REPORT ON

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP) FOR THE CONSTRUCTION OF INTERNATIONAL STUDENTS HOSTEL FOR THE AFRICA CENTER OF EXCELLENCE FOR POPULATION HEALTH AND POLICY (ACEPHAP), BAYERO UNIVERSITY KANO, NIGERIA

(AFRICA CENTRES OF EXCELLENCE FOR DEVELOPMENT IMPACT) PROJECT

JANUARY 2023

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LIST OF ACRONYMS AND THEIR DEFINITIONS

ACE	African Centre for Excellence
ACEPHAP	Africa Center of Excellence for Population Health and Policy
AKTH	Aminu Kano Teaching Hospital
ASUU	Academic Staff Union of Universities
B	Bottom
BUK	Bayero University Kano
CBOs	Community Based Organizations
CDA	Centre for Dryland Agriculture
CO	Carbon Monoxide
CSOs	Civil Society Organizations
EMP	Environmental Management Plan
ESIAs	Environmental and Social Impact Assessments
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Standards
FAC	First Aid Cases
FMEnv	Federal Ministry of Environment
FGDs	Focus Group Discussions
FRSC	Federal Road Safety Corps
GPS	Global Positioning System
GRM	Grievance Redress Mechanism
H_2S	Hydrogen Sulphide
IEC	Independent Environmental Consultant
IUCN	International Union for Conservation of Nature and Natural Resources
LGA	Local Government Area
LTI	Lost Time Injuries
MDAs	Ministries, Departments and Agencies

NESREA	National Environmental Standards and Regulations Enforcement Agency
ND	Not Detected
NGOs	Non-Governmental Organizations
NO_2	Nitrogen Dioxide
OHS	Occupational Health and Safety
OP	Operational Policy
PAPs	Project Affected Persons
PDO	Project Development Objective
PIC	Prior Informed Consent
PIU	Project Implementation Unit
PPE	Personal Protective Equipment
ACEPHAP	Regional Innovation, Training and Entrepreneurship Accelerator
SEP	Stakeholder Engagement Plan
SPM	Suspended Particulate Matter
T	Top
TPV	Third Party Validation
WB	World Bank

EXECUTIVE SUMMARY

ES 1 Introduction

The Africa Higher Education Centers of Excellence (ACE) Project is a World Bank initiative in collaboration with governments of participating countries to support Higher Education institutions in specializing in Science, Technology, Engineering and Mathematics (STEM), Environment, Agriculture, applied Social Science / Education and Health. It is the first World Bank project aimed at the capacity building of higher education institutions in Africa.

The first phase (ACE I) was launched in 2014 with 22 Centers of Excellence in nine (9) West and Central African countries; Benin, Burkina Faso, Cameroon, Côte d'Ivoire, Gambia, Ghana, Nigeria, Senegal and Togo. The Project aims to promote regional specialization among participating universities in areas that address specific common regional development challenges. It also aims to strengthen the capacities of these universities to deliver high quality training and applied research as well as meet the demand for skills required for Africa's development. The second phase (ACE II) was launched in East and Southern Africa with 24 centers across Ethiopia, Kenya, Malawi, Mozambique, Rwanda, Tanzania, Uganda and Zambia.

Based on the initial successes, the World Bank and the French Development Agency (AFD) in collaboration with the African governments, launched the ACE Impact-2 Project to strengthen post-graduate training and applied research in existing fields and support new fields that are essential for Africa's economic growth. There are 53 ACEs; 5 Emerging Centers;1 “top up” center in Social Risk Management; and 5 Colleges and Schools of Engineering. The new areas include sustainable cities; sustainable power and energy; social sciences and education; transport; population health and policy; herbal medicine development and regulatory sciences; public health; applied informatics and communication; and pastoral production.

ES 2 Project Components

Project Components

The Project has 3 components

Component 1: This component aims to build and strengthen the capacity of competitively selected ACE Impact centers based in higher education institutions across West and Central Africa.

Component 2: Component 2 seeks to expand the regional scope of impact of the ACEs funded under Component 1 by providing demand-side funding for partnering institutions and regional students to buy the training and services from the ACEs that are most relevant:

Component 3: Enhancing Regional Policymaking, Monitoring, and Facilitation.

The **Project Development Objectives** overall goal of the proposed Africa Center of Excellence for Population Health and Policy (ACEPHAP):

- To train postgraduate students to acquire knowledge, skills and competences towards achieving health-related SDGs
- To strengthen capacity and capability of translating research findings to policy and practice
- To promote and enable gender parity and participation in population health research and policy
- To increase the nursing human resources for health in West and Central Africa

ES 3 Need for ESMP

This project is being guided by various applicable policies, regulations and guidelines on conducting ESMP studies stipulated by relevant authorities. These include Federal Ministry of Environment, State Ministry of Environment, as well as the World Bank Environmental and Social Framework (ESF).

It identifies mitigation, monitoring and institutional measures to be taken to avoid or minimize adverse environmental impacts during project implementation and operation. The long-term beneficial impacts include improved learning for postgraduate education students in the campus.

The World Bank has Operational Policies (OP) to avoid, reduce or eliminate adverse environmental and social impacts of potential projects, as well as improve decision making. The ESMP project has triggered the following policies:

- OP 4.01 Environmental Assessment which covers impacts on the environment (air, water and land), human health and safety, physical cultural resources, and global transboundary and environmental issues,
- OP 4.11 Cultural Physical Resources which provides cultural heritage guidelines to avoid or mitigate adverse impacts of development projects.

ES 4 Legal and Institutional Framework

The relevant national laws, legislation and policies aimed at protecting the environment and particularly to guide the preparation of the ESMP for the proposed project have been integrated including the Operational Policies of the World Bank.

ES 5 Environmental and Social Baseline

The purpose of the baseline data acquisition was to establish, the status of the various environmental components that are likely to be affected by the proposed project. In order to achieve this, environmental parameters were determined from literature survey, fieldwork, laboratory and data analyses. The components of the environment evaluated covered biophysical, social and health.

The approach adopted was to obtain ecological baseline data from desktop, field and laboratory
studies, interviews and consultations with individuals/representatives of the communities of the project area. This approach would provide adequate information for establishing the baseline status of the environment of the study area.

For the purpose of baseline data acquisition, an integrated and interdisciplinary team of professionals and practitioners were engaged. The various areas covered in course of this study are: Air quality, Soil, Water Quality (Surface and Ground water), Noise, Meteorology, Vegetation and Socio-economics.

The proposed ACEPHAP Center is located at Aminu Kano Teaching Hospital Bayero University Kano (11.9634° N, 8.5504° E) Nigeria. It is within the North-Western Zone of Nigeria, which is heavily populated. undertaken. The scope covered includes:

- Meteorology
- Air Quality and Noise
- Soil, Land use and land cover
- Vegetation and Wildlife
- Geology/Hydrogeology
- Surface water
- Human Health
- Socio-economics

ES 6 Description of Environmental and Social Impacts and its Environmental and Social Management Plan.

The development of buildings and improvement of existing facilities have potential negative effects to the physical environment and social wellbeing of the communities as well as natural habitats. The potential negative impacts from building construction projects could include: environmental pollution from construction activities, risk to health and safety of the residents and employees, demand of construction materials such as water, wood, gravel and hard stones; increased run off, socio-cultural changes including loss of farming land, changes of domestic and wild animals access to water point, demolition of structures, interference with animal reserves and foot paths, increased traffic, increased ambient air pollution, increased potential for road accidents, increased surface run off and associated disasters among other impacts. Other anticipated impacts from the building project will be disruption of natural habitats by interference of food chains and breeding sites and habitats, risks of fatal

wildlife attack, displacement or extinction of species, destruction of land, vegetation, introduction of exotic species and possible interference with natural ecological balance, especially within the project area.
In view of the above observation, environmental concerns need to be an integral part of the planning and development process of a project and not an afterthought as it facilitates the proponent to foresee potential project impacts that can be optimized or mitigated. This can be achieved through conduction of environmental and social management Plan and continuous monitoring. The study enables the environmental experts evaluate the current environmental status, opinion of the locals; and establish the potential social and economic benefits of the project. Appropriate remedy is then integrated in the project design and implementation and the effectiveness of the remedy is managed and monitored with the guidance of the Environmental and Social Management Plan.

This however is in line with the National Environmental Impact Assessment (EIA) Decree 86 of 1992 and other Federal and Kano State Ministry of Environments' regulations and standards,
Activities of potential environmental and social impact identified with the proposed project are outlined under three (3) main phases of project activities; these are the Pre-Construction, Construction and Occupation & Maintenance phases.

Pre-Construction phase impacts
During the pre-construction phase, the main risk is neglect of the environmental and social aspects and their low consideration during the technical studies and/or the preparation of unsatisfactory environmental studies. Furthermore, site selection could include some potential environmental and social concerns and impacts.

Key mitigation measures for these risks will be:
- Public and stakeholder consultation during site selection and preparation and validation of studies.
- Quality control and implementation of validation procedures for environmental studies and their dissemination.
- Regular supervision of the building sites by environmental experts.
- Occupational Health and Safety Issues
- Public Safety Issues.

Construction phase impacts
Construction phase risks and impacts at the construction phase will be site specific and could be a source of inconvenience for workers and all those living or working on the University campus. Of these impacts, the most important are:

Negatives impacts
- Loss of vegetation and impacts on fauna.
- effects on the local microclimate
- Soil pollution, disturbance, and erosion.
- Air quality deterioration.
- Vibration and noise nuisance.

- Generation and disposal of solid waste.
- Water and sanitation
- Hygiene, health and safety of workers
- Occupational health and safety.
- Risk of spread of COVID19, respiratory and skin infections
- Public Safety issues
- risk of grievance and conflict

Positives impacts

- Increased and improved economic activities around the project site
- Temporary employment opportunity, business opportunity

Occupation & Maintenance phase

During the occupancy and maintenance phase, ACEPHAP's project activities should not pose any environmental or social problems. Potential negative impacts might generally be due to:

Negatives impacts

- Waste management and disposal
- Fire hazards
- Emission of bad odors
- Early degradation of the building due to misuse and lack of maintenance
- Public health and safety
- Occupational health and safety
- gender-based violence and sexual harassment
- Risk of spread of COVID19, respiratory and skin infections
- Failure to take account of vulnerable people (disabled students, etc.) risk of grievance and conflict

Positive impacts

- Improvement of the aesthetics of the university site/ACEPHAP
- Development of green spaces around the building
- Increased economic activity around the university/ACEPHAP
- Improved student comfort and study conditions
- Employment opportunity, business opportunity (
- Asset on the higher education system at national level

ES 7 Estimated cost of the ESMP Implementation

The cost of implementing the environmental and social management plan is expected to be Ninety-six thousand and thirty United States Dollars US$ 96,030.00) only with details outlined in Table 5.4.

ES 8 Stakeholders Consultation

Stakeholder consultations were carried out with key stakeholders on 22nd September 2022 to obtain their comments and concerns on the proposed project with respect to the potential environmental and socio-economic issues and impacts. Details Minute of consultations see Annex 3 of this Report.

ES 9 Grievance Redress Mechanism

The public consultations showed that there is already a strong communications pathway between the CDA and the host communities and this should continue to be used as a basis for the Grievance Redress Mechanism (GRM) which will be set up for the site.
In the Construction Phase the contractor will be require to establish a GRM immediately upon occupation of the site. Staff will be designated to respond to complaints on a 24/7 basis and their contact details will be advertised on signboards around the site.
During operation CDA -ACEPHAP will also establish a GRM as part of their ongoing Corporate Social Responsibility program.
A Grievance Redress Mechanism (GRM) must be set up by the contractor and a Complaints Officer appointed. A sign board should be placed outside the construction site giving contact names and mobile phone numbers. These phone numbers should be manned 24/7. Any complaints received should be responded to within 24 hours in a polite and respectful way. Complaints and remedial works should be reported at least once a month to the client under CAR – Corrective Action Reporting. Details of the GRM are given in Section 4.4.22.
The establishment of Grievance Redress Mechanisms will provide the procedures by which a resolution to a grievance is sought. A team will be put in place to ensure that complaints from affected persons are promptly addressed in a manner that is fair and acceptable to all parties in an amicable way to avoid or minimize litigation.

CHAPTER ONE: INTRODUCTION

1.0 Background

The Africa Higher Education Centers of Excellence (ACE) Project is a World Bank initiative in collaboration with governments of participating countries to support Higher Education institutions in specializing in Science, Technology, Engineering and Mathematics (STEM), Environment, Agriculture, applied Social Science / Education and Health. It is the first World Bank project aimed at the capacity building of higher education institutions in Africa.

The first phase (ACE I) was launched in 2014 with 22 Centers of Excellence in nine (9) West and Central African countries; Benin, Burkina Faso, Cameroon, Cote d'Ivoire, Gambia, Ghana, Nigeria, Senegal and Togo. The Project aims to promote regional specialization among participating universities in areas that address specific common regional development challenges. It also aims to strengthen the capacities of these universities to deliver high quality training and applied research as well as meet the demand for skills required for Africa's development.

Based on the initial successes, the World Bank and the French Development Agency (AFD) in collaboration with the African governments, launched the Second ACE Impact Project (ACE II) in 2018 across East and Southern Africa with 24 centers across Ethiopia, Kenya, Malawi, Mozambique, Rwanda, Tanzania, Uganda and Zambia to strengthen post-graduate training and applied research in existing fields and support new fields that are essential for Africa's economic growth.

There are 53 ACEs (32 new ones and 21 from ACE I); 5 Emerging Centers; 1 "top up" center in Social Risk Management; and 5 Colleges and Schools of Engineering. The new areas include sustainable cities; sustainable power and energy; social sciences and education; transport; population health and policy; herbal medicine development and regulatory sciences; public health; applied informatics and communication; and pastoral production. The second phase (ACE II) also included new selected centers in Nigeria totalling 17.

In Nigeria, The Africa Center of Excellence for Population Health and Policy (ACEPHAP) was selected to strengthen inter-disciplinary approaches to promote population health outcomes through training and research for evidence-informed policy development in West and Central Africa. This approach utilizes non-traditional partnership among different sectors of the community, public health, industry, academia, health care and local government entities to achieve positive health outcomes through policy development and implementation. The Center has adopted a strategy of translating research outputs to policy through recommendations to policy makers for implementation purposes as a process of promoting or ‘Turning Research into Practice (TRIP)’ for evidence-proven interventions.

The Center’s thematic areas of research cover maternal and child health, nursing, nutrition, mental health and global health. ACEPHAP has seven (7) main collaborating departments which run its academic programmes. These departments are Department of Obstetrics and Gynaecology, Department of Paediatrics, Department of Nursing, Department of Biochemistry, Department of Community Medicine, Department of Internal Medicine and Department of Psychiatry. They are all housed within Aminu Kano Teaching Hospital. These

ESMPs are to be utilised by the contractors, to be commissioned by ACEPHAP for the sub-projects, and will form the basis of site-specific management plans that will be prepared by the contractors as part of their construction methodology prior to works commencing.

As the proponent for the sub-projects, it is ACEPHAP 's objective to avoid, where practical, unacceptable adverse environmental, social and/or economic impacts. In the circumstance that an impact cannot be avoided, ACEPHAP and Project Management (who will be responsible for the management of the upgrade and rehabilitation phase of the project) are committed to the implementation of appropriate mitigation measures. For clarity in the management structure however, Project Management will consult ACEPHAP on matters relating to environmental health and safety performance. Project Management will however have overall responsibility for planning, implementation, monitoring and enforcement of activities associated with this ESMP and environmental and health and safety performance.

1.1 Project Components and Objectives

Component 1: Establishing new Africa Centers of Excellence and scaling up well-performing existing Africa Centers of Excellence (ACE) for development impact. This component aims to build and strengthen the capacity of competitively selected ACE Impact centers based in higher education institutions across West and Central Africa.

- Sub-component 1.1 will establish new centers of excellence for skills and knowledge for development challenges. About 30 centers will be competitively selected based on preestablished selection criteria to receive funding from ACE Impact Project.
- Sub-component 1.2: Scaling up well-performing ACEs: This sub-component will provide additional funding and support to approximately 12 existing ACEs (currently supported through ACE I) to enable them to scale-up their activities.
- Sub-component 1.3 Additional support to the best Engineering and Technology ACE institutions: Institutions will be selected to host an engineering and technology-focused ACE Impact center with capacity in other engineering and technology disciplines.

Component 2: Regional Partnerships and Scholarships. Component 2 seeks to expand the regional scope of impact of the ACEs funded under Component 1 by providing demand-side funding for partnering institutions and regional students to buy the training and services from the ACEs that are most relevant:

- Sub-component 2.1 will support regional institutional partnerships between higher education institutions and the ACEs (under component 1 of the proposed project) to strengthen the capacity of the higher education institutions.
- Sub-component 2.2 will finance two types of regional scholarships to support primarily the training of the next generation of faculty for higher education institutions in the region.

Component 3: Enhancing Regional Policymaking, Monitoring, and Facilitation. Component 3 will support regional policymaking for higher education and regional project monitoring and facilitation. Component 3 will fund, through a Regional IDA grant of US$10 million to the Association of African Universities (AAU), the facilitation of the ACE Impact project’s regional activities and support to centers under the project.

Objectives

The **Project Development Objective** of the ACE II Project is to improve the quality, quantity and development impact of postgraduate education in selected universities through regional specialization and collaboration.

1.2 Institutional Policy, Regulatory and Framework

The ACEPHAP project must comply with both the legal and Institutional framework of the 3 –tiers of Government (Federal, State and Local) in Nigeria. National Regulatory Bodies and Laws / Legislations relevant to the ACEPHAP Project in Nigeria are discussed below.

Federal Regulatory Bodies

- Federal Ministry of Environment (1999 Presidential Directive)
- The National Environmental Standards and Regulations Enforcement Agency (NESREA) Act No 25 of 2007
- The Nigerian Urban And Regional Planning Act Cap N138, LFN 2004

Federal Legislations

- Environmental Impact Assessment Act Cap E12 LFN, 2004
- Federal Environmental Protection Agency Decree No 58 (1988) (Repealed under NESREA Act)
- Land Use Act Cap 202 LFN 1990
- National Environmental Standards and Regulations Enforcement Agency (Establishments) Act of 2007

State Legislations

- Kano State Environmental Planning and Protection Law
- Kano State Refuse Management & Sanitation (REMASAB) Law

Applicable International Conventions, Treaties and Agreements

- Nigeria is signatory to some international agreements and Protocols concerning the environment and relevant to the ACEPHAP Project, notably at operational phase:
- Basel Convention on Transboundary Movement of Hazardous Waste and their Disposal.
- Montreal Protocol on the Control of Substances that Deplete the Ozone Layer and its related amendments
- Stockholm Convention on Persistent Organic Pollutants.
- United Nations Framework Convention on Climate Change (1992)
- Vienna Convention on the Protection of Ozone Layer.

The Institutional framework

Federal Ministry of Environment (1999 Presidential Directive)

The Federal Environmental Protection agency (FEPA) was established by Decree No. 58 of 1988 and subsequently amended by Decree 59 of 1992 with further amendment by Decree 14 of 1999. FEPA was absorbed into the Federal Ministry of Environment (FMEnv) in 1999 by a presidential directive and its functions among others are now the responsibility of the new Ministry. The FEPA act has now been repealed in the NESREA act No 25 of 2007

The National Environmental Standards and Regulations Enforcement Agency (NESREA) Act No 25 of 2007

The Act establishing the Agency creates provisions for the setting of air quality standards and atmospheric protection. The Act also prohibits the discharge of hazardous substances into the air or upon the land and waters of Nigeria or at the adjoining shorelines except where such discharge is permitted or authorised under any law in force in Nigeria. Importantly, these provisions constitute a framework for controlling hazardous emissions from telecommunications and ICT equipment to prevent environmental and health hazards and extended producer responsibility due diligence. Some of these regulations include:

- The National Environmental (Sanitation and Wastes Control) Regulation S.I 28 of 2009;
- National Environmental (Noise Standard and Control Emission) Regulations, S.I No. 35 of 2009;
- Operational guidelines.

Kano State Ministry of Environment

The objectives and policy thrusts of the Kano State Ministry of Environment are to:

- Formulate, monitor and evaluate government policy on environment;
- Control and monitor all forms of environmental degradation and pollution;
- Conserve, protect and enhance the environment, the ecosystem and ecological process essential for preservation and development of both flora and fauna with a view to ensuring the richness of biodiversity;
- Supervise and monitor and evaluate all projects by donor Agency relating to the environment;

Ministry of Women Affairs

The Ministry is in charge of matters relating to women and children in the State. Some areas of work include but are not limited to: Manage overall matter.

1.3 Rationale for ESMP

The proposed International students' hostel of ACEPHAP will involve construction activities that can cause negative environmental and social impacts due to the nature of works. Some of the potential negative impacts that would arise during the construction works will include: generation of hazardous and non-hazardous wastes, noise/air pollution, accident from movement of equipment and materials to site, occupational health & safety risks, risks associated with labour influx (security threat, gender-based violence (GBV) in particular Sexual Exploitation and Abuse due to labour influx, increase in STIs/STDs), grievance, among others.

All these trigger the World Bank's operational policy (OP) on Environmental Assessment (OP 4.01). In addition, the Nigeria EIA Act mandates that any construction that would have significant impact on the environment must be subjected to an environmental assessment prior to commencement of the civil works.

Thus, ACEPHAP is proposing to engage a professional consultant who would conduct an Environmental and Social Management Plan (ESMP) to identify the environmental and social impacts associated with this construction project as well as to proffer mitigation measures to address potential negative impacts.

In line with the Nigeria EIA Act mandates that any construction that would have significant impact on the environment must be subjected to an environmental assessment prior to commencement of the civil works. This Environmental and Social Management Plan (ESMP) is being developed to identify the environmental and social impacts associated with this construction project as well as to proffer mitigation measures to address potential negative impacts, taking cognisance of the World Bank's Safeguard Policies that may also be relevant to the project activities.

1.4 World Bank policies triggered

World Bank projects are guided by Environmental and Social Safeguards Guidelines and Operational Policies. This enables the integration of environmental and social considerations into the development, planning and execution of projects.

Every project is subject to a preliminary environmental and social review based on the type, location, degree of sensitivity, scale, nature, and extent of its potential environmental and social impacts, which is classed in one of the following categories:

(a) **Category A**: Project that is likely to have a negative, nerve, diverse or unprecedented impacts on the environment.
(b) **Category B**: Project whose adverse effects on the population or areas of environmental importance (land, forests, and other natural habitats, etc.) are moderate.
(c) **Category C**: Project whose likelihood of negative environmental impacts is considered minimal or zero.

The ACEPHAP Project is classified as "category C" because its adverse effects on the population or areas of environmental importance are minimal, site specific and likely reversible, and mitigation measures can be more easily designed/ implemented.

Among all the World Bank environmental and social safeguard policies, ***two Operational Policies and Bank Procedures (BPs) were triggered*** under the ACEPHAP Project. i.e. ***OP 4.01 Environmental Assessment*** and ***OP 4.11 Cultural Physical Resources.***

A summary of the World Bank Policies triggered for the project are presented in Table 1.1 below.

Table 1.1: Summary of World Bank policies and Potential triggers for the ACEPHAP International Students Hostel project.

No.	World Bank Safeguard Policy	Summary of core requirement	Potential Trigger under proposed project	Remarks
1	OP 4.01 Environmental Assessment	Requires environmental assessment (EA) of proposed project for Bank financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision making. EA considers the natural environment (air, water, and land), human health and safety, social aspects (involuntary	**Triggered** because the project activities such as site clearing and excavation will impact the air, water, and land.	1. Assessment, management and monitoring of the environmental and social risks and impacts of the project throughout the project lifecycle to meet the requirements of the policy.

		resettlement, indigenous peoples, and physical cultural resources) and trans boundary global environmental aspects. Projects are categorized into A, B, C or FI based on the extent of adverse impacts anticipated from the project. For category A and B projects an ESMP is to be prepared to guide the implementation of mitigation measures for all identified environmental impacts from the proposed project.		2. Develop the ESMP and implement all measures set out in the plan, conduct monitoring and reporting on performance of the plan
2	OP 4.11: Physical cultural Resources	Investigate the inventories cultural resources potentially affected. Include mitigation measures when there are adverse impacts on physical cultural resources or avoid if possible	**Triggered** because the project will involve major excavations, earthworks, and environmental modifications.	1. Assessment, management and monitoring of the environmental and social risks and impacts of the project throughout the project lifecycle to meet the requirements of the policy. 2. Develop the ESMP and Implement all measures set out in the plan, conduct monitoring and reporting on performance of the plan.

The ESMP will achieve the following objectives:

- Provide a detailed description of the main phases of the works (preparation, execution/construction, operation) and key activities of the works to be executed;
- Conduct public consultations with all the stakeholders of the Project in order to collect their suggestions that will be integrated in the ESMP;
- Carry out an analysis of the initial environmental status of the sites concerned and describe the biophysical, socio-economic and cultural characteristics of the environment in which the sub-project activities will take place,
- Highlight the major constraints that need to be taken into account at the time of site preparation, construction and during the construction and installation of equipment and during the operation phase;
- Identify the environmental and social components that may be impacted by the implementation of the works

- Check to ensure that the design and construction methods and the various components of the works are consistent with the ecological, social, economic and cultural realities of the project areas and, if necessary, propose any necessary readjustments;
- Analyse the legal and regulatory framework for environmental management in relation to national legislation and World Bank safeguard policies;
- Identify and analyse, by implementation phase, the potential social and environmental impacts, both positive and negative (including impacts on physical cultural resources) that may result from the realisation of the rehabilitation, renovation or construction works of the infrastructures
- Assess the significance of these impacts during the project phases, compared to the no-project scenario;
- Propose measures to optimise the positive impacts during the different phases of the works and technically viable and economically feasible mitigation measures to avoid, minimise, mitigate or compensate for the negative environmental and social impacts so as to bring them to acceptable levels; on the environment and the human environment;
- Present the costs of implementing the proposed mitigation measures;
- Assess the need for solid and liquid waste collection, disposal and infrastructure management, and make recommendations;
- Propose a mechanism for managing complaints that may arise in the course of the works.
- Potentially screen out environmentally unsound activities
- Propose modified designs to reduce environmental and social impacts
- Identify feasible alternatives
- Predict significant adverse impacts
- Identify mitigation measures to reduce, offset, or eliminate adverse impacts
- Engage and inform potentially affected communities and individuals
- Influence decision-making and the development of terms and conditions

1.4.1 World Bank Operational Policies

The World Bank has Operational Policies (OP) to avoid, reduce or eliminate adverse environmental and social impacts of potential projects, as well as improve decision making. The ESMP project has triggered the following policies:

- Operational Policy 4.)1: Involuntary Resettlement;

- Operational Policy 4.11: Physical Cultural Resources;

1.5 Approach and Methodology for ESMP

The approach and methodology adopted for this ESMP include:

- Bibliographic research / literature review utilizing secondary data collection from previous studies / research to evaluate the state of knowledge on a particular topic or location.
- Site inspection: Construction site inspections are critical to ensuring that quality and safety procedures are followed correctly from the start. Construction projects involve coordinating multiple project team members, materials and equipment, which may

expose contractors to many potential environmental & social risks and hazards. In order to successfully run a construction site through the entire lifecycle of the project, routine construction site inspections are necessary.

While most construction site inspections are conducted during the construction phase, they can begin in pre-construction. Pre-construction inspections survey the property condition and neighbouring areas before construction begins. Pre-construction site inspection checklists may consist of checks on planning permissions, conditions and obligations to ensure compliance with local authorities, and potential environmental & social risks.

