to the protection of the environment (water, air, soils, noise, vegetation, fauna, flora, waste, groundwater) and, pursuant to Clauses 4 and 6 of the CC, the protection of people (labour law, indigenous populations, standards on occupational exposure, other). The Contractor must list all texts, standards, and other regulatory limitations in its Worksite Environmental and Social Management Plan (Worksite - ESMP as specified in the ESHS Specifications) and specify the means taken for compliance.

1.5 ESHS Planning Document

The Contractor prepares, implement, and regularly update the *Worksite Area Environmental and Social Management Plan* (Worksite ESMP).

The Worksite - ESMP represents the unique reference document in which the Contractor defines in detail all organisational and technical provisions implemented to satisfy the obligations of the ESHS Specifications.

The Contractor defines in the Worksite ESMP the number, the locations and the type of Project Area as defined in the ESHS Specifications. For each of the identified Project Area, unless otherwise agreed by the Employer, the Contractor establishes an Environmental Protection Plan (EPP). The EPP(s) are annexed to the Worksite ESMP.

The Worksite - ESMP covers the entire period from the Contract Agreement signature date to the date of issue of the Contract Completion Certificate by the Representative.

Unless agreed otherwise by the Engineer, the Worksite - ESMP is written in the language of communication defined under the CC.

The first draft version of the Worksite ESMP is to be provided by the Contractor to the Representative within 28 days from the date of execution of the Contract Agreement.

No physical work or activity shall commence on any Project Area until such time the Worksite ESMP, and the annexed EPP corresponding to the Project Area, are approved by the Engineer.

During the execution of the Works, whenever instructed by the Engineer, the Worksite ESMP will be updated by the Contractor and reissued to the Engineer. The revised version shall highlight the new elements incorporated in the document.

The Worksite ESMP (and the EPP) is structured according to the plan specified in Appendix 1 of this Annex.

1.6 Management of non-conformities

Non-conformities detected during inspections carried out by the Contractor or Engineer are subject to a process adapted to the severity of the situation. The non-conformities will be defined as Deviations from the requirements of the applicable regulations, the ESHS Specifications, and the Worksite ESMP. Non-conformities are divided into 4 categories as follows:

- Notification of observation of minor non-conformities. The non-conformity results in a notification to the Contractor, followed-up by a signed notification of observation prepared by the Engineer. The multiplication of notifications of observation at the Project Area, or absence of corrective actions by the Contractor, can result in the severity of the non-conformity being raised to that of level 1.
- Level 1 non-conformity: Non-conformities that present a moderate and non-immediate risk for health, environment, social or safety. The non-conformity is identified in writing to the Contractor and shall be resolved within five (5) days. The Contractor addresses to the Engineer the proof explaining how the non-conformity has been corrected. Further to an inspection and a favourable evaluation of effectiveness of the corrective action, the Engineer validates in writing the close-out report for the non-conformity. In all cases where a non-conformity of level 1 is not resolved within one (1) month, the severity of the non-conformity is raised to level 2.
- Level 2 non-conformities: applies to all non-conformities that represent a moderate and immediate risk or with significant consequences to health and/or the environment, social or safety. The same procedure as for level 1 non-conformities is applied. Corrective action shall be taken by the Contractor within three (3) days. All level 2 non-conformities which are not resolved within one (1) month, are raised to level 3.
- Level 3 non-conformities: applies to all non-conformities that have resulted in damage to health or the environment, or which represent a high risk for health, safety, environmental or social hazards. The highest levels of the Contractor's and Engineer's hierarchies present in the Employer's country are informed immediately and the Contractor has twenty-four (24) hours to bring the situation under control. Pursuant to Clause 14.7 of the CC, a level 3 non-conformity results in the suspension of interim payments until the non-conformity has been resolved. If the situation requires, and in pursuance to Clause 9.7 of the CC, the Engineer can order the suspension of work until the resolution of the non-conformity.

1.7 Resources allocated to environmental & health management

ESHS supervisors and Manager:

- The Contractor appoints one Environment, Social, Health and Safety manager(s) in charge of implementing the ESHS Specifications. Several experts may be assigned to fulfil this position. The manager(s) will be the Key ESHS Personnel identified in the bidding process, if any.
- The ESHS Manager is permanently based at the Project Area for the full duration of the works as of Contractor's mobilisation until Taking-Over Certificate is issued.
- This manager holds the power within the Contractor's organisation to be able to suspend the works if considered necessary in the event of level 2 or 3 non-conformities, and allocate all resources, personnel and equipment required to take any corrective action considered necessary.
- The ESHS Manager speaks fluently the language of communication of the Contract, and the official language of the Employer's country, if the language of communication of the Contract is not the official language. The ESHS Manager will hold a relevant University degree or a significant

experience of at least five (5) years in designing and monitoring the implementation of an environmental and social management plan for construction works.

- ESHS supervisors are appointed in sufficient numbers and represent the ESHS Manager within work teams. Their role is to ensure that the works are carried out pursuant to the ESHS Specifications and notify the ESHS Manager of any detected non-conformities.

1.8 Inspections

In addition to the ESHS Manager's own inspections, an ESHS inspection will be carried out on the facilities and Project Area on a weekly basis jointly with the Engineer.

A written report will be drafted for each weekly inspection, in a format approved by the Engineer, addressing non-conformities detected on the Project Area as specified in the ESHS Specifications.

Each non-conformity will be documented by a digital photograph with captions to provide a visual illustration, explicitly indicating the location, date of inspection and the non-conformity in question.

1.9 Reporting

As part of the Progress Report the Contractor submits an ESHS activity report summarising all ESHS initiatives implemented in relation to the execution of the Works during the reporting period to the Engineer monthly. The activity report is a separate document from the update of the Worksite - ESMP, which is updated at the intervals indicated in the ESHS Specifications.

The ESHS activity report is written exclusively in English.

The ESHS activity report is submitted at the latest 7 working days after the last day of the month in question. The report contains the following information.

List of ESHS personnel present at the Site at the end of the month.

Construction works activities conducted during the month.

Inspections carried out (location and intervals).

Non-conformities detected during the month with descriptions of the root cause analysis and corrective actions taken.

Description of actions conducted, and measures taken during the month to remedy non-conformities and to manage environmental, social, health and safety risks and impacts.

Description of stakeholder engagement activities undertaken with neighbouring populations, local authorities, governmental agencies.

Monitoring results for the following indicators:

- Effluent quality, if applicable
- Drinking-water quality, if applicable
- Hazardous and non-hazardous waste generation
- Air and noise emissions, if applicable
- Project Area location
- Recruitment, number of positions and hours worked by local Contractor's Personnel
- Health & safety statistics: number of fatal accidents, lost-time accidents, number of accidents without lost-time, serious illness, frequency of accidents, and serious misconduct by Contractor's Personnel (record sheet attached as an appendix to the activity report, the ESHS Specifications); including root cause analysis and corrective actions taken.
- Where appropriate, description of the formal or informal complaints (negative media attention, strikes or labour disputes, protests, complaints from communities, NGO or workers or formal notice

from authorities...) related to environmental, social, health and safety risks and impacts of the works, including root cause analysis and corrective actions taken.

- Report on training activities (topic, number and duration of sessions, number of participants).
- Provisional environmental, social, health and safety actions for the coming months.

Notification of ESHS events:

- The Engineer is informed within one hour of any accident (i) involving serious bodily injury to a member of personnel, a visitor or any other third party, caused by the execution of the Works or the behaviour of the personnel of the Contractor, or (ii) any significant damage to private property, or (iii) any significant damage to the environment.
- The Engineer is informed as soon as possible of any near accident relating to the execution of the Works which, in slightly different conditions, could have led to bodily injury to people, or damage to private property or the environment.

1.10 Rules of Procedure

Rules of procedure are established by the Contractor for the Project Areas, addressing the following: safety rules, zero tolerance for substance abuse, environmental sensitivity of areas around the Project Areas, the dangers of COVID-19, STDs with HIV/AIDS, gender issues (in particular sexual harassment) and respect for the beliefs and customs of the populations and community relations in general.

The rules are clearly displayed at the different Project Areas.

The rules confirm the Contractor's commitment to implementing the ESHS provisions provided for in the Contract.

New Contractor's Personnel and existing Contractor's Personnel are made aware and acknowledge their understanding of the rules of procedure and the associated provisions with an initial induction and repetitive inductions on isolated core rules in form of toolbox talks, all properly documented and countersigned by the staff. Rules of procedure document are initialled by all Contractor's Personnel prior to the start of any physical work at any Project Area.

For hazardous works a work permit system with previous risk assessment is expected to be implemented and documented.

The rules of procedure include a list of acts considered as serious misconduct and which must result in dismissal from any Project Area by the Contractor, or by the Engineer if the Contractor is not acting in due course, should a Contractor's Personnel repeatedly commit an offence of serious misconduct despite awareness of the rules of procedure, and this is without prejudice to any legal action by any public authority for non-compliance with applicable regulations:

- Drunkenness during working hours
- Drug misuse
- Punishable statements or attitudes, and sexual and mental harassment in particular
- Violent behaviour
- Intentional damage to the assets and interests of others, or the environment
- Repeated negligence or imprudence leading to damage or prejudice to the environment, the population or properties, particularly breaching provisions intended to prevent the spreading of COVID-19
- Possession and/or consumption of meat or any other part of an endangered animal or plant as defined in the Washington convention (CITES) and national regulations
- Serious misconduct, physical aggression, drug trafficking, deliberate and severe pollution, trading and/or trafficking in all or part of protected species, shall lead to immediate dismissal as of the first report of misconduct is detected, in application of the rules of procedure and labour laws.

The Contractor establishes a record for each case of serious misconduct, and a copy will be provided to the Contractor's Personnel in question, indicating all action taken to terminate the misconduct by the

Contractor's Personnel in question and to bring the attention of other Contractor's Personnel to the type of incident detected. This record will be provided to the Engineer as an attachment to the ESHS activity report.

1.11 ESHS Training

The Contractor prepares a training and capacity building programme for its Contractor's Personnel, as described in the Worksite - ESMP and documented each month in the ESHS activity report.

The Contractor also details in the training programme the actions and ESHS training for Subcontractors and other members of the joint venture when applicable.

Training sessions are two-fold: introductory sessions for starting work at the Project Area, and technical training as required in relation to the execution of the Works.

Starting work sessions are organised for each Contractor's Personnel and shall cover as a minimum:

- Rules of procedure
- Safety rules on Project Areas
- Protection of areas adjacent to Project Area
- Risks relating to diseases
- Basic health: combating COVID-19, malaria (if prevalent) and waterborne diseases, improving hygiene
- Emergency response procedures or evacuation.

Technical training:

- Training in the skills needed for tasks requiring a work permit
- Training in first aid and transporting the injured in order to achieve the targets defined in the ESHS Specifications on the number of first aid officers per Project Area and per team
- Ability to drive on rough ground.

1.12 Standards

The Contractor complies with all norms, standards and discharge limit values defined in the national regulations of the Employer's requirements & regulations and pursuant to the ESHS Specifications.

The Contractor complies with norms, standards and discharge limit values recommended by the specialised international organisations affiliated to the United Nations, as described in the ESHS Specifications. In the event of discrepancies in between international standards and national regulations, the Contractor shall comply with the most stringent requirements.

The specialised international organisations affiliated to the United Nations referred to in the ESHS Specifications include:

- World Bank, including the IFC and its Environmental, Health and Safety guidelines available from <http://www.ifc.org/ehsguidelines>.

For matters not addressed in the IFC above document, the most stringent of the norms, standards and discharge limit values of the following institutions shall apply:

- World Health Organization (WHO)
- International Labour Organization (ILO).

2 PROTECTION OF THE ENVIRONMENT

2.1 Protection of adjacent areas

Unless instructed otherwise by the Engineer, the Contractor uses construction methods and means of protection to avoid or minimize adverse effects that are incurred on vegetation, soils, groundwater and

surface water, biodiversity, natural drainage and the water quality in areas within any Project Area and its surroundings for the entire duration of the Works.

Wetland areas include marshes, fens, mires or natural or artificial bodies of water, whether permanent or temporary, where water is stagnant or flowing, fresh, saline or briny, including seawater with a low-tide depth of six metres or less. Filling of all or part of a wetland area is not permitted unless the Works are necessary according to the provisions of the Contract or the instructions of the Engineer.

Except for access roads, or unless instructed otherwise by the Engineer, the entire perimeter of land sites with a surface area of less than 2 hectares is physically demarcated with a fence or tape. For Project Area with a surface area of more than 5 hectares, the perimeter will be physically demarcated by a perimeter track, road, signs, or any other means leaving no possible ambiguity as to the location of the Project Area perimeter.

Unless instructed otherwise by the Engineer, the Contractor defines the perimeter of the Project Area at a distance of at least:

- 50 m from any permanent water course and outside of floodable areas
- 300 m from sensitive urban services and buildings (health centre, school centres, water supply for populations)
- 200 m from any housing and
- 300 m from housing in the specific case of work requiring the use of explosives.

If the footprint of the Works does not respect the distances mentioned and unless agreed upon otherwise by the Engineer, the Contractor will contract a bailiff to make a sworn statement regarding the existence and conditions of residential buildings situated around the Site with a distance specified in the ESHS Specifications. The authority's sworn statement is prepared and provided to the Engineer with the EPP.

2.2 Selection of borrow areas, backfill material stockpile sites and access road

The Contractor will submit to the Engineer for prior approval, within the framework of the EPP, (i) the location of proposed borrow areas or areas to be excavated, or (ii) proposed backfill material stockpile locations or zones designated for the rubble from demolition Works. The access routes to the Project Areas will be shown on a map and approved by the Engineer prior to the start of the corresponding Works.

2.3 Effluents

Effluents consist of liquid discharges, including infiltration, from Project Area, transporting a pollutant (dissolved, colloidal or particles).

A pollutant is a given chemical compound that is at a concentration that is greater than the limit values recognised for that compound according to the ESHS Specifications.

If no recognised threshold exists pursuant to the ESHS Specifications, the Contractor provides proof that the charges are harmless.

No effluent is discharged by the Contractor into water courses, soils, lakes, or the marine environment without prior treatment and without monitoring of the treatment's performance to guarantee the absence of pollution.

The Contractor carries out or contracts the monitoring of the effluent quality pursuant to the ESHS Specifications. In the first case, the Contractor provides the ESHS Manager with the means and skills to carry out in-situ monitoring and laboratory analysis of the performance indicators. In the second case, the Contractor establishes a contract with a specialised contractor, accredited with the Employer's country authorities for this activity.

The physical and chemical parameters of the effluent that are monitored are those that are listed in the applicable regulations according to the provisions of the ESHS Specifications. The parameters have prior approval from the Engineer.

The Contractor will list, locate, and characterise (flow, expected quality, discharge frequency) all sources of effluents and outlets in the natural environment in the Environment Protection Plan(s).

The Contractor will submit to the Engineer an effluent monitoring report monthly, including documentation for the following for each effluent discharge point: (i) average flow rates of discharged effluents, (ii) discharge frequencies and durations over the month, and (iii) the physical and chemical quality of the effluent discharged, for the conformity parameters listed in the ESHS Specifications.

The special case of rainwater run-off:

- Run off consists of the rainwater flow on the surface or the soil and other technical surfaces at Project Areas.
- In the context of the Contract, run-off is considered as an effluent and will be treated in accordance with above, unless demonstrated otherwise, as documented and substantiated by the Contractor, and approved by the Engineer.
- Particular attention will be given to all platforms with installed generators, hydrocarbon storage tanks, refuelling stations, and concrete plants (cover, containment, settling, pH neutralization).

2.4 Atmospheric emissions and dust

Emissions refer to any discharge into the air of solid substances, aerosols, gases, radiation, or energy, whether point sources (e.g., incineration stack) or diffuse (e.g., fugitive dust emissions from road use by trucks).

The Contractor will use equipment and adopt construction and transport methods with atmospheric emissions which are not more than the threshold emission values recommended in the applicable regulations according to ESHS Specifications.

The fleet of vehicles or equipment emitting combustion gases will be maintained at the intervals and according to the methods specified by the manufacturer.

The Contractor will document the maintenance records for its fleet of vehicles, machinery, and equipment. The records will be in the language of communication defined, or any other language approved by the Engineer, and will be at the disposal of the Engineer.

On unpaved roads used by the vehicles and machinery of the Contractor:

- takes action to abate fugitive dust emissions generated by vehicles or mobile equipment in residential areas and on roads within the Project Area perimeter.
- will implement the necessary measures, as described in the Worksite – ESMP, to avoid or limit dust generation: dust removal, regular watering, reduction of Contractor's vehicles speed as specified in the ESHS Specifications.

When storage, handling and transportation of bulk materials is made in the open air and exposed to the wind, the Contractor implements the necessary dust abatement measures, including one or several of the following techniques: vegetation of the surface, covering of the surface, humidification of the surface or covering the trucks.

2.5 Noise & vibration

The Contractor uses equipment and adopts construction and transport methods so not to generate noise levels more than values recommended in the applicable regulations according to the provisions of the ESHS Specifications.

Except as otherwise provided in the Contract or unless waived by the Engineer, high noise generating works (e.g., pile driving, blasting, rock clearing, drilling, percussion drilling) which may impact occupied receptor areas are carried out during normal working days but prohibited at night. A receptor area is defined as an area used for nocturnal socioeconomic activities (e.g., accommodation camps, residential areas, hotels, health centres).

The use of heavy vehicles at night is specified in the ESHS Specifications.

2.6 Waste

The Contractor is responsible for identifying, collecting, transporting, and treating all waste produced on the Project Areas by its personnel, Subcontractors, and visitors.

Waste management should be based on the following hierarchy: prevention of waste generations, reuse, recycling, and disposal. The Contractor selects suppliers having a voluntary and documented policy to reduce the volume and weight of packaging, and to select recyclable or biodegradable packaging.

The Contractor establishes and maintains a waste register which is at the disposal of the Engineer. This register will record all waste management operations: production, collection, transport, treatment. The following aspects are documented in this register:

- Type of waste, using the nomenclature specified in the ESHS Specifications
- Waste quantities
- Name and address of the third-party waste management facilities receiving waste or parties taking possession of the substances no longer considered as waste
- Name and address of waste transport contractors
- Planned waste treatment.

The Contractor files and maintains at the disposition of the Engineer the waste manifests for the collection, transport, treatment and/or elimination of waste.

The waste register is established and available as of the Contractors mobilisation to any Project Area. This register will be archived for at least 1 year after the Taking-Over Certificate for the Works is issued.

The Contractor implements specific waste management practices adapted to the level of danger for human health or the natural environment. Three waste categories are identified for Project Areas and in tracking documents:

- Hazardous waste: any waste with one or several dangerous properties as listed in Appendix 2
- Non-hazardous waste: any waste with no properties rendering it hazardous. Non-hazardous waste contaminated by hazardous material will be considered as hazardous waste, unless instructed otherwise by the Engineer
- Inert waste: any waste unaffected by any significant physical, chemical, or biological modifications, which does not decompose, burn or produce any physical or chemical reaction, is not biodegradable and does not damage any substance with which it comes into contact in a manner likely to cause damage to the environment or human health.

The Contractor assesses, document and effectively implements any local recycling or re-use options for its waste.

Waste is categorised and stored separately prior to removal from the Project Areas, depending on the level of danger, phase (liquid, solid or gas), the waste management solution to be applied and its potential in terms of recycling or reuse.

Waste is collected from each Project Area at the same rate that it is produced and is placed in temporary locations meeting the following criteria:

- Located at over 100 m from any natural sensitive area and over 500 m from any socioeconomic sensitive area (school, market, healthcare centre, water well or catchment area), with the exception of waste storage area in camps

- Protected from moving machinery and vehicles, but easy to access for regular collection
- Located on a flat impervious surface to prevent infiltrations
- Under cover for non-inert waste
- Stored in containers of the appropriate size, tightness and level of resistance depending on the danger and phase (solid, liquid, gas) of the waste
- Liquid wastes storage is equipped with secondary retention with a volume at least equal to the greater of the following two values: (i) 100% of the capacity of the largest reservoir and (ii) 50% of the overall capacity of the associated reservoirs
- Hazardous waste stored pursuant to the present ESHS Specifications.

Waste is removed from Project Areas and transported to recycling, treatment and waste management facilities on a regular basis. The frequency of removal, approved by the Engineer, guarantees:

- No overflow from containers
- No unpleasant odour or emissions which are dangerous for human health
- No proliferation of insects, rodents, dogs or other animals which are harmful or dangerous for human health
- Regular cleaning of containers and surfaces on which they are located.

Unless otherwise specified in the Contract or instructed by the Engineer, waste incineration is prohibited on Project Areas. Two exceptions are medical waste and green waste, which unless instructed to the contrary by the Engineer, are managed pursuant to the ESHS Specifications.

The use of third-party waste management services is subject to a documented prior audit of the treatment, storage, and recycling facilities by the Contractor, to guarantee the conformity with the provisions of the ESHS Specifications on waste.

Pursuant to the ESHS Specifications, the provisions applicable to the Contractor regarding waste management also apply to any third-party waste management Subcontractor. The Engineer reserves its right to inspect third party waste management facilities and prohibit the Contractor from using the facilities if considered unacceptable.

The management of non-hazardous waste complies with the following conditions:

- Inert waste is removed or treated on-site and can be disposed in a permanent or temporary landfill with unused backfill material
- The location, capacity, and environmental protection measures, particularly for water courses, implemented by the Contractor or any Subcontractor, will comply with the provisions of the ESHS Specifications, and will be described in the EPP and validated by the Engineer.