- Data collection utilizing primary and secondary data collection methods and distribution of Socio-economic and health structured Questionnaires to respondents in the study area
- Stakeholder Consultations through identification and engagement of relevant stakeholders within the proposed project vicinity using focus group, individual depth interviews, and observation methods amongst others
- Reporting the findings by detailing how the research was conducted, the research methods used and the reasons for choosing those methods; and outlining the participants and research methods used, e.g. surveys/questionnaire, interviews

1.6 Structure of the Report

In line with the Terms of Reference (ToR), the report includes the following topics:

Preliminary pages

Chapter 1: Introduction

Chapter 2: Project Description

Chapter 3: Description of the Environmental and Social Baseline Conditions of the Project Area

Chapter 4: Assessment of Potential Environmental and Social Impacts

Chapter 5: Environmental and Social Management plan

Chapter 6: Stakeholders Consultation

Chapter 7: Grievance Redress Mechanism

Chapter 8: Risk and Accident Management

Conclusion and Recommendations

Annexes

CHAPTER TWO: PROJECT DESCRIPTION

2.0 Introduction

The Center is located at Aminu Kano Teaching Hospital, Bayero University Kano (11.9634° N, 8.5504° E) in Tarauni Local Government Area of Kano State, Nigeria. It is within the North-Western Zone of Nigeria, which is heavily populated. The ever-growing population in West African region outstrips the already deficient health workforce. This is in addition to other health and demographic challenges posed by a rapidly increasing population. (Figure 1).

Figure 2.1: Digital View of the ACEPHAP Project Site

Plate 2.1: Street view of the ACEPHAP project site

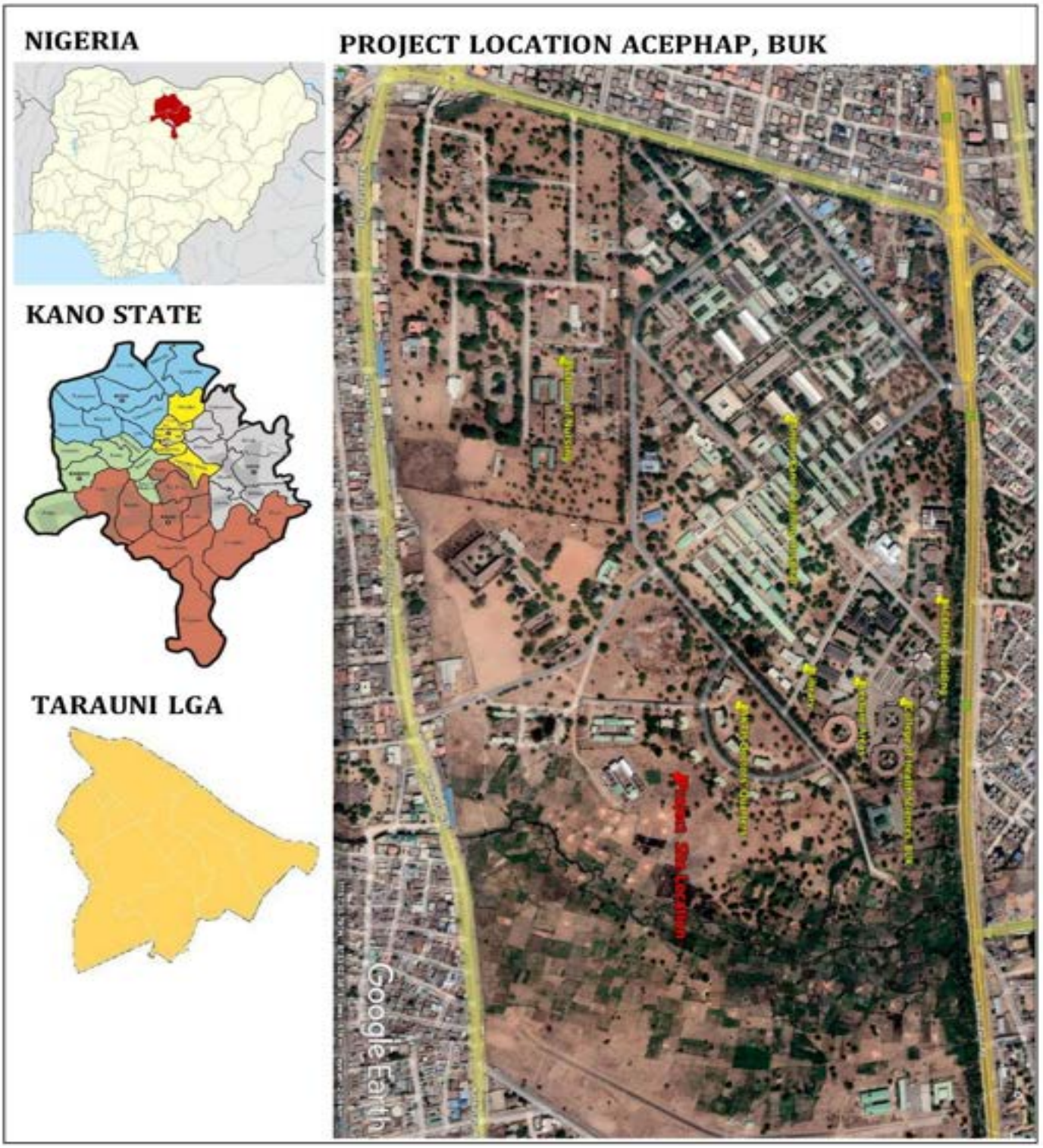


Figure 2.2: Project study Location

2.1 Description of the Proposed Intervention Works

The proposed activities associated with the project will involve construction of a new building and associated structures and works such as plumbing, electrical fittings, soakaway, roofing etc to accommodate the international students' hostel. The construction works will be implemented within Aminu Kano Teaching Hospital campus of the Bayero University Kano, as such there will be no involuntary resettlement, acquisition of land, relocation,

compensation, loss of physical and economic assets, and/or loss of livelihoods particularly as the project by design cannot finance concerns of involuntary resettlement or land acquisition or compensation.

The international students' hostel of ACEPHAP is a one storey building that is designed to accommodate the following features:

A. Power House
B. Main Building
C. Gate House

The main building is designed to include the following:

a. GROUND FLOOR:

- Reception and waiting area
- Creche
- Convenience store
- Common area
- Laundry
- Gym
- Restaurant
- Service area
- Central atrium
- Twelve bedrooms, with four rooms designed to accommodate students with disability
- Fourteen toilets
- Two changing rooms
- Three escape stairways
- Three courtyards

b. FIRST FLOOR

- Common area
- Two study areas
- Kitchen
- General store
- Cold store
- Facility office
- Two service shafts
- Central atrium
- Twenty bedrooms
- Twenty-three toilets
- Two changing rooms
- Three escape stairways
- Three courtyards

2.1.1 Description of the proposed construction and equipping of ACEPHAP

There are six critical stages of construction: pre-construction, sitework, rough framing, exterior construction, MEP (mechanical, electrical, and plumbing), and finishing.

1. Pre-construction

The pre-construction phase is the point where someone takes an idea and puts it into motion. This stage involves planning, surveying, engineering, design development, permits, and more. It serves as the roadmap the rest of the project will follow.

2. Sitework and foundation

The second stage of construction is when the project finally breaks ground. Crews get the site ready by grading the property, digging or drilling for a foundation and footings, and developing a driveway for deliveries and subs. They'll also drill wells and bring underground utilities to the site, like electricity and gas.

The excavation, earthwork, drilling, utilities, concrete, framing, and scaffolding are done at this stage

Phase risks

During the sitework and foundation phase, the risks anticipated include accidents, air pollution, waste pollution, noise pollution, and water pollution.

3. Rough framing

The third of the sixth phases of construction is rough framing, and it's when the building starts going vertical. The cranes lift the structural steel into place while steel contractors attach it to the foundation and footings.

With the steel for each floor in place, crews pour the concrete for the floors. After that, the framing sub will build the walls and give the building its main structure.

Phase risks

A lot of the rough framing stage involves cranes, welding, and metal framing; the risks anticipated include accidents, air pollution, waste pollution, noise pollution, and water pollution.

4. Exterior construction

The fourth phase of construction involves "drying in" the building, or sealing it off to the elements. This stage involves installing the windows, doors, siding, roofing, any brick or plasterwork, and everything else the drawings call for on the exterior of the building.

Phase risks

By this stage, the risks begin to mount with the possibility of accidents and falls from heights at an increase. Though the probability of air and water pollution is reduced, those of noise and waste pollution remains at the same rate.

5. MEP (Mechanical, Electrical, Plumbing)

At this stage, Mechanical contractors can install boilers, air handlers, ductwork, and other equipment. Electricians can start installing panels, generators, elevators, switchgear, and distribution rooms, and pull wire throughout the building. Plumbers are also on-site, running water supply pipes as well as waste, drain, and vent pipes. This is also the stage where fire suppression and alarm subcontractors will start installing their systems, and elevator constructors can build their shafts and cars.

Phase risks

The only risk that fades a bit at this construction phase is air pollution, others are at the same rate as in the previous phase.

6. Finishes and fixtures

Of all the phases of construction, finishes and fixtures are the final push. At this point, the building starts to take its final form, inside and out.

There are many moving parts at this stage, and the general contractor has to stay on top of things to make sure it runs smoothly. The number of subs jumps tremendously: glazing, door and window, masonry, plastering, elevator, insulation, drywall, painting, tile, finish carpentry, and flooring subcontractors are all working inside the building to finish the job. Landscaping subs and swimming pool contractors might be working on buttoning up the exterior features. It's a busy time for everyone involved.

7. Equipping of digital laboratory

The Center will also utilise one of its existing office buildings to install digital equipment for C-CODE activities. Such equipping will be handled by the NUC. Potential risks for this include positive risks as improvement of learning environment, provision of job opportunities and capacity building for the Center's stakeholders. Potential negative impacts may include injuries from moving the equipment, temporary obstruction of traffic at the Center, as well as temporary loss of power supply. This activities under this project include installation of Recording Studio Equipment, Wiring and Cables, Storage and Editing Equipment. Details of these activities as well as the relevant equipment are shown below.

Table 2.0 Summary of Technical Specifications. Recording Studio Equipment

Item No	***Item***	**Minimum Specifications Required**
1.1	**Camera**	**XA45** (with an SDI connector)
1.2		CAMGEAR CMG-M6-MS-AL-TRISYS - MARK 6 MS AL
2	**Recorder**	Sumo19 SE
3.1	**Tablet**	WACOM Cintiq Pro 24
3.2		ELGATO Stream Deck MK.2 Keypad

Item No	*Item*	**Minimum Specifications Required**
3.3		AJA HA5-Plus-R0 - HDMI to 3G-SDI with DSLR format support
4.1	**Computer**	Mac mini M1: HDD 512Go +RAM 16Go + keyboard + mouse
4.2		Apple Lightning Digital AV Adapter
4.3		7" Full HD SDI Assistant Monitor w/ HD-SDI & HDMI
4.4		SMALL HD 48-inch Thin SDI Cable
4.5		Miniature Articulated Arm w/ Shoe Mount and reversible 1/4 inches-20 thread
4.6		WC Super Clamp
5	**Software**	Goodnotes (license)
6.1	**Audio**	VideoMic Pro + Compact Directional On-camera Microphone
6.2		Digital wireless system Wireless GO II Single
6.3		Lavalier Go
6.4		VXLR Minijack to XLR Adaptor
6.5		Adaptor DCS1 Dual Cold Shoe Mount
7.1	**Background**	LL White + Black 180x275cm (L6921)
7.2		LL Green screen 300x350cm (LC5781)
7.3		LL Stands support kit (L1108)
7.4		Pince clip for the background (i.e. Manfroto 175Z)

Item No	*Item*	**Minimum Specifications Required**
8.1	**Prompter**	Datavideo 2400-5030 - TP-650 - Large Screen Prompter
8.2		Datavideo 2400-5056 - WR-500 universal Bluetooth Remote Control
8.3		64 GB iPad Wi-Fi (2021), 9. Gen, 10.2" Multi-Touch-Display for the prompter
8.4		EG coque pour iPad 10.2" 9e génération
9	**Lights**	LG-E268LK3 - E268 BI COLOUR **3 LIGHT** LOCATION LIGHTING KIT (3 bulbs + stands)

Table 2.1 Summary of Technical Specifications. Wiring and Cables

Item No	*Item*	**Minimum Specifications Required**
1.1	**Video wiring**	SDI video cable (coaxial with BNC connector m/m) 30m CONTRIK NX08L37BTBL30-BL
1.2		SDI video cable (coaxial with BNC connector m/m) 15m
1.3		SDI video cable (coaxial with BNC connector m/m) 5m
1.4		SDI video cable (coaxial with BNC connector m/m) 2m

Item No	*Item*	**Minimum Specifications Required**
1.5		HDMI Splitter 1x HDMI - 2x HDMI 4K@60Hz
1.6		XLR audio cable m/f 3m
1.7		XLR audio cable m/f 15m
2	**Electrical wiring**	Multi-socket outlet

Table 2.2 Summary of Technical Specifications. Storage and Editing Equipment

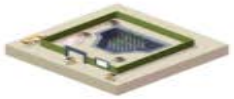
Item No	*Item*	**Minimum Specifications Required**
1.1	**Storage**	1 TB Samsung 870 EVO SSD
1.2		USB-C 3.1 Docking Station
2.1	**Editing**	Mac mini M1: RAM 16Go - HDD 512Go + keyboard + mouse
		Disk dur local 16 To (p.ex. LaCie 2BIG)
		Apple Multiport
2.2		Screen Eizo EV2451-Swiss Edition noir - 23.8" IPS-LCD-Widescreen, Black
2.3		Final Cut Pro X (license)

Closeout

Once the major stages of construction are in the bag, it comes time to wrap the job up. This is when the SME equipment and machineries are brought in for installation. The major risk at

this stage is accidents from trips and falls by workers involved in lifting the equipment and machinery.

LEVELSET



	Pre-construction	Sitework/foundation	Rough framing	Exterior construction	MEP (Mechanical, Electrical, Plumbing)	Finishes/fixtures
Major Risks	• Changing specs and drawings	• Retainage (long wait) • Differing site conditions • Weather delays • Bankruptcy	• Retainage (long wait) • Weather delays • Bankruptcy • Material price increase	• Retainage (long wait) • Weather delays • Schedule delays • Changing specs • Fund shortage • Bankruptcy • Material price increase	• Schedule delays • Retainage (short wait) • Fund shortage • Changing specs • Bankruptcy Material price increase	• Schedule delays • Communication problems • Changing specs • Retainage (short wait) • Fund shortage • Bankruptcy • Material price increase
Type of Contractor						
General Contractor	General Contractor	General Contractor	General Contractor	General Contractor	General Contractor	General Contractor
Architect/design	Architect/design	Architect/design				
Engineering firm	Engineering firm	Engineering firm				
Surveyor	Surveyor	Surveyor				
Excavator		Excavator				
Drilling		Drilling				
Earthwork		Earthwork				
Utilities		Utilities				
Concrete/Cement		Concrete/Cement				
Framing/structural		Framing/structural	Framing/structural			
Scaffolding		Scaffolding	Scaffolding	Scaffolding		
Metal			Metal	Metal		
Roofing				Roofing		
Siding				Siding		
Glass/glazing				Glass/glazing		Glass/glazing
Doors & windows				Doors & windows		Doors & windows
Masonry/brick				Masonry/brick		Masonry/brick
Plastering				Plastering		Plastering
Fire suppression					Fire suppression	
Electrician					Electrician	
Plumbing					Plumbing	
HVAC					HVAC	
Elevator					Elevator	Elevator
Insulation						Insulation
Paving						Paving
Drywall						Drywall
Painting						Painting
Tile						Tile
Finish carpentry						Finish carpentry
Flooring						Flooring
Swimming pool						Swimming pool
Landscaping						Landscaping

GROUND FLOOR PLAN

ROOM LEGEND

Number	Name	Number	Name	Number	Name
000	Reception and Waiting Area	C107	Bedroom	A106	Escape Stairway
R000	Gate House	C108	Bedroom	C103	Escape Stairway
T101	Toilet	C109	Common Area	B106	Service Area
A101	Crèche	B101	Laundary	003	Courtyard
A102	Bedroom	B102	Escape Stairway	002	Central Atrium
A103	Bedroom	B103	Changing Room	004	Courtyard
A104	Bedroom	B104	Changing Room	005	Courtyard(Indoor-Outdoor eating area)
A105	Bedroom	B105	Gym	T108	Toilet
A107	Bedroom	B106	Eating Area	T109	Toilet
A108	Bedroom	T102	Toilet	T110	Toilet
C101	Convenience Store	T103	Toilet	T111	Toilet
C102	Bedroom	T104	Toilet	T112	Toilet
C104	Bedroom	T105	Toilet	T113	Toilet
C105	Bedroom	T106	Toilet	T114	Toilet
C106	Bedroom	T107	Toilet		

Figure 2.3: Proposed Ground Floor Design of the ACEPHAP Project

GROUND FLOOR PLAN
FIRE ESCAPE ROUTE

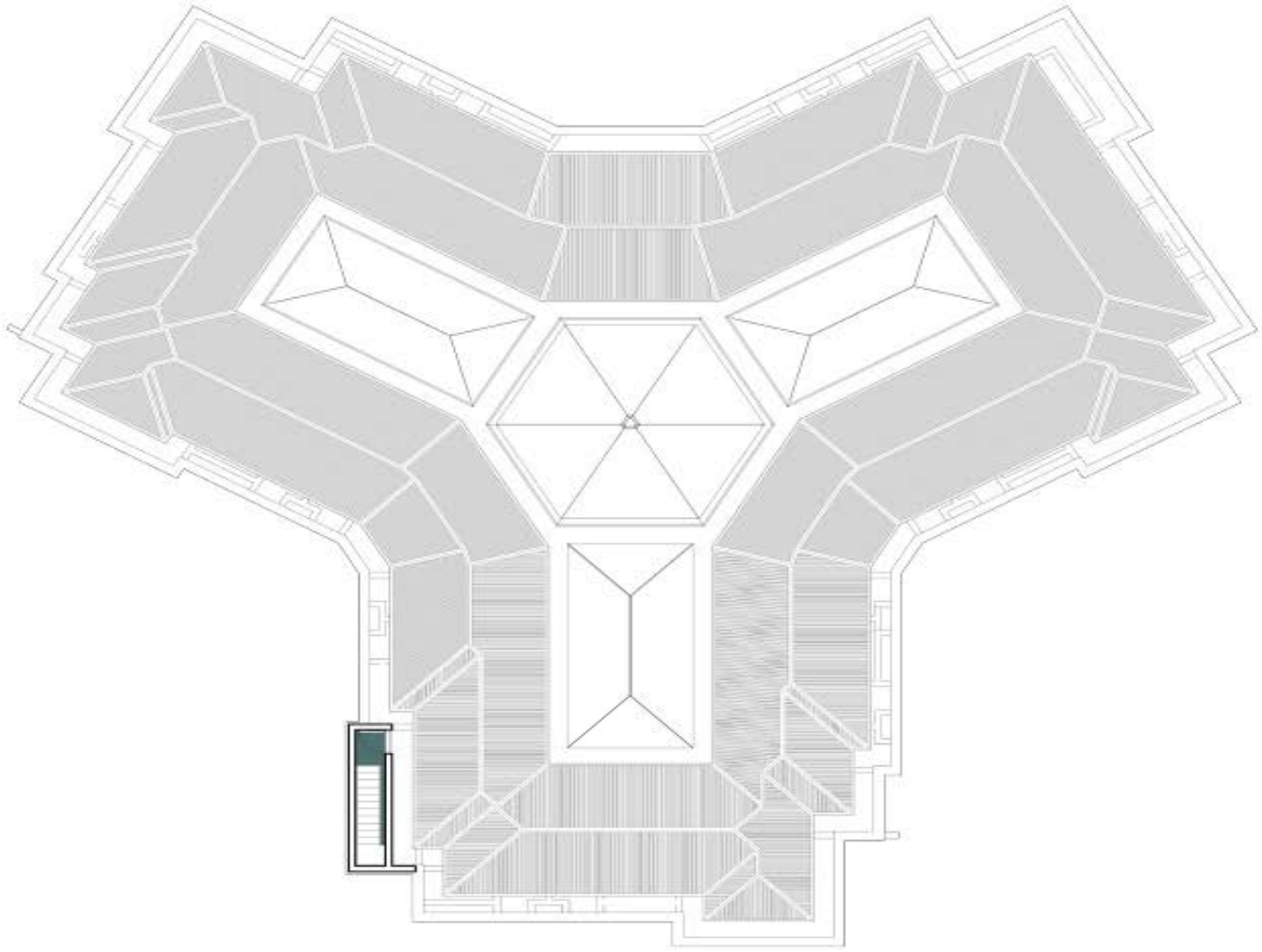
Figure 2.4: Proposed Ground Floor Fire Escape Plan of the ACEPHAP Project

FIRST FLOOR PLAN

ROOM LEGEND

201	Common Area	C207	Bedroom	T206	Toilet	T119	Toilet
R001	Power House	C208	Bedroom	T209	Toilet	T115	Toilet
A201	Bedroom	B201	Bedroom	T210	Toilet	T223	Toilet
A202	Bedroom	B202	Bedroom	T211	Toilet	T221	Toilet
A203	Study Area	B203	Bedroom	T212	Toilet	008	Service Shaft
A204	Bedroom	B204	Bedroom	T213	Toilet	007	Service Shaft
A205	Bedroom	B205	Bedroom	T214	Toilet		
A206	Bedroom	B206	Bedroom	T215	Toilet		
A207	Bedroom	B207	Bedroom	T216	Toilet		
C201	Bedroom	T201	Toilet	T217	Toilet		
C202	Bedroom	T202	Toilet	T218	Toilet		
C203	Bedroom	T203	Toilet	T219	Toilet		
C204	Bedroom	T204	Toilet	B109	Kitchen		
C205	Study Area	T205	Toilet	B110	Card Store		
C206	Bedroom	T206	Toilet	B111	Store		
		T207	Toilet	B112	Facility Office		

Figure 2.5: Proposed First Floor Design of the ACEPHAP Project



ROOF PLAN

Figure 2.6: Proposed Roof Plan of the ACEPHAP Project

MAIN ENTRANCE VIEW

Figure 2.7: Proposed 3D Design of the ACEPHAP Project

CHAPTER THREE: DESCRIPTION OF THE ENVIRONMENTAL AND SOCIAL BASELINE CONDITIONS

3.0 Introduction

This section of the report puts together the baseline environmental data characteristics of the study area. For the purpose of baseline data acquisition, an integrated and interdisciplinary team of professionals and practitioners were engaged. The various areas covered in course of this study are: Air quality, Soil, Water Quality (Surface and Ground water), Noise, Meteorology, Vegetation and Socio-economics.

Data collection for this ESMP study commenced with a formal focused discussion with key stakeholders of the proposed project afterwards was the actual sampling which took place on 30th of August, 2022. An environmental baseline study was carried out to establish a benchmark of existing environmental conditions in the proposed project site prior to the commencement of the project against which potential impacts of the planned project on the site could be assessed. Thus, the data presented and information given was gathered from a combination of both primary and secondary sources. That is, field observation and laboratory analyses as well as established facts in literature derived through literature review process. The data presented here were analyzed in line with national and internationally acceptable standards.

3.1 Climate /Meteorology

Like other parts of Nigeria, Kano climate is characterized by the hot and wet conditions associated with the movement of the Inter-Tropical Convergence Zone (ITCZ) north and south of the equator. When it is to the south of the equator, the northeast winds prevail producing the dry-season condition and when it moves into the Northern Hemisphere, the south-westerly wind prevails bringing rainfall and the rainy (wet) season.

In Kano, the wet season is warm, oppressive, and overcast and the dry season is hot and partly cloudy. Over the course of the year, the temperature typically varies from 12°C to 35°C and is rarely below 10°C or above 39°C.

The hot season lasts for 2.1 months, from February 20 to April 22, with an average daily high temperature above 33.3°C. The hottest day of the year is March 29, with an average high of 35°C and low of 20.5°C.

The dry season lasts for 3.4 months, from June 24 to October 6, with an average daily high temperature below 29°F. The coldest day of the year is December 31, with an average low of 13°C and high of 29.5°C. For a comprehensive discussion of the climatic conditions of the factory area, thirty five-year (1986 – 2021) long-term meteorological data of Kano State, its area of operation airshed, was collected from the Nigeria Meteorological Agency (NIMET, 2021).

3.1.1 Rainfall and Relative Humidity

The tropical continental air mass predominates during the dry season. Much of the rain in Kano State falls between June and September in the north during which showers are a daily occurrence while it's from April to October in other parts. The showers rarely last long and

are a far cry from the regular torrential rain known in wet tropical regions. From late October to February, during the cold season, the climate is dominated by the Harmattan wind blowing Sahara dust over the land. The dust dims the sunlight thereby lowering temperatures significantly and also leading to the inconvenience of dust everywhere in houses. The annual rainfall is between 500mm in the north and 1300mm to the south. Figure 4.1 below shows a chart of thirty five-year average monthly rainfall within Kano State.

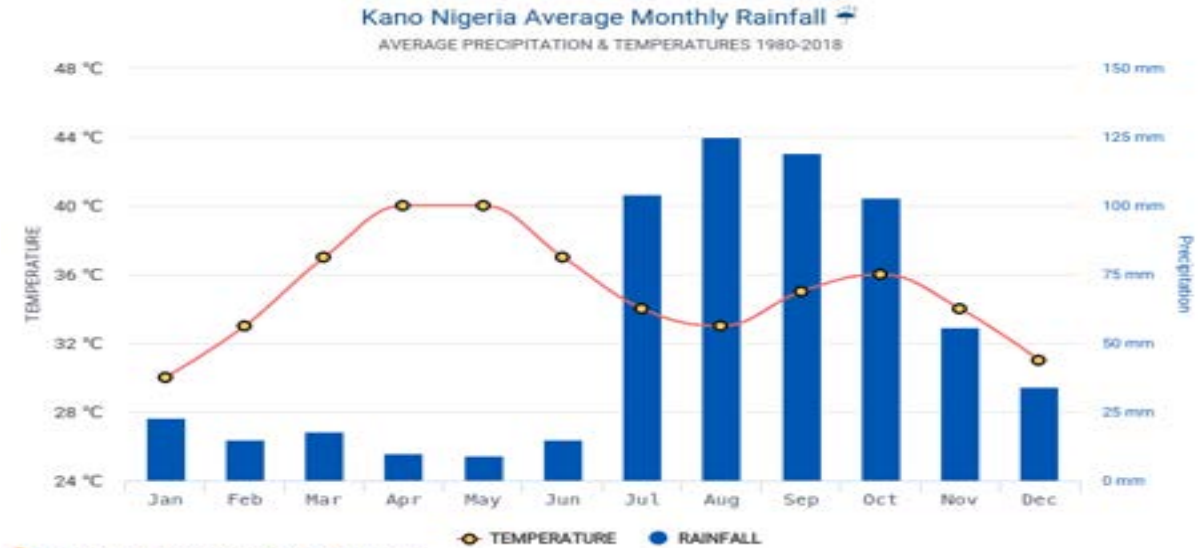


Figure 3.1: Average Precipitation and Temperatures for Kano

3.1.2 Air Temperature

The state is characterised by two extreme temperatures relative to its tropical position viz. the wet and dry seasons. The highest temperature during the hot season is experienced in the months of March/April. Between November and February, there is the prevalence of harmattan, characterised by very cold temperatures and dust laden winds and often accompanied by thick fog of alarming intensity.

With an annual average temperature of 28.3 °C (82.9 °F), Kano is, on the whole, a very hot area. However, maximum daytime temperatures are for most of the year generally under 40 °C (104.0 °F) and the dryness makes the heat bearable. The warmest months are February to April when daytime temperatures can exceed 45 °C (113.0 °F).

Measured air temperatures of 27.7ºC – 41.1ºC were obtained in the proposed project area during this study.