Non-hazardous waste that cannot be recycled is disposed of to landfill, complying with the following criteria:

- Walls and base sealed by a geo-membrane or a layer of compacted clay with a permeability 10^{-7} cm/s
- Drained for the recovery of leachates, which are routed to a lagoon aerobic/anaerobic treatment prior to discharge into the natural environment or collected in a temporary storage prior to regular collection and transfer to a treatment unit (septic tank or wastewater treatment plant)
- Regularly compacted and covered by earth to limit odours and the proliferation of insects
- When the landfill has reached full capacity, vents are installed to evacuate gases, and the landfill covered by a geo-membrane with a minimum thickness of 1 mm, or a layer of compacted clay, and a top layer of 1.5 m of topsoil, which is revegetated.

Any other proposal must first be validated by the Engineer.

The Contractor's hazardous waste is managed by a specialised waste Subcontractor, accredited in the Employer's country for this activity.

In the absence of an existing waste management solution for hazardous waste satisfying the provisions of the ESHS Specifications, the Contractor takes the following action:

- Medical waste is incinerated in a specific facility constructed and accredited for this purpose. The Contractor will submit the technical specifications of the facility to the Engineer before importing or procuring the equipment.
- Hydrocarbons, lubricants, paints, solvents and batteries are transported in drums to the capital city, or any other city where suitable waste management facilities are available. Sludge from settling tanks/ponds, septic tanks or oily water skimmers will also be managed in the same way.
- Contaminated soils from construction/demolition and drilling muds will be treated, stabilised, and disposed of to landfill. Prior approval is required from the Engineer regarding the method and site location. The Contractor obtains authorisation from the competent local authorities prior to any disposal to landfill.

Prior approval from the Engineer is required before implementing waste management solutions on any other hazardous waste.

Prior to the issue of the Taking-Over Certificate for the Works, the Contractor provides documentation on hazardous waste landfilled at other sites than accredited third party waste management facilities. The documentation includes a plan showing the location of landfill sites. The document is provided to the competent local authorities whose jurisdiction covers the landfill sites.

2.7 Vegetation clearing

The Contractor describes in the Worksite - ESMP the planned methods and schedule for vegetation clearing. Cutting of trees is strictly prohibited.

Vegetation clearing using chemicals is not permitted.

Vegetation clearing using bulldozer is not permitted in zones less than 30 m from areas designated as sensitive by the Engineer, where only manual clearing is authorised.

Unless otherwise specified in the Contract or if otherwise instructed by the Engineer, burning vegetation is not permitted. Green waste can be burnt with prior approval from the Engineer regarding the location, method, and schedule.

Areas cleared prior to undertaking earthworks are shown on a plan with a minimum scale of 1/10,000. Plans are submitted to the Engineer for validation prior to start clearing works.

The Contractor undertakes physical demarcation of zones to be cleared using a method approved by the Engineer.

Trees are not to be cut down and must be protected against clearing machinery using a method approved by the Engineer.

Clearing is undertaken without damage to adjacent non-cleared areas. Topsoil is stored within the cleared areas at the edge of the cleared zone. Clearing is undertaken working from the edge of the zone inwards.

2.8 Biodiversity

The Contractor shall ensure that all personnel are informed and aware of the importance to protect fauna and flora.

2.9 Erosion and sediment transport

The Contractor plans earthworks and optimises the management of space to ensure that all cleared surfaces and areas exposed to soil erosion are minimised on all Project Areas.

Topsoil:

- Unless indicated otherwise by the Engineer, the top 25 centimetres of the soil will be considered as topsoil

- Earthworks for the temporary occupation of the Project Area are preceded by the clearing of topsoil and the storage of this soil separately from the underlying sterile soil
- Topsoil is stored according to the provisions approved by the Engineer to enable reuse during Project Area rehabilitation
- The refurbishment must be done in accordance with the provisions described in the next Clause.

Draining and treatment of rainwater run-off:

- The gradient of Project Areas allows the collection and drainage of rainwater from the entire surface area to one or several discharge points. No pools of water are created
- Suspended solids in rainwater are removed using sediment traps / settling ponds. Rainwater from vehicle parking areas, machinery areas, workshops is subject to treatment with oily water separators
- Rainwater treatment units are sized, cleaned, maintained and accessible to ensure compliance with the effluent quality criteria defined in the ESHS Specifications and to allow monitoring of performance.

Sediment control:

- The Contractor installs sediment control barriers to slow the flow of water and control sediment transport at Project Areas with (i) a gradient of more than 20%, and (ii) where land is disturbed by the Works or where stockpiled mineral material are susceptible to erosion
- Sediment control barriers are installed on the slope or at the base of the slope to protect the natural drainage system from sediment accumulation at levels higher than the natural situation. These barriers comply with the following principles:
 - Made with geotextiles or straw bales or any other means pre-approved by the Engineer
 - Deployed before the start of works and removal of topsoil. Barriers can be used for the physical demarcation of working areas
 - Installed, cleaned, maintained, and replaced according to manufacturer recommendations
 - Drainage surface area does not exceed 1,000 m² per 30 m of barrier. The length of the slope behind the barrier is less than 30 m, and is not used for flows more than 30 l/s.

For the dredging of marine sediments, unless specified otherwise in the Contract, or instructed otherwise by the Engineer, and particularly if the working area is exposed to currents, the Contractor will install a geotextile silt curtain, or any other technique approved by the Engineer to control turbidity clouds.

Backfilling and stockpiling of backfill materials:

- In the EPP of these temporary and permanent stockpiles, the Contractor defines the proposed arrangements (height, slope, drainage, revegetation, etc.) to guarantee stability and erosion resistance
- For permanent backfill material stockpiles, the stockpile is shaped and compacted to ensure long-term stability
- Temporary stockpiles likely to result in strong erosion (duration of storage, rainy season, presence of downstream issues, etc.) are protected against runoff erosion by: (i) revegetation using fast growing grass species, either by direct seeding or by hydro-seeding, or (ii) using other natural anti-erosion cover with prior approval from the Engineer.

2.10 Site rehabilitation

Unless instructed otherwise by the Engineer, the Contractor will rehabilitate all Project Areas disturbed by the Works, prior to the Completion of the Works.

All buildings and free standing and underground structures (e.g., piping, underground tanks, sumps, and basins) are removed. All waste and rubble are removed in accordance to the provisions of the ESHS Specifications. After removal of buildings structures and rubble, the Contractor returns Project Areas to their original condition, according to the following provisions.

Land is adjusted to ensure that run-off water drains without eroding soil or stagnating in pools. Unless instructed otherwise by the Engineer, the gradients of restored sites (excluding backfill as defined in the ESHS Specifications) must be as for the adjacent undisturbed land.

Rehabilitated Project Areas do not represent hazards for people. Areas near steep drops at quarries are indicated with permanent concrete signs. Holes are refilled. Sharp or unstable items are rendered inoffensive.

Unless specified otherwise in the Contract, or instructed otherwise by the Engineer, the Contractor undertakes revegetation of all Project Areas disturbed by the works and bears the cost of such work.

Topsoil set aside during initial earthworks pursuant to the ESHS Specifications, is evenly spread over cleared areas. The surface of compacted soils on Project Areas is loosened by scouring (using rakes or other acceptable methods).

The Contractor describes in the Worksite - ESMP the planned revegetation works to ensure sustainable Project Area rehabilitation: methods, plant species to be used and their origins, activity schedule based on a progressive taking over of Project Areas.

Prior approval by the Engineer is required regarding the origin of seeds and plants proposed by the Contractor. The species used for revegetation must be suitable for the local environmental conditions, and selected according to the rehabilitation programme: stabilisation of backfill, landscaping, drainage, prevention of erosion, etc.

Revegetation is undertaken throughout the duration of construction Works and is not limited to the rehabilitation of Project Areas at Completion of the Works.

2.11 Documentation on the Project Area condition

The Contractor documents changes in condition of all Project Areas from the start of Works until the Contract Completion Certificate is issued. Documentation comprises dated and geo-referenced colour photographs taken from a constant angle and viewpoint.

It is recommended to consider the positioning of two webcams on top of the existing NAPTIN HQ office building, which is located at the highest point of the plot. Daily still shots shall be transferred to a hard disk storage and be accessible remotely. This will allow a detailed progress documentation at the end of the project.

The Project Area condition is documented as a minimum for the following stages:

- Before any Project Area disturbance at the start of Works
- On Completion of the Works, but prior to starting rehabilitation
- On completion of rehabilitation and revegetation, if necessary, but prior to the Taking-Over Certificate issuing.

The Contractor specifies in the Worksite – ESMP: (i) the list of viewpoints to be used, (ii) areas to be photographed, and (iii) methods used for taking and archiving photographs.

Adjacent areas (100 m from the perimeter of the Project Area) are included in photographic documentation.

Unless instructed otherwise by the Engineer, structures to be buried are photographed weekly until covered. As a minimum the structures are photographed twice for Works with duration of less than 7 days, and at least once a week for Works with a longer duration.

Photographs subject to the present Clause are archived in digital format and provided to the Engineer monthly under the CC - Progress Reports.

The nomenclature of electronic files for photographs explicitly indicates the Project Area, date and structure documented.

3 HEALTH & SAFETY

3.1 Health and safety plan

In application of Clauses 4 and 6 of the CC, the Contractor describes in the Health and Safety Plan section of the Worksite - ESMP its organisation for managing health and safety (section 7 of Worksite – ESMP as described in Appendix 1), pursuant to its Health and Safety Management System (HSMS) (the "Health and Safety Plan").

Pursuant to Clause 6 of the CC, the plan identifies and specifies:

- All health and safety risks relating to the execution of the Works, by also identifying gender-specific risks
- Prevention and protection measures to control risks related to the execution of the Works, by differentiating, where necessary, measures concerning the protection of women and men
- Human and material resources involved
- Works requiring work permits; and
- Emergency plans to be implemented in the case of an accident
- In addition, this Health and Safety Plan describes how workers are trained in health and safety aspects.

The Contractor implements prevention, protection, and monitoring measures, as described in the Health and Safety Plan.

3.2 Daily and weekly meetings

The Contractor organises as a minimum one health and safety meeting per week (or at another frequency approved by the Engineer) with all the personnel assigned to the Project. At the meeting accidents and incidents as well as Near misses that occurred in the previous week are discussed and feedback provided. Means of improvements are identified, documented, and assessed to establish corrective actions. The Engineer is invited to participate at all health and safety meetings. Meeting reports are provided to the Engineer.

The Contractor organises daily (or at another frequency approved by the Engineer) health and safety meetings per team, prior to the start of the daily work. The meeting establishes the health and safety risks associated with the day's tasks and activities and means of prevention and protection to be implemented. Minutes of the meetings shall be recorded.

3.3 Equipment and operating standards

The facilities and equipment used by the Contractor are installed, maintained, revised, inspected, and tested pursuant to the manufacturer's recommendations. The recommendations are available in English language.

The Contractor lists and describes in the Health and Safety Plan the national and international standards, guidelines, and industry codes of practice, applied during the execution of the Works.

3.4 Work permit

Unless otherwise provided in the Contract, or unless otherwise instructed by the Engineer, work requiring work permits are defined in the Health and Safety Plan. Work permits will be documented and saved.

The Contractor puts in place a work permit procedure to manage risks through the implementation of prevention and protection measures prior to the starting of work. This procedure is subject to validation by the Engineer.

3.5 Personal protective equipment

The Contractor ensures that all personnel, visitors or third parties entering a Project Area are equipped with Personal Protection Equipment (PPE) pursuant to the practices and standards here specified.

The Contractor describes in the Health and Safety Plan the PPE to be used per Project Area and per activity.

Personnel and visitors to Project Areas are equipped with a safety helmet, safety shoes and a reflective jacket as a minimum.

Adequate quantities of PPE are available on the Project Areas. Storage conditions must be compatible with usage pursuant to the provisions of the ESHS Specifications.

Contractor personnel are trained in how to use and care for PPE and the Engineer must be able to obtain the training reports.

3.6 Dangerous substances

A substance is considered dangerous if one or several of its properties render it dangerous, as defined in Appendix 2 to the ESHS Specifications. The Contractor identifies and manages dangerous substances planned for use on the Project Area in the manner described in the present Clause.

Details of risks and related prevention and protection measures are included in the Health and Safety Plan.

The assessment of the impact of the toxicity of dangerous substances on the reproductive functions of women and men must be considered.

The transport to the Project Area and use of dangerous substances requires prior authorisation from the Engineer.

The Contractor obtains all necessary authorisations and/or licenses for the storage and use of dangerous substances from local authorities. A copy of the authorisations is provided to the Engineer.

For each dangerous substance used, the Contractor will implement the recommendations described: (i) in the Material Safety Data Sheets (MSDS), and (ii) by the Globally Harmonized System of Classification and Labelling of Chemicals established by the United Nations for hazardous chemicals.

Copies of MSDSs are kept on the Project Area and made available to personnel. The Contractor's staff is aware of the health and safety risks related to hazardous materials. The Contractor provides the Engineer with copies of all MSDSs and training reports.

3.7 Storage of dangerous substances

Storage areas are designed and equipped by the Contractor based on the chemical and physical properties of the substances, on the types of containers stored, the number of people requiring access, the ventilation requirements, the quantities of the substance used and potential chemical reaction with other substances.

Pursuant to the ESHS Specifications, the Contractor anticipates and plans for the storage and management of hazardous waste.

Storage areas for dangerous substances are subject to strict rules, which are regularly checked by the ESHS Manager appointed pursuant to the ESHS Specifications. The rules include the following as a minimum:

- Access to the storage area is limited to trained and authorised individuals
- An inventory is maintained up-to-date
- MSDSs must be available for all stored dangerous substances, and the substances must be clearly labelled

- A strict and methodical storage system is implemented (storage plan posted, large or heavy packaging may not be stored at heights, equipment and tools may not be stored in the dangerous substance storage room)
- Compliance with product expiry dates and implementation of a disposal procedure for substances which are not needed, or which have expired
- Entrances, exits and access to emergency equipment are always kept clear
- Storage areas are clearly identified with warning signs at the entrance. The Contractor displays the storage plan (location of the different products, maximum inventory), a summary of labelling system and information on chemical incompatibilities
- Chemicals which could react together (leading to explosions, fire, projections or the emission of dangerous gases) are physically separated
- Products that react violently with water are stored to prevent contact with water, even in the event of flooding
- Inflammable products are always stored separately in a dedicated area with adequate ventilation.

Buildings used to store large quantities of dangerous substances are isolated from other buildings to avoid the spreading of fire. Such buildings are constructed using solid and non-combustible building materials and are equipped with evacuation systems and the appropriate firefighting equipment. Access to the buildings is clear, allowing for rapid evacuation in the event of an accident.

The electrical systems are reduced to the essential minimum, and access points are equipped with adequate lighting (300 lux).

All storage areas are equipped with secondary retentions. Each storage area acts as a general secondary retention. Suitable absorbents (neutralising and non-combustible) are available in the storage area to clean up any spills and leaks.

The Contractor maintains the storage area at a suitable temperature for storing dangerous substances at an appropriate level to avoid any deterioration of the containers.

3.8 Planning for emergency

The emergency plan required in application of the ESHS Specifications covers the following emergency situations as a minimum:

- Fire or explosion
- Structural failure
- Loss of the containment of dangerous substances
- Safety incident or malicious act
- Natural disasters.

The Contractor details the emergency plan in the Health and Safety Plan.

The Contractor ensures that all personnel are informed and aware of how to react in an emergency, and responsibilities are defined. Information and awareness training is documented, and available on all Project Areas.

The Contractor organises and documents emergency simulation exercises within 3 months of the physical start of the Works, and subsequently once every 12 months up to the issue of the Taking-Over Certificate. The Engineer is invited to participate in each of these exercises.

Fire extinguishers are made available in each building at clearly identified locations.

3.9 Medical check-ups

The Contractor organises medical check-ups for all Contractor's Personnel prior to the initial mobilisation to the Project Area to check aptitude for the work. Medical check-ups are adapted to the anticipated occupied positions and carried out pursuant to the recommendations of the International Labour

Organization. After the check-up, a written medical certificate is issued declaring the aptitude of the worker for the allocated tasks.

Hearing tests are conducted for the Contractor's personnel exposed to specific risks (such as noise levels above 80 dB(A), exposure to hazardous materials, etc.) to establish an initial state of health. Annual tests are carried out to monitor any changes and detect any deterioration.

The Engineer can request additional medical examinations for the Contractor's Personnel if considered necessary, and all associated costs shall be borne by the Contractor.

A medical examination is carried out on any Contractor's Personnel returning to work after leave caused by a work-related accident. A written medical certificate is issued confirming the Contractor's Personnel's aptitude to return to work at the designated workstation.

The Contractor can produce a copy of its Contractor's Personnel's work aptitude certificates at the request of the Engineer or any competent authority.

Specific arrangements for tasks' assignments or workstations shall be made for pregnant Personnel.

3.10 First aid

The Contractor ensures that at least one first aid officer is present at any one time during working hours, per Project Area and per team of 10 to 50 workers present, and one extra first aid officer for each additional 100 workers. The necessary First Aid equipment needs to be made available and cover all supplies for the anticipate types of injuries from the nature of works.

The Project Area must be equipped with a communication system available immediately and primarily for the purposes of communication with the first aid services. Information on how to communicate with the first aid services is clearly indicated near the communications equipment. The nearest to the construction site Hospitals need to be contacted and an emergency response process agreed for the treatment of severe injuries.

3.11 First aid kits

The Project Area must be equipped with an adequate number of first aid kits to ensure that all workers can access these kits in approximately 5 minutes. Kits must be always available and be replenished daily.

Each vehicle is equipped with a first aid kit.

First aid equipment complies with attached specifications.

Emergency medical evacuations.

The Contractor establishes and provides the Engineer within one month of the physical start of works a copy of an agreement with a specialised company for the handling of personnel in the event of a serious accident requiring an emergency medical evacuation, which cannot be organised using the first aid vehicle specified in the ESHS Specifications without endangering the life of the patient.

The agreement includes a convention with a referring hospital where the member of personnel evacuated in emergency conditions will be treated.

The agreement covers the use of air transportation to evacuate the injured patient(s) to the referring hospital.

3.12 Access to health care

The Contractor guarantees access to health care for all personnel in necessary cases of accident or illness occurring during the execution of the Works, i.e.:

- Medical check-ups: initial (recruitment), annual and upon returning to work after sick leave

- Screening, vaccinations, and preventive healthcare
- General healthcare during the execution of the Works
- Medical assistance in the event of an accident and assistance for emergency evacuations.

Subcontractor's personnel, other contractors, the Employer, or the Engineer, present at the Project Area, must never be refused medical assistance, under the pretext that they are not directly employed by the Contractor. The Contractor may however define a unit rate cost per medical act for personnel, other than its own Contractor's Personnel, display this rate in the healthcare centre and forward the information to the Engineer.

In the event of accident or serious illness, medical personnel must be trained, available and equipped with the necessary material, medicines, and consumables to provide first aid for the patient, stabilise their condition, until the patient is:

- Either treated or discharged or
- Hospitalized at the camp or in a larger hospital or
- Evacuated to a medical centre which is well equipped for intensive care, if necessary.

3.13 Health monitoring

The Contractor cannot recruit workers in poor health.

The initial pre-recruitment examination must confirm that applicants carry no infectious diseases and are physically able to carry out the tasks required for the position.

The detection of pregnancy during the initial pre-recruitment examination of female applicants shall not constitute grounds for declining recruitment unless medical risk is proven.

The Contractor organises annual medical check-ups for its Contractor's Personnel and keeps up to date a medical record for each Contractor's Personnel. The presence of Contractor's Personnel for medical check-ups, treatment and hospitalisation is incorporated into the Contractor's planning.

The Contractor provides the Contractor's Personnel with prophylaxis and vaccinations against local diseases and vectors. In particular, the Contractor will promote the use of impregnated mosquito nets by its Contractor's Personnel in camps or off-site lodging and distributes these nets appropriately.

The Health and Safety Plan includes a Contractor's Personnel health risk assessment based on exposure to specific risks (such as noise levels above 80dB(A), exposure to hazardous materials, etc.) and describes the medical monitoring implemented.

3.14 Sanitary repatriation

The Contractor is responsible for the sanitary repatriation of Contractor's Personnel in the event of a serious injury or illness. The Contractor will take out the necessary insurance to cover the cost of the sanitary repatriation of its Contractor's Personnel.

3.15 Hygiene, accommodation and food

Drinking water:

- The Contractor provides personnel with drinking water at the Project Area. The quantity and quality of this water complies with the standards of the World Health Organization at supply points
- Unless the supply of drinking water is provided by a certified supplier, the quality of the drinking water provided to workers is tested at least at the start of the Works and then monthly. The protocol for taking and analysing samples is based on the recommendations of the World Health Organization. The results shall be documented and made available on the Project Areas.

Accommodation conditions:

- The accommodation provided for non-resident Personnel in a camp or an alternative structure outside of the Project Areas, such as a hotel or rented house, will comply with the conditions of the ESHS
- Unless specified otherwise in the Contract, or instructed otherwise by the Engineer, Personnel are housed in rooms. Rooms do not host more than 4 individuals, with no bunk beds, and with 0.5 m³ of storage space available per person
- Rooms shall not be mixed: separate rooms must be made available for both men and women.
- Rooms are lit and equipped with power sockets, beds and windows fitted with mosquito nets. Flooring is of a hard and impervious material
- The temperature in rooms and common areas shall be kept at an appropriate level during occupied hours
- Night-time noise levels to which personnel are exposed comply with the limits recommended by the World Health Organization
- The Contractor provides one drinking water tap per 10 Contractor's Personnel, one shower per 10 Contractor's Personnel as a minimum, one individual toilet for 15 Contractor's Personnel as a minimum, and one urinal per 25 Contractor's Personnel at accommodation camps. Separate showers, toilets, and locker-rooms must be made available for women
- The Contractor constructs and maintains a shared leisure area in each camp and a sports field for use by Personnel.