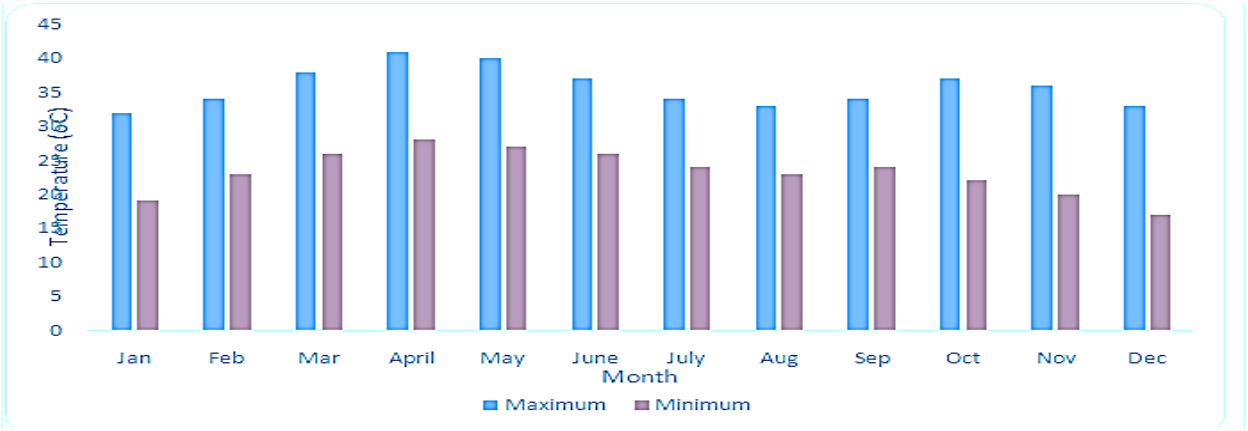


Figure 3.2: Thirty Five-Year Air Temperature Distribution in the Area (NIMET, 2021)

Wind Speed

In this study, the measured northeast wind level was 5.8 m/s and northwest wind was 7.2 m/sat the proposed project area. There was some occasional calmness with insignificant wind speed in the area. The mean surface wind speed and direction depends on the seasonal variation, which also follows the migratory ITCZ with two main air masses alternate with the season.

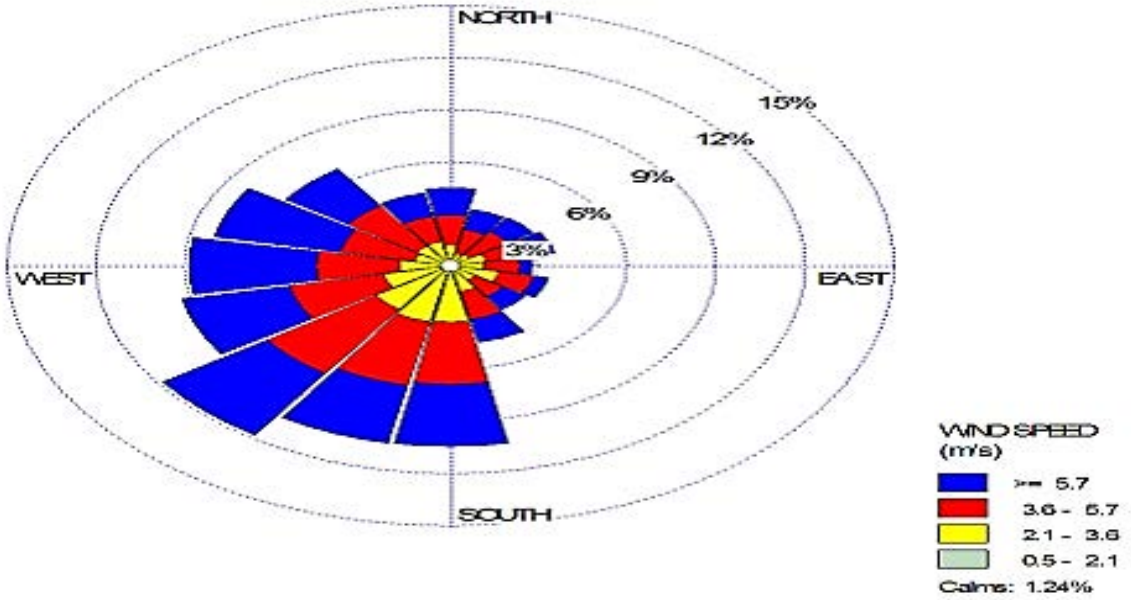


Figure 3.3: Wind Rose Showing Wind Direction of the Project Area
Source: Nigerian Meteorological Agencies (NIMET).

3.2 Air Quality and Ambient Noise Levels

3.2.1 Air Quality

Poor air quality is a result of several factors, including emission from various sources both natural and man-made caused, this occurs when pollutants reach high enough concentration to endanger human health and/or environment. It is however important to establish the ambient atmospheric conditions of the project area to monitor likely changes in the future. The air quality parameters were particulate matter concentrations including those with diameter less than 1 microns (PM_1), those with diameter less than 2.5 microns ($PM_{2.5}$), those

with diameter less than 10 microns (PM_{10}) and total suspended particulate (TSP). Other air quality parameters including gaseous pollutants concentrations were carbon monoxide (CO), oxides of nitrogen in form of nitrogen dioxide (NO_2), sulphur dioxide (SO_2), hydrogen sulphide (H_2S), Carbon dioxide (CO_2) and Volatile Organic Compounds (VOCs).
As presented above, the air quality data collected indicates that:

- Typically, pollutants like SO_2, H_2S, NH_3, CO, were not detected at the various sampling locations. VOC was however detected at all the sampled locations.
- No elevated PM 2.5 and PM 10 above the FMEnv threshold of 250 µg/m^3 were recorded at any of the sampling locations.

The air quality assessment results indicate that all pollutants measured were either not detected or within acceptable FMEnv limits. Consequently, the ambient air quality in the area can be adjudged to be good. The air shed within the project area of influence is not degraded.

Particulate Matter (PM $_{2.5}$)
PM 2.5 refers to atmospheric particulate matter (PM) that has a diameter of less than 2.5 micrometres. PM2.5 is an air pollutant that is a concern for human health when levels in the air are high, they reduce visibility and cause the air to appear hazy when levels are elevated.

The concentration of PM2.5 satisfied the FMENV and NESREA regulatory requirement in all the sampled locations. The concentration of PM2.5 varied from the least 20.0 – 36.4 PPM.

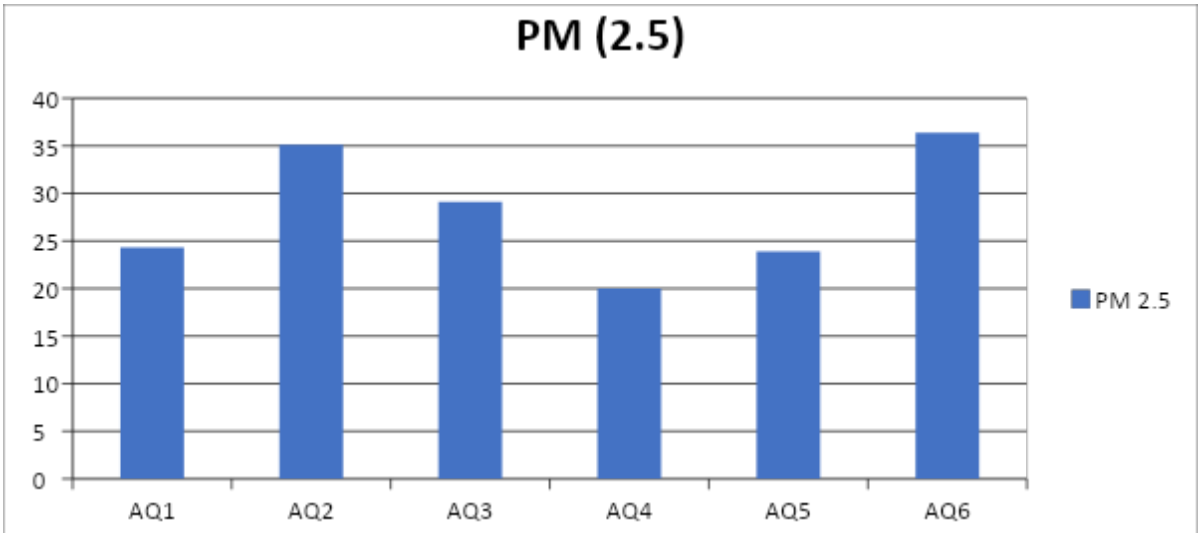


Figure 3.4: Particulate Matter (PM 2.5)

Particulate Matter ($PM_{5.0}$)
$PM_{5.0}$ refers to atmospheric particulate matter (PM), that have a diameter of less than 5.0 micrometres. The concentration of $PM_{5.0}$ obtained varied from the least 24.5 – 43.4 PPM.

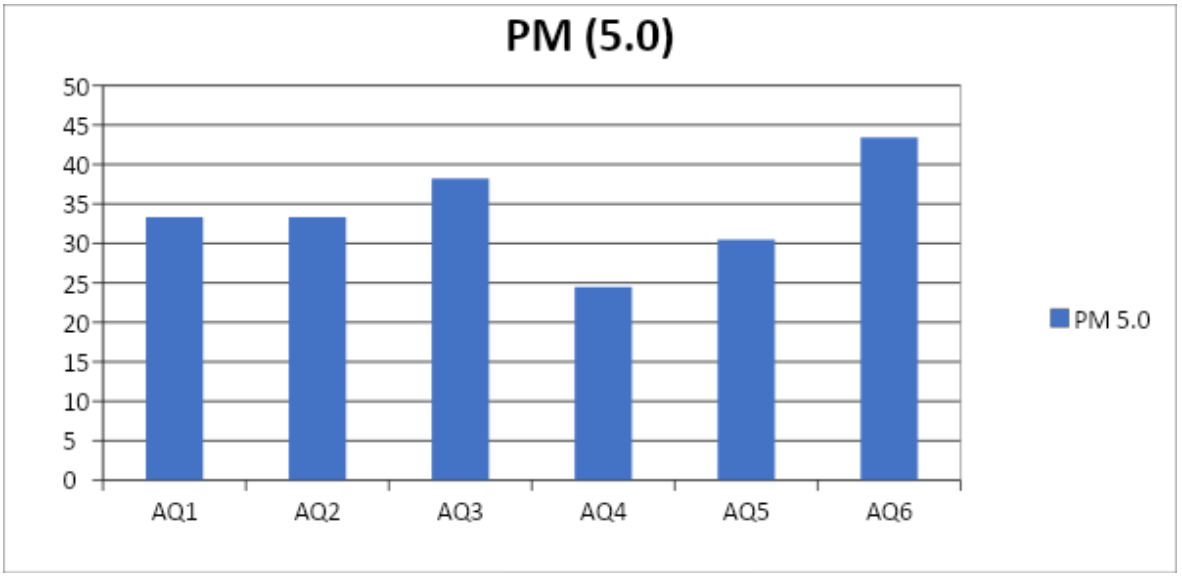


Figure 3.5: Particulate Matter (PM5.0)

Particulate Matter ($PM_{10.0}$)

PM_{10} describes inhalable particles, with diameters that are generally 10 micrometres and smaller. PM_{10} can be found in dust, smoke etc.

The concentration of PM_{10} varied from the least 36.7 – 53.5 PPM.

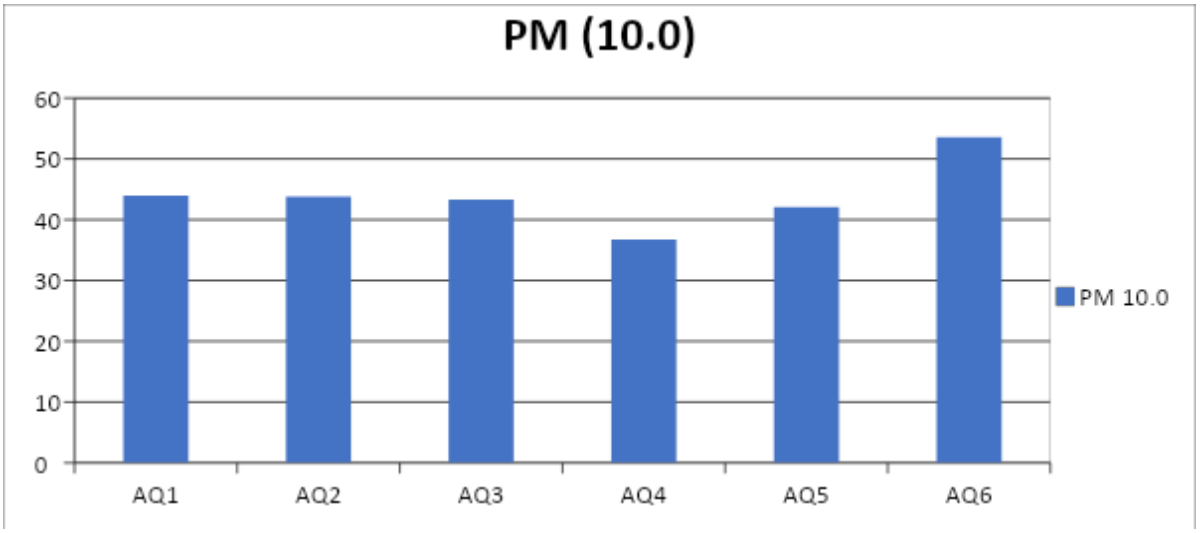


Figure 3.6: Particulate Matter (PM10.0)

Total Suspended Particle (TSP)

Total Suspended Particle (TSP) is a complex mixture of organic substances, present in the atmosphere as solid particles and liquid droplets. They include fumes, smoke, dust and aerosols. Health impacts of PM vary depending on the size and the concentration of the particles. For regulatory purposes and for estimating health impacts, PM is measured and classified by the respiratory fraction of particles including $PM_{2.5}$ and PM_{10} as monitored in this study. Total Suspended Particle causes respiratory morbidity, deficiencies in pulmonary (lung) functions including decreased lung function (especially in children), and lung cancer with the consequence of increased mortality, among others. They can also contribute to acid

deposition and may absorb solar radiation and impair/ reduce visibility. Particulates are formed during fuel combustion. Volume source of air pollution is a three-dimensional source of emissions and this is an area source with a third dimension with dust from wind erosion of uncovered gravels piles within construction sites as major source.
The concentration of suspended particulate matter (TSP) satisfied the FMENV and NESREA regulatory requirement in all the sampled locations.
The concentration of suspended particulate matter (TSP varied from the least 75.8 – 130.5 PPM.

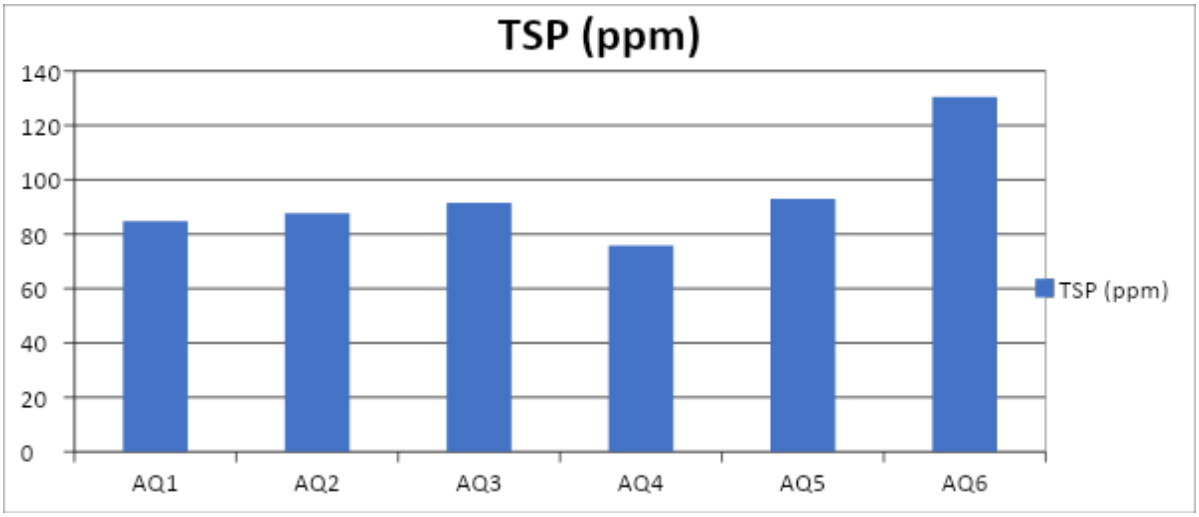


Figure 3.7: TSP

Carbon Monoxide (CO)
Carbon Monoxide is a colourless and odourless gas that can be harmful to when inhaled. Breathing air with high CO reduces O_2 that can be transported in the blood stream. Its main source during the fieldwork could be combustion in mobile plants engaged at site.

Carbon Monoxide in air is the product of incomplete combustion; it is primarily from the emissions of vehicles and generators. Carbon monoxide inhalation causes muscular twitching, impairs thinking and causes drowsiness by reducing the oxygen carrying capacity of the blood. It is also associated with increase in the likelihood of exercise related pain in people with coronary heart disease.

The level of carbon monoxide (CO) in the ambient air during the monitoring ranged from 2.0PPM – 9.0PPM. However, the average value is below the FMENV Standard of 10PPM for ambient air quality of 1991.

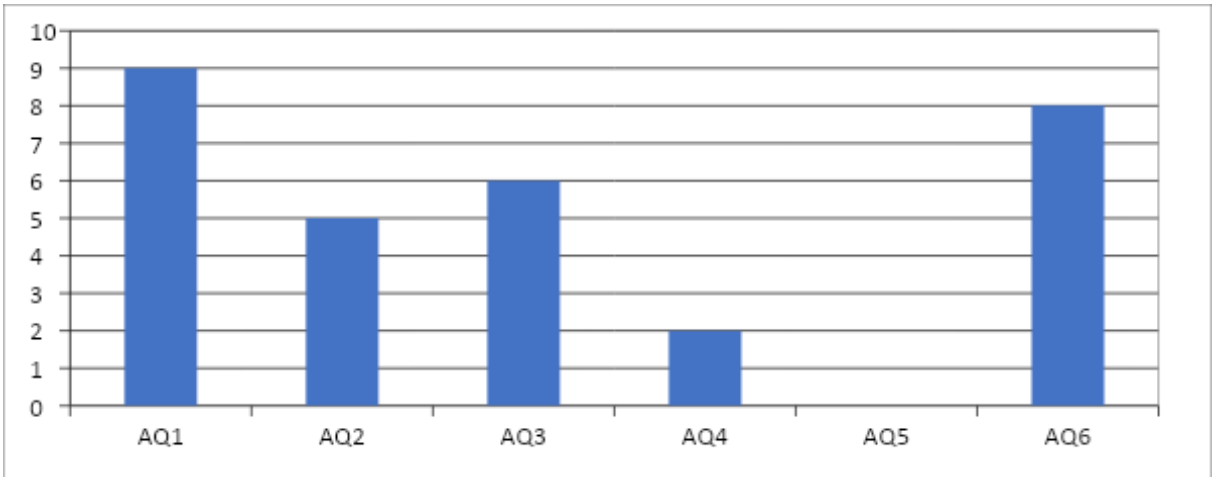


Figure 3.8: CO

Carbon Dioxide

Carbon dioxide CO_2 occurs naturally in the atmosphere. Levels of atmospheric carbon dioxide have increased since the industrial revolution. CO_2 emissions impact human health by displacing oxygen in the atmosphere. In closed areas, high levels of carbon dioxide can lead to health complaints such as headaches, dizziness, restlessness and difficulty in breathing. The concentration of carbon dioxide recorded ranged from 468ppm to 567 ppm.

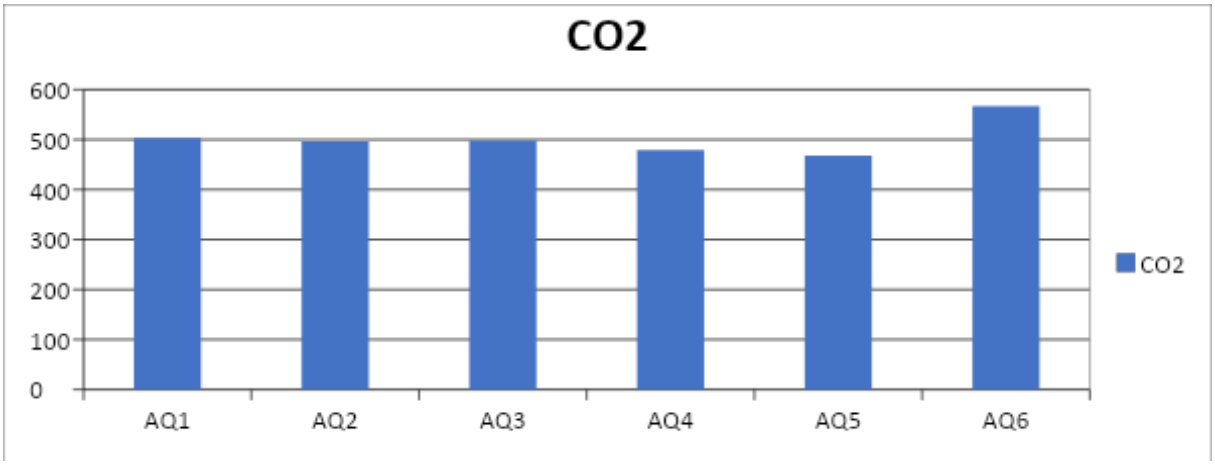


Figure 3.9: CO_2

Methane CH_4

Methane is a colorless and odourless gas. Though it is a non-toxic gas, its presence in soil gas can create environmental concern because it can act as an asphyxiant. It is a major by-product of the decomposition of wastes, plant material in swamps, and from animals including cattle. In addition to being of global warming concern thus contributing to climate change, CH_4, when breathed in at high levels, can cause suffocation, loss of consciousness, headache, dizziness and increased breathing rate. Methane was only Detected at the control point in all sampled locations during this monitoring.

Nitrogen Dioxide (NO_2)

Oxides of nitrogen (NO_X) that are of concern in atmospheric pollution are Nitric Oxide (NO) and Nitrogen Dioxide (NO_2). They usually find their way into the atmosphere by combustion

activities where nitrogen present in fuel and combustion air interact with oxygen in the combustion air for their formulation depending on the combustion temperature, among other factors. Breathing air with a high concentration of NO_2 can irritate airways in the human respiratory system which can aggravate respiratory diseases including asthma, leading to respiratory symptoms such as coughing, wheezing or difficulty breathing.
The concentration of NO_2 Obtained during the assessment was 0.03PPM. The values are within the FMEnv of lower and upper limits 0.04 – 0.06ppm

Volatile Organic compound (VOC)
Volatile organic compound are emitted as gases from solids or liquids chemicals, some of which may have short and long-term adverse health effects. The health effects include eyes, nose and throat irritation, headache, loss of coordination and nausea, damage to liver, kidney and central nervous system.

The values obtained for VOC are low (Table 1) when compare with FMENV Limit of 10PPM indicating that no pollution experience during monitoring. The value of VOC recorded ranged from 0.09 – 1.3PPM.

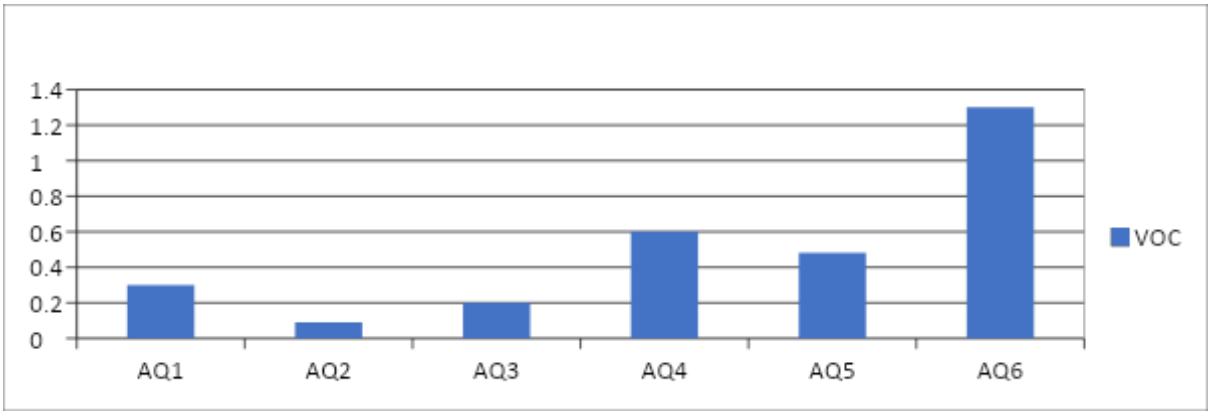


Figure 3.10: VOC

Sulphur dioxide (SO_2), Ammonia (NH_3) and Hydrogen Sulphide (H_2S)
Within the environmental survey during the monitoring Sulphur dioxide (SO_2), Ammonia (NH_3) and Hydrogen Sulphide (H_2S) were not detected. This is a normal situation, given the relatively nature of the area. These gasses are typically associated with anthropogenic activities such as industrial operations or vehicular emission, which were minimal in the environment as the time sampling was conducted.

3.2.2 Ambient Noise Level

Noise Measurement
Environmental noise is the accumulation of all noise present in a specified environment; the principal sources of environmental noise are surface motor vehicles, aircraft, trains and industrial sources. These noise sources expose millions of people to noise pollution that has increasingly been identified as a public health issue especially in an occupational setting. Exposure to noise is associated with several negative health outcomes, depending on the duration and level of exposure; noise may promote hearing loss, high blood pressure, cardiovascular diseases, sleep disturbances and birth defects.

Table 3.1: Nigeria's Standard Noise Levels (FMENV, 1992)

Duration per Day, hour	NESREA Noise Limit	Permissible Exposure Limit, dB (A)
8	85	90
6		92
4		95
3		97
2		100
1.5		102
1		105
0.5		110
0.25 or less		115

Table 3.2: Maximum Allowable Log Equivalent (hourly measurements), in dB

Receptor	Day-time (7:00 22:00
Residential, institutional, educational	55
Industrial, commercial	70

(World Bank, 1999)

Table 3.3: Guidelines values for Community Noise (Berglund et al. (1999)

Environments	Critical Health Effect(s)	Level dB(A)
Outdoor living area	Serious annoyance, daytime and evening	55
	Moderate annoyance,daytime and evening	50
Dwelling, indoors	Moderate annoyance,daytime and evening	35
Inside bedrooms	Sleep disturbance, night-time	30
Outside bedrooms	Sleep disturbance, window open (outdoor)	45

The NESREA and WHO Limits are in “Leq”, that is continuous EQUIVALENT sound level. This is a geometric average of the noise levels over the period of monitoring. This allows occasional peaks above the standard noise level which are compensated by occasional dips below the standard.

Infrequent vehicle movements are typical examples which do not infringe on the standard.

Most of the noise levels are within acceptable levels. In general, the measured noise levels are

representative of typical rural areas and a true representation of what exists at the proposed site due to the absence of academic activities as a result of the ASUU Strike by Lecturers nationwide.

Sound levels were measured inside and outside facility. And the noise recorded ranged from 52.7 – 68.8 all within the FMEnv limit of 90 dB(A) and NESREA limit of 85 dB(A).