Hygiene in shared areas:

- Sanitary areas (showers, sinks, urinals, toilets) are cleaned and disinfected by the Contractor's cleaning service at least once every 24 hours. Cleaning operations are documented
- The canteen, kitchen and kitchen utensils are cleaned after each meal service
- The number and location of toilets shall be adapted to the number of employees and the configuration of the Project Areas (distance, isolated area, etc.). Separate toilets will be made available for women.

3.16 Substance abuse

The use, possession, distribution or sale of illegal drugs, controlled substances (as per local regulations) and alcohol is totally prohibited on the Project Areas. The Contractor implements a zero-tolerance policy for the consumption of these substances. Any person suspected by the Engineer to be under the influence of alcohol or controlled substances on any Project Area is immediately suspended from his/her position by the Contractor, pending the results of medical tests.

3.17 Traffic

The Contractor defines a Traffic Management Plan in Worksite - ESMP (section 11 as defined in Appendix 1 to the ESHS Specifications - the "Traffic Management Plan").

The Traffic Management Plan:

- includes the characteristics of its fleet of vehicles and site machinery and
- defines the itineraries used on a map for each route between the different Project Areas that must be validated by the Engineer.

The Contractor requests that the Employer obtain the authorisations of the competent administrative authorities if public roads are used. Any Engineer's instruction to update the Traffic Management Plan shall be implemented.

Within one month of the physical start of Works, the Contractor informs the administrative authorities of areas crossed by the Contractor's vehicles, of the itinerary and characteristics (frequency of passing, size and weight of trucks, materials carried) of the Contractor's fleet of vehicles.

If public roads are used, and unless approved otherwise by the Engineer, the Contractor mandates a bailiff to make a sworn report regarding the state of the road prior to use by the Contractor's vehicles. The report is annexed to the Traffic Management Plan.

The Contractor describes in the Traffic Management Plan the expected traffic created by its fleet of vehicles (frequency of trips between Project Areas, working hours, convoys).

The Contractor also describes the number and positioning of flagmen.

Unless specified otherwise in the Contract or instructed otherwise by the Engineer, heavy vehicles (i.e., with a GVWR of more than 3.5 t) may not be used at night between 22:00 and 06:00.

3.18 Speed limits

The Contractor takes action to limit and check the speed of all vehicles and machinery used to execute the works.

The maximum speed of all machinery and vehicles of the Contractor complies with the lowest of the following: the speed limit defined according to the Employer's country regulations or the following limits:

- 10 km/h within the Project Area
- 30 km/h in villages or hamlets, in towns, from 100 m before the first house
- 80 km/h on unpaved roads outside of towns, villages, hamlets, and camps.

In coordination with the competent Employer's country authorities, the Contractor provides and installs signs for the fleet of vehicles along public roads, when public signs are inadequate.

The Contractor provides each of its drivers with a map at the appropriate scale of the roads authorised for the execution of the Works, clearly indicating the maximum speeds authorised, and ensures their understanding.

It is strictly prohibited to transport people, equipment or products other than those required for the Works and the management of Project Areas, on board any of the Contractor's vehicles. This provision also applies to the transport of live animals and meat obtained from hunting, fishing or poaching.

The trailers and skips used to carry materials which could be projected (sand, crushed material, aggregates, selected materials) are covered with a tarpaulin for the entire itinerary between two Project Areas.

The Contractor carries out regular inspections along the roads used by its fleet of vehicles to ensure compliance with the ESHS Specifications. The Contractor records these inspections and the results and transmits a summary of checks carried out for the previous month to the Engineer monthly.

4 APPENDIX 1 Contents of Worksite – ESMP

1.	Environmental policy	Declaration of ESHS policy signed by the managing director of the Contractor and clearly defining the commitment of the Contractor in terms of (i) ESHS management for its construction sites and (ii) compliance with the ESHS Specifications of the Contract.
2.	Worksite ESMP	Target and content of the Worksite Environmental and Social Management Plan Preparation and updating schedule Quality assurance and validation
3.	ESHS resources	Human resources: <ul style="list-style-type: none"> • ESHS Manager • ESHS Supervisors • Person in charge of relations with stakeholders • Medical personnel Logistics & communications: <ul style="list-style-type: none"> • ESHS vehicles • IT stations • In situ noise, air and water measuring equipment • Analysis laboratory used Reporting: <ul style="list-style-type: none"> • Weekly inspections • Monthly • Accident / Incident
4.	ESHS regulations	Definition of standards for the applicable national ESHS regulations and the ESHS recommendations of institutions affiliated to the United Nations (WHO, ILO, IMO, IFC), applicable to the execution of the Works: <ul style="list-style-type: none"> • Discharge standards • Minimum wage • Day and/or night traffic restrictions • Other Definition of ESHS standards for the industry applied
5.	ESHS operational inspection resources	Site tracking procedure: <ul style="list-style-type: none"> • Frequency • Personnel • Assessment criteria Non-conformity handling and detection procedure: <ul style="list-style-type: none"> • Distribution information • Notification depending on the level of importance allocated to non-conformities • Tracking of the closing of the non-conformities Management of data on tracking and non-conformities: <ul style="list-style-type: none"> • Archiving • Use as a performance indicator

6.	Project Areas	<p>Description of Project Areas (as per definition in the ESHS Specifications):</p> <ul style="list-style-type: none"> • Number • Location on a topographical map • Activities • Opening & closing schedule • Access <p>Reference to the Appendix: an Environment Protection Plan (EPP) for each Project Area</p>
7.	Health and Safety Plan	<p>Identification and characterisation of health and safety risks, including the exposure of personnel to chemicals, biological hazards and radiation</p> <p>Description of working methods to minimise hazards and control risks</p> <p>List of the types of work for which a work permit is required.</p> <p>Personal protection equipment.</p> <p>Presentation of the medical facilities at Project Areas:</p> <ul style="list-style-type: none"> • Healthcare centre, medical equipment and allocation of medical staff • Medical acts that can be carried out on-site • Ambulance, communications • Referring hospital <p>Evacuation procedure for medical emergencies.</p> <p>Description of the internal organisation and action to be taken in the event of an accident or incident.</p>
8.	Training plan	<p>Basic training for non-qualified staff</p> <p>Health & safety training</p>
9.	Labour Conditions	<p>Description of Human Resource Policy for construction works of direct and indirect workers</p>
10.	Local recruitment	<p>Local labour requirements:</p> <ul style="list-style-type: none"> • Job descriptions and the levels of qualifications required • Recruitment procedure and deployment schedule • Initial training to be provided by the Contractor for each job description <p>Location and management of the local recruitment office(s)</p>
11.	Traffic Management Plan	<p>Description of the fleet of vehicles/machinery used for the execution of the Works</p> <p>Deployment (Project Area & schedule) and maintenance sites for each vehicle and machine</p> <p>Mapping of itineraries, travel times, and areas where speeds are limited</p> <p>Dust suppression:</p> <ul style="list-style-type: none"> • Mapping of road sections where dust reduction initiatives apply • Water points identified or to be created for refuelling tanker trucks • Capacity of the tanker trucks used and calculation of the number of trucks required

		<ul style="list-style-type: none"> • Width of the track to determine if one watering run or equivalent is adequate (narrow track) or if two runs are required (wide track) • Number of watering or equivalent operations proposed per day depending on the climate
12.	Dangerous products	<p>Inventory of dangerous products per Project Area and per period</p> <p>Transport and storage conditions and chemical incompatibility</p>
13.	Effluents	<p>Characterisation of effluents discharged to the receiving environment</p> <p>Facilities for the treatment or pre-treatment of effluents</p> <p>Measures for reducing the sediment content of rainwater runoff</p> <p>Measures for monitoring the efficiency and performance of facilities for reducing sediment content of rainwater runoff</p> <p>Resources and methods for monitoring effluent and rainwater runoff quality</p>
14.	Noise and vibrations	<p>Estimation of the frequencies, duration, days of the week and noise levels per Project Area</p>
15.	Waste	<p>Inventory of waste per Project Area and per period</p> <p>Collection, intermediate storage, handling and treatment methods for ordinary or inert waste</p> <p>Storage and handling methods for dangerous waste</p>
16.	Clearing and revegetation	<p>Methods & schedule for clearing vegetation and earthwork activities</p> <p>Methods, species and schedule for the revegetation of Project Areas disturbed by the works</p>
17.	Biodiversity	<p>Schedule for adequate fauna and flora management</p> <p>Measures for minimizing impact on fauna and flora species based on the Contracting Authority procedures</p> <p>Measures for monitoring the efficiency and performance of the plan in place</p> <p>Measures for limiting IAS</p> <p>Measures for monitoring the efficiency and performance of the plan in place</p>
18.	Prevention of erosion	<p>Location of zones suffering from erosion</p> <p>Methods and schedule for the implementation of anti-erosive actions, including topsoil storage</p>
19.	Documentation on the Project Area condition	<p>List and cover of viewpoints</p> <p>Imaging method</p> <p>Archiving photographs</p>
20.	Rehabilitation	<p>Method and schedule for Project Area rehabilitation</p>
21.	Appendices	<p>Environment Protection Plans (number and location specified in Section 6 "Project Areas" above):</p> <ul style="list-style-type: none"> • Marking out of the Project Area perimeter on a map

		<ul style="list-style-type: none"> • Definition of zones for vegetation clearing, zones for the storage of usable timber, zones for burning of green waste • Definition of on-site activities: construction, storage areas, accommodation areas, offices, workshops, concrete making units • Layout of activity areas on the Project Area: construction works, production/operation areas, rehabilitation, and closure • Zones for the storage of topsoil, spoil from earthworks, materials • Access routes and checkpoints • Project Area occupancy schedule • Organisation of Project Area preparation • Liquid discharge outlet points • Proposed sampling points for monitoring water quality • Atmospheric emission outlet points • Location of the storage site for dangerous products • Location and mapping of waste treatment facilities when handled by an external service provider • Any other information relating to the environmental management of the Project Area <p>Emergency plan:</p> <ul style="list-style-type: none"> • Description of facilities • Characterisation of hazards • Emergency situations • Organisation structure - roles and responsibilities • Emergency procedures • Human and material resources • Triggering of the plan • Reporting <p>Authority's sworn reports as specified in the ESHS Specifications.</p>
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5 APPENDIX 2 – Properties rendering a product dangerous²

1.	Explosive	substances and preparations which could explode in the presence of a flame or which are more sensitive to impacts and friction than dinitrobenzene.
2.	Combustive	substances and preparations which, when in contact with other substances, particularly inflammable substances, undergo strongly exothermic reactions.
3.	Easily inflammable	substances and preparations (i) in liquid phase (including extremely inflammable liquids), with a flash point below 21°C, or which can heat up to the extent of spontaneous combustion in ambient air; or (ii) in solid phase, which can burst into flames easily in the brief presence of a source of inflammation and which will continue to burn after the removal of the source of inflammation or (iii) in gaseous phase, which are inflammable in air at normal pressure; or (iv) - which, when in contact with moist air or water, produce dangerous quantities of gases which are easily inflammable.
4.	Inflammable	liquid substances and preparations, with a flash point equal to or above 21°C and less than or equal to 55°C.
5.	Irritant	non-corrosive substances and preparations which, when in immediate, extended or repeated contact with the skin and mucosa, can cause inflammation.
6.	Harmful	substances and preparations which, in case of inhaling, swallowing or cutaneous penetration, can lead to risks of limited severity.
7.	Toxic	substances and preparations (including highly toxic substances and preparations), which, in case of inhaling, swallowing or cutaneous penetration, can lead to serious, acute or chronic risks, and even death.
8.	Carcinogenic	substances and preparations which, in case of inhaling, swallowing or cutaneous penetration, can lead to or increase the frequency of cancer.
9.	Corrosive	substances and preparations which, in case of contact with living tissues, can destroy the latter.
10.	Infectious	substances containing viable micro-organisms or their toxins, for which it is known or we have good reasons to believe that they cause disease in humans or other living organisms.
11.	Harmful to reproduction function	substances and preparations which, in case of inhaling, swallowing or cutaneous penetration, can induce or increase the frequency of undesirable non-hereditary effects in offspring or have a negative effect on reproductive functions and abilities.
12.	Mutagenic	substances and preparations which, in case of inhaling, swallowing or cutaneous penetration, can lead to hereditary genetic disorders or increase the frequency of these disorders.
13.	React with water	substances and preparations which, in case of contact with water, air or an acid, release a toxic or highly toxic gas.
14.	Sensitising	substances and preparations which, in case of inhaling or cutaneous penetration, can lead to a hypersensitisation, so that renewed exposure to the substance or preparation will cause characteristic harmful effects. This property can only be considered if test methods are available.

² Source: French Environment Law / Articles R541-8.

15.	Ecotoxic	substances and preparations with inherent or potential immediate or deferred risks for one or several environmental components.
16.	Dangerous for the environment	substances and preparations which are likely, after elimination, to lead to another substance, by any means, e.g., a lixiviation product, with one of the above characteristics.

ANNEX FOUR









NATIONAL POWER TRAINING INSTITUTE OF NIGERIA
REGIONAL TRAINING CENTRE, KAINJI





NATIONAL POWER TRAINING INSTITUTE OF NIGERIA
REGIONAL TRAINING CENTRE, KARPLI

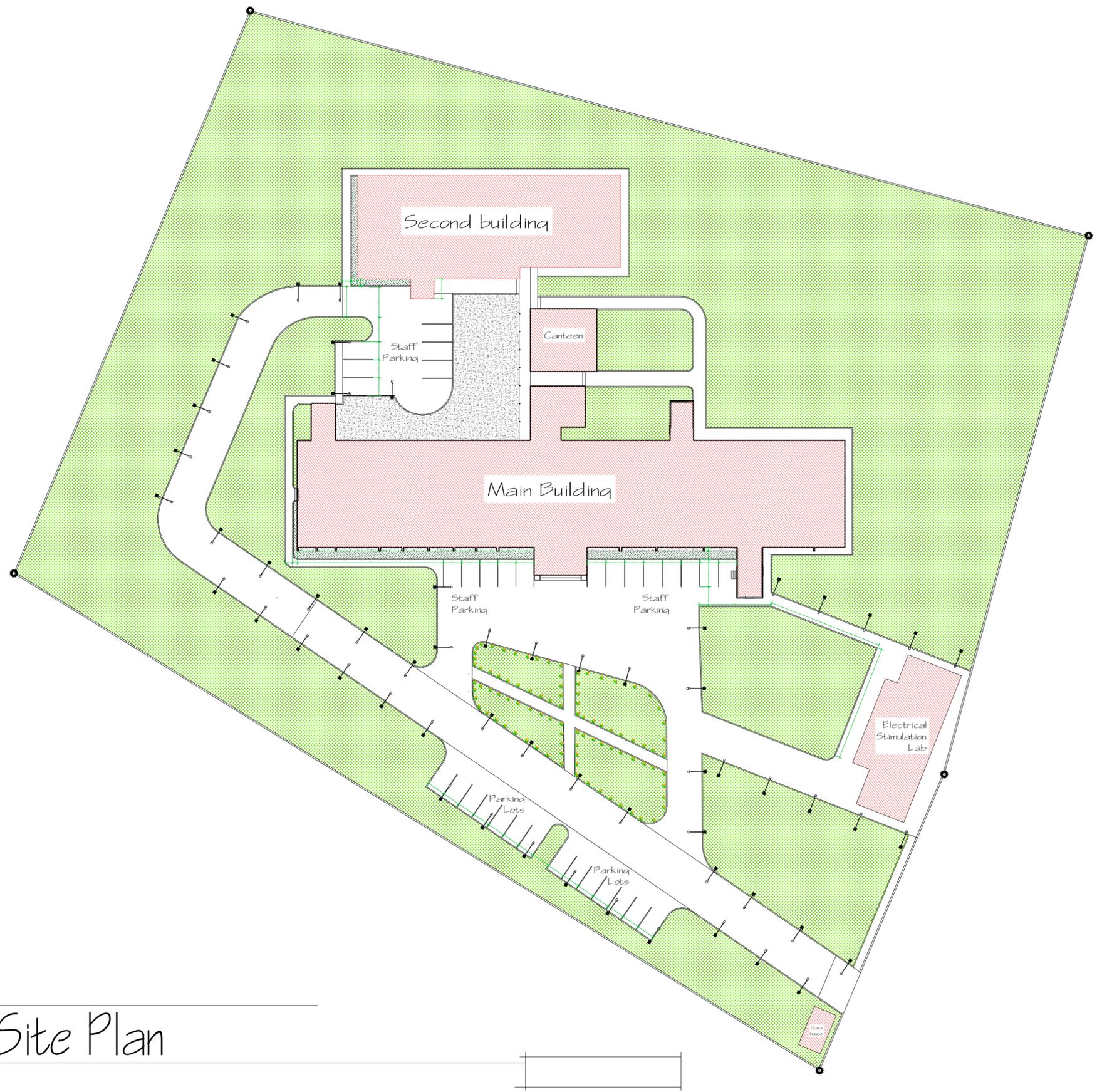
PROJECT: REHABILITATION AND UPGRADE OF NAPTIN KAINJI REGIONAL TRAINING CENTRE AND SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF TRAINING EQUIPMENT UNDER THE PROGRAM: "ENHANCING VOCATIONAL TRAINING DELIVERY FOR THE NIGERIAN POWER SECTOR"

LOCATION NAPTIN REGIONAL TRAINING CENTER, KAINJI

CLIENT: NATIONAL POWER TRAINING INSTITUTE OF NIGERIA (NAPTIN)

CONTRACTOR: TESHMONT-DEREKSON CONSORTIUM (TDC)

DATE: OCTOBER, 2025



Site Plan

NOTE'S.

1. Drawing must not be scaled directly, and if any ambiguity, the consultant architect must be seen without any alteration.
2. Written dimensions to be taken in preference.
3. Dimensions to be checked on site.
4. Architect is to be notified of any discrepancies between this drawing and others including those issued by the consultants and sub-contractors before commencing work.

ITEM	DESCRIPTION	INTL.	DATE

PROJECT:

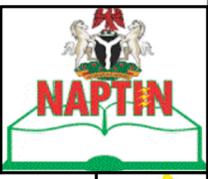
Rehabilitation and Upgrade of Naptin Kainji Regional Training Centre and Supply, Installation, Testing & Commissioning of Training Equipment Under the Program: "Enhancing Vocational Training Delivery for the Nigerian Power Sector"

LOCATION:

Naptin Regional Training Center, Kainji

CLIENT:

National Power Training Institute of Nigeria (NAPTIN)



CONTRACTOR:

Teshmont-Derekson Consortium (TDC)



PHONE: +234 803 326 1153

DRAWING TITLE: Architectural Drawings

SCALE SHEET NO

1:500

01

DESIGNED BY: KINGCOLLINS NIG. LTD.

DRAWN BY: KINGCOLLINS NIG. LTD.

DATE: OCTOBER, 2025

DRAWING NO:

NOTE'S.

1. Drawing must not be scaled directly, and if any ambiguity, the consultant architect must be seen without any alteration.
2. Written dimensions to be taken in preference.
3. Dimensions to be checked on site.
4. Architect is to be notified of any discrepancies between this drawing and others including those issued by the consultants and sub-contractors before commencing work.

ITEM	DESCRIPTION	INTL.	DATE

PROJECT:

Rehabilitation and Upgrade of Naptin Kainji Regional Training Centre and Supply, Installation, Testing & Commissioning of Training Equipment Under the Program: "Enhancing Vocational Training Delivery for the Nigerian Power Sector"

LOCATION:

Naptin Regional Training Center, Kainji

CLIENT:

National Power Training Institute of Nigeria (NAPTIN)



CONTRACTOR:

Teshmont-Derekson Consortium (TDC)



PHONE: +234 803 326 1153

DRAWING TITLE: Architectural Drawings

SCALE: SHEET NO

1:150

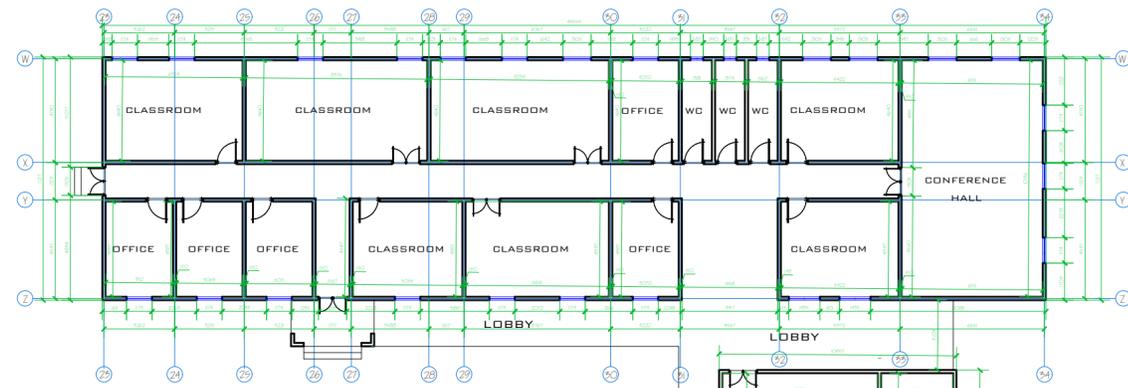
02

DESIGNED BY: KINGCOLLINS NIG. LTD.

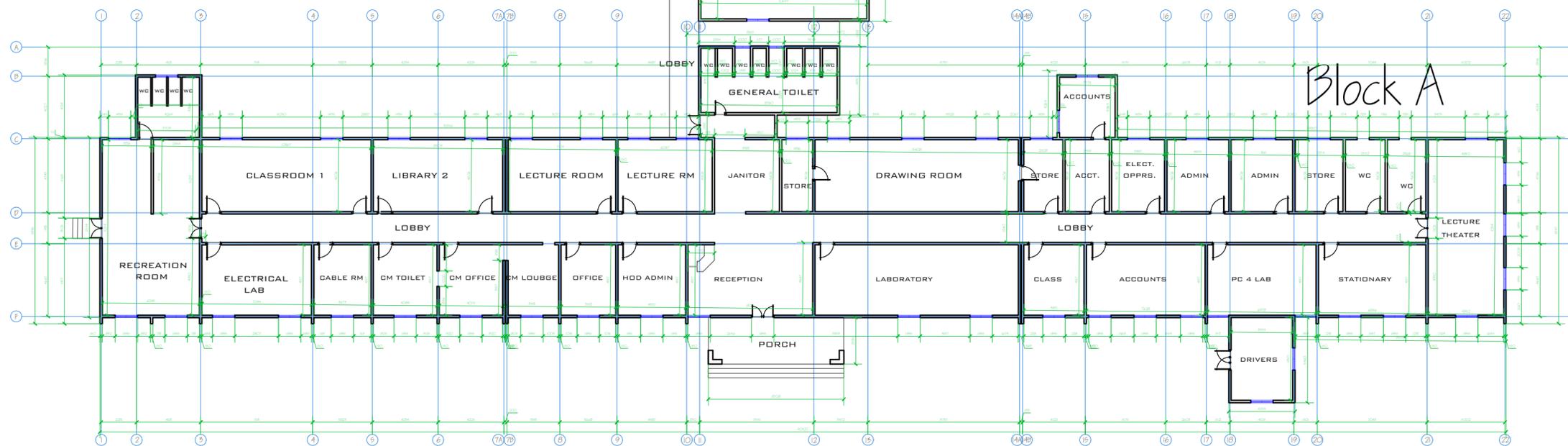
DRAWN BY: KINGCOLLINS NIG. LTD.

DATE: OCTOBER, 2025

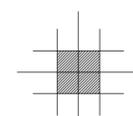
DRAWING NO:



Block B



Block A



Existing Ground Floor Plan

NOTE'S.

1. Drawing must not be scaled directly, and if any ambiguity, the consultant architect must be seen without any alteration.
2. Written dimensions to be taken in preference.
3. Dimensions to be checked on site.
4. Architect is to be notified of any discrepancies between this drawing and others including those issued by the consultants and sub-contractors before commencing work.

ITEM	DESCRIPTION	INTL.	DATE

PROJECT:

Rehabilitation and Upgrade of Naptin Kainji Regional Training Centre and Supply, Installation, Testing & Commissioning of Training Equipment Under the Program: "Enhancing Vocational Training Delivery for the Nigerian Power Sector"

LOCATION:

Naptin Regional Training Center, Kainji

CLIENT:

National Power Training Institute of Nigeria (NAPTIN)



CONTRACTOR:

Teshmont-Derekson Consortium (TDC)



PHONE: +234 803 326 1153

DRAWING TITLE: Architectural Drawings

SCALE: SHEET NO

1:150

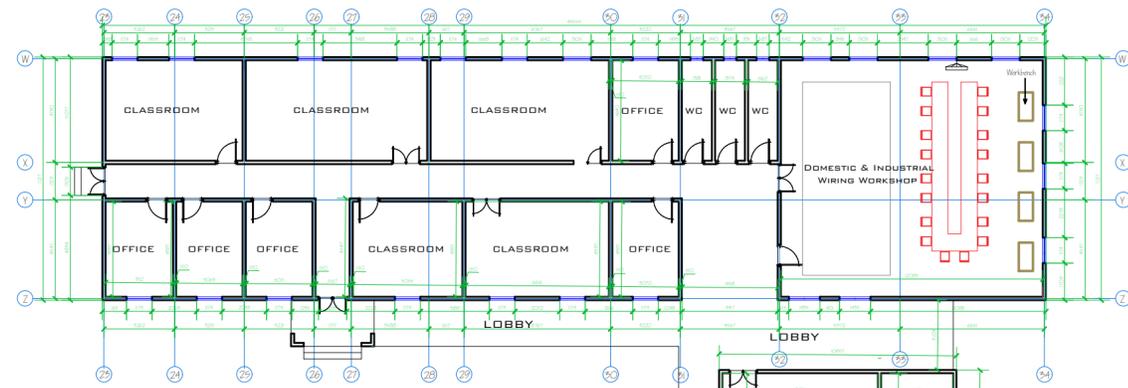
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DESIGNED BY: KINGCOLLINS NIG. LTD.

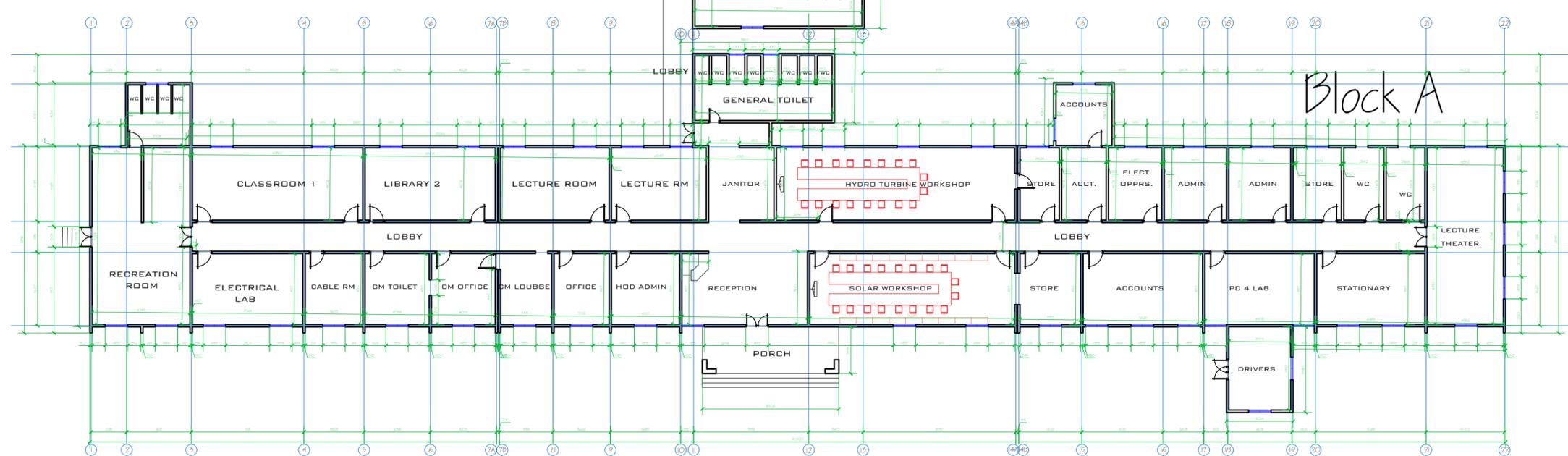
DRAWN BY: KINGCOLLINS NIG. LTD.

DATE: OCTOBER, 2025

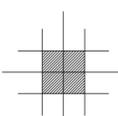
DRAWING NO:



Block B

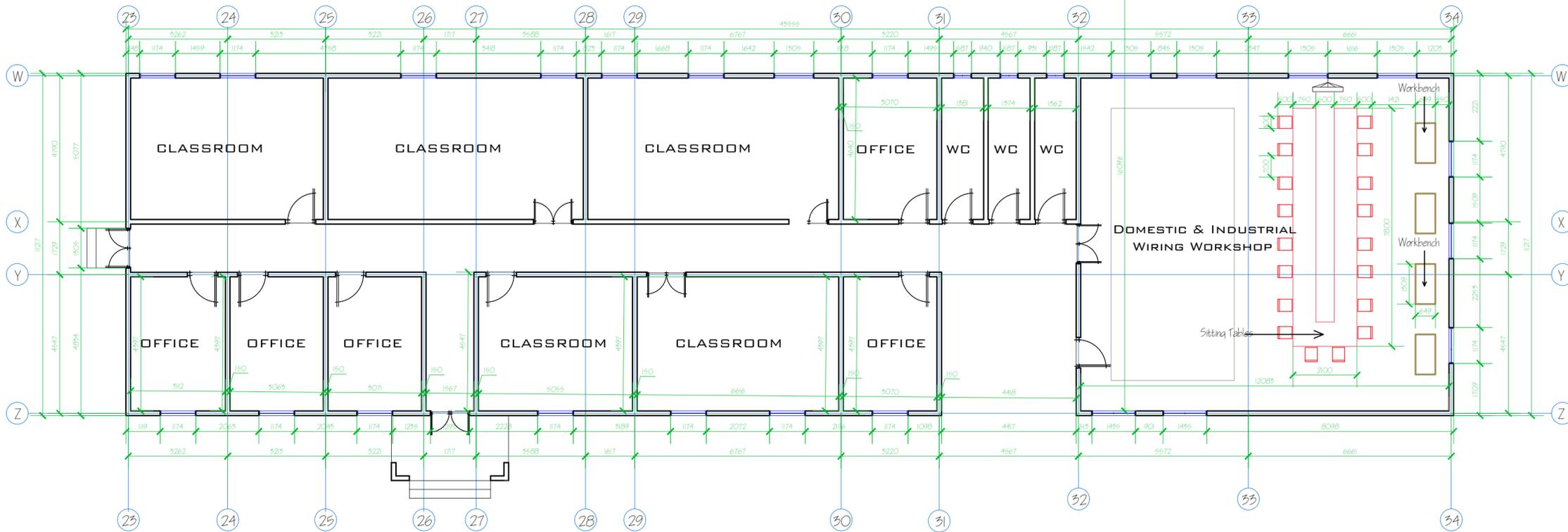


Block A



Modified Ground Floor Plan

Block B



NOTE'S.

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National Power Training Institute of Nigeria (NAPTIN)



CONTRACTOR:

Teshmont-Derekson Consortium (TDC)



PHONE: +234 803 326 1153

DRAWING TITLE: Architectural Drawings

SCALE: SHEET NO

1:125

04

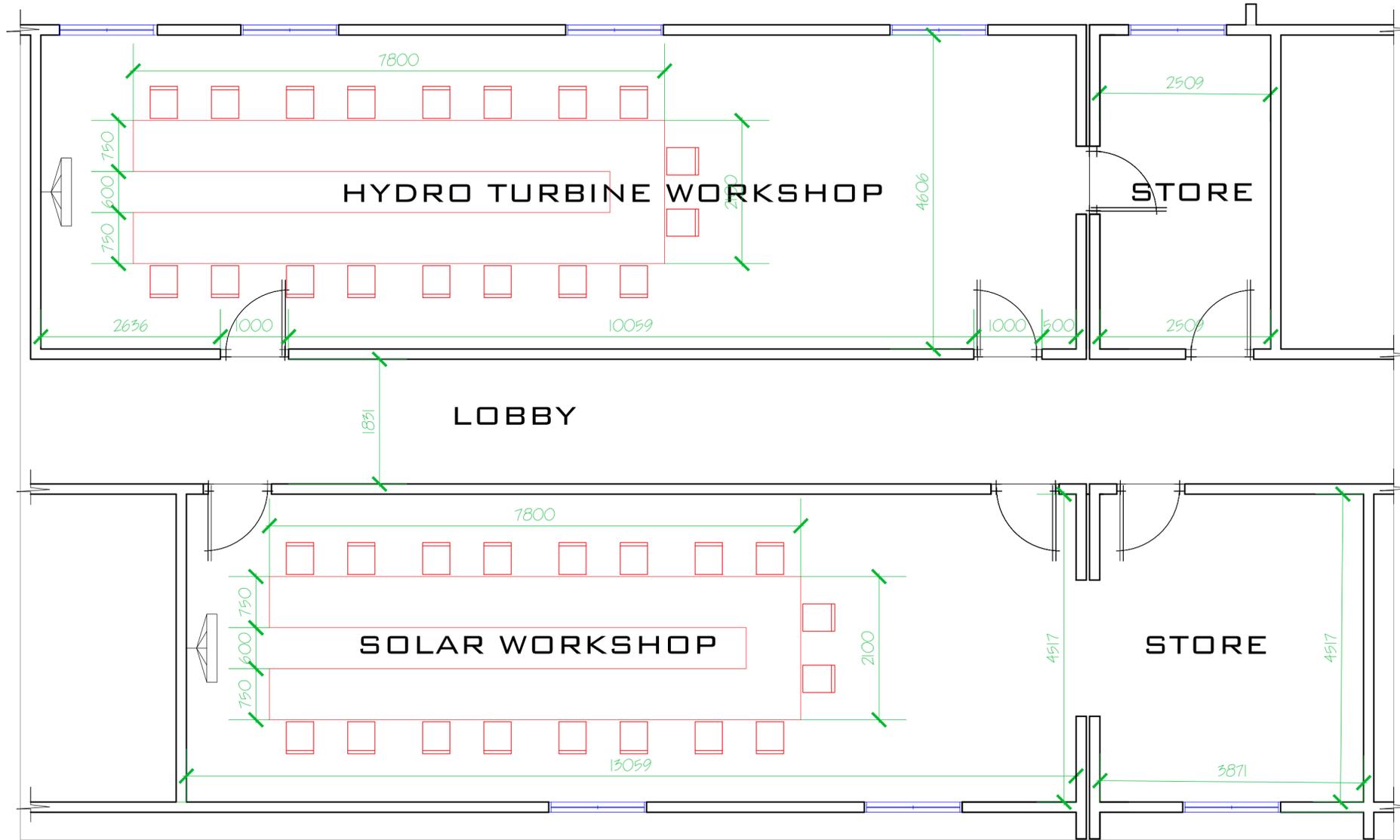
DESIGNED BY: KINGCOLLINS NIG. LTD.

DRAWN BY: KINGCOLLINS NIG. LTD.

DATE: OCTOBER, 2025

DRAWING NO:

Modified Floor Plan Block B



Workshop Sitting Schedule

NOTE'S.

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CLIENT:

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CONTRACTOR:

Teshmont-Derekson Consortium (TDC)



PHONE: +234 803 326 1153

DRAWING TITLE: Architectural Drawings

SCALE SHEET NO

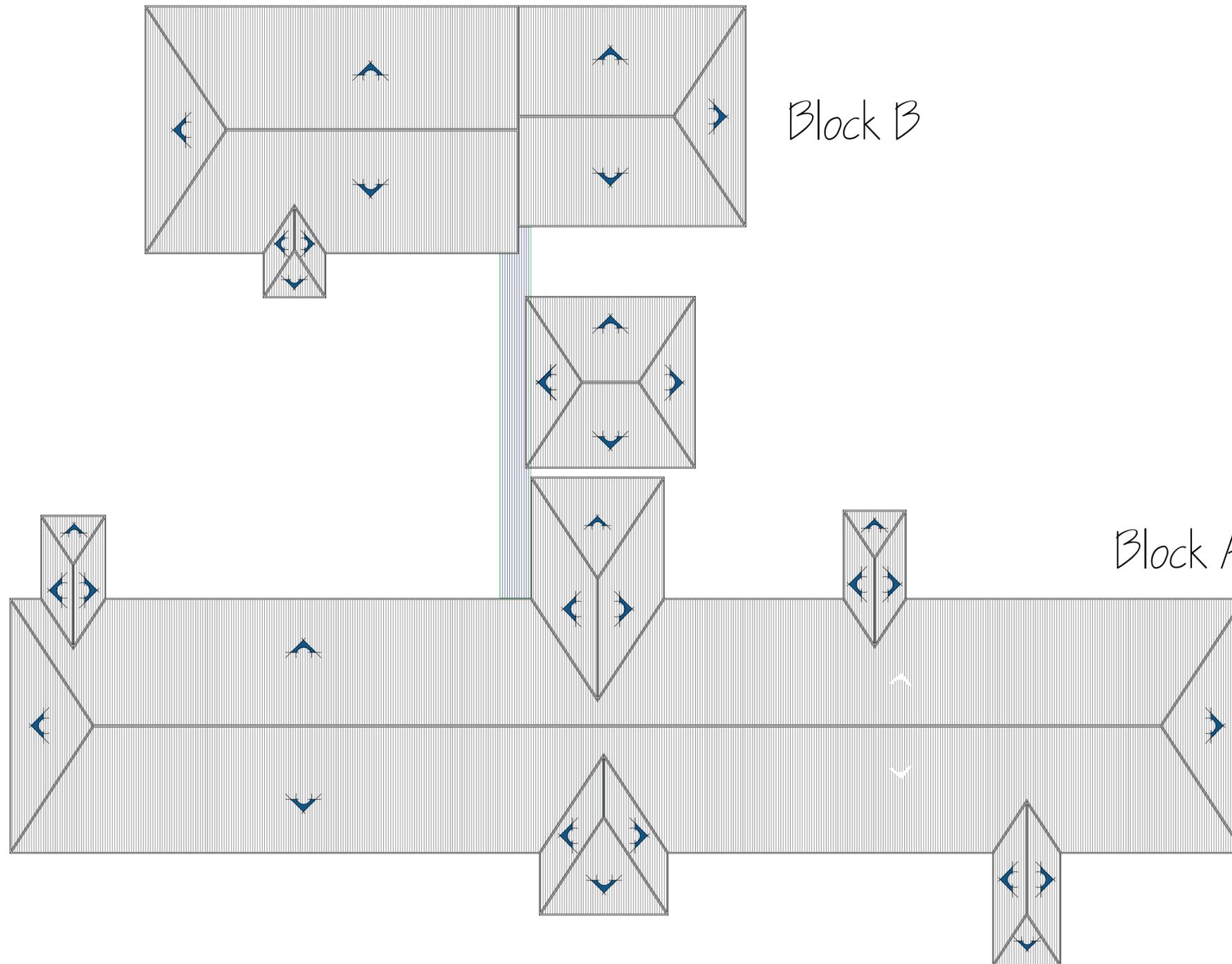
05

DESIGNED BY: KINGCOLLINS NIG. LTD.

DRAWN BY: KINGCOLLINS NIG. LTD.

DATE: OCTOBER, 2025

DRAWING NO:



Block B

Block A

Roof Plan

NOTE'S.

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ITEM	DESCRIPTION	INTL.	DATE

PROJECT:

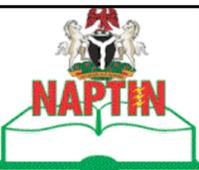
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CONTRACTOR:

Teshmont-Derekson Consortium (TDC)



PHONE: +234 803 326 1153

DRAWING TITLE: Architectural Drawings

SCALE SHEET NO

1:150

06

DESIGNED BY: KINGCOLLINS NIG. LTD.

DRAWN BY: KINGCOLLINS NIG. LTD.

DATE: OCTOBER, 2025

DRAWING NO:

NOTE'S.

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CONTRACTOR:

Teshmont-Derekson Consortium (TDC)



PHONE: +234 803 326 1153

DRAWING TITLE: Architectural Drawings

SCALE SHEET NO

1:250

07

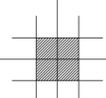
DESIGNED BY: KINGCOLLINS NIG. LTD.

DRAWN BY: KINGCOLLINS NIG. LTD.

DATE: OCTOBER, 2025

DRAWING NO:




Front Elevation



NOTE'S.

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CONTRACTOR:

Teshmont-Derekson Consortium (TDC)



PHONE: +234 803 326 1153

DRAWING TITLE: Architectural Drawings

SCALE SHEET NO

1:150

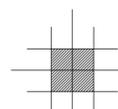
08

DESIGNED BY: KINGCOLLINS NIG. LTD.

DRAWN BY: KINGCOLLINS NIG. LTD.

DATE: OCTOBER, 2025

DRAWING NO:



Right Side Elevation



NOTE'S.

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LOCATION:

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CONTRACTOR:

Teshmont-Derekson Consortium (TDC)



PHONE: +234 803 326 1153

DRAWING TITLE: Architectural Drawings

SCALE SHEET NO

1:150

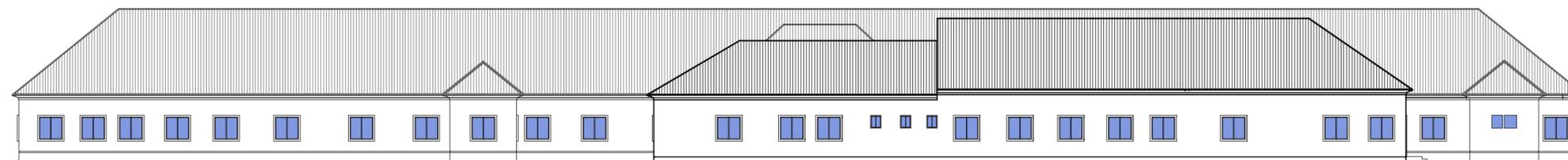
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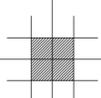
DESIGNED BY: KINGCOLLINS NIG. LTD.

DRAWN BY: KINGCOLLINS NIG. LTD.

DATE: OCTOBER, 2025

DRAWING NO:




Back Elevation



NOTE'S.

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ITEM	DESCRIPTION	INTL.	DATE

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CLIENT:

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CONTRACTOR:

Teshmont-Derekson Consortium (TDC)



PHONE: +234 803 326 1153

DRAWING TITLE: Architectural Drawings

SCALE: SHEET NO

1:150

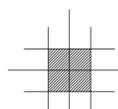
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DESIGNED BY: KINGCOLLINS NIG. LTD.