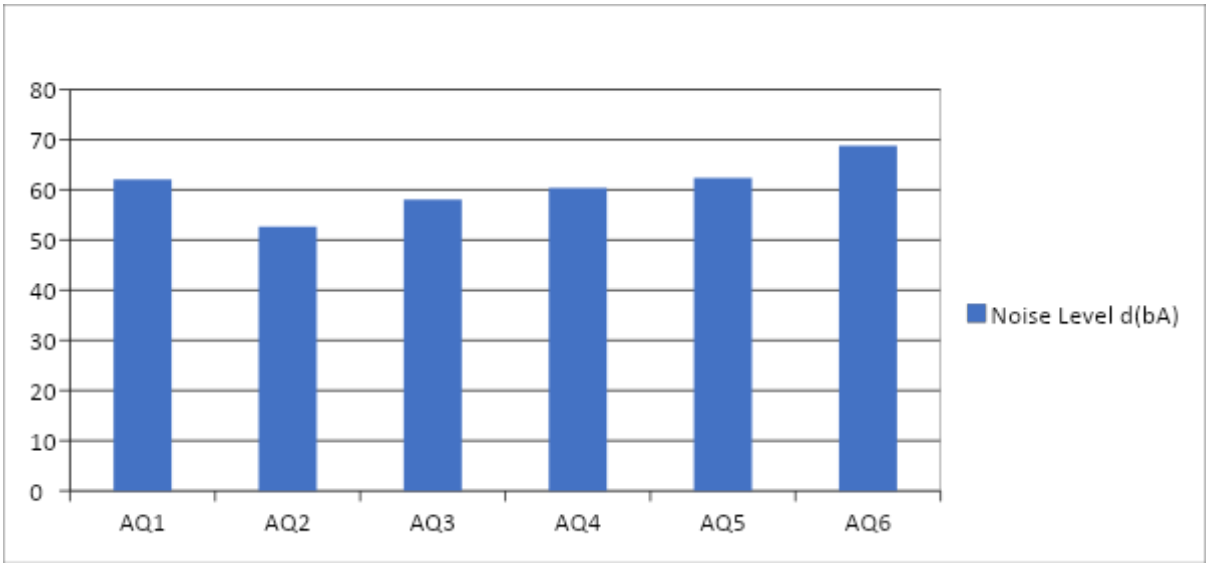


Figure 3.11: Noise Level Measurement

Noise Levels

As shown in Figure 3.11 above ambient daytime noise levels recorded within the sampling locations ranged between 52.9 – 68.9 dB(A). Generally, the collated results show that the values were below the FMEnv permissible Noise Exposure Limits of 90 dB(A).

Sampling Points at proposed ACEPHAP International Students Hostel, AKTH; Kano

Table 3.4: Details of the air quality and noise data collected as part of the baseline surveys

	Sampling Points	GPS Coordinates		Noise Level	CH_4	CO_2	CO	NO_2	SO_2	H_2S	NH_3	VOC	PM			TSP	Temp	RH	Weed Speed
		Longitude	Latitude	dB(A)	ppm								PM 2.5	PM 5.0	PM 10		^{O}C	%	m/s
1.	A Q 1	11.98062	8.42522	62.3	ND	503	ND	ND	ND	ND	ND	0.3	24.2	33.3	44.0	84.7	37	52.1	0.7
2.	AQ 2	11.98038	8.42338	52.9	ND	496	ND	ND	ND	ND	ND	0.09	35.2	33.3	43.8	87.6	35	57.4	1.6
3.	AQ 3	11.98128	8.42418	58.3	ND	498	ND	ND	ND	ND	ND	0.2	29.2	38.1	43.3	91.6	37	53.7	1.3
4.	AQ 4	11.98038	8.42338	60.6	ND	479	ND	ND	ND	ND	ND	0.6	20.1	24.2	36.7	75.8	36	53.4	1.3
5.	AQ 5 CENTRE	11.98127	8.42416	62.5	ND	468	ND	ND	ND	ND	ND	0.48	23.8	30.4	42.1	93.0	35	53.1	0.9
6.	AQC	11.98144	8.42470	68.9	0.6	567.1	4.6	0.03	ND	ND	ND	1.30	36.3	43.3	53.6	130.5	36.4	52.6	1.2

*WS = Wind Speed; Particulate Matter = PM; RH = Relative Humidity; VOC = Volatile Organic Compound.

As presented above, the air quality data collected indicates that:

- Typically, pollutants like SO_2, H_2S, NH_3, CO, were not detected at the various sampling locations. VOC was however detected at all the sampled locations.
- No elevated $PM_{2.5}$ and PM_{10} above the FMEnv threshold of 250 µg/m^3 were recorded at any of the sampling locations.

The air quality assessment results indicate that all pollutants measured were either not detected or within acceptable FMEnv limits. Consequently, the ambient air quality in the area can be adjudged to be good. The air shed within the project area of influence is not degraded.

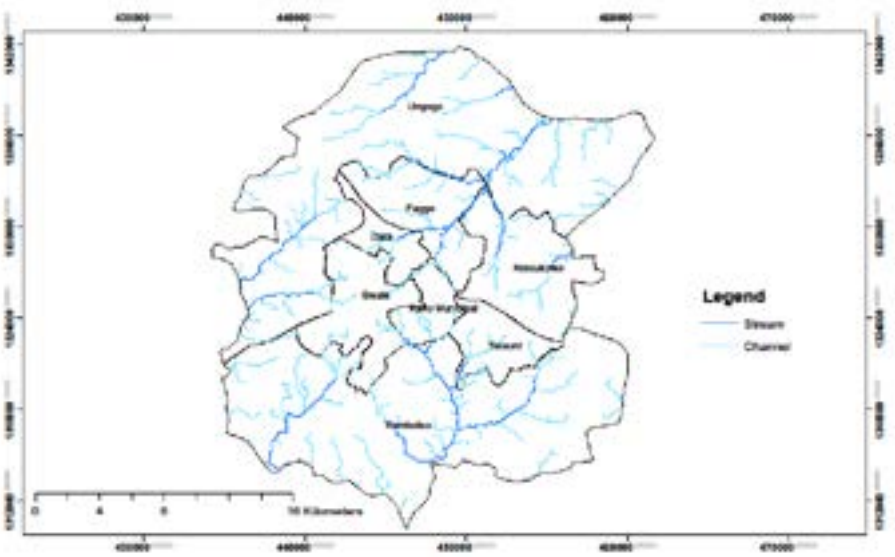
Plate 3.1: Typical Sampling Setups during the Study in ACEPHAP BUK

3.3 Water Studies

3.3.1 Hydrology

Kano lies on the average altitude of 478m above the sea level and is generally undulating lowland. The land relief is influenced by the geology, characterized by small blocky and low laying outcrops. Like the River Kano, Challawa, Jatau and Dudurun Gaya it joins the River Hadejia, which empties into Lake Chad.

The project area is located around the Aminu Kano Teaching Hospital (AKTH), Bayero University Kano. However, there was no surface water as at time of sampling. Borehole water sample was taken from control point (Main Gate) within the project area. Water supply from the academic teaching blocks is through boreholes.



Drainage Map of Kano Metropolis

3.3.1 Groundwater (Borehole) Analysis

The environmental baseline data of water quality of the proposed project area are presented in this sub-section. Groundwater one sample were collected and analysed in a laboratory (**Green Eco Technology Resource Limited**) approved by the Federal Ministry of Environment (FMEnv). The water samples were preserved in an iced cool container before transportation to the laboratory within six hours.

Samples for general physico-chemical analysis were collected in 1-Litre acid pre-washed and distilled water rinsed plastic bottles, water samples for biochemical oxygen demand (BOD) and organic parameters were collected in 500 mL amber glass bottles. The water samples for metal analysis were collected in 60-mL acid pre-washed plastic bottles into which 1 mL of concentrated nitric acids had been added. Samples for microbiology analysis were placed in sterilized 30-mL plastic vials. In-situ determination of the pH, temperature, conductivity, total dissolved solids (TDS), turbidity, salinity and dissolved oxygen (DO) of the water samples were carried out at the point of sample collection using a hand-held Horiba U-52 multi-parameter meter which had been calibrated prior to sampling. Samples collected were kept in ice chest after collection and transported to the laboratory for wet chemical analyses. All the samples were appropriately preserved and analyzed within their holding time. Analyses were carried out using standard operating protocols as indicated in national and international guidelines including the Federal Ministry of Environment, FMEnv (1991), US Environmental Protection Agency (USEPA) and APHA (2005) methodologies for water analysis.

3.3.1.1 Physico-Chemical Characteristics of Ground Water

The chemistry of groundwater varies from place to place depending on the nature of the sub-soils and rocks that it passes through. Daly (1994) observed that in areas where limestone bedrock and limestone- dominated sub-soils are common; groundwater is often ‘hard’, containing high

concentrations of calcium, magnesium, and bicarbonate. However, in areas where volcanic rocks of sandstones are present, softer water is normal. Therefore, in considering the impact of human activities, it is necessary to first consider the natural (or baseline) water quality. Groundwater is usually considered pure and safe to drink as it undergoes a filtering and cleansing process through a subsoil cover and rock medium that surface waters do not have. However, this does not guarantee groundwater purity. Problems can arise either due to the natural conditions in the ground or pollution by human activities.

Table 3.5: Results of groundwater analysis

PARAMETERS	**RESULTS**	**FMEnv Limit**
Temperature ^{0}C	35.5	< 40
Colour Pt. Co scale	18.3	NS
Alkalinity	0.17	NS
Dissolved Oxygen	6.4	10
Acidity	6.11	NS
pH Pt. Co scale	7.5	6.0-9.0
Turbidity NTU	34.2	NS
Salinity mg/l	0.04	NS
Total Dissolved Solid mg/l	212	2000.00
Total Suspended Solid mg/l	14	30.00
Calcium Hardness mg/l	3.49	NS
Magnesium hardness mg/l	8.23	600
Electrical Conductivity uS/CM	0.478	NS
Cyanide mg/l	ND	10.00
Nitrite mg/l	ND	NS
Sodium mg/l	0.16	NS
Chloride mg/l	0.13	NS
Calcium mg/l	4.81	NS
Nitrate mg/l	ND	20
Sulphate mg/l	ND	0.20
Ammonia mg/l	ND	5.00
Magnesium mg/l	6.00	NS
Potassium mg/l	6.0	20
Fluoride mg/l	0.04	5
METALS		
Iron Total mg/l	0.10	20.00
Manganese mg/l	ND	5.00
Copper mg/l	0.02	<1.00
Zinc mg/l	0.06	<1.00
Cadmium mg/l	ND	<1.00
Chromium mg/l	ND	<1.00
Lead mg/l	ND	<1.00
Nickel mg/l	0.08	<1.00

Arsenic mg/l	0.02	<1.00

Temperature: The temperature of the groundwater of the study area was 35.5 ºC during the study period. This is in compliance with FMENV regulatory limit of (35 – 45) ºC.

pH: The pH of the groundwater of the study area during the study was 6.11 this shows neutral.

Electrical Conductivity: The conductivity values were 0.478µS/cm. Electrical Conductivity is the ability of a solution to permit the flow of electrical current. It varies with the number and type of ions in the solution. The conductivity in water is proportional to the concentration of dissolved solids, mostly inorganic salts. The higher the salinity of water the higher the conductivity value (Kiely, 1998).

Dissolved Oxygen: The DO levels of the groundwater in the area during the study period were 6.4 mg/l.

Chloride: chloride which is a function of the salinity level of the water was analyzed during study and concentrations were 0.13 mg/l. This is a measure of solids of oxides and chlorides in water. It affects the taste of a groundwater quality.

Nutrients: Nitrates and nitrites were not detected during study. Sulphate was not detected. Nutrients includes the ionic forms ($NO3^-$, $P04^{-3}$ and $SO4^{2-}$) and utilizable forms of nitrogen, phosphate and sulphur respectively. Nitrate ($NO3^-$) is one of the most common contaminants identified in groundwater. It is highly mobile and under wet conditions, it is easily leached out of the rooting zone, through soil and permeable subsoil. $NO3^-$ is a good indicator of contamination by fertilizers and waste organic matter. The consumption of nitrate rich water by children may give rise to a condition known as methaemoglobinaemia, also called blue boy syndrome (Kiely, 1998). Sulphates ($SO4^{2-}$) are also good indicators of contamination by fertilizers and waste organic matter. Many aquatic and microscopic organisms utilize sulphate for their growth. Phosphate will stimulate the growth of plankton and other aquatic plants, which provide food for fish.

Cations: during the present study, the concentration of magnesium was 6.0 mg/l in the ground water studied while calcium concentration was 4.81 mg/l. Ammoniacal nitrogen was not detected in the groundwater around the study area.

Heavy Metals in Groundwater: the following metals were analysed in the groundwater – Arsenic, Chromium, Zinc, Copper, Iron, Lead, Manganese and Cadmium. Arsenic, Cadmium, Lead, manganese and Chromium were not detected in the water while Copper, Zinc and Iron were detected in the following concentrations respectively: 0.02mg/l, 0.06mg/l and 0.10mg/l.

The assessment of heavy metal status is because of the concerns relating to their presence in water. Such concerns are toxicity, bioaccumulation and hazards to human health (GEMS 1992).

Microbiology of Ground Water (Bore Hole)

The distribution of heterotrophic bacteria and fungi and hydrocarbon utilizes in the underground water samples collected at different sampling stations is presented in **Table 5.8**. Heterotrophic bacteria abundance was observed to vary from 0.5 $x10^3$ CFU/ml during study. Total heterotrophic fungi were not observed during the study. Hydrocarbon utilizing bacteria (HUB) population was

observed with concentration of 3.0 x10^2 and Hydrocarbon utilizing fungi (HUF) was not observed in the study area. Total Coliform detected in the groundwater studied was 5 x 10^3.

Table 3.6: Microbes in the Groundwater Samples

Parameters	Range CFU/ml
Total Heterotrophic Bacteria cfu/g	0.5 x 10^3
Total Heterotrophic Fungi cfu/g	NIL
Total Hydrocarbon Utilizing Bacteria cfu/g	3 x 10^2
Total Hydrocarbon Utilizing Fungi cfu/g	NIL
Total Coliform cfu/g	5.0 x 10^3

Source: Fieldwork (2022)

Plate 3.2: Water sampling within the study area

3.4 Soil Studies

Field observations and soil sampling were carried out on the project location and its area of influence for soil study. Field soil morphological description following the procedure in the 'Guideline for Soil Survey and Profile Description' (FAO, 2006) was adopted. Soil sampling was carried out using Dutch Soil Auger with stainless steel tip. Depth of soil sampling was 0 – 30 cm in view of the widespread intensive cultivation and partly built-up nature of the study area with mosaic of fallow area. All the soil observation and sampling points were geo-referenced using hand-held GPS.

Soil Type

Soils in the study area were developed in Basement Complex rocks comprising older granite, undifferentiated granites of migmatites and granitic gneisses with characteristic aeolian deposits from loessial material (Maniyunda*et al*., 2017), and according to D'Hoore (1964), soils in the study area are highly weathered and markedly laterized by the loss of silica. The soils are generally brownish to reddish brown in colour, with little profile morphology, texturally sands and loamy sands (Bashir and Bubenzer, 1991). In the Soil Map of the World, FAO (1996) grouped the soils as Ferrugineous Tropical Soils, and correlated as Haplustults (USDA-SSS, 2014).

Physical Properties of the Soils

To assess the quality of soils in the study area, several 0 –15 and 15 – 30 cm soil samples (n = 10) were widely spatially spread within the project location were collected and analyzed. The particle size distribution and texture of the soil samples are presented in Table annx5.3. The soils are mostly, 41 -76 % sand, with silt accounting for 14-32 % and clay 10-27% (Table annx5.3 Therefore, the soils are predominantly sandy loam (SL) in texture. From the particle size data along with the predominant brownish soil colour, there is clear evidence of homogeneity within and around the project location (Table 3.7). The moderately high content of silt in the soils predisposes the soils to encrustation with potential of increased storm water following the formation of crust especially when the soils are bare. Land clearing and site grading should therefore be carefully planned to avoid excess land take. Consequently, the soils within and around the project location are not envisaged to be physically aggressive as to enhance rapid external corrosion of buried metals. However, the moderately high amount of silt combined with clay predisposes the soils to subsidence especially when wet. Therefore, appropriate foundation that can support heavy load against subsidence should be considered for buildings at the site.

Table 3.7: Spatial Distribution of the Physical Characteristics of the Soils and their Statistical Summary

Field Code	Coordinates of Soil Sampling Location			Particle Size Distribution (%)			Texture
	Lat (oN)	Long. (oE)		Sand	Silt	Clay	
SP1	11.98124	8.42514	0-15	62	26	12	Sandy loam
			15-30	66	21	13	Sandy loam
SPC	11.98145	8.42471	0-15	56	27	17	Sandy loam
			15-30	62	22	16	Sandy loam

Chemical Characteristics of the Soils

Table 3.8 presents the data on the chemical properties of the soil, spatially spread soil samples within and around the project location. The essence is to assess the chemical characteristics of soils within the area of influence of the project as at the time of field investigation. The pH varies from 5.20 – 6.03. In general, the soils are slightly acidic and thus have the potential of being chemically aggressive. Soils with low pH are reported to be chemically aggressive (Turk and Foth, 1997; Sparks *et al*., 1996). Except for the available phosphorous with concentrations of 3.12 – 6.57 ppm for all of the other chemical parameters that were determined were very low, generally less than one. The low chemical content is indicative of sufficiently homogeneous chemical nature of the soils. Further is that there is no unusual value in any of the chemical parameters that was determined including the available-P, probably suggestive of the 'chemically unpolluted/uncontaminated nature' of the study area in regards to soil chemical properties. Specifically, within the study area, the organic carbon (OC) content, and hence, the organic matter (OM) are both low and are within the range commonly obtained in unpolluted/uncontaminated mineral soils. Similarly low are the total nitrogen (TN) and the exchangeable bases (Ca^{2+}, Mg^{2+}, K^{+} and Na^{+}) as all the values reported are within the normal range commonly obtained in unpolluted/uncontaminated mineral soils. With soil pH of mostly close to 6, the exchangeable acidity is expected to be low (Brady, 2002), hence, the very low exchangeable acidity concentrations that were reported. The oil and grease (O&G) otherwise referred to as total hydrocarbon content (THC) concentrations were similarly very below, generally between 1.00 and 2.00 mg/kg in all of the sampling locations. In general, from the soil chemical characterization

data, there was no evidence of bioaccumulation and or pollution of soils in the study area as at the time of field investigation.

Table 3.8: Spatial Distribution of the Chemical Characteristics of Soils in the study Area and their Statistical Summary

Field Code		Ph		Avail-P	OC	OM	TN	Exch. Bases				Exch. Al	ECEC	THC
								Ca	Mg	K	Na			
		(H_2O)	($CaCl_2$)	(ppm)	(%)			(Cmol/kg soil)						(ppm)
P1	0-15	6.03	5.60	3.77	0.39	0.67	0.04	5.52	2.71	0.84	3.22	1.21	13.51	1.23
	15-30	6.01	5.42	3.34	0.25	0.34	0.02	5.02	2.63	0.54	2.94	0.99	12.22	1.21
PC	0-15	5.42	4.68	6.02	0.73	1.16	0.12	5.20	2.68	0.82	2.22	1.18	12.96	1.20
	15-30	5.25	4.27	5.34	0.54	0.69	0.07	4.99	2.45	0.46	1.85	0.96	12.52	1.04

Soils and Geology

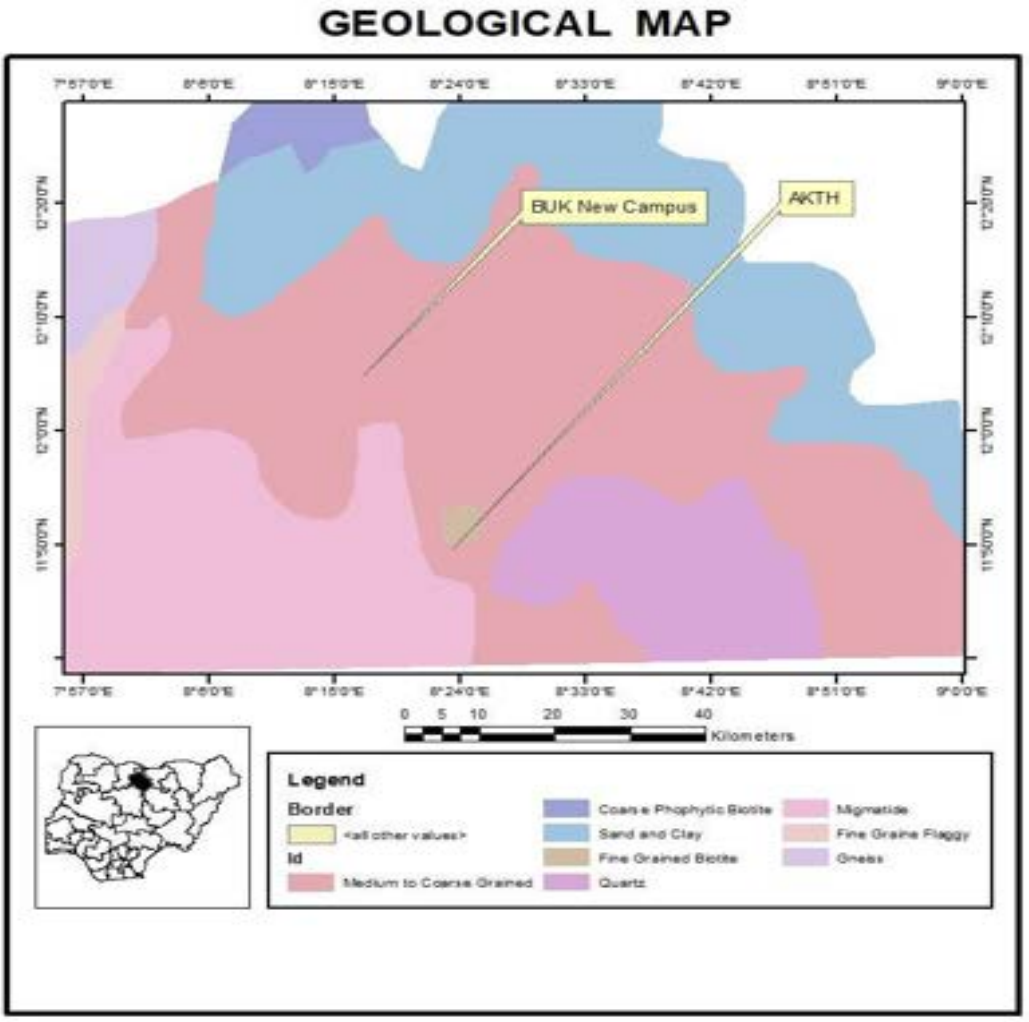
The geology underlying the project locations is composed of precambrian basement complex rocks. The lithological units in the area are of Migmatite Gneiss. The soils are predominantly loamy, derived from the basement complex rocks and are mostly well drained with a medium texture. The soils are of high agricultural value for both tree and arable crops. The soil characteristic described in Table 3.8 was based mainly on soil morphology. An approximate classification was made by spreading a sample on a flat surface and examining it, noting particular grain size, gradation, grain shape and particle hardness, using hand-held GPS.

All the soil samples collected for various laboratory analyses were properly labeled to indicate sampling location, soil depth, sample number and date of sampling. On the field and in transit en-route to the laboratory, microbiology and THC/O&G samples were kept in a cooler with ice-chest. In the laboratory pending analyses, the samples were transferred into a refrigerator until they were finally analyzed. Chain of Custody Form was also kept to track sample movement.

Table 3.9. Summary of the Methods Employed for the Analysis of the Soil Samples.

Parameter	Method
Physical Soil Properties	
Particle (Grain) Size Distribution	Hydrometer (Bouyoucos, 1951)
Porosity	Cylindrical Method (Sparks *et al*., 1996)
Bulk density	Gravimetric method (Blake and Hartge, 1986)
Texture	Textural Triangle
Organics Content of the Soil Samples	
Total Hydrocarbon Content (THC)/Oil & Grease	Xylene extraction followed by the use of Spectrophotometer
Total Organic Carbon (TOC)	Dichromate Wet Oxidation Digestion (Walkley and Black, 1934) as reviewed by Sparks *et al.*, 1996
Metal Content of the Soil Samples	
Exchangeable Bases/Cations (K, Na, Ca, Mg)	Ammonium Acetate Extraction, followed by the use of Flame Photometry (K & Na) and Atomic Absorption Spectrophotometry (Jones, 1988) for Ca & Mg.
Heavy metals (Cd, Cr, Cu, Fe, Pb, Zn, Co, Ni, V)	Acid Digestion, followed by the use of Atomic Absorption Spectrophotometry (AAS) (Jones, 1998; Allen, 1974)
Chemical Soil Properties	
pH	Glass electrode pH meter
Total Nitrogen	Macro Kjedahl (Jackson, 1962) and Sparks *et al.* (1996)
Available phosphorus	Colorimetric (Jones, 1998; Murphy and Riley, 1962)

Exchangeable acidity	Sparks *et al.* (1996)



Geological Map of Kano State

Laboratory QA/QC

Soil sample handling, preservation and analysis in the laboratory were in accordance with the provisions in the Environmental Guideline and Standard in Nigeria by the FMEnv and as in other internationally acclaimed publications such as the "Methods of Soil Analysis by Sparks*et al*. (1996) Parts II & III. The analytical methods used were those that are specified in Internationally Published Methods and Procedure.

Heavy Metal Content of the Soils

Table 3.10 gives the concentrations of the various heavy metals that were investigated in soils of the study area and also presents the statistical summary for same. Generally, the concentrations of each of the heavy metal are very low when compared with corresponding concentrations in normal unpolluted/uncontaminated mineral soils (Allen *et al.,* 1974; Alloway, 1991). From the heavy metal concentration data reported for the soils, there was no evidence of heavy metal accumulation/bioaccumulation in the soils as at the time of investigation. This is because the heavy metal concentrations reported for soils in the study area are all within the normal range in unpolluted mineral soils. For Fe and Mn, the normal range in unpolluted mineral soils was not

provided by Alloway (1991), however, Brady (2002) indicated that Fe and Mn concentrations that are considerably higher than 5,000 mg/kg in soils are not unusual.

Table 3.10: Spatial Distribution of the Heavy Metal Content of soils in the study Area and their Statistical Summary

Field Code	Coordinates of Sampling Location			Mn	Fe	Cu	Zn	Cr	Pb	Ni	V
	Lat. (°N)	Long. (°E)		(ppm)							
SP1	11.98124	8.42514	0-15	20.36	92.40	1.98	1.79	0.02	0.02	0.02	0.15
			15-30	20.21	90.21	1.74	1.73	0.01	0.01	0.01	0.13
SPC	11.98145	8.42471	0-15	30.45	92.50	1.20	1.60	0.02	0.02	0.02	0.19
			15-30	29.72	91.88	1.41	1.23	<0.01	0.01	<0.01	0.14

Microbial Diversity and Population Density in the Soils

The microbial diversity and population density in soils of the study area are presented in Table 3.11. The soil flora comprised of *Bacillus spp, Actinomycetes spp, Rhizopus spp and Aspergillus spp* mostly. In general, total heterotrophic bacteria (THB) abundance was significantly higher than fungal (THF) abundance. This is probably due to the slightly high pH of the study environment because Fungi are known to thrive much better in strongly acidic than in near neutral to alkaline soil environment. However, the abundance of THB and THF in the soils all occurred within the known range for normal, unpolluted mineral soil environment. The hydrocarbon utilizing bacteria (HUB) and fungi (HUF) occurred in varying proportions in the soil samples. Their population densities in all of the sampling locations were less than 1% of the THB and THF respectively, thus, indicative of non-hydrocarbon polluted/contaminated soil environment. In general, the microbial diversity and population density recorded in soils of the study area are indicative of healthy, unpolluted/uncontaminated mineral soil environment.