DRAWN BY: KINGCOLLINS NIG. LTD.

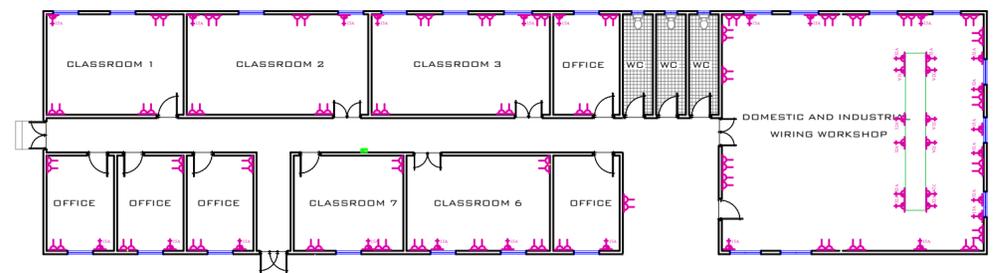
DATE: OCTOBER, 2025

DRAWING NO:



Left Side Elevation





Modified Power Layout

- NOTE'S.**
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LOCATION:
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CLIENT:
 National Power Training Institute of Nigeria (NAPTIN)

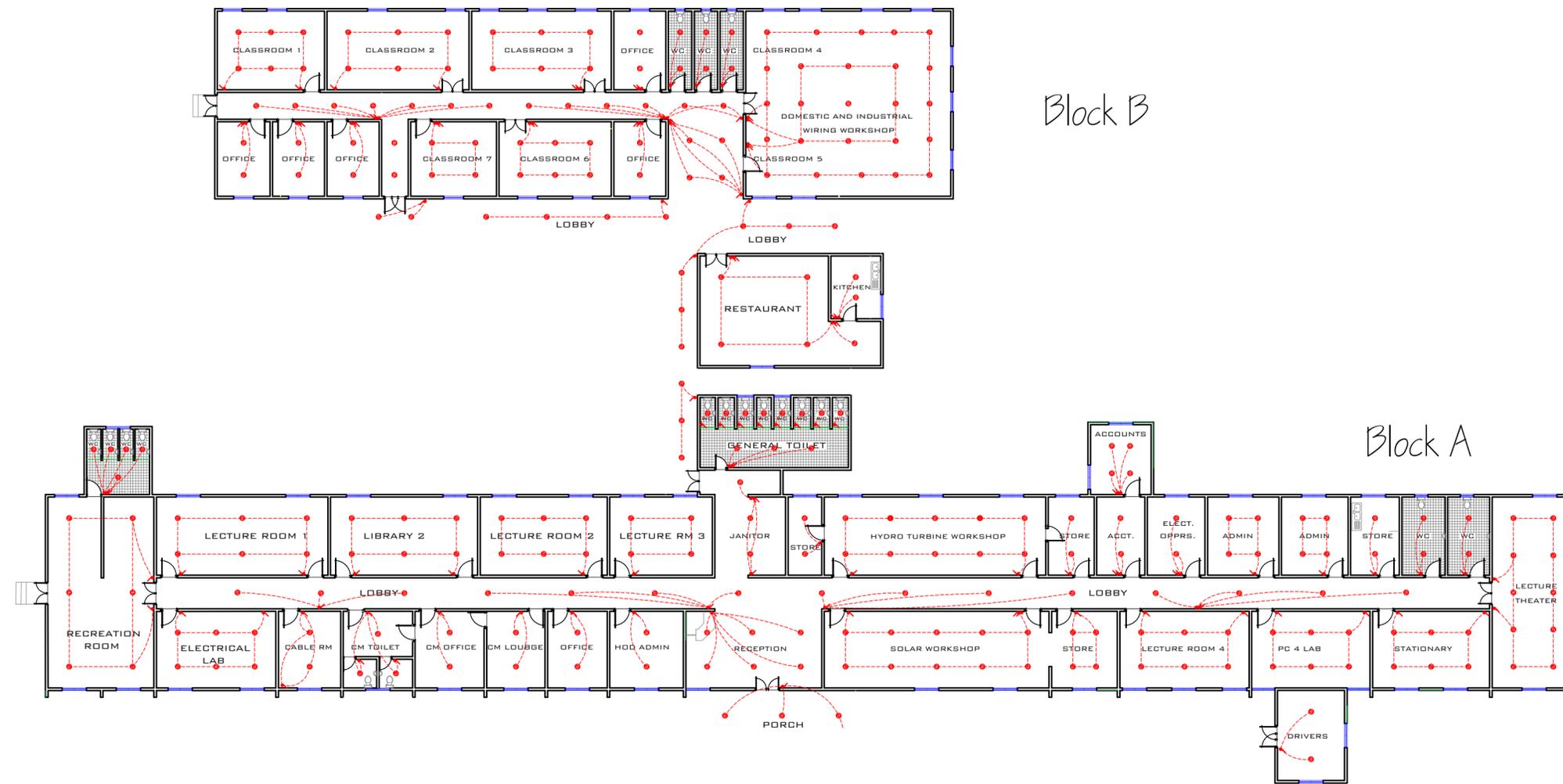


CONTRACTOR:
 Teshmont-Derekson Consortium (TDC)



PHONE:	+234 803 326 1153
DRAWING TITLE:	Electrical Drawings
SCALE	SHEET NO
1:150	11

DESIGNED BY: KINGCOLLINS NIG. LTD.
 DRAWN BY: KINGCOLLINS NIG. LTD.
 DATE: OCTOBER, 2025
DRAWING NO:



Block B

Block A

Modified Lighting Layout

NOTE'S.

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LOCATION:

Naptin Regional Training Center, Kainji

CLIENT:

National Power Training Institute of Nigeria (NAPTIN)



CONTRACTOR:

Teshmont-Derekson Consortium (TDC)



PHONE: +234 803 326 1153

DRAWING TITLE: Electrical Drawings

SCALE: SHEET NO

1:150 12

DESIGNED BY: KINGCOLLINS NIG. LTD.

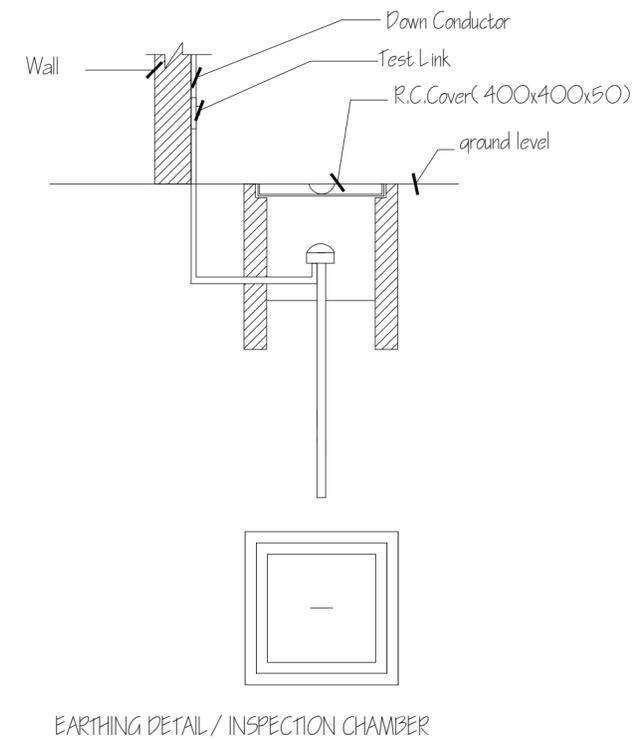
DRAWN BY: KINGCOLLINS NIG. LTD.

DATE: OCTOBER, 2025

DRAWING NO:

LEGEND

SYMB	ABB	DESCRIPTION	SPECIFICATION
⊙		1x35W Chalice open recessed downlight	Thorn Cat. No. CH190V35G
⊙		1x50W Chalice eyeball recessed downlight	Thorn Cat. No. CH80AMV50WHI
⊙			
⊙		1x18W decorative uplighter silver coated metal wall bracket with diffuser	Thorn Cat. No. OLYMPA118S
⊙		1x18W Tuba glass wall mounted decorative luminaire, white	Thorn Cat. No. TUBW118W
⊙		1x28W supernovello glassware shallow opal ceiling fitting	Thorn Cat. No. 2DXB28/2DXN28
⊙		26W Aluminium bodied, semi-conical wall light for surface/bracket mounting with polycarbonate diffuser	Thorn Avenue Deco
⊙		1x8w emergency bulkhead lighting fitting - in UPS	Thorn Cat. No. EVBP 3NM/W
⊙		1x 42W Glacier II decorative pendant luminaire large with aluminium reflector on chain suspension	Thorn Cat. No. GLCLZD42W
⊙		6x36w Gino Chandelier uplighter fitting with 3 shades, white	Thorn Cat. No. J121685
⊙		1x60W Table reading light fitting	RAAK Cat. No. C-1527, 1400
⊙		5A 1-gang 1-way light switch	MEM 2400
⊙		2-gang ditto	MK Cat. No. 4872
⊙		5A 1-gang 2-way light switch	MEM 2401
⊙		5A 2-gang 2-way light switch	MEM 2402
⊙		5A 1-gang 2-way dimmer light switch	MEM
⊙		5A 1-gang 1-way dimmer light switch	MEM 2320
⊙		5A 2-gang 1-way dimmer light switch	MEM
⊙		5A 3-gang 1 way dimmer light switch	MEM
⊙		5A 1-gang intermediate light switch	MEM 2405
⊙		5A Ceiling fans and switch	
⊙	EF	300x300mm extractor fan	MEM 1200
⊙			MEM 3100
⊙	SSO	13A switched socket outlet	MEM 3100
⊙	SSO	13A 2-gang switched socket outlet	MEM 3101
⊙	SSO	15A switched socket outlet	MEM 4012
SYMB	ABB	DESCRIPTION	SPECIFICATION
⊙	FS	Fused switch	MEM
⊙	DB	Distribution Board	MEM
⊙	C/O	Change Over	MEM
⊙	M	Energy Meter	
⊙		1m pure copper spiked lightning arrester	
⊙		25mm x 3mm pure copper tape	
⊙		Earth termination	



LEGEND AND EARTH DETAIL

NOTE'S.

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CONTRACTOR:

Teshmont-Derekson Consortium (TDC)



PHONE: +234 803 326 1153

DRAWING TITLE: Electrical Drawings

SCALE: SHEET NO

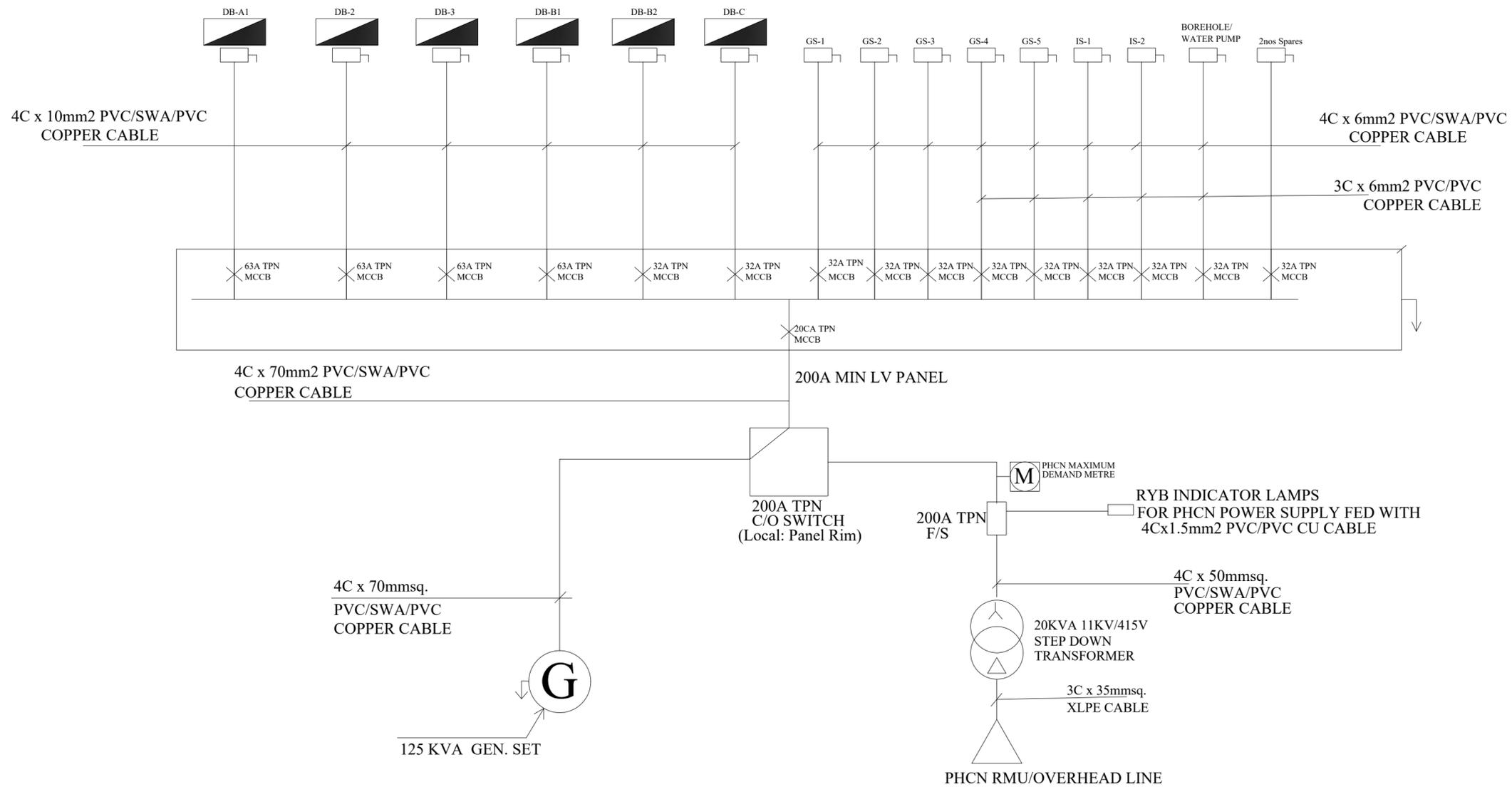
13

DESIGNED BY: KINGCOLLINS NIG. LTD.

DRAWN BY: KINGCOLLINS NIG. LTD.

DATE: OCTOBER, 2025

DRAWING NO:



POWER SUPPLY SCHEMATIC DIAGRAM

NOTE'S.

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ITEM	DESCRIPTION	INTL.	DATE

PROJECT:

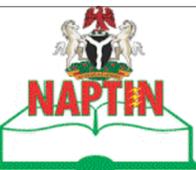
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National Power Training Institute of Nigeria (NAPTIN)



CONTRACTOR:

Teshmont-Derekson Consortium (TDC)



PHONE: +234 803 326 1153

DRAWING TITLE: Electrical Drawings

SCALE: SHEET NO

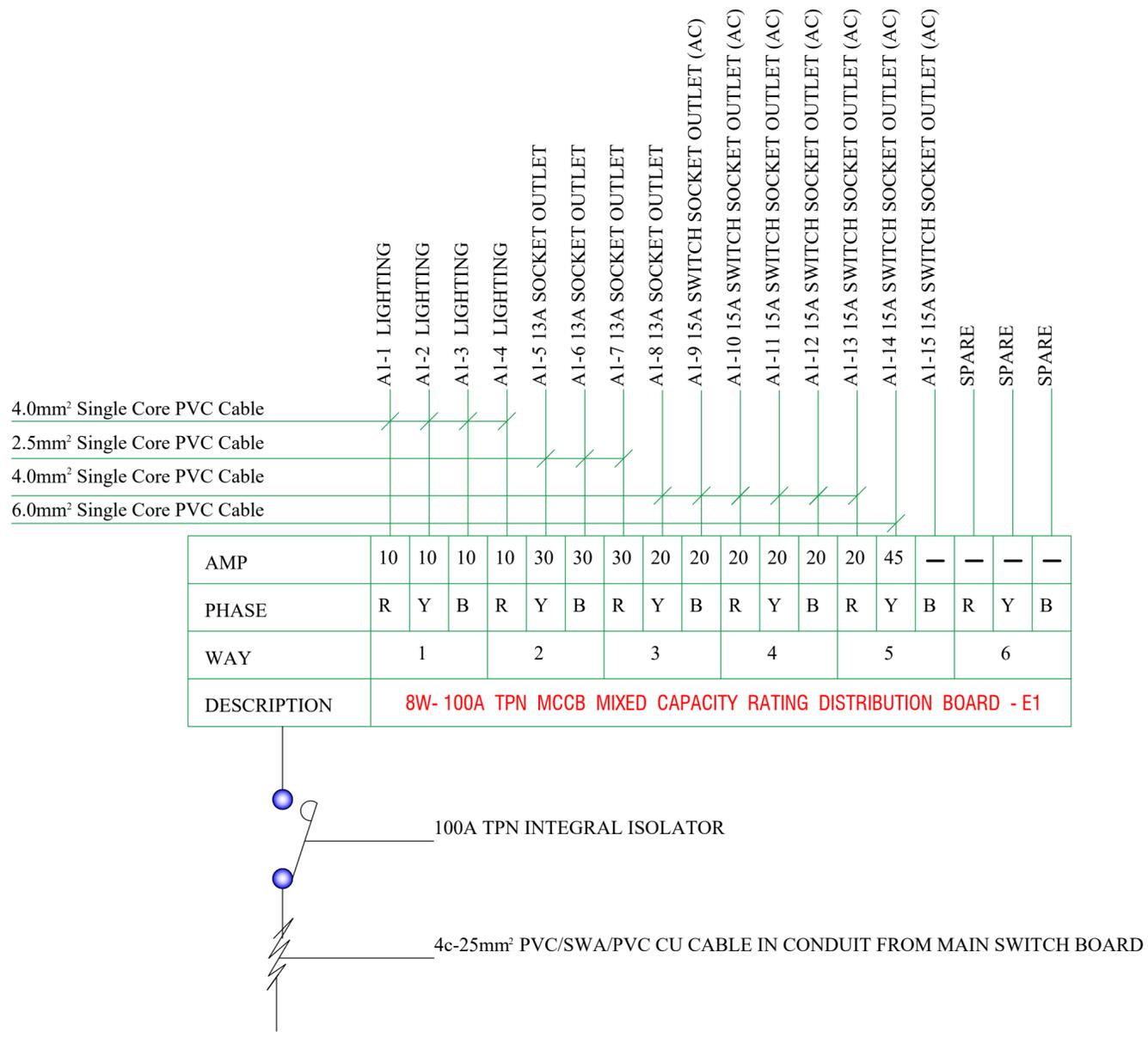
14

DESIGNED BY: KINGCOLLINS NIG. LTD.

DRAWN BY: KINGCOLLINS NIG. LTD.

DATE: OCTOBER, 2025

DRAWING NO:



DISTRIBUTION BOARD A2

- NOTE'S.**
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CLIENT:
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CONTRACTOR:
 Teshmont-Derekson Consortium (TDC)



PHONE: +234 803 326 1153

DRAWING TITLE: Electrical Drawings

SCALE: SHEET NO

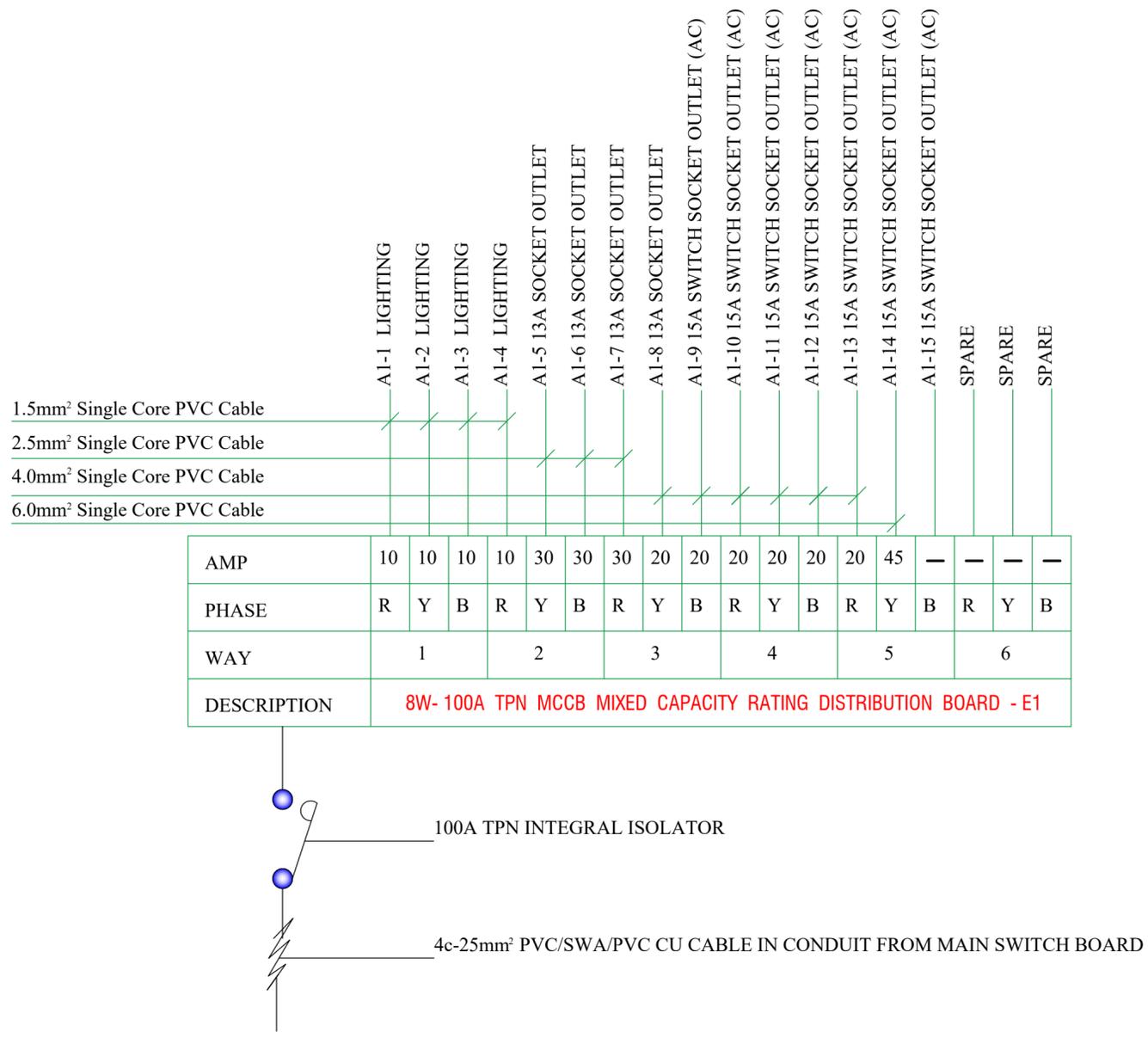
16

DESIGNED BY: KINGCOLLINS NIG. LTD.