Table 3.11: Microbial Diversity and Population Density in Representative Soil Samples in the Study Area

Field Code	Coordinates of Sampling Location			THB7	THF	HUF	HUB	Isolated Organisms
	Lat. (°N)	Long. (°E)		(cfu/g)				
SP1	11.98124	8.42514	0-15	$2.6x10^3$	$1.0x10^1$	$0.4x10^1$	$0.6 x 10^1$	*Bacillus spp, Rhizopus spp, Actinomycetes spp,*
			15-30	$2.4x10^3$	$0.65x10^1$	$0.2x10^1$	$0.4 x 10^1$	
SPC	11.98145	8.42471	0-15	$1.5 x10^2$	$0.7x10^1$	$0.3x10^1$	$0.4 x 10^1$	*Bacillus spp, Rhizopus spp, Actinomycetes spp,*

Plate 3.3: Soil sampling within the study area

3.5 Vegetation

The allocated project site for the proposed intervention work is the within the Aminu Kano Teaching Hospital (AKTH) Premises and presently farming area for Rice, The Vegetation of the Study area mostly consist of a patchwork of fallow regrowth which are at various stages of development and also matrices of tree and food crop farm. Tree and food trees observed around the project area includes; Groundnut Plantation, Baobab, Neem Tree, Gum Arabic, Thorn Tree, Dum Palm, Chris thorn etc.





Plate 3.4: Display of Vegetation at the project location

Site reconnaissance survey and Field Data Gathering

A combined site reconnaissance survey and field data collection program was executed by a team of environmental and social specialists. The site reconnaissance survey was undertaken to confirm

the information identified as part of the desk-based assessment and also to physically observe the general biophysical and socio-economic characteristics of the entire study area and refine the proposed field data collection methods, where it was appropriate.

The sampling was conducted using pre-determined sampling locations essentially based on ecological features and the geographical location of communities/settlements in the study area. Each sampling station was geo-referenced using an Extrex Model Global Positioning System (GPS).

Field data was collected for air quality, noise and ecology at sensitive receptor locations. A summary of the type of data collected during the field surveys is presented in Table xx below.

Table 3.12: Summary of the Baseline Data Collected During the Field Works

Component		**Data collected and methods**
Physical Environment	Suspended Particulate Matter (SPM)	HAZ-DUST Handheld Air Borne particulate meter (HPPC 6+) Counting Efficiency – 50% at 0.3 um; 100% for particles > 0.45 um (ISO 21501-4)
	Volatile Organic Compounds (VOC) and Formaldehyde (HCHO)	Gas Alert VOC/ TVOC range: 0.00 to 9.99ppm range: 0.00 to 100ppm
	Temperature, Relative Humidity, Dew point and Wind Speed	Kestrel 5500 Weather meter was used for the measurements of microclimatic parameters. This Weather Tracker is a sophisticated, multi-function environmental monitoring instrument used to measure major environmental condition including Barometric Pressure, Altitude, Density, Temperature, Humidity, Wind Speed, Wind Chill, Dew Point, Wet Bulb, and Heat Index.
	NO, SO_2, CO_2, NH_3, H_2S, NO_2, CO, NO	Gray Wolf Advance Sense Pro Environmental test meter
	Groundwater	In situ groundwater data was collected from existing boreholes within the health facilities. The indicator parameters were temperature, Total Dissolved Solid (TDS), Electrical Conductivity EC and pH
Biological Environment	Ecological biodiversity	● Vegetation and flora surveys via a detailed assessment of plant characterics and identification and an inventory of economic crops within the project locations. Method involved the use of photograph and frequency method while attributes considered were frequency, cover, density, production, structure and composition of plant species. ● Fauna survey using a range of methods, i.e direct observation, indirect observation, identification and biological nomenclature, handpicking and informal Interviews. ● Soil characteristic based mainly on soil morphology. An approximate classification was made by spreading a sample on a flat surface and examining it, noting particular grain size, gradation, grain shape and particle hardness.
Socioeconomic Environment	Stakeholder Engagements	● Socio economic study focused on the facilities' immediate environment with stakeholders consulted around all the facilities through interviews and Focus Group Discussions. .

3.6 Wildlife

Some eleven wildlife species were observed in the study area. This included mammals, rodents, birds and wild ruminants. Five animal species were abundant in the area namely *Agama agama*, *Agama aculeate*, *Rattus fuscipes*, *Opheodrys vernalis* and *Bubulcus ibis.* There were three species common in the area namely *Turacoena modesta*, *Zenaidam acruora* and *Cricetomys gambianus*. Occasionally occurring species were two, namely *Ploceidea* and *Thryonomys swinderianus*.

Table 3.13: Wildlife species composition

S/N	Common name	Scientific name	Ecological status			
			A	C	O	R
1	Black dove	Turacoena modesta		X		
2	Morning dov	Zenaida macroura		X		
3	Weaver dove	Ploceidae			X	
4	Agama lizard	Agama agama	X			
5	Female agama	Agama aculeate	X			
6	Bush rat	Rattusfuscipes	X			
7	Olive green snake	Opheodry svernaris	X			
8	Grass cutter	Thryonomys swinderianus			X	
9	Cattle egret	Bubulcus ibis	X			
10	Monitor lizard	Cryceptomys ganbians				X
11	African giant rat			X		
	Total		5	3	2	1

Source: Field Survey 2022. Key: A-Abundant; C-Common; O-Occasional; R-Rare

4.6.1 Soil Fauna

The soil macro-fauna encountered within the study area include various arthropods (insects, millipedes, mites), molluscs (snails), annelids (earthworms) and nematodes. These organisms are primary consumers; decomposers, mixers and utilizers of energy stored in plants and plant residues, and contribute to the re-cycling of nutrients. Others were secondary consumers such as centipedes and spiders.

3.7 Socio-Economics Data Collection

The methods of data collection adopted for this study includes observation, and use of questionnaire and secondary data where applicable.

Focal group discussions were held in the ACEPHAP Unit of Aminu Kano Teaching Hospital Complex of the Bayero University Kano which is the major identified project community,

ACEPHAP is located within the Aminu Kano Teaching Hospital Complex of the Bayero University Kano. Questionnaire administration sessions were held with a total of 40 staff and students within the project community and observable physical features in the community were recorded.

Total current student enrolment is 46,492 (37,214 undergraduates, and 9,278 Postgraduate Students) made up of 30,141 Male and 16,351 Female students. The total staff strength is 4,618 (1,720 Academic Staff, and 2,898 Non-Teaching Staff), 321 full professors, 7 international staff, running 99 academic programs with 89 fully accredited by the NUC (10 new programs still in their infancy yet to be accredited).

3.7.1 Traffic Studies

The traffic studies of the access roads indicated that highest flow of vehicular traffic was experienced from the direction of the Exit Gate to the Project area only at peak hours to go to work and lecture rooms and back. Taking cognizance of the number of vehicular traffic along the Road leading to the Exit Gate and project site access road, workers and residents around the project site and its environs may not experience heavier human and vehicular traffic during the construction work in view of the -low vehicular movements in the project area.

3.7.2 Age Distribution

As indicated, there is the possibility of higher youth population (active age group) in the project area as the respondents in the age group of 18 to 45 years (50%) account for the highest proportion in the sampled population. This is followed by age group of 46 to 65 years (30%) while those that are above age 65 years' account for 15%. The age group below 18 years' account for only 5%. The age group distribution indicated by the respondents is expected of a university environment.

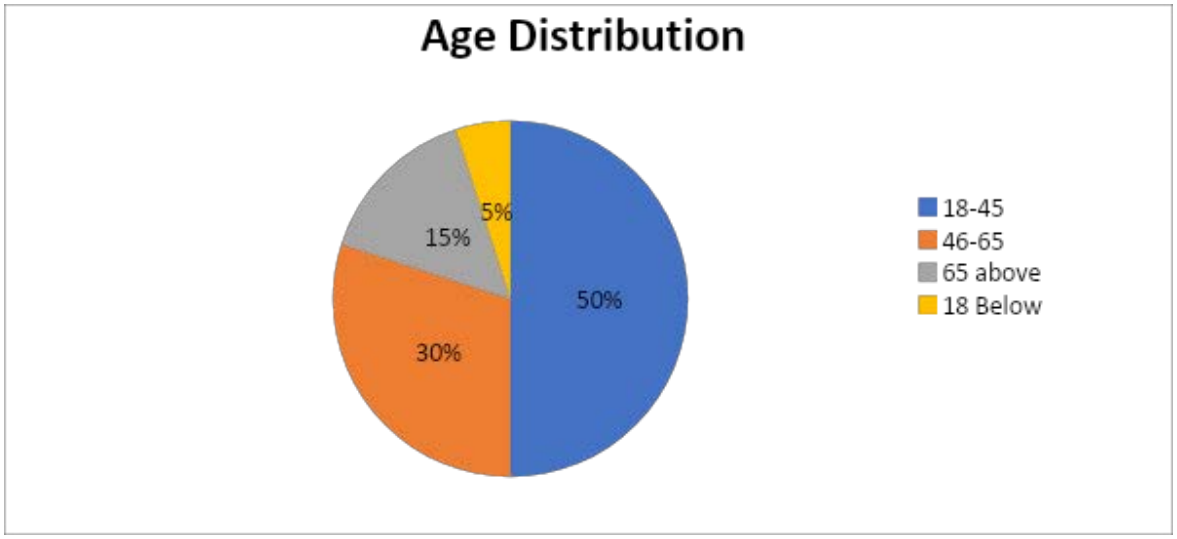


Figure 3.12: Percentage Age Distribution of respondents in the Project location
Source: Field Survey

3.7.3 Marital Status

Married respondents account for 57% while single account for 23% followed by the divorced which accounted for 15%. The widowed only accounted for 5% of the respondents. It could therefore be envisaged that a great number of the people in the school, who are incidentally mainly staff of the university are married (because of the on-going Industrial Action by University Lecturers in Nigeria, the students were not around for Academic activities). Married people are presumed to be more responsible in our society.

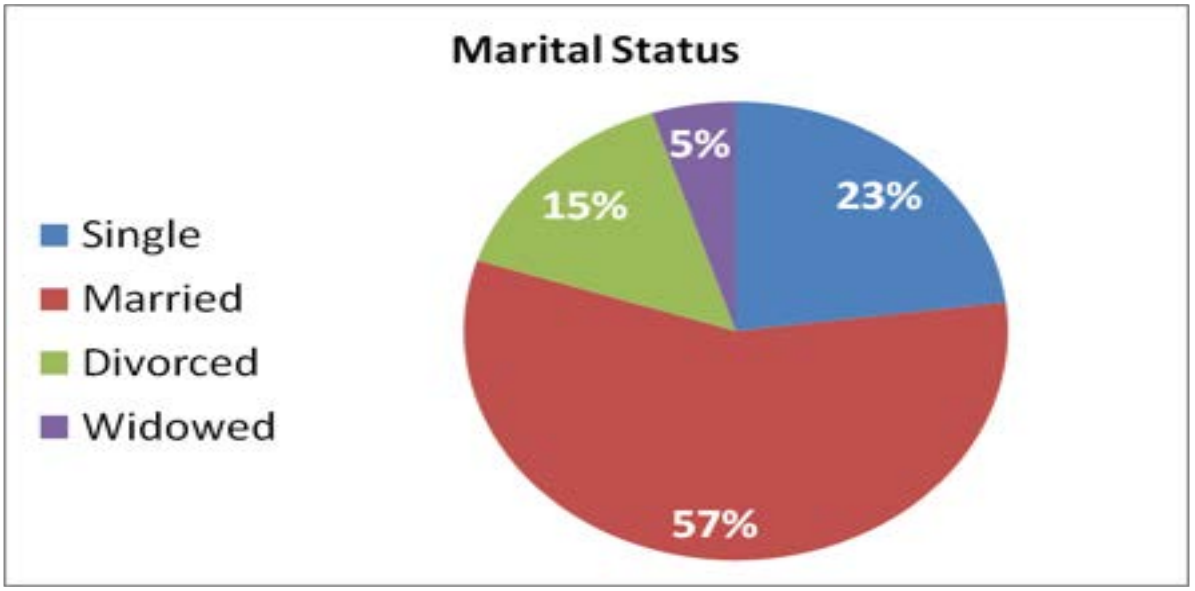


Figure 3.13: Percentage Marital Status distribution of respondents in the Project location
Source: Field Survey

3.7.4 Occupation

Civil service (government workers) are the dominant livelihoods indicated by the sampled population. This is not also unexpected due to the circumstance that surrounds the university as a public University in Nigeria. Consequently, occupations indicated by respondents are civil service (40%) followed by Salary and self – employed personnel in trading/business (the form of businesses prevalent being such as point of sale (POS) operators, Recharge card sellers) (15%) each while students account for 28%. The least respondent was the unemployed which accounted for 2% of the total respondents.

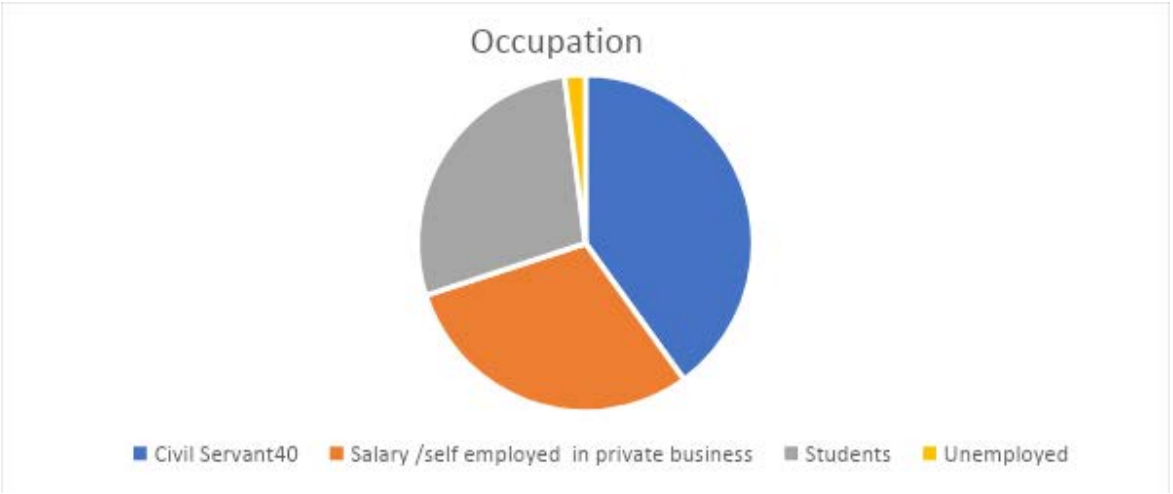


Figure 3.14: Percentage Occupation distribution of respondents within the Project location
Source: Field Survey

3.7.5 Residential Status

Of the sampled respondents the permanent residents are more in number, they accounted for 55% of the respondents and have lived there for 6-9 years, this is followed by the returnee residents due to work posting or retirement back to home and they have lived there for 3-5 years. The least respondents are the non-residents who are in town occasionally for lectures or other academic related activities and they have lived there for 0-2 years. On the other hand, the relationship to household head was 70% self, 25% spouse and 5% Parent showing that more of the respondents

were household heads while the dominant average household (HH) size indicated by the sampled respondents are 3 to 5 people showing (62%) of the respondents.

Figure 3.15: Percentage Residential status within the Project location
Source: Field Survey

3.7.6 Ethnic Groups

Indicated ethic group by the respondents are Hausa / Fulani 77%, Igala 10%, Igbo 6% and Yoruba 2%, while the other tribes generally constitute 5% of the respondents respectively. The indicated ethnic groups by the respondents may not necessary represent the real composition of the school staff. However, a Federal establishment such the ACEPHAP is expected to have multi-ethnic compositions.

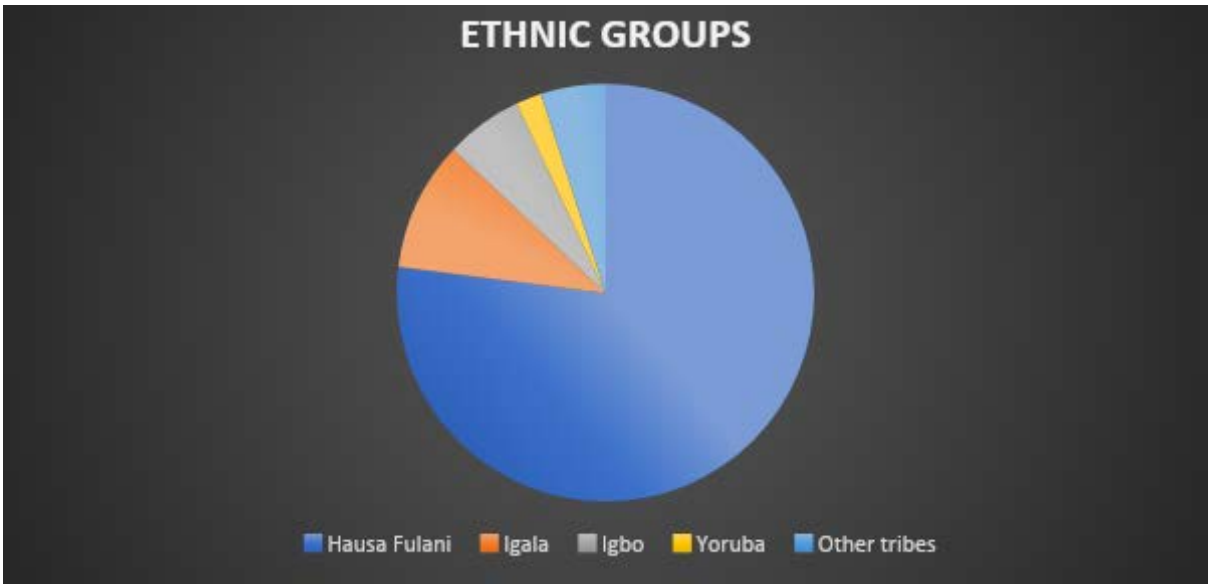


Figure 3.16: Percentage distribution of Ethnic groups within the Project location
Source: Field Survey

3.7.7 Education

Respondents' dominant education attainments are University graduate (44%) and University postgraduate (22%). Others such as OND/NCE/HND account for 9%, Secondary School education is 13%, Primary School is 7% while no formal education accounted for 5% of the respondents. As expected of a university community, it could therefore be noted that there is a high level of literacy people within the study area.

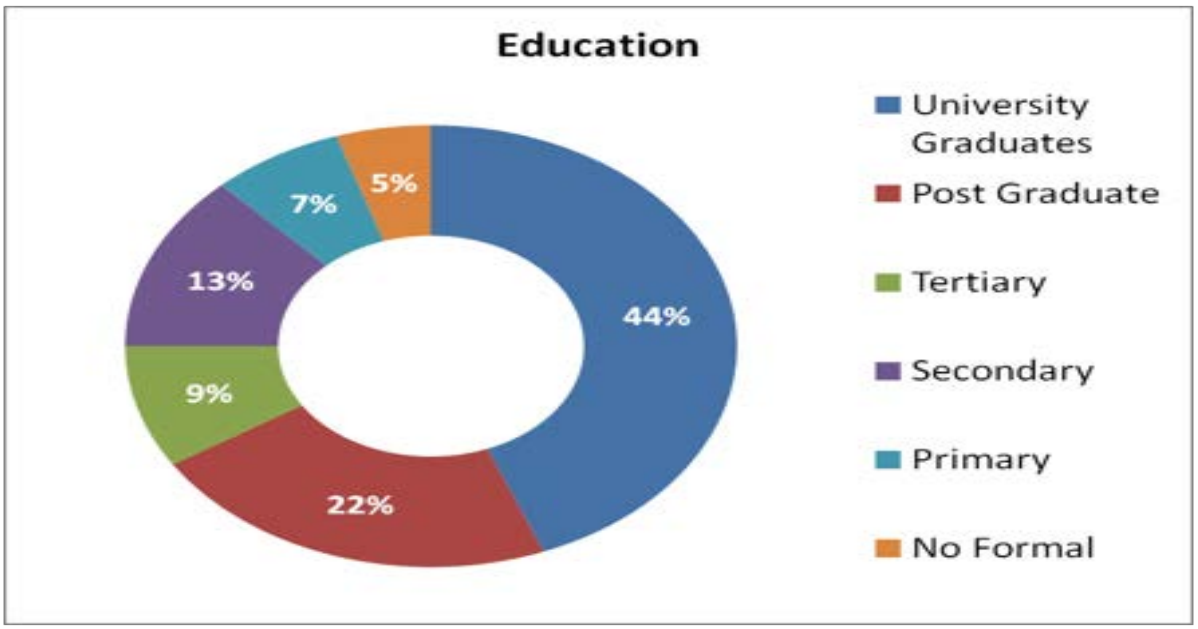


Figure 3.17: Percentage Education Distribution within the Project location
Source: Field Survey

3.7.8 Income

Monthly income indicated by the respondents are: below ₦50,000 (25%), ₦50,000 to N100,000 (30%), while those earning Above N100,000 accounted for 45% of the respondents. It should be noted that some of the respondents particularly the monthly non-salary earners are unable to estimate their monthly income as a result of improper financial record keeping.

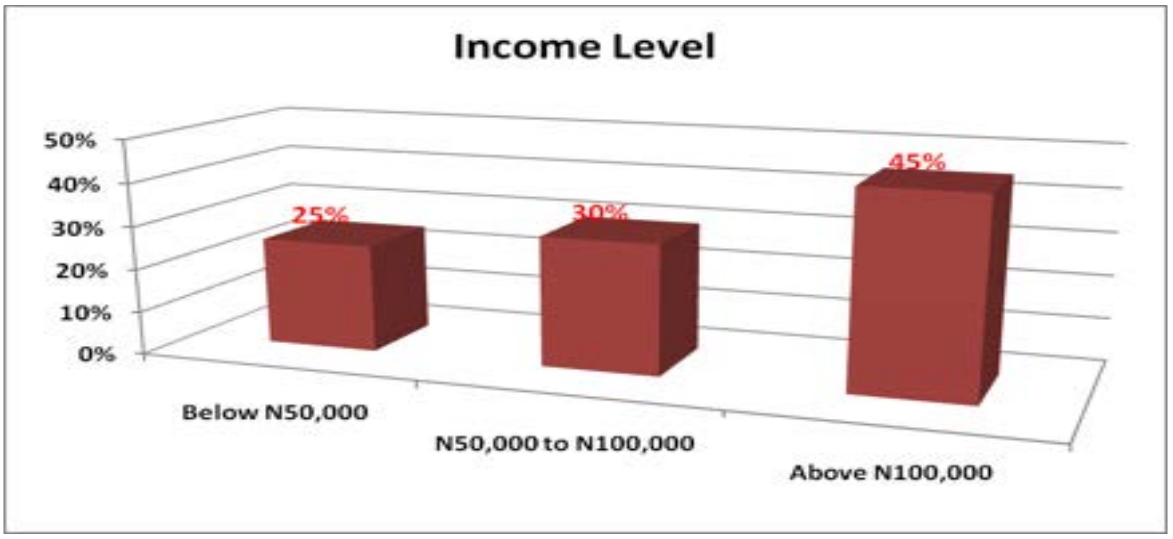


Figure 3.18: Percentage Income Distribution within the Project location
Source: Field Survey

3.7.9 Settlement Patterns, Housing Structures and Characteristics

The Main Campus of the University and is sited on the banks of a major river channel (River Watari). The New campus houses the central administration, as well as ten faculties namely; Faculties of Agriculture, Arts and Islamic Studies, Computer Science and Information Technology, Communication, Education, Engineering, Earth and Environmental Sciences, Law, Management Sciences as well as Social Sciences; three Schools namely; School of Post Graduate Studies, School of General and Entrepreneurship Studies, and Dangote Business School. Ten research Centers; Center for Information Technology, Centre for Dryland Agriculture, Centre for

Nigerian Languages, Translation and Folklore, Centre for Economic, Social and Population Research, Centre for Islamic Civilizations and interfaith Dialogue, Centre for Gender Studies, Centre for Democratic Research and Training, Centre for Quranic Studies, Centre for Renewable Energy Research, and Centre for African Entrepreneurship Research. The University's Micro Finance Bank, Physical Planning Unit, Maintenance Services Division, the main and new Library complex.

Furthermore, about 220 senior staff houses and 20 junior/intermediate houses. There are about 1000 rooms in the student's hostels on campus, a stadium, and a modern student's center managed by the students' body.There are commercial and banking facilities and services as well as Recreation centre all located at the new campus.

The Main Core is the pedestrian-only heart of the campus and features both administrative buildings and general student service spaces. All are arranged around a green quadrangle and interconnected through paths, the uneven terrain necessitating terraces and ramps. Jutting rooflines and roofed walkways afforded protection from both sun and downpours in the rainy season.

Apart from its varied architecture, BUK's landscaping keeps it from being a series of concrete islands. The buildings are integrated with the surrounding Date Palm trees via numerous green spaces that surround the main structures. Concrete expanses are even broken up by small framed triangles of grass.

The Old Campus is located just outside the ancient walls of Kano City. It houses 4 faculties i.e the Faculties of;

- Physical Sciences
- Life Sciences
- Basic medical sciences
- Pharmaceutical sciences.

There is a center; Centre for Biotechnology Research, and an annex of the Center for Information technology.

The central laboratory complex is also located at the old campus as well as some sections of the main library, university health services clinic, and the consultancy services unit. In addition, it contains 19 blocks of hostels with 48 rooms each for students, 167 senior staff houses and 47 units of junior/intermediate staff houses. There are large lecture theartres, halls and sporting facilities. There are commercial services including banking services.

Outside the two campuses, there exists the Aminu Kano Teaching Hospital campus which houses 3 faculties; the faculties of: Clinical sciences, Dentistry, and Allied Health Sciences.

It also houses 3 Centers namely:

- Centre for Infectious Diseases,
- Centre for Advance Medical Research, and
- African Centre of Excellence for Population Health Policy.

The AKTH campus is located some 12 kilometers from the old campus and about 20 kilometers from the new campus. Also sited there are some Student's Hostels and a Medical Library.

3.7.10 Respondents Land and House Tenures

The tenure of the housing and land is presented in Fig. 3.19. As shown in the figure, 50% of respondents indicated they live in rented apartments while 30% indicated they live in personal/owned apartments; in addition, 15% of the respondent indicated they live in leased tenure

while only 5% indicated free house/accommodation. Similarly, the land tenure followed same pattern as that of the housing tenure.

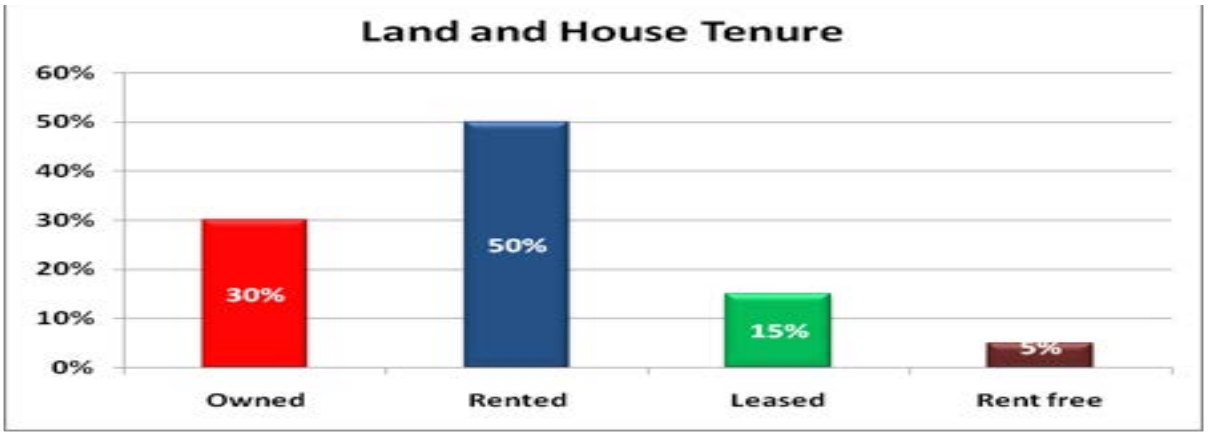


Figure 3.19: Percentage distribution of Respondents based on Land and Housing Tenure Characteristics
Source: Field Survey

3.7.11 Household Solid Waste Management

The waste management method adopted by the users around the project area was examined. The prevalent methods of management include use of receptacles and dumping by roadsides for domestic and office generated waste.