DRAWN BY: KINGCOLLINS NIG. LTD.

DATE: OCTOBER, 2025

DRAWING NO:



AMP	10	10	10	10	30	30	30	20	20	20	20	20	20	20	45	—	—	—	—
PHASE	R	Y	B	R	Y	B	R	Y	B	R	Y	B	R	Y	B	R	Y	B	
WAY	1			2			3			4			5			6			
DESCRIPTION	8W- 100A TPN MCCB MIXED CAPACITY RATING DISTRIBUTION BOARD - E1																		

DISTRIBUTION BOARD A3

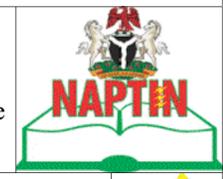
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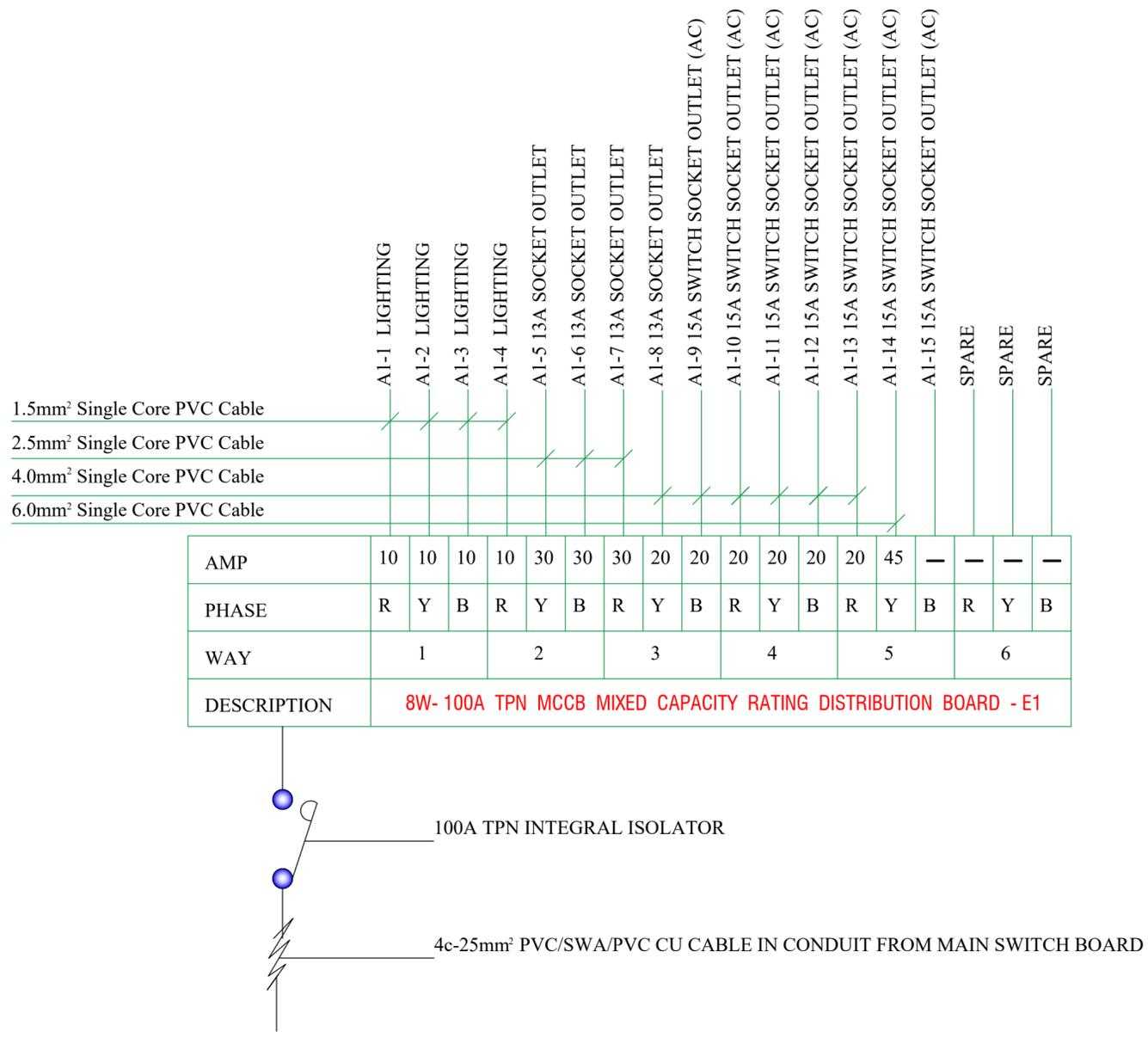


CONTRACTOR:
 Teshmont-Derekson Consortium (TDC)



PHONE:	+234 803 326 1153
DRAWING TITLE:	Electrical Drawings
SCALE	SHEET NO
	17

DESIGNED BY: KINGCOLLINS NIG. LTD.
 DRAWN BY: KINGCOLLINS NIG. LTD.
 DATE: OCTOBER, 2025
DRAWING NO:



DISTRIBUTION BOARD B1

- NOTE'S.**
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CONTRACTOR:

Teshmont-Derekson Consortium (TDC)



PHONE: +234 803 326 1153

DRAWING TITLE: Electrical Drawings

SCALE: SHEET NO

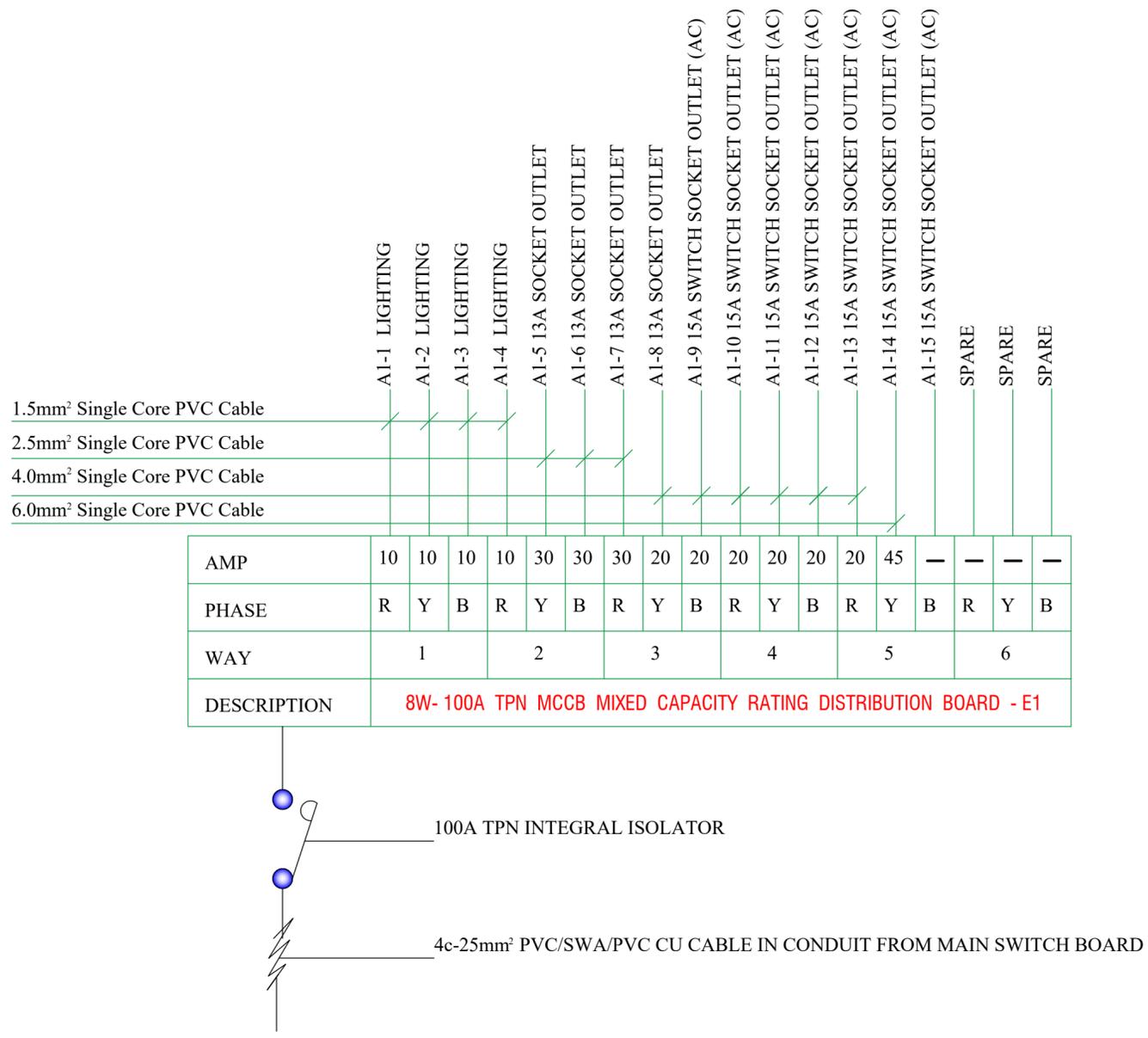
18

DESIGNED BY: KINGCOLLINS NIG. LTD.

DRAWN BY: KINGCOLLINS NIG. LTD.

DATE: OCTOBER, 2025

DRAWING NO:



DISTRIBUTION BOARD B2

- NOTE'S.**
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PROJECT:

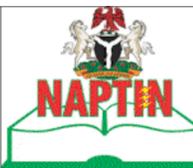
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CONTRACTOR:

Teshmont-Derekson Consortium (TDC)



PHONE: +234 803 326 1153

DRAWING TITLE: Electrical Drawings

SCALE: SHEET NO

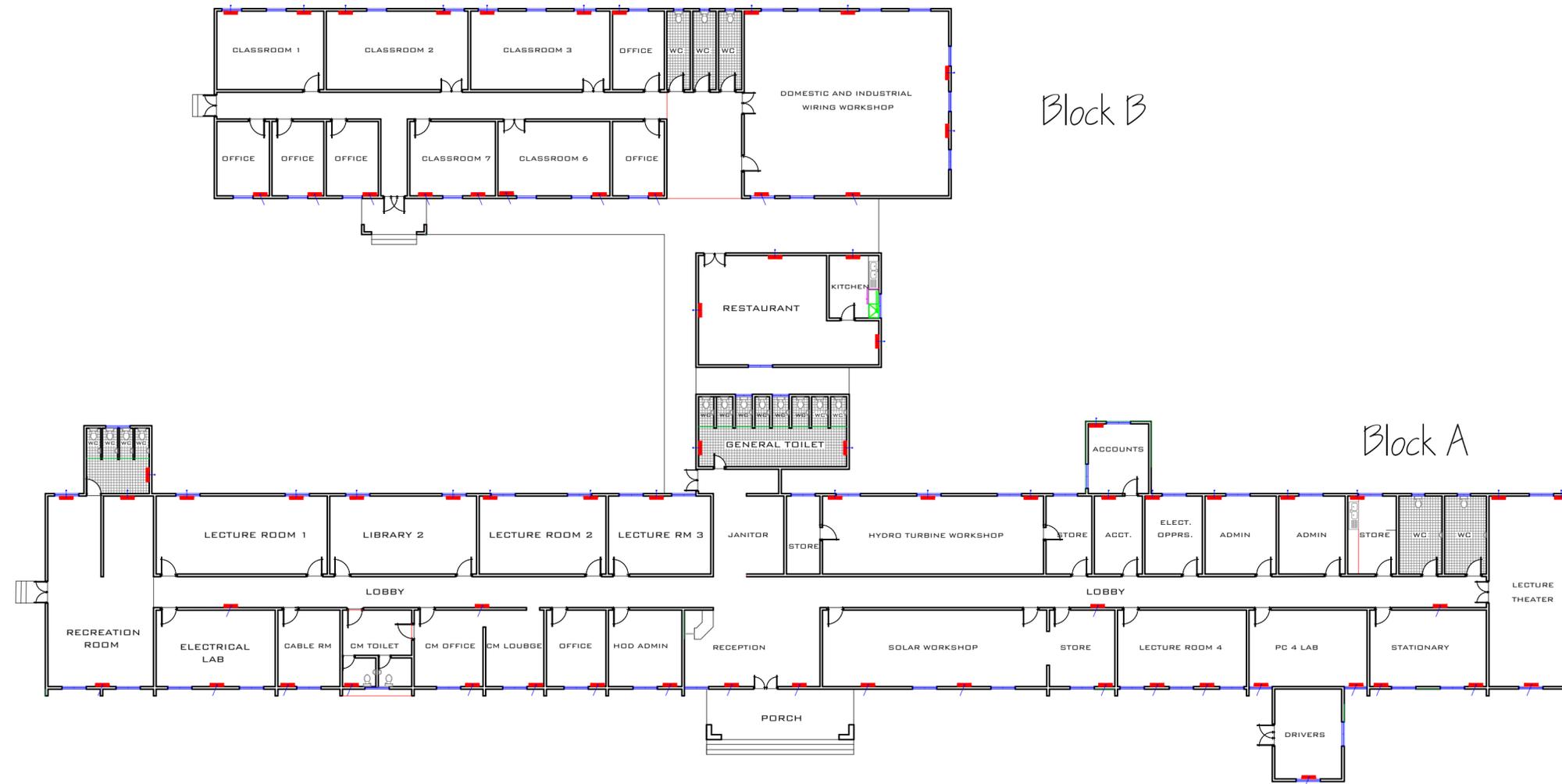
19

DESIGNED BY: KINGCOLLINS NIG. LTD.

DRAWN BY: KINGCOLLINS NIG. LTD.

DATE: OCTOBER, 2025

DRAWING NO:



Block B

Block A

NOTE'S.

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PROJECT:

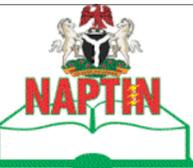
Rehabilitation and Upgrade of Naptin Kainji Regional Training Centre and Supply, Installation, Testing & Commissioning of Training Equipment Under the Program: "Enhancing Vocational Training Delivery for the Nigerian Power Sector"

LOCATION:

Naptin Regional Training Center, Kainji

CLIENT:

National Power Training Institute of Nigeria (NAPTIN)



CONTRACTOR:

Teshmont-Derekson Consortium (TDC)



PHONE: +234 803 326 1153

DRAWING TITLE: Mechanical Drawings

SCALE: SHEET NO

1:150

20

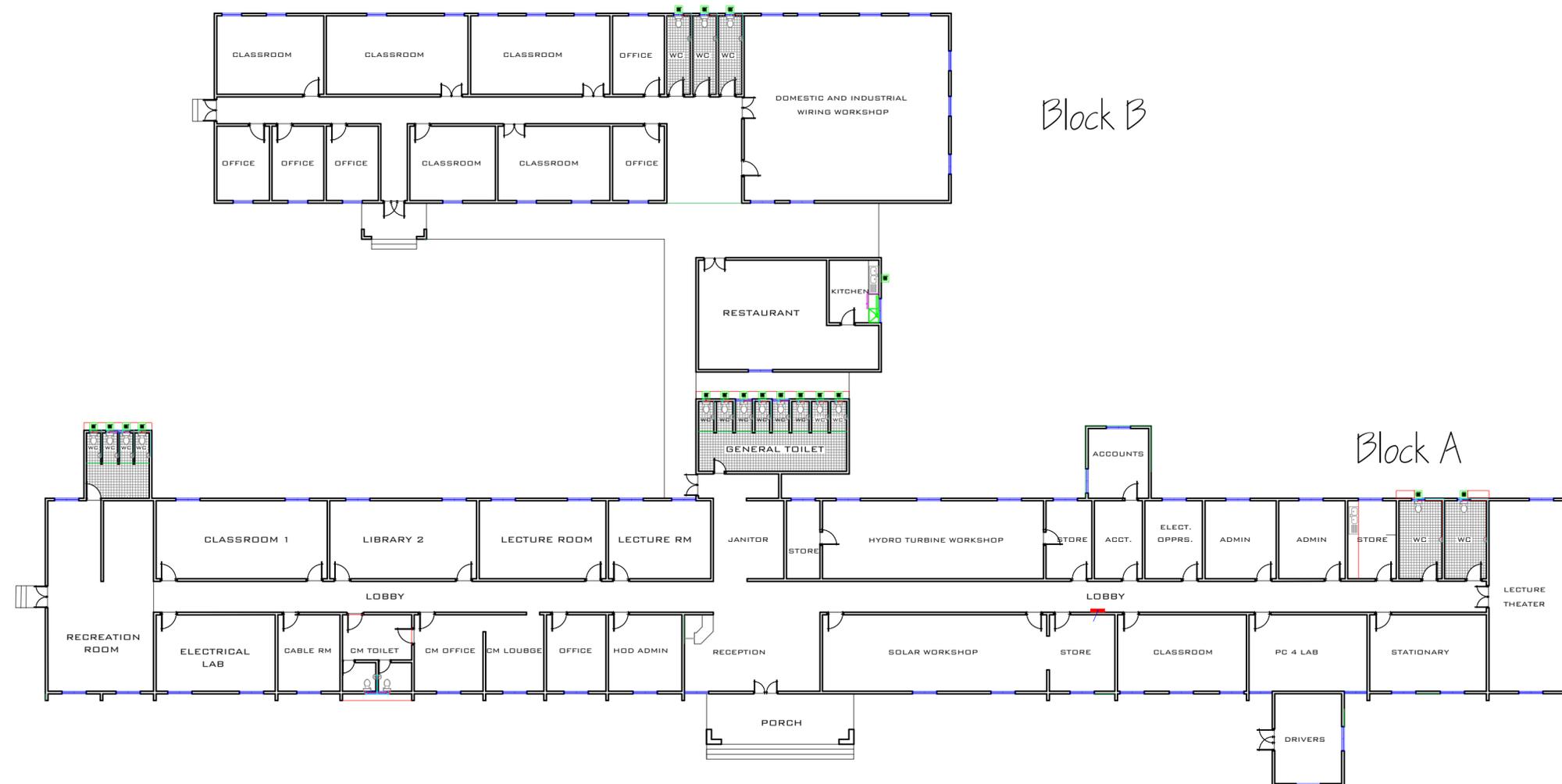
DESIGNED BY: KINGCOLLINS NIG. LTD.

DRAWN BY: KINGCOLLINS NIG. LTD.

DATE: OCTOBER, 2025

DRAWING NO:

Modified Air Conditioning and Ventilation System



Block B

Block A

Modified Water Supply System

NOTE'S.

1. Drawing must not be scaled directly, and if any ambiguity, the consultant architect must be seen without any alteration.
2. Written dimensions to be taken in preference.
3. Dimensions to be checked on site.
4. Architect is to be notified of any discrepancies between this drawing and others including those issued by the consultants and sub-contractors before commencing work.

ITEM	DESCRIPTION	INTL.	DATE

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SCALE SHEET NO

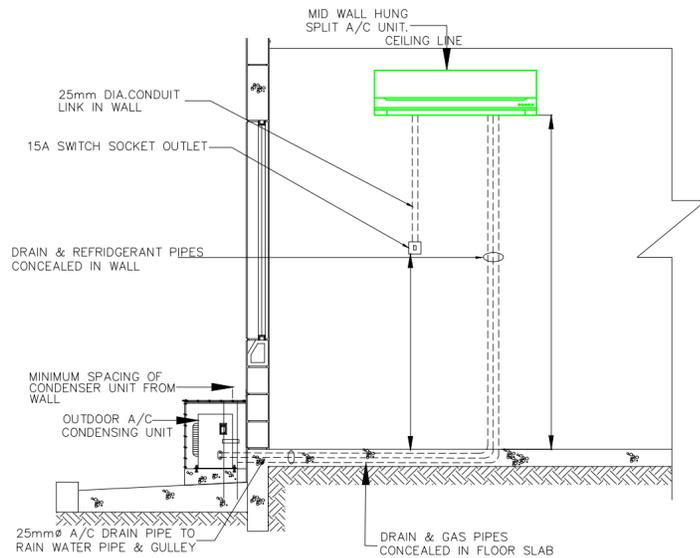
1:150 21

DESIGNED BY: KINGCOLLINS NIG. LTD.

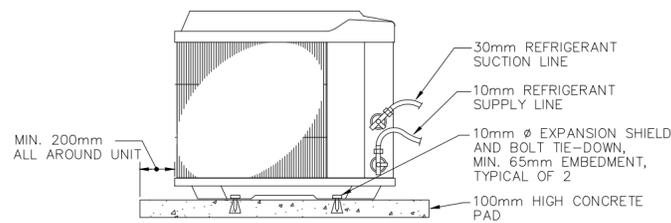
DRAWN BY: KINGCOLLINS NIG. LTD.

DATE: OCTOBER, 2025

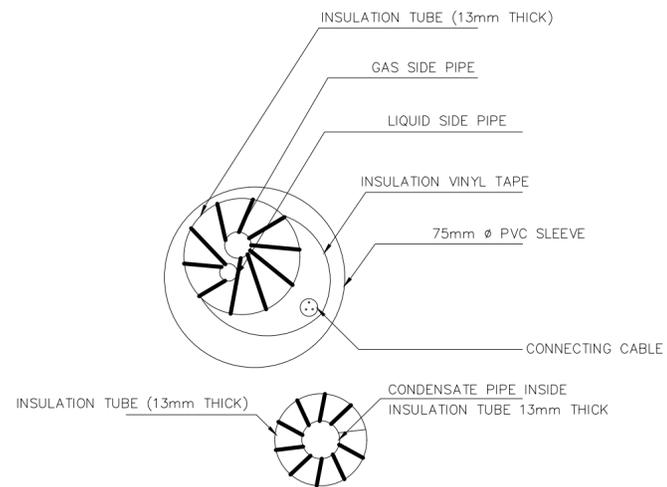
DRAWING NO:



1 FRONT ELEVATION FOR TYPICAL A/C INSTALLATION
NTS

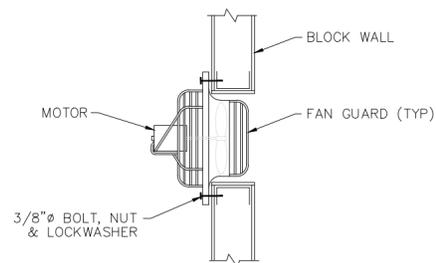


2 CONDENSING UNIT DETAIL
NTS

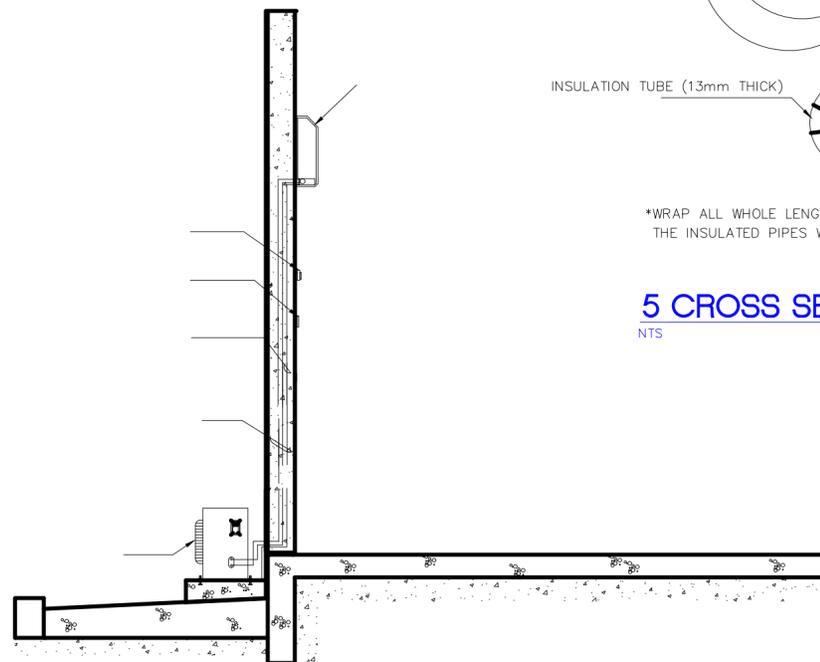


*WRAP ALL WHOLE LENGTH OF THE INSULATED PIPES WITH VINYL TAPE

5 CROSS SECTION OF A/C PIPING
NTS



3



4 TYPICAL AC INSTALLATION DETAIL
NTS

NOTE'S.

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PHONE: +234 803 326 1153

DRAWING TITLE: Mechanical Drawings

SCALE: SHEET NO

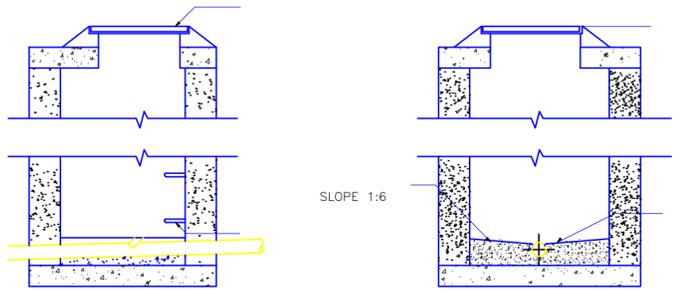
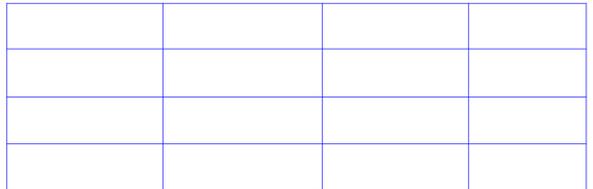
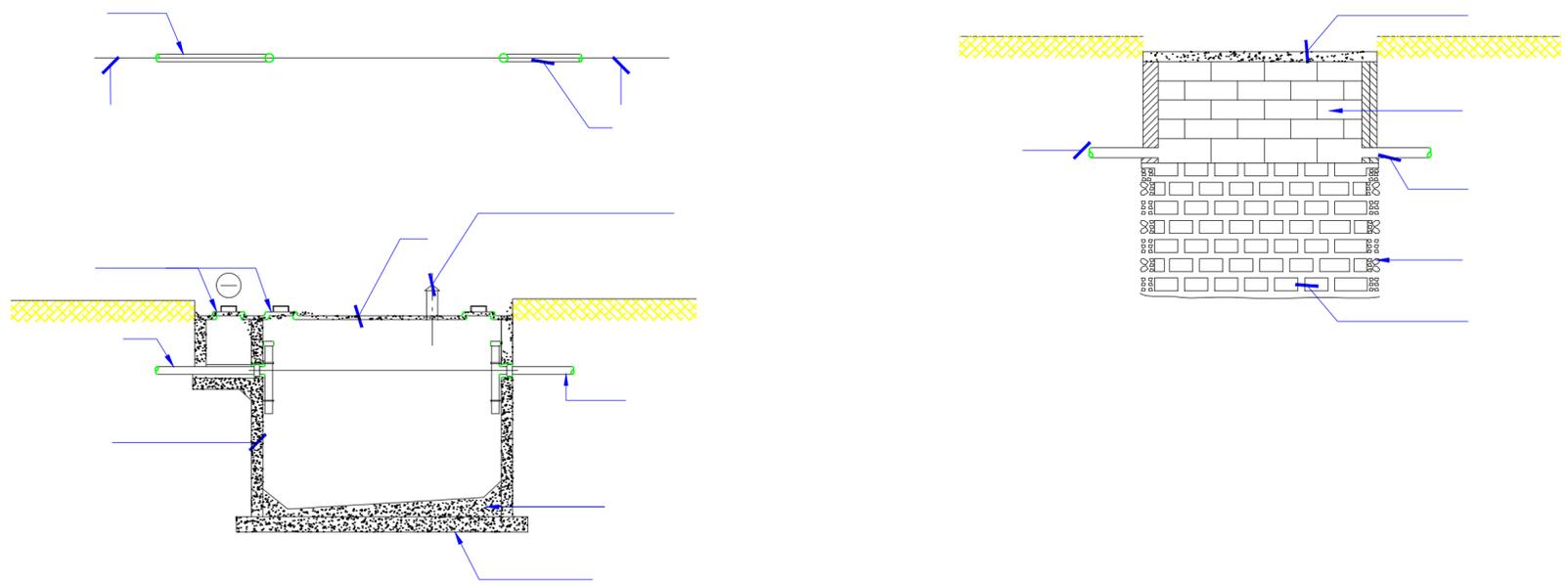
22

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DATE: OCTOBER, 2025

DRAWING NO:



NOTE'S.

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2. Written dimensions to be taken in preference.
3. Dimensions to be checked on site.
4. Architect is to be notified of any discrepancies between this drawing and others including those issued by the consultants and sub-contractors before commencing work.

ITEM	DESCRIPTION	INTL.	DATE

PROJECT:

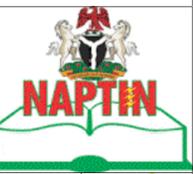
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CONTRACTOR:

Teshmont-Derekson Consortium (TDC)



PHONE: +234 803 326 1153

DRAWING TITLE: Mechanical Drawings

SCALE: SHEET NO

23

DESIGNED BY: KINGCOLLINS NIG. LTD.

DRAWN BY: KINGCOLLINS NIG. LTD.

DATE: OCTOBER, 2025

DRAWING NO:

PLUMBING DETAILS

ANNEX FIVE

SAMPLE SOCIO-ECONOMIC AND STAKEHOLDER CONSULTATION QUESTIONNAIRE

(To be administered to household heads or adult household members)

SECTION A: IDENTIFICATION INFORMATION

- **Community/Town:** _____
- **Local Government Area (LGA):** _____
- **State:** _____
- **Date of Interview:** ____ / ____ / ____
- **Name of Interviewer:** _____

Respondent Information

- **Name of Respondent:** _____
- **Relationship to Household Head:**
 Self Spouse Child Relative Other (specify): _____
- **Age (years):** _____
- **Sex:** Male Female
- **Nationality:** _____
- **Nativity:** Indigene Non-indigene
- **Length of Stay in the Community (years):** _____

SECTION B: EDUCATIONAL BACKGROUND

What is your **highest level of academic qualification?**

- No formal education
- FSLC (First School Leaving Certificate)
- WASC/SSCE
- OND / TC II
- HND / BSc
- MSc / PGD
- Other (specify): _____

SECTION C: GENERAL HOUSEHOLD INFORMATION

- **Religion:**
 Christianity Islam African Traditional Religion (ATR) Other (specify):

- **Family Pattern:**
 Nuclear Joint Individual
- **Household Size:**
 Small (2–4 persons)
 Medium (5–7 persons)
 Large (Above 7 persons)

Livelihood and Income

- **Main Occupation of Household Head:** _____
- **Monthly Income from Main Occupation (₦):** _____
- **Secondary Source of Income:** _____
- **Monthly Income from Secondary Source (₦):** _____
- **Number of Adult Earning Members:** _____
- **Number of Dependents:** _____
- **Estimated Annual Household Expenditure (₦):** _____

SECTION D: PUBLIC UTILITIES AND INFRASTRUCTURE

Condition of Public Amenities in Your Community

Amenity	Very Good	Good	Fair	Poor
Roads to the community	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Roads within the community	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Schools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Public health facilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Potable water supply	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Public electricity supply	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Communication facilities (phone/postal)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION E: WATER SUPPLY

What is the main source of water for your household?

- River/Stream
- Borehole (commercial)
- Borehole (private)
- Public pipe-borne water
- Pond
- Water vendor
- Well water
- Other (specify): _____

SECTION F: ELECTRICITY AND ENERGY USE

Primary Source of Electricity

- Hurricane/kerosene lamp
- Private generator
- Community generator
- State Government Utility
- Company operating in the community
- PHCN / National Grid
- None

Secondary Source of Electricity

- Hurricane/kerosene lamp
- Private generator
- Community generator
- Company operating in the community
- None

Main Cooking Fuel Used

- Firewood
- Charcoal
- Kerosene
- Gas (LPG)
- Electricity

- Crop residue / Sawdust
- Animal waste
- Other (specify): _____

SECTION G: HEALTH AND SANITATION

Toilet Facilities Used

- Pit latrine
- Bush/open defecation
- Bucket system
- Water closet
- Other (specify): _____

Household Waste Disposal Method

- Private open dump
- Public open dump
- Organized waste collection
- Burning
- Bush disposal
- Burying

Common Diseases/Health Conditions in the Area

- Malaria
- Typhoid
- Diarrhoea
- Cough
- Respiratory disturbances
- Other (specify): _____

SECTION H: PROJECT AWARENESS AND PERCEPTION

1. Are you aware of the proposed Rehabilitation Project?

- Yes No

If Yes, source of information:

- Community meeting
- Traditional leader

- Government officials
- Media
- Others (specify): _____

2. What is your overall opinion about the project?

- Good Bad Cannot say

3. If Good, what positive impacts do you expect from the project?

(e.g. improved facilities, employment, better access, training opportunities)

4. If Bad, what negative impacts do you foresee?

(e.g. noise, waste, safety risks, displacement, disruption of activities)

5. Do you have any concerns or suggestions regarding the project?

SECTION I: ADDITIONAL COMMENTS

Any other comments you would like to make regarding the project or your community:

Enumerator's Remarks (if any):

Signature / Thumbprint of Respondent: _____

Date: ____ / ____ / ____

ANNEX SIX

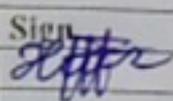
Field Note (NAPTIN)

AIR QUALITY MEASUREMENT SHEET

Ref No.	
Company Name	TEST MOUNT - DEREKSON Consortium (TDC)
Project Title	ENVIRONMENTAL, SOCIAL, HEALTH AND SAFETY (ESHS) MANAGEMENT
Location	OF THE REHABILITATION OF NAPTIN BUILDING, KAINJI, NGW
Date	BUSA - 22nd - 24th October, 2025

Sample Point	CO ppm	SO ₂ ppm	NO ₂ ppm	H ₂ S ppm	CO ₂ ppm	VOCs ppm	SPM		Noise (dB)
							PM _{2.5}	PM ₁₀	
AQ 1	1.00	0.00	0.01	0.00	320	0.00	4.40	8.10	44.20
AQ 2	2.00	0.00	0.01	0.00	373	0.00	4.00	8.50	43.70
AQ 3	1.00	0.00	0.00	0.00	387	0.00	5.20	8.40	46.60
AQ 4	1.00	0.00	0.00	0.00	383	0.00	6.10	7.60	45.20
AQ 5	2.00	0.00	0.00	0.00	379	0.00	5.40	8.20	44.20
AQ 6	2.00	0.00	0.00	0.00	374	0.00	6.40	7.70	45.70
AQ 7	1.00	0.00	0.00	0.00	388	0.01	5.30	7.70	43.00
AQ 8	1.00	0.00	0.00	0.00	384	0.01	6.90	8.80	43.30
AQ 9	2.00	0.00	0.00	0.00	381	0.02	5.40	8.30	44.20
AQ 10	1.00	0.01	0.00	0.00	284	0.00	5.00	7.50	43.20
AQ 11	1.00	0.01	0.00	0.00	383	0.00	6.30	9.10	46.00
AQ 12	1.00	0.01	0.00	0.00	280	0.03	5.40	8.00	45.40
AQ 13	1.00	0.01	0.00	0.00	385	0.00	6.20	8.00	43.10
AQ 14	1.00	0.01	0.00	0.00	381	0.00	5.40	7.50	43.40
AQ 15 Ctrl	1.00	0.02	0.00	0.00	381	0.00	6.70	8.20	43.00
AQ 16									
AQ 17									
AQ 18									
AQ									
AQ									
AQ									
AQ									
AQ									
FME _{env} Limits	10	0.01	0.04-0.06	0.008	-	0.2-5.0	25	-	80
World Bank AQG 2021	4mg/m ³ (24 Hrs)	40µg/m ³ (24 Hrs)	25µg/m ³ (24 Hrs)	-	-	-	-	45µg/m ³	-

Fieldworks, 2025

Name	Organization	Sign
Peter K. Agubue	ISIL Supervisor	

METEROLOGY MEASUREMENT SHEET

Ref No.	
Company Name	TESHMONT - DEREKSON consortium (TDC)
Project Title	ESHS Management of the Rehabilitation of NAPTAN building
Location	Kainji, New Bussa
Date	22nd - 24th October

Sample Code/Location	Temp (°C)	Dew Point (°C)	Wet Bulb (°C)	Relative Humidity (%RH)	Atmospheric Pressure (HPA)	Wind Speed (m/s)
MET 1	33.40	16.20	18.50	45.30	1013.90	0.40
MET 2	32.20	14.90	17.90	45.80	1012.40	0.60
MET 3	30.80	15.80	18.30	46.90	1013.50	1.00
MET 4	33.30	15.30	18.30	44.00	1013.70	0.70
MET 5	31.30	15.60	18.50	45.00	1013.60	1.00
MET 6	31.50	15.70	18.30	45.30	1013.40	1.50
MET 7	31.90	15.60	17.40	45.00	1013.80	0.80
MET 8	31.60	16.40	18.00	45.60	1013.50	0.80
MET 9	31.50	15.00	19.10	45.20	1013.60	1.00
MET 10	32.20	15.20	18.00	46.50	1012.90	1.10
MET 11	31.60	15.30	19.30	47.40	1013.40	1.50
MET 12	32.10	15.70	18.10	46.50	1013.80	1.40
MET 13	32.20	16.40	18.30	47.00	1013.40	1.30
MET 14	32.40	14.50	17.00	45.00	1013.20	1.00
MET 15 Control	31.80	15.60	17.20	45.30	1013.50	1.20
MET 16						
MET						
MET						
MET						
MET						
MET						
MET						
MET						
MET						
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MET						
MET						
MET						

Fieldworks, 2025

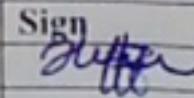
Name	Organization	Sign
Peter K. Agabue	Supervisor	

WATER IN-SITU MEASUREMENT SHEET

Ref No.	TESHMONT - DEREKSON Consortium (TDC)		
Company Name	ESHS Management of the Rehabilitation of NAPTIN Build		
Project Title	Kainji, New Bussa, Niger stat		
Location			
Date	22nd - 24th October, 2025		

Sample Code	Date/ Time	Sources/Sample Locations	pH	Temp	DO	EC	TDS	SAL
Groundwater								
GW1	23/10	Project site	8.10	29.20	4.20	390.60	195.30	
GW2	23/10	Control	8.18	28.70	5.50	367.20	183.00	
GW								
GW								
GW								
GW								
GW								
GW								
GW								
GW								
GW								
Surface water								
SW 1	23/10	Upstream River Niger	8.03	29.80	8.30	172.50	86.20	
SW 2	23/10	Midstream ✓ ✓	8.16	28.50	7.20	171.40	85.50	
SW 3.	23/10	Downstream ✓ ✓	8.29	28.70	8.10	180.30	90.20	
SW								
SW								
SW								
SW								
SW								
SW								
SW								

Fieldworks, 2025

Name Peter K. Agble	Organization Supervisor	Sign 

ANNEX SEVEN

DETAILED RESULT OF SAMPLES TESTED

Soil Analysis Result

Parameter	SS1	SS2	SS3	SS4	SS5	SS6 (Control)	Standard (FMEnv / WHO)
Soil Texture (USCS)	CH	SC	SP	CL	ML	SC	—
Soil Colour	Dark brown	Brown	Light brown	Brown	Brown	Dark brown	—
pH	6.2	6.5	6.3	6.1	6.4	6.7	5.5–8.5
Organic Matter (%)	2.1	2.4	2.0	1.9	2.2	2.6	—
Organic Carbon (%)	1.22	1.39	1.16	1.10	1.28	1.51	—
Moisture Content (%)	14.5	16.2	13.8	15.0	14.2	13.5	—
Bulk Density (g/cm ³)	1.71	1.68	1.75	1.72	1.70	1.66	≤1.85
Porosity (%)	35	37	34	36	35	38	—
Cation Exchange Capacity – CEC (meq/100g)	12.1	14.2	13.4	11.8	12.6	15.1	≥10
Electrical Conductivity (μS/cm)	175	192	185	170	178	155	≤400
Total Nitrogen (%)	0.11	0.13	0.10	0.09	0.12	0.15	—
Available Phosphorus (mg/kg)	9.6	11.2	8.9	9.1	10.4	12.8	≤50
Exchangeable Potassium (mg/kg)	78	85	72	75	80	92	≤200
Calcium (Ca, mg/kg)	420	455	398	410	435	480	—
Magnesium (Mg, mg/kg)	110	125	105	115	120	135	—
Sodium (Na, mg/kg)	42	48	40	44	46	50	≤200
Sulphate (SO ₄ ²⁻ , mg/kg)	18	22	17	19	21	25	≤500
Chloride (Cl ⁻ , mg/kg)	35	38	32	34	36	40	≤250
Atterberg Limits – Plasticity Index (%)	25	21	NP	19	16	18	—
Permeability	Low	Moderate	High	Low–Mod.	Medium	Moderate	—
Lead (Pb, mg/kg)	14.3	12.5	11.6	15.1	13.8	10.9	≤50
Cadmium (Cd, mg/kg)	0.21	0.25	0.20	0.22	0.24	0.19	≤0.8
Chromium (Cr, mg/kg)	22.1	20.4	18.6	23.3	21.9	16.7	≤100
Copper (Cu, mg/kg)	18.5	16.9	15.2	19.1	17.8	14.6	≤100
Nickel (Ni, mg/kg)	9.4	8.8	7.9	10.2	9.1	7.3	≤50
Zinc (Zn, mg/kg)	85.2	79.5	72.8	88.4	81.9	67.2	≤300
Iron (Fe, mg/kg)	236	215	203	245	228	190	—
Total Heterotrophic Bacteria (CFU/g)	2.3×10 ⁴	2.6×10 ⁴	1.8×10 ⁴	2.1×10 ⁴	2.4×10 ⁴	3.1×10 ⁴	≤1×10 ⁵
Fungal Count (CFU/g)	1.2×10 ³	1.5×10 ³	1.0×10 ³	1.3×10 ³	1.4×10 ³	1.1×10 ³	≤1×10 ⁴
E. coli Presence	ND						
Salmonella spp.	ND						