As shown in Figure 3.20, the household solid waste management methods adopted by the respondents at the study community include: Waste Collectors 25%, Burning 60%, while refuse dump is 15%. In Kano State, solid waste is managed by an agency of the state government known as Kano State Refuse Management and Sanitation Board (REMASAB). Nonetheless, the waste collection service of the agency is often limited to the urban areas and are usually irregular. The project location is in the urban area of the state and also the state capital, results from the respondents shows that most of the waste are evacuated by waste collectors.

Figure 3.20: Percentage distribution of Respondents based on Waste Disposal Methods
Source: Field Survey

3.7.12 Sources of Energy

Sources of energy are not the same everywhere and it varies from one household to another. As indicated, primary source of energy for lighting by the respondents is electricity supply from the

national grid (65%), while those that depend on power generating sets as primary source of energy account for 25%. Other sources of energy indicated are the solar power, and batteries which constitute only 10% of the respondents. Meanwhile, mix energy use is common among many people in Nigeria due to unstable power supply from the National Grid. As regards energy for cooking, main sources indicated are cooking gas (70%), firewood (20%), charcoal (5%) and Kerosene 5%. It was observed that cooking with firewood is common among the food vendors while charcoal is mostly used by those selling roasted food**.** Cooking gas remains one of the sources of clean energies used around the world.

3.7.13 Sources of Water

Indicated sources of water for household use in the study area is majorly through the government water utility which dominated about 60% of the respondents, however other sources indicated by the respondents are boreholes/Well 35% and Rain harvesting 5%. Generally, households within the community depend on Government pipe borne water specifically at the project location except when there are issues.

3.7.14 Living Standard

Most of the respondents claimed that their standard of living has been the same over the previous three years. About 20% affirmed that it has been better while 25% indicated that it has got worse over the same period. Of those that claimed that the situation has got worse they gave reason that it was caused by the state of the country's economy occasioned by the effect of the COVID-19 and the incessant labour union strike in the university while some respondents stated otherwise. However, Majority of the respondents where excited about the proposed project and believed that the proposed project will improve the situation of some folks for employment opportunities and knowledge in the project community.

3.7.15 Local Economy

As a university community, it is expected that there would be other means of livelihood outside civil servants. Observed economic activities within the school ranged from commercial tricycle operators, Motor Cycle riders, local food vendors, information and computer technology (ICT) services (such as computer/internet services and photocopy machine operator), POS vendors, Recharge card sellers and petty trading. Basically, the economic activities of the campus are dominated by retails and it is scanty perhaps due to the industrial action (ASUU Strike) as at the time of the study.

3.8 Health Status and Health Management Method

Prevailing Sickness

Baseline health condition of the people of the study area was assessed through survey. The dominant health challenge/sickness indicated was Malaria (65%) while typhoid and cough/cattarrh account for 15% and 10% respectively. Other ailments such as stomach ache, cholera, pile, eye pains and stomach ulcer jointly account for 10% of the total sampled population.

3.8.1 Health Management

According to the respondents most of these illnesses they suffer from are treated mostly by visiting a hospital/clinic, buying drugs from the local pharmaceutical stores and occasional traditional methods. Of those that visit hospital for health treatment, 60% indicated that they have visited within the last six months followed by those that have visited a health facility in the last one year

(20%.). About 12% of the sampled population have visited within the last five years while 8% had visited more than five years ago. The university has a health center/facility within the campus.

CHAPTER FOUR: ASSESSMENT OF POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS

4.0 Screening and Scoping for Potential Impacts

The first step in identifying impacts associated with the project is the development of an interaction matrix which shows the relationship / interaction between the project environmental and social components and planned project activities.

A modified version of the Leopold Interaction-matrix technique was employed to screen and scope for the potential impacts of the proposed Project on the environment. The basis for the screening was derived from the following:

- Knowledge of the Project activities.
- Detailed information on the environmental and socio-economic setting of the Project's area of influence.

- Consultation with relevant stakeholders.
- Review of other ESIA reports on similar projects/environments.

Table 4.1: Project Activities – Leopold's Environmental and Social Interaction Matrix (Impact significance Matrix)

Summary of Project Activities at various Phases	Receptors															
	Physical					Biological		Socio-economic						Others (Health and Safety)		
	Air Quality	Ambient Noise	Soil	Groundwater and Aquifer	Landscape/ Topography	Terrestrial Flora	Terrestrial Fauna	Land Use	Population	Utilities	Infrastructure	Employment/ Income	Gender issues	Construction workers	Workplace health and safety	General Public
Pre-construction Phase																
Site selection								X								
Site clearing and preparation	X	X	X		X	X	X					X		X		
Mobilization of construction equipment and materials to site	X	X									X	X				X
Construction Phase																
Civil work activities including excavation, trenching, cable laying, foundation, construction of International Students Hostel building	X	X	X	X					X			X	X	X		X
Installation of ancillary facilities, power storage batteries.	X	X	X										X	X		X
Waste generation and disposal			X	X							X	X		X		X
Commissioning Phase																
Testing of International Students Hostel and associated Infrastructure		X							X		X			X		X
Operational Phase																
International Students Hostel and associated Infrastructure and facilities operation and provision of training for users		X										X	X		X	X
Routine maintenance; waste generation and disposal	X		X	X	X					X	X	X	X		X	X

Table 4.2: International Students Hostel and associated Infrastructure Impacts Categorisation

Project Activities	**Associated and Potential Impacts**	**Direct**	**Indirect**	**Adverse**	**Beneficial**	**Reversible**	**Irreversible**	**Cumulative**	**Long term**	**Short term**
Pre-construction Phase										
Permitting Stakeholders' engagement Land Use Recruitment Land preparation and clearing	Employment opportunities arising from recruitment of workers									
	Business opportunities for local contractors through sub-contracting activities									
	Loss of vegetation covers due to site clearing and preparation activities									
	Skill acquisition and enhancements to locals and future workforce									
	employment issues (quotas and methods)									
Construction Phase										

Mobilization to site	Influx of sub-contractors and suppliers and increase pressure on existing social infrastructure		■	■		■		■	■	■
	Increased risks of accidents leading to injury and loss of asset during mobilization		■	■		■	■			■
	Nuisance (noise and vibrations) from movement of heavy-duty equipment and vehicles affecting site workers and wildlife	■		■		■		■		■
	Dust particles and vehicular emissions from increased movement	■		■		■		■		■
	Generation of wastes such as scrap metal, wood, sand, concrete, paper, domestic waste etc	■		■		■		■		■
Commissioning and Operational Phases										
Testing and commissioning designs generation facility maintenance and servicing	Generation of designs	■			■	■			■	
	Increased opportunities and quality of life (small, medium, large scale) due to enhanced service delivery for users of the International Students Hostel		■		■	■	■		■	
	Soil / groundwater contamination from accidental petrol / diesel /engine oil spill during refueling of vehicle and facility owned diesel or petrol generators		■	■		■	■	■	■	
	Workplace accidents / incidents (cuts, trip, falls etc) leading to injury / death of personnel during operations	■		■		■	■		■	■
	Acquisition of skills by individuals to be employed to operate the studio and ancillary facility	■		■		■	■		■	

KEY

■	Activity interacts with ecological or social component
	Activity does not interact with ecological or social component

4.0.1 Determination of Impact Significance

The significance of impacts that could occur due to the implementation of the project's activities were established based on three steps which are:

- Impact Magnitude which combines the extent, duration, scale and frequency of an impact
- Value/ Sensitivity/ Fragility and importance of the relevant Receptor;
- Identification of the impact significance, which is the cumulative indicator of both of the above two key variables.

The magnitude of an effect requires quantifying the sources of potential environmental and socio-economic effects from routine and non-routine project activities such as the extent of land clearing or predicted change in noise levels. On the other hand, the receptor sensitivity is derived from factors such as:

- Legislative controls;
- Designated status within the land use planning system;
- Number of affected individual receptors;
- Ability of the resource or receptor to absorb change; and
- Public perception about the criticality or sensitivity of the receptors.

The determination of impact significance also entails considering compliance with environmental policies, quality standards and set pollution limits.

4.0.1.1 Method for Determining Impact Magnitude

Potential negative impacts were assigned Negligible, Low, Medium, and High labels based on their magnitude while for positive impacts, it sufficed to indicate that the project is expected to result in a particular positive impact without assigning a magnitude to it.

4.1 Methods and Techniques used in assessing and analyzing the environmental and social impacts of the proposed construction

A risk assessment matrix (Table 4.3) was used to determine the risk of each individual environmental aspect relevant to the Construction of Africa Center of Excellence for Population Health and Policy (ACEPHAP). The level of risk determined from the matrix identifies the level of control measures required for that environmental aspect. These risks are to be mitigated through the application of measures identified in this ESMP.

Table 4.3: 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

Explanatory notes on the selection of the consequence and probability for each issue are presented in Table 4.4 – Risk Matrix Explanation.

Table 4.4: Risk Matrix Explanation

Probability			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 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 or complaints.

4.2 Potential Social and Environmental Impacts

The project is expected to have high positive environmental and social impacts for impacted communities in the project area and the West African coast at large as it provides incentives for establishing innovation platform for knowledge flow and collective dialogue between, researchers, industries, commercial business and educational institutions in the region and increase in various

commercial production, improved environmental management and livelihoods. Other Positive impacts include

- Improved skills sets of graduating individuals having vast and diversified experience in Population. Health and Policy issues.
- Asset on the higher education system at university and national level
- Improved student comfort and study conditions
- Improvement of the aesthetics of the university site
- Development of green spaces around the building
- Increased economic activity around the university
- Employment opportunity, and business opportunity.

4.3 Enhancement Measures for Identified Positive Impacts

4.3.1 Focus on practice-anchored intelligent engineering education

The Project will enhance Nigeria's intention of improving its Focus on practice-anchored intelligent engineering education that will produce a critical mass of future teachers/instructors for the new vision, as well as a new corps of engineering leaders to drive the vision of "the Africa we want", in addition to developing the next generation of scientists, researchers, teachers, entrepreneurs, and product developers, and enrolling new postgraduate students from Nigeria and the sub-region as envisaged in ACE I; and specifically apply and strengthen modern Population and Health Policy design methodologies emerging from application contexts to suit and accelerate the advanced skills development in the region, as well as deepen industry-mediated collaborative research driven by these highly productive modern platforms.

To enhance this impact, the following measures shall be implemented:

- Expand learning and research opportunities for postgraduate studies in all the key sectors consistent with the SDGs, by deploying existing and new advances in ICT, for which BUK has a leading edge in the sub-region; and
- Leverage on the cognate intellectual infrastructure and the output of the university and collaborating partners to serve as the launch pad for start-up research-based companies borne out of university research, discovery and innovation activities, by partnering firms and emerging techpreneurs.

4.3.2 Direct employment and training

The Project will give rise to direct employment opportunities across different skill levels, from unskilled to highly skilled labour. It is estimated that during construction phase, at least 80 job opportunities would be created. Training for local people from skilled technicians shall also be carried out.

The following measures shall be implemented to ensure that direct employment and training opportunities are maximized:

- A Labour and Employment Management Plan (LEMP) shall be developed prior to construction, detailing percentages and numbers of the workforce to be sourced from the local area and various demographics as well as influx management. The plan shall follow local and international employment guidelines.

- The Project Management in conjuction with contractor shall provide notification to different groups in the community on specific jobs and skills required for the project, prior to the commencement of construction. Subsequently, the group leaders shall notify the local population prior to the commencement of construction of job opportunities and relevant skills/qualifications required to be employable on the Project.
- The Project GBV Action Plan shall be implemented to ensure that the Project does not increase women's burden and that women not only contribute, but also benefit from it.
- The EPC contractor shall initiate training and skills development programmes prior to the commencement of construction, as a means of ensuring that members of the local workforce are up-skilled and can be employed on the Project.

During the operational phase of the Project, job opportunities will also be created. About 15 people will be employed. This will be a mixture of skilled labour (such as electrical and mechanical technicians) and unskilled labour (such as cleaners and security personnel). Periodic capacity building will be offered to the workforce.

4.3.3 Procurement and indirect employment

The construction and operation of the proposed Project will create opportunities for the supply of goods and services to the Project and in turn, indirect employment will be created in the supply chain. Other opportunities for local companies to provide catering, waste / recycling and landscaping facilities, etc. will also be created. Local and regional procurement targets shall be included in the Project's LEMP to enhance this potential opportunity.

The negative environmental and social impacts will largely be localized in spatial extent, short in duration, occurring within less sensitive environmental areas and are manageable through the implementation of appropriate mitigation measures. Based on the assessment, the potential environmental and social impacts are outlined in Table 4.5.

Table 4.5: Ranking Assessment Matrix Results

Aspect	Potential Impacts	Probability	Consequence	Risk Ranking	Controls
Visual Amenity	Degraded visual amenity due to untidy construction site and presence of plant and equipment.	C	4	Low	See ESMP in Table 5.1.
Air Quality	Dust generated through upgrading/ upgrading / installation works	C	5	Low	
Noise and vibration	Temporary elevated noise emissions during Construction /upgrading/ installation (during weekdays and on the weekend) at neighbouring academic offices.	C	4	Low	
Waste water /Water quality and hydrology	Discharge of contaminant laden runoff from accidental spillage of chemicals and fuels from the operation and maintenance of civil works plant and equipment	D	4	Low	
	Discharge from feedlots, contaminated storm water runoff from housing structures	C	3	Medium	

Waste Management	Potential contamination of land and water due to inappropriate handling and disposal of waste materials	D	3	Medium	
	Non-conformance with waste hierarchy and principles.	D	3	Medium	
Socio-economic	Safety and access impacts associated with the construction. Amenity Impact on stakeholders	D	3	Medium	
Cultural Heritage	Impact to any item of historic heritage significance during construction	E	4	Low	
Flora and fauna	Spread of exotic species	E	4	Low	
Cumulative impacts	Cumulative impacts on environment and community due to cumulative construction projects in the immediate vicinity	C	4	Medium	

4.4 Impacts due to Construction Works

4.4.1 Air Quality

4.4.1.2 Impacts

Air quality impacts during construction are likely to result from the following sources:

- Dust from movement of haulage trucks and haulage of spoil for disposal
- Dust from stripping of vegetation and site formation pavement during road rehabilitation
- Dust from earthworks such as use of borrow pits, embankments and cut and fill
- Dust from loading, unloading and construction materials from borrow pits particularly in areas where receptors (people) are present such as in villages;
- Dust from concrete batching plants
- Dust entrained by wind from uncovered surfaces
- Minor increases in NOx and SOx from construction machinery and vehicles
- Air quality issues will be localized. The proposed International Students Hostel within the ACEPHAP complex, which will be adversely affected.

4.4.1.3 Mitigation

The mitigation measures to protect sensitive receptors from air quality issues are:

- Concrete batching plants to be located at least 300 m downwind or as far as practicable from the nearest dwellings in order to reduce the impact of fumes on humans and to be fitted with necessary equipment such as bag house filters to reduce fugitive dust emissions
- Stockpiles of materials such as sand must be managed to reduce dust emissions. The location of the stockpile must be downwind of sensitive receptors. The stockpile must be sprayed with water before material is moved. If the stockpile is within 300 m of dwellings the stockpile should be covered with tarpaulins and fenced in to form a high barrier and prevent wind lifting and dispersing the materials.
- Water will be sprayed on construction sites and approach roads to suppress dust in dry weather
- Trucks transporting materials will be covered with automatically closing covers or tarpaulins to avoid spilling material on roads
- Construction vehicles and machinery will be maintained to minimize emissions of fuel fumes
- During construction the contractors will immediately clean up any mud or dusty materials left on public roads. Wheel cleaning facilities will be installed at site access points to stop carry over of materials onto roads

Air quality monitoring will take place to confirm the impact of the project on air quality and identify corrective actions if needed.

4.4.2 Water Quality

4.4.2.1 Impacts

Water quality impacts during construction are likely to result from the following sources:

- Increased sedimentation of water courses
- Accidental spills contaminating wells with oils, lubricants, paint wastes etc
- Sanitation facilities such as toilets leaking into potable water source .

4.4.2.2 Mitigation

The mitigation measures to protect from water quality issues are:

- Wells will be identified in advance of construction and demarcated to ensure vehicles and machinery does not encroach on them. Identification will require consultation with community members.
- No materials will be stored within 50 m of a water course, including soil, spoil, aggregates, chemicals or other materials used during construction.
- Temporary drainage provision will be made during construction to ensure that any rain storm water running off the construction areas will be controlled. It will be lead to silt traps before discharge t the natural drainage system.
- Any toilet or personal washing facilities on site will have prefabricated septic tanks installed on site which discharge to a subsurface soakaway, to avoid soil contamination and smell.
- Chemical and oils storage areas will be laid on a hard concrete base. Overhead protection from rain and severe weather will be provided. A perimeter kerb will be provided leading to a spill collection sump.
- Fuel storage for site vehicles must be in an elevated skid mounted tank placed on a hard area with a kerb built up around it that is capable of holding 110% of the contents of the tank volume. It may have a drainage plug to allow rain water to be discharged but this must have a tap which is Normally Closed and be kept closed at all times.
- Vehicle maintenance workshops, vehicle parking areas and vehicle cleaning areas must be placed at least 300m away from the nearest water body and have surrounding drainage to ensure contaminated water does not enter a watercourse. Maintenance and cleaning activities must be on hard standing surface.
- Contingency plans for control of spills of oil and other hazardous substances will be formulated and spill collection kits kept readily available.

Water quality monitoring will take place to confirm the impact of the project on water resources and identify corrective actions if needed.

4.4.3 Solid and Liquid Waste

4.4.3.1 Impacts

Waste impacts during construction are likely to result from the following sources:

- Clearance of site vegetation. ACEPHAP Site is open land. This vegetation will be cleared and removed to a municipal dump site approved by local authorities.
- The potential impacts arising from solid and liquid waste production and disposal will be mitigated through a number of activities defined in the EMP, and which will be incorporated in the bid documents and construction contracts.
- As regards removal of topsoil and underlying materials a mass balance “cut and fill budget” will be prepared so that cut material from an embankment can be reused on site to fill in low lying areas. This will minimize vehicle movement and save money in purchasing fill material. The cut and fill budget will be subject to approval by the materials engineer to confirm the materials are of suitable load bearing integrity.

4.4.3.2 Mitigation

The mitigation measures to protect from waste contamination issues are:

- Waste removal and disposal will be subject to the waste hierarchy of reduce / reuse / recycle. Where waste materials can be reused they will be, but not if this leads to pollution.
- Vegetation will be cleared and removed to a municipal dump site approved by local authorities.
- Waste storage containers for worker's general waste will be provided and emptied regularly
- Hazardous liquid wastes will be kept in a dedicated store. Hazardous waste such as oily rags, old oil filters or chemical containers will be disposed of in plastic bags or sealed bins to an approved contractor.
- Mud on roads will be avoided by wheel cleaning facilities at entry and exit points
- Soil and overburden will be removed, stored and reused as far as possible in accordance with a cut and fill mass balance plan
- Spoil will not be disposed of where it may impact on any vegetation
- Topsoil will be stockpiled and used for later landscaping
- Municipal type waste such as food wastes, paper, cardboard, clean wood and other materials will be collected in bins and emptied regularly to a municipal waste tip to avoid encouraging vermin and rodents.
- Temporary waste storage will be in an area kept as dry as possible with a lightweight roof to keep off rain.
- Burning of waste will be prohibited at all times.
- It has been noted on some sites that wastes are dumped by residents. The contractor will not be responsible for this in the future and this process will have to be terminated. However existing wastes on site will be removed by the contractor.

Waste disposal monitoring will take place by visual inspections of the sites on a regular basis by the construction supervision inspectors.

4.4.4 Noise

4.4.4.1 Impacts

The major sources of noise pollution during construction are removal of existing surface vegetation and overburden and site formation. In this site there is no pronounced slope so no site leveling will be required. Consequently, there should be no need for impact piling. No rock will be extracted other than by excavators so no blasting will take place. The general movement of construction vehicles for haulage of removed over burden and delivery of construction materials will create noise and vibration.

As regards removal of topsoil and underlying materials a mass balance "cut and fill budget" will be prepared so that cut material from an embankment can be reused on site to fill in low lying areas. This will minimize vehicle movement and save money in purchasing fill material. The cut and fill budget will be subject to approval by the materials engineer to confirm the materials are of suitable load bearing integrity.

Table 4.6 indicates noise levels for construction machinery.[48] Construction activities could reasonably be expected to produce noise levels up to 90 dB(A) within 5 m of machinery. For the project, no receptors other than construction workers will be this close to the machinery, and they will be required to wear appropriate PPE. This is the distance from the edge of the site. If vehicles were to operate at the far edge of the site, they would be about 400 m distance from the nearest noise sensitive receptor.

[48] Noise from Construction Equipment and Operations, Building Equipment and Home Appliances. US-EPA. December 2011.

Table 4.6 Construction Machinery Noise

	Noise Emission Level (dBA) at Distances (m) from Equipment										
Equipment	**5**	**10**	**15**	**20**	**40**	**60**	**80**	**100**	**150**	**200**	**300**
1 Bulldozer	86	80		74	68	64.5	62	60	56.5	54	50.5
2 Excavator	84	78		72	66	62.5	60	58	54.5	52	48.8
3 Loader	90	84		78	72	68.5	66	64	60.5	58	54.5
4 Land scraper	90	84		78	72	68.5	66	64	60.5	58	54.5
5 Mixing											
Equipment	87	81		75	69	65.5	63	61	57.5	55	51.5
6 Roller	87	81		75	69	65.5	63	61	57.5	55	51.5
7 Vibratory roller	86	80		74	68	64.5	62	60	56.5	54	50.5
8 Backhoe			81								
9 Compactor			82								
10 Concrete mixer			85								
11 Crane (mobile)			83								
12 Generator			81								
13 Jack hammer			88								
14 Paver			89								
15 Pneumatic tool			85								
16 Pump			76								
17 Shovel			82								
18 Truck			88								

The loudest piece of equipment is the jack hammer with a noise level of 90dB(A) at 15m. The Inverse Square Law (ISL) states that sound levels drop at the rate of 6dBs / doubling of distance which would give the Table 4.7 below.

Table 4.7 Sound attenuation with Distance

Distance from Source in m.	15	30	60	120	240	480	960	~1km
Sound Level in dB(A)	90	84	78	72	64	58	52	~50

This is attenuation with distance based purely on the ISL. If one includes for ground scrubbing and atmospheric absorption the sound levels will be much lower.

To be detectable the noise level needs to be comparable with the ambient, and to be intrusive noise level needs to be 10dB(A) higher than the ambient. Given a daytime ambient of typically 55dB(A) activities that are more than 200 metres from noise sensitive dwellings should not be intrusive. This comment relates to the noisiest activity. Other activities will be quieter than this.

The ACEPHAP site at Kano has noise sensitive receptors closer than 50 metres at the moment and noise from construction impacts is expected to be a nuisance.

Noisy activities will not be continuous and the sources will move around the site. Also noisy activities will be limited to daytime hours 0700 to 1900 so there should be no sleep disturbance. Sometimes it is necessary to carry out activities on site which cannot be interrupted, such as concrete pouring. If it
should be necessary to work at night, or in close proximity to the site boundary, then a public information campaign is essential. Sound levels are only considered intrusive if residents object, and if they are advised in advance in a respectful manner, told how long the activity will take and their indulgence requested, they are likely to agree without protest. This issue is dealt with in more detail in the CEMP.

In connection with vehicle movement is safety to residents, particularly children. Noise is an issue here because often audible warning devices are fitted to vehicles particularly when reversing and residents should be made aware of the safety considerations.

There will be no impact piling. Ground surface vibration may be caused from the use of heavy construction machinery. Tracked plant such as bulldozers and vibratory rollers may cause vibration, more so than rubber wheeled plant such as dumper trucks. However it is anticipated that the receptors are unlikely to be significantly adversely affected by vibration as generally over 20 m from the construction, the vibrations in buildings are beyond human perception[49].

4.4.4.2 Mitigation

The potential noise impacts will be mitigated through a number of activities which will be defined in the ESMP. These will be incorporated in the bid documents and construction contracts and are:

Source Control

Maintain all exhaust systems in good working order; undertake regular equipment maintenance, enclose stationary equipment such as generators where practicable and reduce vehicle speeds around sensitive receptors such as dwellings and schools.

Siting

Locate sites for concrete-mixing, batching plants and similar activities at least 500 m away from sensitive areas.

Timing

Operate between 7am-7pm only and reach an agreement with nearby residents regarding the timing of heavy machinery work, to avoid unnecessary disturbances.

[49] Martin, D (1977) Transport and Road Research Laboratory, UK. . Ground vibrations caused by road construction.

Community notification
In advance of construction, representatives from religious buildings, schools and village leaders will be consulted on the timing of construction so key ceremonies, exam times, or other significant events so that impacted upon them are as little as possible.
Consultation and engagement
Set up procedure for handling of noise complaints through the Grievance Redress Mechanism and continually seek suggestions from community members to reduce noise intrusion.

Potential sensitive receptors in residential areas, businesses, religious buildings and schools may be exposed to short term impacts. With the above mitigation measures in place, potential noise impacts during the construction stage are anticipated to be acceptable. In addition, during construction, noise monitoring will be undertaken near sensitive receptors in order to identify corrective action if needed.

4.4.5 Fauna
4.4.5.1 Impacts
No endangered species or animals of special scientific interest have been detected on the sites during the baseline studies. Removal of the vegetation will not impact on the habitats of any animals. None the less steps will be taken to protect endemic commonly appearing species on the site. The project will not have any impacts on fish.

4.4.5.2 Mitigation
Contractors will issue instructions to their staff and workers that no capturing or animals particularly birds is allowed on site for eating or any other purposes. Anyone caught doing so can face dismissal.

4.4.6 Flora
4.4.6.1 Impacts
No rare plant species or flowers, shrubs and trees of special scientific interest have been detected on the sites during the baseline studies. However, controls will be exerted on the site over taking vegetation.

4.4.6.2 Mitigation
No open burning will be allowed on site. Workers will not be allowed to use local wood for cooking. Cooking services will be provided in the canteen facilities.

4.4.7 Cultural Resources
4.4.7.1 Impacts
There are no religious buildings or cultural monuments in the vicinity of the sites. No archaeological remains have been identified during the baseline study but should any be found during construction steps will be taken to preserve them.

4.4.7.2 Mitigation
If any archaeological remains are uncovered during construction the “chance find” procedure will be invoked. All excavations must stop immediately and the nearest representative of the department of antiquities be notified. Further instructions will be taken from them. This will be considered as a valid claim from the contractor for an extension of time.

4.4.8 Occupational Health and Safety
4.4.8.1 Impacts

The contractors may be exposed to occupational risks during construction work. Risks will arise from a range of hazards such as the use of heavy plant and working with rotating tools. These issues are dealt with in detail in the ESMP

4.4.8.2 Mitigation

The civil works contractors must implement adequate precautions to protect the health and safety of construction workers. The occupational health and safety risks will be minimized by not only providing adequate personal protective equipment (PPE) but ensuring workers wear it. In addition, the contractors will undertake the following activities:

- An Environment Health and Safety Officer (EHSO) will be appointed prepare a Health and Safety Management Plan, to implement the HSMP and ensure that the requirements of the EMP are met.
- The EHSO will ensure that the HSMP is submitted to TCN prior to construction for approval, that accurate records and reports of any occupational health and safety incidents are kept, and reviewing the distribution and use of appropriate PPE.
- The EHSO will also encourage awareness building on safety through activities such as “Toolbox Briefings” and reporting “Near Misses.”

4.4.9 Community

4.4.9.1 Impact

In public consultations anxieties were expressed over the following issues:

- Influx of foreign workers and clashes with local residents
- Complaints being made but ignored
- Risks to the public from heavy machinery and traffic

4.4.9.2 Mitigation

The following activities will be undertaken in order to minimize impacts on the community during construction:

To minimize the number of foreign workers being brought to the site, the contractor will be required to hire unskilled labor from local people if they wish to be hired. It is accepted that the contractor may insist in using his own labor for skilled jobs. He must offer employment to women if they are agreeable. He must be able to show from his records that he has done this. This will be a contract condition and so is enforceable.