ND = Not Detected, USCS Codes; CH – High Plasticity Clay; SC – Clayey Sand; SP – Poorly Graded Sand; CL – Low Plasticity Clay

Surface Water Quality Analysis

Parameter	SW1 – Upstream	SW2 – Midstream	SW3 – Downstream (Control)	FME _{env} / WHO Standard
pH	6.7	6.5	6.8	6.5 – 8.5
Temperature (°C)	26.4	26.8	26.1	≤ 30
Dissolved Oxygen (DO, mg/L)	6.2	5.6	6.4	≥ 5.0
BOD ₅ (mg/L)	3.5	4.2	2.9	≤ 6.0
COD (mg/L)	10.4	12.1	9.6	≤ 30
Total Suspended Solids (TSS, mg/L)	22.4	28.6	19.5	≤ 50
Total Dissolved Solids (TDS, mg/L)	140	162	132	≤ 500
Turbidity (NTU)	6.5	7.8	5.9	≤ 10
Electrical Conductivity (μS/cm)	220	245	198	≤ 400
Nitrate (NO ₃ ⁻ , mg/L)	2.1	2.6	1.8	≤ 50
Nitrite (NO ₂ ⁻ , mg/L)	0.03	0.04	0.02	≤ 3
Ammonia (NH ₃ , mg/L)	0.02	0.04	0.01	≤ 1.5
Phosphate (PO ₄ ³⁻ , mg/L)	0.35	0.42	0.28	≤ 2
Sulphate (SO ₄ ²⁻ , mg/L)	6.8	7.4	6.1	≤ 250
Chloride (Cl ⁻ , mg/L)	18.3	21.1	16.6	≤ 250
Calcium (Ca, mg/L)	27.5	30.1	24.8	≤ 75
Magnesium (Mg, mg/L)	12.4	14.7	11.9	≤ 50
Sodium (Na, mg/L)	15.2	18.7	13.1	≤ 200
Potassium (K, mg/L)	3.4	4.1	3.2	≤ 12
Lead (Pb, mg/L)	0.012	0.015	0.008	≤ 0.01
Cadmium (Cd, mg/L)	0.002	0.003	<0.002	≤ 0.003
Chromium (Cr, mg/L)	0.03	0.04	0.02	≤ 0.05
Zinc (Zn, mg/L)	0.45	0.50	0.38	≤ 3.0
Iron (Fe, mg/L)	0.45	0.52	0.40	≤ 0.30
Oil & Grease (mg/L)	0.9	1.3	0.7	≤ 10
Hydrocarbons (TPH, mg/L)	<1.0	1.5	<1.0	≤ 5
Total Coliform (CFU/100 mL)	220	300	180	≤ 400
E. coli (CFU/100 mL)	18	25	12	≤ 100
Salmonella spp.	ND	ND	ND	-
pH Stability Index	Stable	Slightly Acidic	Stable	—

ND = Not Detected

Sediment Quality Laboratory Results

Parameter	SW1 (Upstream)	SW2 (Midstream)	SW3 Downstream (Control)	FMEV / WHO / Standard
pH	6.4	6.2	6.5	5.5 – 8.5
Organic Matter (%)	3.2	3.6	3.1	—
Moisture Content (%)	18.5	20.2	17.9	—
Bulk Density (g/cm ³)	1.58	1.55	1.60	—
Sand (%)	62.0	58.5	64.2	—
Silt (%)	24.3	27.5	23.1	—
Clay (%)	13.7	14.0	12.7	—
Total Petroleum Hydrocarbons (TPH) (mg/kg)	5.2	8.6	4.3	≤ 50
Lead (Pb) (mg/kg)	18.1	22.4	15.6	≤ 50
Cadmium (Cd) (mg/kg)	0.32	0.38	0.29	≤ 1.0
Chromium (Cr) (mg/kg)	32.5	34.8	30.1	≤ 100
Nickel (Ni) (mg/kg)	12.4	14.2	11.7	≤ 60
Zinc (Zn) (mg/kg)	92.6	98.1	85.2	≤ 200
Iron (Fe) (mg/kg)	285	315	268	—
Total Bacteria (CFU/g)	3.1×10 ⁴	3.6×10 ⁴	2.8×10 ⁴	≤1×10 ⁵
Fungal Count (CFU/g)	1.7×10 ³	2.0×10 ³	1.5×10 ³	≤1×10 ⁴
E. coli Presence	ND	Present	ND	ND Expected
Salmonella spp.	ND	ND	ND	ND Expected

ND = Not Detected

ANNEX EIGHT

Consultation with the Naptin Regional Training Center Director and the Project Manager



Photograp with the director and Project Manager

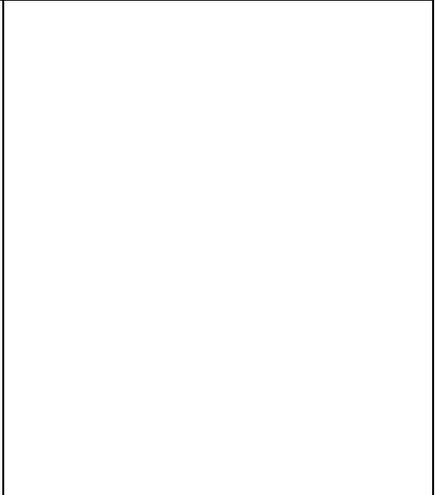


Meeting at the director office



Data gathering Team with Director and project manager at Dam site

Environmental Field Expert



**Environmental Field Scientist at the project site
Stakeholder Engagement activities**



At the palace of the Dakaichi



Naptin liaison officer introducing the consultant



Consultant at



TEHMONT- DEREKSON CONSORTIUM
 NAPTIN Regional Training Centre
 23.10.2025 11:14
 9.853951, 4.61302
 VJ3749SM, Kabatashi 923106

Presenting a refreshment and a token to the Dakaichi



TEHMONT- DEREKSON CONSORTIUM
 NAPTIN Regional Training Centre
 23.10.2025 11:19
 9.853950, 4.61304
 VJ3749SM, Kabatashi 923106

Photograph at



TEHMONT- DEREKSON CONSORTIUM
 NAPTIN Regional Training Centre
 28.10.2025 11:20
 9.853951, 4.61302
 VJ3749SM, Kabatashi 923106

Photograph with community Leader



TEHMONT- DEREKSON CONSORTIUM
 NAPTIN Regional Training Centre
 23.10.2025 11:22
 9.853951, 4.61302
 VJ3749SM, Kabatashi 923106

Photograph with youth group



TEHMONT- DEREKSON CONSORTIUM
 NAPTIN Regional Training Centre
 23.10.2025 11:21
 9.853951, 4.61302
 VJ3749SM, Kabatashi 923106

Photograph with women group

Data gathering Picture



TEHMONT- DEREKSON CONSORTIUM
 NAPTIN Regional Training Centre
 22.10.2025 12:57
 9.86382, 4.61890
 Wawa, Mokwa Rd, Nassarawa 923106

Air Quality Measurement at the project site



TEHMONT- DEREKSON CONSORTIUM
 NAPTIN Regional Training Centre
 22.10.2025 12:57
 9.86380, 4.61890
 Wawa, Mokwa Rd, Nassarawa 923106



TEHMONT- DEREKSON CONSORTIUM
 NAPTIN Regional Training Centre
 22.10.2025 13:00
 9.86382, 4.61888
 Wawa, Mokwa Rd, Nassarawa 923106

Noise Measurement



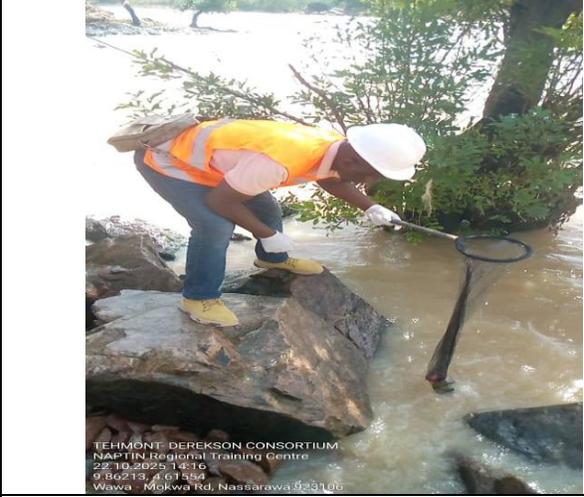
Soil Sample collection

Surface water collection



Surface water collection

Surface water In-situ measurement



Hydrobiology sampling

Traffic Assessment

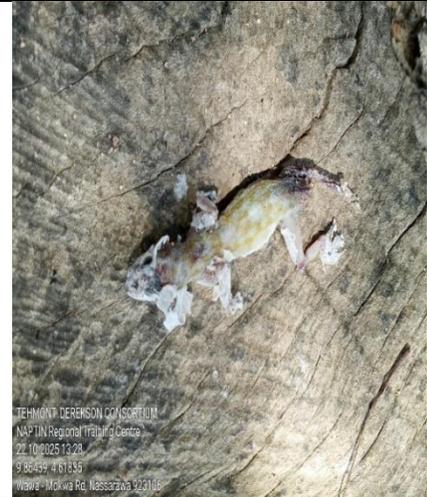
Biodiversity Study



TEHMONT-DEREKSON CONSORTIUM
NAPTIN Regional Training Centre
23.10.2023 13:12
9.84998, 4.59600
Wawa - Mokwa Rd



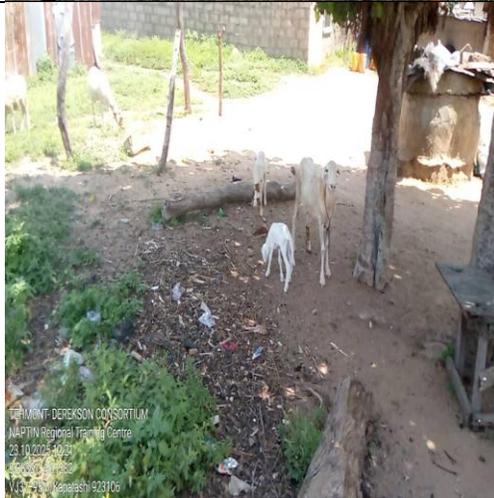
TEHMONT-DEREKSON CONSORTIUM
NAPTIN Regional Training Centre
23.10.2023 13:13
9.84999, 4.59602
Wawa - Mokwa Rd



TEHMONT-DEREKSON CONSORTIUM
NAPTIN Regional Training Centre
22.10.2023 13:28
9.86439, 4.61835
Wawa - Mokwa Rd, Nassarawa 923106



TEHMONT-DEREKSON CONSORTIUM
NAPTIN Regional Training Centre
23.10.2023 13:27
9.85424, 4.61835



TEHMONT-DEREKSON CONSORTIUM
NAPTIN Regional Training Centre
23.10.2023 13:31
9.85424, 4.61835
Wawa - Mokwa Rd, Nassarawa 923106



TEHMONT-DEREKSON CONSORTIUM
NAPTIN Regional Training Centre
22.10.2023 13:31
9.86439, 4.61835
Wawa - Mokwa Rd, Nassarawa 923106

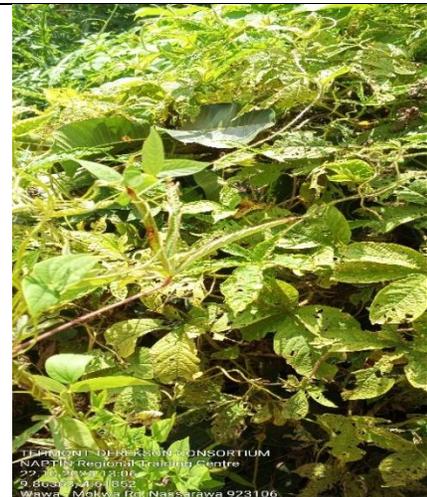
Fauna Study



TEHMONT-DEREKSON CONSORTIUM
NAPTIN Regional Training Centre
22.10.2023 13:04
9.86027, 4.61837
Wawa - Mokwa Rd, Nassarawa 923106



TEHMONT-DEREKSON CONSORTIUM
NAPTIN Regional Training Centre
22.10.2023 13:05
9.86027, 4.61837
Wawa - Mokwa Rd, Nassarawa 923106



TEHMONT-DEREKSON CONSORTIUM
NAPTIN Regional Training Centre
22.10.2023 13:06
9.86027, 4.61837
Wawa - Mokwa Rd, Nassarawa 923106



TEHMONT-DEREKSON CONSORTIUM
NAPTIN Regional Training Centre
22.10.2025 13:02
9.86369, 4.61862
Wawa - Mokwa Rd, Nassarawa 923106



TEHMONT-DEREKSON CONSORTIUM
NAPTIN Regional Training Centre
22.10.2025 13:06
9.86369, 4.61864
Wawa - Mokwa Rd, Nassarawa 923106



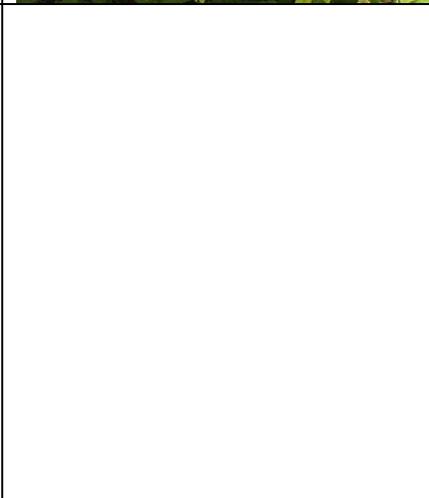
TEHMONT-DEREKSON CONSORTIUM
NAPTIN Regional Training Centre
22.10.2025 13:06
9.86362, 4.61849
Wawa - Mokwa Rd, Nassarawa 923106



TEHMONT-DEREKSON CONSORTIUM
NAPTIN Regional Training Centre
22.10.2025 13:06
9.86369, 4.61864
Wawa - Mokwa Rd, Nassarawa 923106



TEHMONT-DEREKSON CONSORTIUM
NAPTIN Regional Training Centre
22.10.2025 13:06
9.86360, 4.61861
Wawa - Mokwa Rd, Nassarawa 923106



Flora study

Some Faeturs at Naptin Regional Training Center



TEHMONT-DEREKSON CONSORTIUM
NAPTIN Regional Training Centre
23.10.2025 10:30
9.86457, 4.61744
Wawa - Mokwa Rd, Nassarawa 923106

Class Room



TEHMONT-DEREKSON CONSORTIUM
NAPTIN Regional Training Centre
22.10.2025 13:05
9.86369, 4.61864
Wawa - Mokwa Rd, Nassarawa 923106

Facility Frontage Landscaping



TEHMONT-DEREKSON CONSORTIUM
NAPTIN Regional Training Centre
22.10.2025 13:05
9.86378, 4.61835
Wawa - Mokwa Rd, Nassarawa 923106

Generator

Socioeconomics Study and Indicator



Community Mosqu under Construction



Anglican Church



Primary School



Photograph with the primary School students



Fish Feed grinding and peleting



Sun drying Fish feed



Sun drying farm produce



TEHMONT-DEKESON CONSORTIUM
NAPTIN Regional Training Centre
23/10/2025 12:42
9.86161, 4.61357
Uremed Road, Komi 923106

Sun drying groundnut



TEHMONT-DEKESON CONSORTIUM
NAPTIN Regional Training Centre
23/10/2025 12:42
9.86161, 4.61357

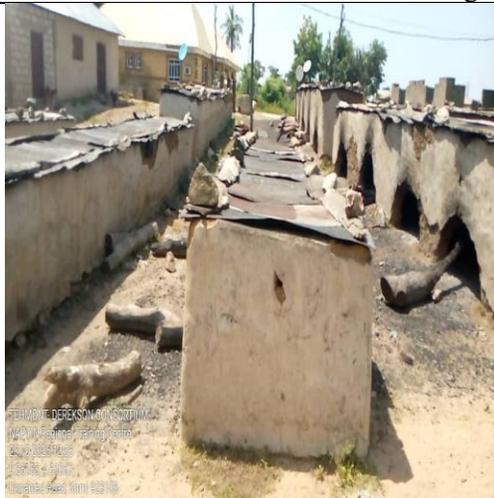
Housing Pattern



TEHMONT-DEKESON CONSORTIUM
NAPTIN Regional Training Centre
23/10/2025 12:42
9.86161, 4.61357

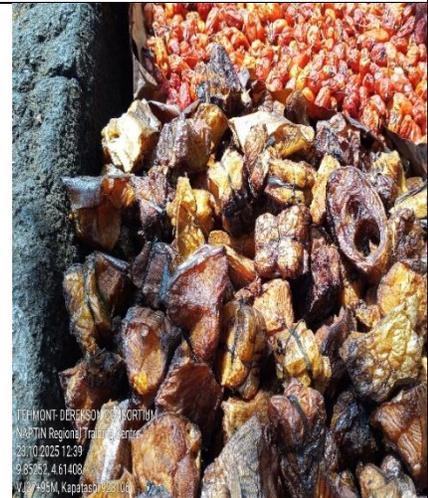


TEHMONT-DEKESON CONSORTIUM
NAPTIN Regional Training Centre
23/10/2025 12:36
9.86161, 4.61357
#KWAU23420 Fakun Rafi, Kapatashi 923106



TEHMONT-DEKESON CONSORTIUM
NAPTIN Regional Training Centre
23/10/2025 12:36
9.86161, 4.61357
#KWAU23420 Fakun Rafi, Kapatashi 923106

Fish smoking kiln



TEHMONT-DEKESON CONSORTIUM
NAPTIN Regional Training Centre
23/10/2025 12:39
9.86161, 4.61408
Uremed Road, Komi 923106

Sun drying smoking fish



TEHMONT-DEKESON CONSORTIUM
NAPTIN Regional Training Centre
23/10/2025 12:39
9.86161, 4.61406
Uremed Road, Komi 923106

Fish undergoing processing for smoking



TEHMONT-DEKESON CONSORTIUM
NAPTIN Regional Training Centre
23/10/2025 12:34
9.86161, 4.61370
Uremed Road, Komi 923106

Fish Pond



TEHMONT-DEKESON CONSORTIUM
NAPTIN Regional Training Centre
22/10/2025 14:09
9.86204, 4.61558
Wawa - Mokwa Rd, Nasserawa 923106

Kanji Dam



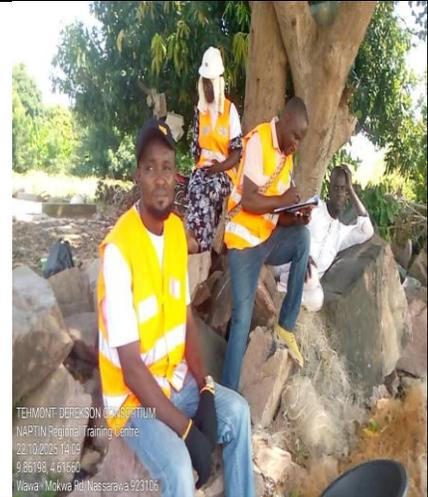
TEHMONT- DEREKSON CONSORTIUM
NAPTIN Regional Training Centre
23.10.2025 12:46
9.83407, 4.61239

Means of transportation



TEHMONT- DEREKSON CONSORTIUM
NAPTIN Regional Training Centre
23.10.2025 12:35
9.83407, 4.61357
9.83407, 4.61357

Fuel wood



TEHMONT- DEREKSON CONSORTIUM
NAPTIN Regional Training Centre
22.10.2025 14:09
9.86198, 4.61660
Wawa - Mokwa Rd, Nassarawa 923106

Focus group Discution with Fisherman



TEHMONT- DEREKSON CONSORTIUM
NAPTIN Regional Training Centre
23.10.2025 14:29
9.86203, 4.61563
Wawa - Mokwa Rd, Nassarawa 923106

Fisherman at the Dam site

ANNEX NINE

Community Engagement Meeting

STAKEHOLDERS ATTENDANCE LIST

NAME OF PROJECT: Rehabilitation and Upgrade of NAPTIN Kainji Regional Training Centre and Supply, Installation, Testing & Commissioning of Training
 NAME OF STATE/LGA: Niger State / New Bussa

DATE: 23-10-2025

S/N	NAME	CONTACTS	DESIGNATION/ COMMUNITY	SIGN
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6	Fakun J.S. MANUDA	08054568592	Fakun	
7	MUSA FAKUN	NIL	Fakun	
8	RAKIYA ABUBAKAR IDRIS	07041147938	Fakun	
9	RAKIYA SAIDU		Fakun	
10	HALIMA ABDULLAH		Fakun	
11	RABI MOHAMMED		Fakun	
12	FATI IDRIS		Fakun	
13	MARTAN -M ATUBA		Fakun	
14	BALI HASSAN		Fakun	
15	NURAIN MOH'D	08142564904	Fakun	
16	UBAIDA IBRAHIM	07013921420	Fakun	
17	Muhammed Sule O.	08105941380	Site Mgr.	
18	Peter K. Agabue	08037634882	Project Team Lead	
19	Engr. Akaje O. Akeem		NAPTIN KIC	
20	Bachi Y. Daliyas	0812813552	Environmental Scientist	