- A “Complaints Mechanism” will be set up and a complaints officer appointed so that any complaints are responded to within 24 hours in a polite and respectful way.
- The contractor will be required to prepare a traffic management scheme and submit to the client for approval before occupancy of the site is given to them.
- To ensure safety warning signs and fencing will be erected at the construction sites and around borrow pits, in full view of the public, warning people of potential dangers such as moving vehicles, and excavation to raise awareness on safety issues.
- Heavy machinery will not be used after day light and all such equipment will be returned to its overnight storage area/position before night.
- All sites including storage areas will be made secure, discouraging access by members of the public by fencing when appropriate. In particular children will be warned not play on the sites, especially after dark.

4.4.10 Pedestrian Road Safety

4.4.10.1 Impacts

During construction, there may be a risk to members of the public from hazards such as the use of heavy machinery, excavations, and changes in traffic priorities. The site at Kano is not near to residential dwellings.

4.4.10.2 Mitigation

A Traffic Management Plan will set out safe access during construction. Clear signs will guide and advise other road users. Road control staff will be deployed if necessary when heavy vehicle are turning across traffic. The community will be involved in road safety with requests for schools, churches and mosques to reinforce the message on safety throughout the communities. In particular children will be warned not to play near the access roads when vehicles are passing, especially if it is after dark

4.4.11 Utilities Provision

4.4.11.1 Impacts

The project may require the relocation of electricity cables which may lead to interruption of electricity supplies for local residents.

4.4.11.2 Mitigation

Any disruption will be discussed with utility operators and the community beforehand. People affected will be informed in advance of any power cuts and the duration of the cut will be made clear in order that they can plan around the lack of power.

4.4.12 General House keeping

4.4.12.1 Impacts

When dealing with environmental controls on a construction site it is not possible to detail in writing every possible occurrence. Therefore, as a general rule contractor should practice "good housekeeping". The site should be kept clean and tidy, spills should be mopped up as soon as they occur, rubbish should be collected and removed promptly and tools and equipment stored away neatly when not in use. More details will be given in the ESMP

4.4.12.2 Mitigation

The concept of "good housekeeping" is easy for anyone to understand, even those of a non-technical nature. The contractor's staff are expected to behave in a responsible way and not wait to be told what to do on every occasion. They will benefit from Good Housekeeping as a clean well run site is less likely to have industrial accidents. Monitoring will be by visual inspection by the construction supervision consultants.

4.4.13 Potential Socio-economic Benefits

4.4.13.1 Impacts

During the construction phase there may be positive impacts. The projects may provide short term local employment opportunities for community members in terms of site clearance, excavation, loading and offloading of materials. Other short term opportunities are likely to arise from the provision of security services where temporary camps or stores are erected and from opportunities to provide goods and services to construction workers e.g. food kiosks and other shops.

4.4.13.2 Mitigation

If impacts are positive mitigation is not required. However the positive impacts will be enhanced by preferentially offering jobs to local labor and encouraging contractors to purchase local produce.

4.4.14 Impacts due to Operation

4.4.14.1 Pesticides

Herbicides are one branch of pesticides. Any pesticides stored on site for control of weeds, rodents or vectors (such as mosquitoes) should be should be kept in a secure storage and application should be made under controlled conditions. Technical staff and residents should be advised and workers wear PPE.

4.4.15 Migratory Birds

The project area does not contain any natural habitats considered to be either critical or fragile. The project area does not have any wetlands or forested areas nearby or International Bird areas (IBAs) and there are no international migratory bird Flyways.

4.4.16 Noise

If the noise produced by operating machinery is considered intrusive to adjacent property owners a barrier of mature trees or tall soil berms between the substation and nearby residences can be helpful in partially reducing the perception of noise impacts, although trees do very little in reality. Earth berms can reduce up to 7dBs but as the sound is low frequency barriers are not very effective.

4.4.17 Spills

Equipment like Power Generating Sets may occasionally need oil replacement or replenishment but this is usually very infrequent. In the event of a spill the same procedure as given under Commissioning should be followed.

4.4.18 HSE

There must be adequate precautions to protect the health and safety of plant workers. All staff must be provided with personal protective equipment (PPE) and made to wear it. The details are given in the ESMP but in addition, the facility operators should undertake the following activities:

- An Environment Health and Safety Officer (EHSO) should be appointed to ensure that the EMP is implemented
- The EHSO will ensure that accurate records and reports of any occupational health and safety incidents are kept, and reviewing the distribution and use of appropriate PPE.
- The EHSO will also encourage awareness building on safety through activities such as “Toolbox Briefings” and reporting “Near Misses.”
- Site briefings for visitors on restricted areas and emergency evacuation procedure
- Induction EHS briefings for new staff
- Implement Corrective Action Reporting (CAR)

4.4.19 Tool box briefings

Tool box briefings should be held every morning during roll call and a “safety moment” held. These need only last 2-3 minutes and a specific item can be stated, for example when hot work permits are needed, or when safety equipment is needed if working at a height. The essence of Tool Box meetings is repetition. Staff becomes complacent if not continually

reminded of safety procedures. Topics can be repeated every few weeks. The topics addressed should be recorded and reported in the monthly management reports.

4.4.20 Near Misses

Near Misses are situations that arise that could have led to a safety incident but which were spotted by vigilant staff and avoided by swift action. This may be something as simple as spotting a gas cylinder propped upright without support that may fall and injure someone and insisting that it be held in a cradle on a trolley. (For example see Figures 5.1 and 5.2 below)

Figure 5.1 Examples of Near Misses - Gas cylinders incorrectly stored and handled

Figure 15.2 Examples of Near Misses - Gas cylinders correctly stored and handled

Staff may be reluctant to report “Near Misses” as they fear a reprimand but this reluctance must be overcome. The target should be “Zero Incidents” and many “Near Misses” reported and avoided. An EHS annual report that states No Incidents and No Near Misses will not be believed.

4.4.21 Induction Briefings

- New staff should be given an Induction Briefing at the start of their employment. They should be trained to identify and eliminate, isolate or minimize potential hazards in their working environment.
- Persons entering the site facility should be issued with personal protective equipment (PPE) and be

- required to wear it. This applies to workers and visitors. Any person found not wearing full PPE should be ordered to wear it and if they refuse they should be ordered off the site. Site supervisors and security guards have the authority to do this.
- All staff and visitors should be briefed on and follow emergency and evacuation procedures in particular firefighting.

4.4.22 Corrective Action Reporting (CAR)

If an incident takes place, then it is not enough simply to report it. Steps must be taken to abate the nuisance, end the problem and to avoid it happening again. These steps should be included in Corrective Action Reporting (CAR) which is an iterative process whereby checks are made that the situation has actually been resolved in a prompt manner. Full details on CAR are given in the ESMP.

4.5 Impacts due to Decommissioning

4.5.1 Impacts

The ACEPHAP Building is likely to remain in place for many years and therefore any decommissioning works could be a long time in the future. Building materials and equipment would be dismantled and removed and materials recycled/re-used as far as possible. Any areas disturbed must be restored to pre-project conditions or to conditions acceptable to FMEnv.

After decommissioning the site may be handed over to a new owner and developed for another purpose. In order to avoid any contingent liability to CDA - BUK on handover, the site must be free of all encumbrances. After removal of all ancillary equipment the main issue will be potential soil contamination. This is why the soil sediments samples during the baseline are important.

During the life of the installation all efforts should be made to avoid or minimize spills of potentially contaminating materials and to make strenuous efforts to clean up after any spills. After removal of all site equipment soil samples should be taken and compared with the baseline results. If the post- operative soil samples show similar or lower concentrations of parameters measured in the baseline, then the site is deemed clean and can be handed over. If the concentrations are higher, then it may be necessary to excavate contaminated soils, dispose of the contaminated material and backfill with clean soils. Therefore, it is important to store the baseline soils analysis in a secure place.

Potential negative impacts during decommissioning could include:

- Spillages of oils on ground and into groundwater as equipment are removed.
- Solid wastes such as brick, concrete and rubble from substation site demolition
- Metals and cables from building dismantling can become an eyesore if not taken off site either for re- use or recycling.
- Invasive flora species could colonise former sites on decommissioning following removal of structures, buildings and hardcover.
- Local residents could be subject to noise and air impacts during demolition.

4.6.2 Mitigation

Environmental impacts associated with decommissioning can minimised through the implementation of an environmental and social management plan (ESMP). If the ESMP is followed faithfully then there should not be any residual environmental impacts during decommissioning. Therefore, it is imperative that the ESMP is followed during

Operation so that Decommissioning is not onerous. If the ESMP is not followed, then remedial works or payment of compensation may have to be paid.

4.7 Impacts and Mitigation

The following issues have been addressed in this ESMP:

- Noise
- Air Pollution
- Solid Waste
- Liquid Wastes
- Ground Water Quality
- River Water Quality
- Soils
- Health from Electric Fields
- Ecology
- Habitats
- Flora and Fauna
- Endangered Species
- Socio Economic – positive and negative
- Construction
- Operation
  Decommissioning
- Cultural Heritage
- Religious & Traditions
- Baselines and Seasonal Variations
- ESMP
- CESMP
- Toxic Wastes
- Oil spills
- Maximum Credible Event
- ALARP Events

No issues have been identified that preclude this project proceeding if the following mitigation measures given in the ESMP are implemented.

CHAPTER FIVE: STAKEHOLDERS CONSULTATION

5.0 Introduction

Stakeholder consultations were carried out with key stakeholders to obtain their comments and concerns on the proposed project with respect to the potential environmental and socio-economic issues and impacts. A plan was developed to involve the active participation of all stakeholders in decision-making processes, to foster dialogue and reduce tensions. ESMP questionnaires were equally administered to seek for the opinions and concerns of stakeholders.

It describes the actions that the Project took to disclose pertinent information to stakeholders.

The key project stakeholders were identified for consultations, and these included the following:

- ACEPHAP BUK Members
- ESMP consultants
- Workers/hawkers within the project vicinity

The stakeholder consultation meeting was held on 22nd September, 2022, which Dr. Faisal Dankishiya, inspected and explained the goal of the project and he facilitated the management of the project and its stakeholders, including their environmental and social effects and risks. After initial introductions, proposed project activities were also presented and discussed. Details minute of the consultaion is in the annex of this report.

5.1 Objectives

The objectives of public participation in an ESMP are to provide sufficient and accessible information to potentially interested and affected parties/stakeholders in an objective manner to assist them identify issues of concern, and provide suggestions for enhanced benefits and alternatives. The stakeholder engagement process was designed to conform to the Nigerian EIA Act and international standards. For this Project, the key objectives for stakeholder engagement are:

- Inform and educate stakeholders about the proposed ACEPHAP Project;
- Gather local knowledge to improve the understanding of the environmental and social context;
- Better understand the locally-important issues;
- Provide a means for stakeholders to have input into the Project planning Process;
- Take into account the views of stakeholders in the development of effective Mitigation measures and management plans; and
- Lay the foundation for future stakeholder engagement.

Plate 5.1: Stakeholders having an interactive session on the proposed project

5.2 Disclosure of ESMP

The World Bank (WB) requires that the ESMP is submitted for public disclosure purposes. The disclosure will take the form of in-country as well as disclosure at the infoshop of the World Bank.

5.2.1 In-Country Disclosure Process.

Safeguards Officer will submit copies of the ESMP to the Federal Ministry of Environment for In-house Review and payment of Two Hundred Thousand Naira (N200, 000.00) only; after which it is submitted to the World Bank for clearance.

After clearance from the World Bank, the ESMP will be made available to the University Library website, other public places and the Physical Planning/Works and Services Department of the University as part of the tender documents for contractors to bid in tendering process which will be published in a national newspaper.

CHAPTER SIX: GRIEVANCE REDRESS MECHANISM

6.0 Introduction

In this chapter, a description of the step-by-step process for registering and addressing grievances and provide specific details regarding a cost-free process for registering complaints, response time, and communication modes are presented. It also describes the mechanism for appeal and the provisions for approaching civil courts if other options fail.

6.1 Grievance Procedures

Grievance related to any aspect of the project will be handled through negotiations, which will be aimed at achieving consensus following the procedures below.

The grievance redress procedure shall guarantee the delivery of speedy, just and fair resolution of their grievances, preferably at local and state levels. The mechanisms shall be

simple, easily accessible, and flexible and open to various proofs taking into cognizance the fact that it may involve people that are illiterate.

These Mechanisms are:

1st Order Mechanisms:	PIU and ACEPHAP Team
2nd Order Mechanisms:	Security Team
3rd Order Mechanisms:	NPC Team

6.2 The Need for Grievance Redress Mechanism (GRM)

The Grievance Redress Mechanism (GRM) describes the process by which people affected by the project can bring their grievances to the project management in a culturally appropriate manner, for consideration and redress.

It is understood that effective organizational design and coordination substantially decrease the probability of problems in implementation. Nevertheless, some affected persons are still likely to believe they have been treated inadequately or unfairly. Providing an accessible and credible means for PAPs to pursue any grievances may decrease the likelihood of overt resistance to the project or of protracted judicial proceedings that can halt implementation.

Therefore, in the event that grievances arise, this redress mechanism has been prepared to address such. The Grievance mechanisms designed herewith has the objective of solving disputes at the earliest possible time, which is in the interest of all parties concerned. This mechanism explicitly discourages referring such matters to the law courts for resolution, which would take a considerably longer time. As much as possible, clear procedures for filing and resolving grievances from the affected population have been designed.

During the consultations, the affected persons were helped to appreciate that there are provisions for addressing any complaints or grievances. And the grievance procedure will further be made available to the affected persons through project implementation.

The mechanism provides an affordable and accessible procedure for third-party settlement of disputes arising from resettlement. This mechanism is localized as much as possible with the active involvement of the ACEPHAP project office and other concern stakeholders within environment.

6.3 Grievance Redress Process

There is no ideal model or one-size-fits-all approach to grievance resolution. However, for simplicity, accessibility, affordability, and accountability, the following components make for a good grievance mechanism:

- Receiving and registering a complaint.
- Screening and assessing the complaint.
- Formulating a response.
- Selecting a resolution approach.
- Implementing the approach.

- Announcing the result.
- Tracking and evaluating the results.
- Learning from the experience and communicate back to all parties involved.
- Preparing a timely report to management on the nature and resolution of grievances.

As much possible, a localized mechanisms that take account of the specific issues, cultural context, local customs, and project conditions and scale have been adopted. The Grievance procedures highlighted in this Chapter fall into four steps as outlined in Table 6.1.

Table 6.1: Grievance Procedures Steps

Step	Category	Activities
1	***Reception and registration***	PAP files complaints or grievances with regard to any aspect of the resettlement project verbally, in writing or through a representative in English or local language. The PAP first instance where to complaint is the "ACEPHAP committee".
2	***Resolution***	All grievances referred to the appropriate party for resolution Resolution made within 15 days after receipt of grievance. If additional information is needed, project management can authorize additional 15 days for resolution. Results of grievances disclosed to the griever in writing with an explanation of the basis of the decision.
3	***Appeals***	Grievers dissatisfied with the response to their grievance may file an appeal. In such cases, the responsible authority assembles "The PMU (Project Coordinator" to hear cases including at least one disinterested party from outside the agency responsible for the resettlement project. There will be no further redress available outside the resettlement project. In such cases, grievances would need to be pursued through the legal system.
4	**Monitoring**	During project implementation and for at least 3 months following the conclusion of the project, monthly reports will be prepared by the scheme safeguards officer regarding the number and nature of grievances filed and made available to project management.

6.3 Objective and Purpose of Grievance Redress Mechanism

The objective of the GRM is to provide a procedure which will be used to address and resolve grievance or complaints from affected persons promptly, and fairly in a manner that is acceptable to all parties. It is intended to provide an alternative form of dispute resolution to avoid or minimize litigation.

6.3.1 Potential Grievances/Disputes

Potential issues of grievances and disputes envisaged during the project implementation are expected to be related to the following:

• Noise generation
• Dust dispersal
• Poor housekeeping at project site
• Improper behavior by artisans towards members within the university environment.

6.3.2 Redress Mechanism

- The general steps of grievance process comprise:
- Registration of complaints
- Determining and implementing the redress action.
- Verifying the redress action.
- Monitoring and Evaluation.

6.3.3 Registration of Complaints

Complaints can be logged verbally or in writing or phone call to the ACEPHAP Project Coordinator at the secretariat on the Aminu Kano Teaching Hospital Campus. The elected consultant for the project i.e., Physical Planning Department can also receive complaints. The ACEPHAP Project Coordinator will inform the team leader for the grievance redress committee within 24 hours on any complaint lodged.

6.3.3.1 Determining and Implementing the Redress Action

When a grievance/dispute is recorded as per above-mentioned registration procedures, the dedicated redress team will be called into action, and mediation meetings will be organized with the interested parties. Minutes of meetings will be recorded. The grievance issue will be resolved within 5 working days of receipt of complaints.

6.3.3.2 Verifying the Redress Action

The grievance redress team will visit the affected property or get in touch with the complainant to confirm that the redress action is carried out. If the complaint is not satisfied with the outcome of the redress action, additional steps will be taken to reach an amicable agreement. Verification will be completed within 5 days of the execution of the redress action.

6.3.3.3 Monitoring and Evaluation

The monitoring and evaluation team will monitor the activities of the Grievance Redress Team to ensure that complaints and grievances lodged are followed-up and resolved amicably as much as possible.

6.4 Membership of Grievance Redress Team/Committee

The membership of the grievances and redress team/committee shall be constituted by the Director of ACEPHAP and it shall cut across all participatory team heads in the project.

6.5 Functions of the Grievance Redress Team/Committee

- Resolving of grievances, disputes, complaints, and conflicts from project affected persons.
- Aid the Safeguards Officer in the smooth implementation of the ESMP.
- Ensure that concerns of affected stakeholders and suggestions are incorporated and implemented during the construction phase.

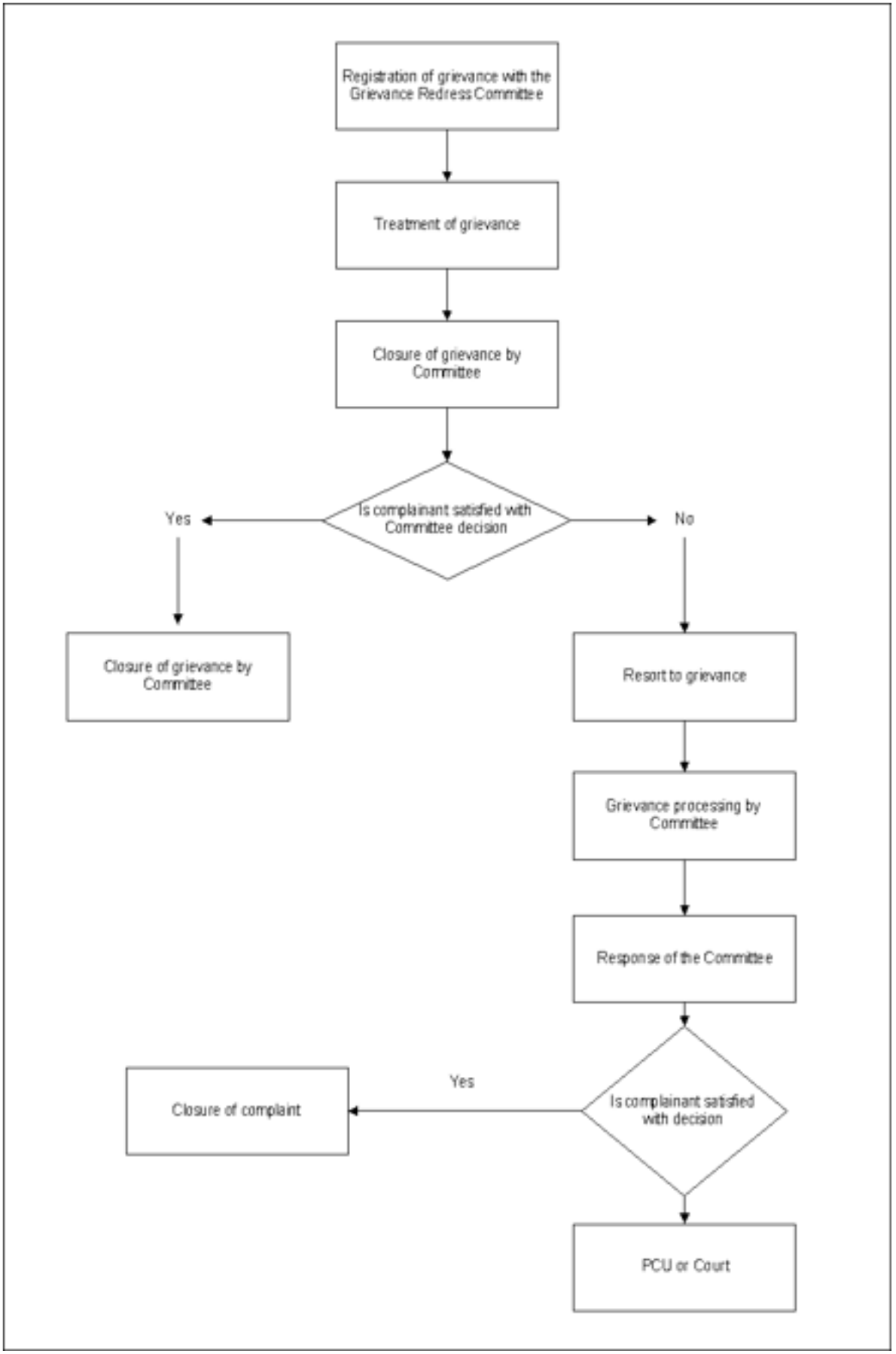


Figure 6.1: Flowchart for Grievance Mechanism Adapted from NEWMAP, 2011

CHAPTER SEVEN: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

7.0 The Proposed Mitigation Measures

Effective waste management, control of water discharges and air emissions, as described below, are critical to reducing adverse ecological impacts from construction and operational phases of the ACEPHAP International Students Hostel Project. In addition, the environmental management plans and monitoring indicators and techniques discussed below are recommended to further reduce potential ecological impacts.

The feasible, practical and cost-effective mitigation measures for identified impacts throughout the project cycle as outlined in Table 6.1 are discussed as appropriate with the requisite monitoring indicator on environmental and social management plan.

Table 7.1: The Environmental and Social Management Plan

Activities	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost ($)	Parameters to be Measured	Method of Measurement	Performance Indicator	Sampling Location	Monitoring Frequency	Responsibility for Monitoring	Monitoring Cost
PRE-CONSTRUCTION PHASE											
General site Conditions	Public and worker safety	The public shall be notified of the works through appropriate notification in the University media and/or at publicly accessible sites within the project area	Work contractors and site engineer	500	Notification to both the public and workers	Pictures of public notification Signage placement at strategic part of site	Notification signage in appropriate place	Site location	Regularly	ACEPHAP environmental and social Safeguard Specialist	300
		All legally required permits shall be acquired for installation / construction and/or upgrade	Work contractors and site engineer	3,000	Site specific regulatory Permits	Citing	Permits obtained	Project office	Once	ACEPHAP S environmental and social Safeguard Specialist	
		The environmental and social safeguard clauses shall be given to the Contractor in bidding documents and contractor shall formally agrees that all work will be carried out in a safe and disciplined manner designed to minimize visual impacts on neighboring residents and environment	Work contractors and site engineer		Contractors safeguards code of conduct	Record of notification to contractor	Contractors commitment in writing	Project Office	Once	ACEPHAP environmental and social Safeguard Specialist	
		Workers' PPE shall comply with international good practice (always hardhats, as needed masks and safety glasses, ear plugs,	environmental and social Safeguard Specialist	5,000	Site specific standard PPE	Citing PPE in place Workers instruction/ training for use	PPE in use by workers appropriately	Site area	regularly	ACEPHAP environmental and social Safeguard Specialist	

		Nose Masks, harnesses and safety boots)									
		Appropriate signposting of the sites will inform workers of key rules and regulations to follow in English & Hausa Languages	environmental and social Safeguard Specialist	4,000	Site specific signposting	Citing of signposting in appropriate language(s)	Signposting understood by workers	Site area	Once	ACEPHAP environmental and social Safeguard Specialist	
				Total Mitigation Cost (Pre-construction Phase)							Total Monitoring Cost (Operation Phase
Total				**12,500**							**300**

Activities	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost ($)	Parameters to be Measured	Method of Measurement	Performance Indicator	Sampling Location	Monitoring Frequency	Responsibility for Monitoring	Monitoring Cost
6,000											
General construction activities	Air quality	Construction phases dust shall be suppressed by ongoing water spraying and/or installing dust screen enclosures at site	Work contactors & Site engineer	3300	Dust monitoring results Particularly suspended particulates (TSP, PM10, or SO_2, NOx, CO, THC)	Air quality equipment. On a need basis at the start of preconstruction /Construction of work areas and subsequently during operational phase.	Adherence to measures	Constructio ns corridors	On spot weekly inspection	Work contactors & environmental Safeguard Specialist	1500
		During preconstruction and/ or construction phases debris shall be kept in controlled area and sprayed with water mist to reduce debris dust	Work contactors & Site engineer		Dust monitoring results Particularly suspended particulates (TSP, PM10, or SO_2, NOx, CO, THC)		Technical Specification Sheet				1300

		The surrounding environment (sidewalks, roads) shall be kept free of debris to minimize dust	Work contractors & Site engineer		Dust monitoring results Particularly suspended particulates (TSP, PM10, or SO_2, NOx, CO, THC)		No extensive dust blow				200
		There will be no open burning of construction / waste material at the site	Work contractors & Site engineer		Dust monitoring results Particularly suspended particulates (TSP, PM10, or SO_2, NOx, CO, THC)		Use of equipment and vehicles in appropriate technical conditions. Provision of Emissions-control equipment where applicable (e.g. filters).				200
		There should be no excessive idling of construction vehicles at sites	Work contactors & Site engineer		Dust monitoring results Particularly suspended particulates (TSP, PM10, or SO_2, NOx, CO, THC)						200
	Noise	Construction noise should be limited to restricted times agreed to in the work permit	Work contactors & Site engineer	350	Noise levels not to exceed 90dB(A) Records of equipment maintenance	Air quality Equipment On a need basis at the start of preconstruction /Construction of work areas and subsequently during operational phase	Adherence to measures		Regular on spot inspection	Work contractors & environmental Safeguard Specialist	

		During operations, the engine covers of generators, air compressors and other powered mechanical equipment shall be closed.	ACEPHAP safeguard specialist		Noise levels not to exceed 90dB(A) Records of equipment maintenance	On a need basis at the start of preconstruction /Construction of work areas and subsequently during operational phase	Adherence to measures	Constructio n areas	Regular on spot inspection	Work contractors & environmental Safeguard Specialist	
	Occupatio nal Health and Safety	Provide H&S Training to the construction workforce (including sub-contractors, temporary workers and drivers)	Works contractor	5500	Training performed and recorded	Check Training records	Adherence to measures	Constructio n areas	Regular on spot inspection	Work contractors & environmental and social Safeguard Specialist	500
		Ensure site premises are provided with appropriate fencing (where applicable) and lighting. Use hazard notices/signs/barriers to prevent access to dangerous areas.			H&S planning of construction site done, items installed						
		Ensure speed limits on site and on transporting routes.			Speed signs installed	Random site inspection	Compliance level	Transportin g routes	Regularly	environmental and social Safeguard Specialist	
		Ensure the use of Personal Protective Equipment (PPE) for workers.			PPE used on-site by workers	Random site inspection	Correct use of PPE	Among workers	Regularly	environmental and social Safeguard Specialist	
	Labour Rights	Ensure that all workers have access to and are aware about the Grievance Mechanism	PIU/ Contractor		Grievance Mechanism in place and grievances recorded	Review of grievance register	Level of grievance address and resolved	Among the workers	Once	Safeguard Specialist (social) University gender	
		The Project GBV action plan shall be implemented to ensure that the Project does not increase women's burden and that women not only contribute, but also benefit from it.									

Activities	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost ($)	Parameters to be Measured	Method of Measurement	Performance Indicator	Sampling Location	Monitoring Frequency	Responsibility for Monitoring	Monitoring Cost
	Water Quality	The site will establish appropriate erosion and sediment control measures such as e.g. silt traps to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers.	Work contractor	3000	Number of silt traps in place	Visual observation of silt traps Sample collection from water sources (and analysis)	Adherence to regulatory water quality standards	Water resources in constructio n areas of influence	Quarterly	environmental Safeguard Specialist	500
	Storm water	Storm water must be appropriately channelized to minimize sediment from moving off site.	Work contractors	800	Number of silt traps in place	Visual observation of silt traps Sample collection from water sources (and analysis)	Adherence to regulatory water quality standards	Water resources in constructio n areas of influence	Quarterly	environmental Safeguard Specialist	500
Soil quality	Soil Pollution	Avoidance of oil/ waste oil spillage from construction equipment's	Work contractors and site engineer		Heavy metals in soil,	Soil sampling and analysis	Adherence to regulatory standards	Constructio n areas	Quarterly	environmental Safeguard Specialist	500
Activities	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost ($)	Parameters to be Measured	Method of Measurement	Performance Indicator	Sampling Location	Monitoring Frequency	Responsibility for Monitoring	Monitoring Cost
	Waste manageme nt	Waste collection and disposal pathways and sites should be identified for all major waste types expected from demolition and construction activities.	Maintenance contractor and staff	500	Waste management plan taking cognizance of waste sorting/segre gation, treatment and appropriate waste disposal Waste temporary storage sites	Waste management plan in place	Adherence to measures in waste management plan The records of waste disposal will be maintained as proof for proper management as designed.	Constructio n areas	Regularly / daily	ACEPHAP environmental Safeguard Specialist	500

		Demolition wastes should be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers and disposed properly by licensed collectors	Maintenance contractor and staff	500	Waste management plan		Adherence to measures in waste management plan The records of waste disposal will be maintained as proof for proper management as designed.	Constructio n areas	Regularly/dai ly	ACEPHAP environmental Safeguard Specialist	
		Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)		500	Waste management plan		The records of waste reused and recycled will be maintained as proof for proper management as designed.	Constructio n areas	Regularly/dai ly	ACEPHAP environmental safeguard specialist	
Activities	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost ($)	Parameters to be Measured	Method of Measurement	Performance Indicator	Sampling Location	Monitoring Frequency	Responsibility for Monitoring	Monitoring Cost
Environmen tal nuisance		Dust accumulation, waste littering, effluent discharge, and degradation of land formation							Regularly	ACEPHAP environmental safeguard specialist	
	Chance find procedure	Avoid further work in such areas	Work contractors		Heritage resources, particularly archaeologic al etc.	On a need basis during construction phases Log book of chance finds	Adherence to measures Satisfactory implementation of current management controls for Chance Finds	Constructio n areas	Regularly	Site engineer Social Safeguard specialist	500

		Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be present until the responsible local authorities and Bureau of Art and Culture take over									
Activities	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost ($)	Parameters to be Measured	Method of Measurement	Performance Indicator	Sampling Location	Monitoring Frequency	Responsibility for Monitoring	Monitoring Cost
	Toxic / hazardous waste management	Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information	Works contractor	500	List of chemicals likely to be used, their respective quantities and storage facilities; and Details on the mode of disposal of empty vials, chemicals containers and expired chemicals. Waste Management plan and its compliance	Log book	Adherence to measures in waste management Plan	Construction areas	Regular /daily monitoring	Safeguard specialist	300
		The containers of hazardous substances shall be placed in a leak-proof container to prevent spillage and leaching				Log book	Adherence to measures in waste management Plan	Construction areas	Regular /daily monitoring	Environmental Safeguard specialist	
		The wastes shall be transported by specially licensed carriers and disposed in a licensed facility.				Log book	Adherence to measures in waste management Plan	Construction areas	Regular /daily monitoring	Safeguard environmental specialist	
		Paints with toxic ingredients or solvents or lead-based paints will not be used				Log book	Adherence to measures in waste management Plan	Construction areas	Regular /daily monitoring	Environmental Safeguard specialist	

Activities	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost ($)	Parameters to be Measured	Method of Measurement	Performance Indicator	Sampling Location	Monitoring Frequency	Responsibility for Monitoring	Monitoring Cost
Traffic and Pedestrian Safety	Direct or indirect hazards to public traffic and pedestrians by construction activities	In compliance with national regulations the contractor will insure that the rehabilitated and construction site is properly secured and related traffic regulated. This includes but is not limited to Signposting, warning signs, barriers and traffic diversions:	Work contractors and site engineer	3000	Delivery plan on Project site routes and environ	Citing of traffic management delivery plan	Adherence to measures in the traffic management	Construction areas	Regularly /weekly	Environmental and social Safeguard specialist	2000
		Site will be clearly visible and the public warned of all potential hazards				Provision of safe passages and crossings for pedestrians where upgrading / construction traffic interferes					
		Traffic management system and staff training, especially for site access and near-site heavy traffic.				Driver Training Records as part of Induction training					
		Organise carpools/buses for worker transportation where possible to avoid additional traffic pressure.				Carpools/ buses used					
		Adjustment of working hours to local traffic patterns, e.g. avoiding major transport activities during rush hours.				Peak hours on local roads avoided, Grievance Mechanism					

		Prevent storage of construction materials, equipment and machineries on traffic lanes.				Dedicated storage areas in place					
Activities	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost ($)	Parameters to be Measured	Method of Measurement	Performance Indicator	Sampling Location	Monitoring Frequency	Responsibility for Monitoring	Monitoring Cost
Status of Vegetation	Vegetation clearance and potential impact on the disturbance and destruction of Biodiversity	Surveys of existing invasive species populations prior to construction Prepare a Vegetation clearing and debris Management. Plan. to include • Invasive plant control measures to manage established invasive species populations and to prevent invasive species establishment.	Site engineer	1,000	Vegetation (sample) collection around the entire project area; and wildlife sampling through An interview with renowned hunters	Vegetation clearing and debris management plan in place	Adherence to specific avoidance and minimisation measures in the Vegetation clearing and debris management plan Tracking changes in the status of listed species	Construction corridor	Quarterly	ACEPHAP environmental safeguards specialists	750
				Total Mitigation Cost (Operation Phase							Total Monitoring Cost (Operation Phase
Total				**22,650**							**8,450**
Activities	**Potential Impact**	**Mitigation Measures**	**Responsibility for Mitigation**	**Mitigation Cost ($)**	**Parameters to be Measured**	**Method of Measurement**	**Performance Indicator**	**Sampling Location**	**Monitoring Frequency**	**Responsibility for Monitoring**	**Monitoring Cost**
OPERATIONAL PHASE											
Solid waste management	Waste Materials, electrical/ electronic waste, Packaging items/scraps Food scraps,	Maintaining records of waste Maintain good working condition to prevent spills, or waste litter with the ground, or exposure to rain and wind; Segregate waste in adequate receptacles	ACEPHAP PIU	1,000	Expected volume of other solid wastes generated such as empty containers, domestic wastes,	Records of waste management	Adherence to measures in waste management plan	Operational areas of project	Daily or weekly basis	Environmental Safeguard specialist	700

	Used ventilation filters, unused / used cleaning materials, from operational phases.	and dispose as required under national regulations			empty vials and packing materials, on a daily or weekly basis						
Individual waste water Treatment	Water quality	The approach to handling sanitary wastes and wastewater from building sites (installation or upgrading/ construction works) must be approved by the local authorities as applicable.	Works contractor and ACEPHAP PIU	400	On project site and linkage to receiving water bodies	Waste water discharge	Adherence to measures in waste management plan	Operational areas of project	Regular inspection of waste water discharge as applicable	Environmental Safeguard specialist	
		Before being discharged into receiving waters, effluents from individual wastewater systems must be treated in order to meet the minimal quality criteria set out by national guidelines on effluent quality and wastewater treatment			On project site and linkage to receiving water bodies	Waste water discharge	Adherence to measures in waste management plan Monitoring of new wastewater systems (before/after) should be carried out	Operational areas of project	Regular inspection of waste water discharge as applicable	Environmental Safeguard specialist	
Activities	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost ($)	Parameters to be Measured	Method of Measurement	Performance Indicator	Sampling Location	Monitoring Frequency	Responsibility for Monitoring	Monitoring Cost
Flies and rodents with respect to operational facilities	Poor sanitation and hygiene, disease	Maintain structures to keep out pests (e.g. plug holes, seal gaps around doors and windows);	ACEPHAP PIU	250	Regular cleaning and good sanitation practices	Visual observation of pest control measures is in place	Adherence to measures sanitation practices	Operational areas	Regularly/daily	ACEPHAP PIU environmental safeguard specialist	300

	/pest infestation										
		Use mechanical controls (e.g. traps, barriers, light, and sound) to kill, relocate, or repel pests;									
		Use good housekeeping practices in facilities to limit food sources and habitat for pests									
		Improve drainage and reduce standing water to control mosquito populations;									
Activities	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost ($)	Parameters to be Measured	Method of Measurement	Performance Indicator	Sampling Location	Monitoring Frequency	Responsibility for Monitoring	Monitoring Cost
Occupational health and safety	Chemical Pollution	The contractors / consultant to develop a Health and Safety Policy and procedures to guide the operational activities.	ACEPHAP PIU	3,000	Health and Safety Policy and procedures in place	Adherence to health and safety procedure	Records on frequency, type, and source of illness/accident /injury Records on non-compliances Frequent illness of workforce medical fitness, workplace accident	Work places	Bi- annually during operational phase	Environmental and social Safeguard specialist ACEPHAP PIU	500
		All workers should be given proper induction/ orientation on safety. Conducting of Health and safety durbars to sensitize workers on	ACEPHAP PIU		Training content and records	Inspection	Training records and job permits	Work place			200

		risk of accidents and occupational diseases									
Disposal of hazardous waste in course of maintenance works	Toxic pollution	Infrastructure for hazardous waste containment / management in place. Engage experienced artisans for any operational work.	ACEPHAP PIU	1,500	Availability and proper use of PPE's during maintenance and cleaning works	inspection	Issuance of job permits and Use of PPEs	Work places		Environmental Safeguard specialist ACEPHAP PIU	200
Activities	Potential Impact	Mitigation Measures	ACEPHAP PIU	Mitigation Cost ($)	Parameters to be Measured	Method of Measurement	Performance Indicator	Sampling Location	Monitoring Frequency	Responsibility for Monitoring	Monitoring Cost
		Regularly service all equipment and machinery to ensure they are in good working condition.	ACEPHAP PIU	500	Record of equipment maintenance	Records/ log book inspection	All emergency response equipment are functional	Operational areas	Quarterly	Environmental and social Safeguard specialist ACEPHAP PIU	200
		Ensure there are first aid kits on site and a trained person to administer first aid.	ACEPHAP PIU	750	Staff awareness of health and safety	Health and safety procedures in place	All employees in the facility have Practical skill sets and culture on health and safety	Operational areas	Quarterly	Environmental Safeguard specialist ACEPHAP PIU	200
Emergency preparedness and response	Emergency on site	Develop and implement a project-specific Emergency Preparedness and Response Plan for the operational phase covering the risks on local communities.	ACEPHAP PIU	4,500	Staff awareness of health and safety	Emergency response plan in place	Staff regularly performs mock drills in case of emergency response	Operational areas	Regularly	environmental Safeguard specialist ACEPHAP PIU	250
		Develop measures/systems for collaboration with the local communities and other external parties including local governmental agencies,		3,000	Test all early warning systems and alarms						400

		media, etc. where necessary.									
		Where necessary, communicate the details of the nature of the emergency, protection options, etc. through trained community liaison officer(s).		2,000							750
Equipping of digital laboratory for C-CODE	Injuries during installation of the equipment Temporary obstruction of traffic in the Center	Provide forklifts to move the equipment to the installation site Ensure the use of protective gloves by the engineers Ensure use of alternate routes and back doors to transport the equipment into the installation site	ACEPHAP PIU ACEPHAP PIU		Effective use of the provided safety materials Use of alternate routes	Inspection Inspection			Throughout installation and handing over of the laboratory Throughout installation and transportation	Safeguards officer Safeguards officer	
				Total Mitigation Cost							Total Monitoring Cost

				(Operation Phase)							(Operation Phase
Total				**17,900**							**3,700**

7.1 Capacity Building

Implementing efficiently and effectively the ESMP requires the right set of knowledge and skills. All persons responsible as listed in Table 7.2 shows the role and responsibilities of stakeholders to be undertaking work during the life of the project. Table 7.3 is the recommended training course outline, contents and schedules for the consideration of the PIU for implementation of the ESMP throughout the Project cycle, which personnel must be trained on the contents of the ESMP, as it is important that all site personnel have a basic level of environmental awareness.

Table 7.2: The Roles and Responsibilities of the Stakeholders in the Implementation, Monitoring and Review of the ESMP

S/N	Stakeholder	Roles and Responsibilities
1	ACEPHAP PIU	● Liaise closely with Osun State Ministry of Environment in preparing a coordinated response on the environmental and social aspects of project development respectively as required; ● Safeguards due diligence ● In case of any violations on arising works, PIU will request contractors to amend and correct the violation. ● Receive and supervise the environmental report from the Independent Environmental Consultant (IEC), ● PIU's Safeguard Specialist will be in charge of review environmental report and recommend further actions. ● Cooperate with WB to periodically supervise contractors' activities. ● Weekly meetings will be held between Contractors, PIU, and consultants. In addition, PIU is to have assigned personnel for regular inspection.
2	Osun state Ministry of Environment	● Environmental compliance Coordinator at the State level ● Lead role - provision of advice on screening, scoping, review of draft ESMP report (in liaison with Federal Ministry of Environment) ● Site assessment and monitoring of ESMP implementation
3	Federal Ministry of Environment	● Lead role - provision of advice on screening, scoping, review of draft ESMP report (in liaison with State Ministry of Environment), ● Receiving comments from stakeholders, public hearing/ review of the project proposals, and convening a technical decision-making panel arising from the public disclosures, ● Project categorization for EA, Applicable standards, Environmental and social liability investigations, Monitoring and evaluation process and criteria
4	Other MDAs	● Other MDAs come in as at when relevant areas or resources under their jurisdiction or management are likely to be affected by or implicated by projects. ● They participate in the EA processes and in project decision-making that helps prevent or minimize environmental and social impacts and to mitigate them. These institutions may also be required, to issue a consent or approval for an aspect of a project; allow an area to be included in a project; or allow impact to a certain extent or impose restrictions or conditions, monitoring responsibility or supervisory oversight
5	World Bank (WB)	● Overall supervision and provision of technical support and guidance.

		● Recommend additional measures for strengthening the management framework and implementation performance; ● Supervising the application and recommendations of sub- project ESMPs.
6	Safeguards Unit	**Environmental Safeguard Officer** ● Analyze potential community/individual sub-projects and their environmental impacts; ● Ensure that project activities are implemented in accordance to best practices and guidelines set out in the site specifics; ● Identify and liaise with all stakeholders involved in environment related issues in the project; and ● Be responsible for the overall monitoring of mitigation measures and the impacts of the project during implementation. ● Lead the process of Disclosure of the ESMP **Social Safeguard Officer** ● Develop, coordinate and ensures the implementation of the social aspects of the ESMP; ● Ensure the operationalisation of Grievance Redress Mechanism (GRM)on the project ● Periodically monitor the GRM to ensure it is effective and fit for purpose ● Identify, and address issues of GBV in liaison with the Osun State Ministry of Women and Children Affairs ● Ensure project beneficiaries and host communities are adequately sensitised about the available reporting channels and how to access them ● Identify and liaise with all stakeholders involved in social related issues in the project; ● Conduct impact evaluation and beneficiaries' assessment; and ● Establish partnerships and liaise with organizations, Community Based Organizations (CBOs) and Civil Society Organizations (CSOs).
7	Works Contractor	● After receiving and committing to the environmental procedures and Management Plans, ● Contractors must fully carry out the measures of the environmental protection, health and safety procedure as indicated; ● Any changes related to Environment, health and safety procedure must be informed to PIU for approval ● In case of any violations on arising works either detected by Environmental consultant, Safeguard Specialists, or new arising works proposed by contractors, they must be reported to PIU for further actions. ● If contractors decided to not follow instruction from PIU, construction activities will be halted until necessary actions are taken. ● Contractors must assign at site, personnel in charge of Environment, health and safety procedure. ● Compliance to BOQ specification in procurement of material and construction ● Provide oversight function during construction and decommissioning

7.1.1 Capacity Building Requirements

Based on the assessment of the institutional capacities of the different agencies that will be involved in the implementation of the ESMP, the following broad areas of capacity building have been identified and recommended for the PIU and other relevant agencies for effective implementation of the ESMP.

It is important to ensure that all site personnel have a basic level of environmental awareness training. Topics covered should include among others:

- What Is Meant By "Environment"?
- World Bank Safeguards Policies
- Why the Environment Needs to Be Protected and Conserved.
- How Construction Activities Can Impact on The Environment.
- Construction Health Safety and Environment
- What Can Be Done to Mitigate Against Such Impacts?
- Awareness of Emergency and Spills Response Provisions.
- Social Responsibility during Construction e.g. being Considerate to Local Residents.
- The Environmental and Social Management Plan (ESMP);
- Environmental and Social Monitoring and Audit;
- Solid Waste and waste water Management;
- Environmental Reporting.

Table 7.3: Recommended Training Courses

S/N	Proposed Training Topics	Course Content	Proposed Schedule	Target audience	Duration	Estimated Cost/ Budget (US$)
1	Understanding Safeguard Policies of the World Bank and its linkages to projects and sub- projects	• What Is Meant by World Bank Safeguards Policies? • How Projects / sub project execution Activities Can Impact on the Environment. • Screening of projects to categories • Understanding of tools for implementing Safeguard Policies	Within the first Six months of Project commencement	Officers of PIU Relevant staff of Kano State Ministry of Environment & FMEnv (EA) Safeguard Specialist other relevant MDAs, LGA departments, NGOs, CBOs., Contractor	3 days	8,500
	Environmental & Social Safeguard Monitoring, Reporting and due diligence on projects	Awareness of Emergency and Spills Response Provisions. • Social Responsibility during Construction E.g., Being Considerate to Local Residents. • Rain harvesting to manage storm run-off in project area. • The Environmental and Social Management Plan (ESMP); • Environmental and Social Monitoring and Audit; • Solid Waste Management; Proper selection, handling, storage, application, use, and disposal of all hazardous materials and chemicals used in the Project activities in accordance with the Chemical Management Plan; • Code of Conduct Training for Contractors on GBV / SEA issues				

2	Introduction to Construction HSE	• Overview of Health and Safety Hazards in Construction • Incidents: Causation, Investigation & Reporting • Excavation Safety • Construction Site Inspection • Personal Protective Equipment • Code of Conduct Training for Contractors on GBV / SEA issues • Mitigation, roles & responsibilities, monitoring and budgeting;		Contractor 's Personnel, Local community	2 days	6,000
3	**Estimated Total Cost**					**14,500**

7.2 ESMP Cost

Table 7.4: Cost of ESMP

S/N	ESMP ACTIVITES	COST (US dollars $)
1.	Cost of mitigation	54,850
2.	Cost of monitoring	12,450
3.	Capacity building	14,500
4.	Disclosure	5,500
5.	Contingency Plan 10%	8,730
	TOTAL	**96,030**

7.3 DISCLOSURE COSTS

Table 7.4 Costs of Disclosure

S/No	Tasks	Cost (US dollars $)
1	ESMP Registration with FMEnv	60.00
2	Production of 20 copies of the ESMP	1,000.00
3	Public Display Newspaper Advertisement Radio Announcement	 1,000.00 1,500.00
4	Panel Review by FMEnv	1,000.00
5.	Logistics	940.00
	Total	5,500.00

7.4 ESMP Implementation Schedule

It is expected that the activities related to the ESMP Matrix as seen above should to be integrated into the overall construction schedule. The implementation schedule is presented in the Table 7.5 below.

Table 7.5: ESMP Implementation Schedule

S	Activity	Responsibility	Months											
			1	2	3	4	5	6	7	8	9	10	11	12 - 18
1	ESMP Disclosure	RITEA Team												
2	Develop Environmental/Social Requirements in Bid Documents	RITEA Team												
3	Finalization and Approval of Engineering Designs	Engineering Consultant, RITEA Team												

4	Allocate budget for ESMP Monitoring	RITEA Team												
5	Appoint Support Staff for ESMP	RITEA Team												
6	Review and Approval of Contractor's HSE, WMP, TMP	RITEA E&S Team												
7	Capacity building	RITEA Team												
8	Implementation of Environmental and Social Mitigation Measures	Contractor												
9	Supervision of pre-Construction and Construction activities	RITEA Team												
10	Supervision of ESMP Implementation	RITEA E&S Team, Engineering Consultant												
11	Environmental and Social Monitoring and Auditing	FMEnv, KASEPPA												
12	Reporting on ESMP Implementation	RITEA E&S Team												

CHAPTER EIGHT: CONCLUSIONS AND RECOMMENDATIONS

8.0 Conclusions and Recommendations

Generally, the study has indicated that the proposed project will not severely impact negatively on the existing environmental, social and health as well as safe conditions of the people, locally.

- There was no identification of cultural and heritage sites that may be affected by the proposed development.
- Potential environmental and social impacts of sufficient magnitude that could interrupt the execution of the project were not detected. Although, there were few negative environmental and social impacts that may potentially occur due to the activities associated with the proposed works at operational phase but adequate mitigation measures have been provided to address them.
- The proposed intervention work is most desirable because of the obvious environmental, health and socio-economic benefits. These far out-weigh the negative environmental and social impacts that could arise in the course of implementation.
- Appropriate institutional framework has been drawn up to implement the mitigation measures and environmental management plan including the proposed monitoring programmes.
- The project would influence the social and economic conditions of people and communities for commercial business. It is a long-term venture to create spinoff companies/ start- up digital engineering companies such that when the students eventually graduate, they would be able to stand on their own without looking for any job.

From the foregoing, the recommendations include the following:

- Academic Community members should be sensitized and duly informed on the time and duration of works through consultations;
- Construction works should be carried out in an environmentally sustainable and socially responsible and inclusive manner;
- Appropriate use of green hedges is existing around project sites so that the project site is not visually intrusive from public road.

REFERENCES

- Environmental and Social Management Plan (ESMP) for the Conduct of ESMP for Centre for Dryland Agriculture, Bayero University Kano CDA, 2017
- Environmental and Social Management Plan (ESMP) for the African Centre of Excellence (ACE) in Information Technology ACEPHAP, 2016
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- NESREA (2009) National Environmental Standards and Regulations Enforcement Agency (Establishment) Act, 2007, National Environmental (Noise Standards and Control) Regulations 2009. The Federal Government Printer, Lagos, Nigeria
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ANNEXES

ANNEX 1: Terms of Reference

TERMS OF REFERENCE TO ENGAGE A CONSULTANT TO PREPARE AN ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP) FOR THE CONSTRUCTION OF INTERNATIONAL STUDENTS HOSTEL FOR THE AFRICA CENTER OF EXCELLENCE FOR POPULATION HEALTH AND POLICY (ACEPHAP), BAYERO UNIVERSITY KANO, NIGERIA

A. INTRODUCTION & BACKGROUND

The Africa Higher Education Centers of Excellence (ACE) Project is a World Bank initiative in collaboration with governments of participating countries to support Higher Education institutions in specializing in Science, Technology, Engineering and Mathematics (STEM), Environment, Agriculture, applied Social Science / Education and Health. It is the first World Bank project aimed at the capacity building of higher education institutions in Africa.

The first phase (ACE I) was launched in 2014 with 22 Centers of Excellence in nine (9) West and Central African countries; Benin, Burkina Faso, Cameroon, Côte d'Ivoire, Gambia, Ghana, Nigeria, Senegal and Togo. The Project aims to promote regional specialization among participating universities in areas that address specific common regional development challenges. It also aims to strengthen the capacities of these universities to deliver high quality training and applied research as well as meet the demand for skills required for Africa's development. The second phase (ACE II) was launched in East and Southern Africa with 24 centers across Ethiopia, Kenya, Malawi, Mozambique, Rwanda, Tanzania, Uganda and Zambia.

Based on the initial successes, the World Bank and the French Development Agency (AFD) in collaboration with the African governments, launched the ACE Impact-2 Project to strengthen post-graduate training and applied research in existing fields and support new fields that are essential for Africa's economic growth. There are 53 ACEs ; 5 Emerging Centers;1 “top up” center in Social Risk Management; and 5 Colleges and Schools of Engineering. The new areas include sustainable cities; sustainable power and energy; social sciences and education; transport; population health and policy; herbal medicine development and regulatory sciences; public health; applied informatics and communication; and pastoral production.

B. PRESENTATION OF THE PROMOTER AND ITS MISSIONS

In Nigeria, The Africa Center of Excellence for Population Health and Policy (ACEPHAP) was selected to strengthen inter-disciplinary approaches to promote population health outcomes through training and research for evidence-informed policy development in West and Central Africa. This approach utilizes non-traditional partnership among different sectors of the community, public health, industry, academia, health care and local government entities to achieve positive health outcomes through policy development and implementation. The Center has adopted a strategy of translating research outputs to policy through recommendations to policy makers for implementation purposes as a process of promoting or ‘Turning Research into Practice (TRIP)’ for evidence-proven interventions.

The Center’s thematic areas of research cover maternal and child health, nursing, nutrition, mental health and global health. ACEPHAP has seven (7) main collaborating departments which run its

academic programmes. These departments are Department of Obstetrics and Gynaecology, Department of Paediatrics, Department of Nursing, Department of Biochemistry, Department of Community Medicine, Department of Internal Medicine and Department of Psychiatry. They are all housed within Aminu Kano Teaching Hospital.

The objectives of the ACEPHAP are:

- To train postgraduate students to acquire knowledge, skills and competences towards achieving health-related SDGs
- To strengthen capacity and capability of translating research findings to policy and practice
- To promote and enable gender parity and participation in population health research and policy
- To increase the nursing human resources for health in West and Central Africa

The ACEPHAP project will involve construction of international students hostel which will have significant environmental and social impacts. To ensure all impacts are identified and mitigation measures as well as responsibilities for implementing these measures are in place an Environmental and Social Management Plan (ESMP) is required. The ESMP will also include recommendations on good work practices considering the COVID-19 situation which, requires physical/social distancing, good hygiene practices and consultations where required. The ESMP will ensure the ACEPHAP is in compliance with the World Bank Safeguard Policies particularly OP 4.01 Environmental Assessment and OP 4.11 Physical Cultural Resources both triggered for the ACE II Project. It will also ensure the project complies with the Nigeria EIA Act CAP. E12 L.F.N. 2004.

The ESMP will provide an overview of the environmental and social baseline conditions of the proposed project, summarise the potential impacts associated with the proposed construction works and set out the management measures including implementation and responsibilities required to mitigate any potential risks and impacts associated with the activities of the factory.

In addition, the ESMP will be utilised by the contractor, to be commissioned by ACEPHAP for the sub-project, and will form the basis of site-specific management plans that will be prepared by the contractors as part of their construction methodology prior to works commencing also taking into cognisance the COVID 19 pandemic and the different measures used in preventing its spread.

Thus, ACEPHAP intends to engage a qualified consultant to carry out this ESMP.

C. B. PROJECT DVELOPMENT OBJECTIVES AND COMPONENTS

The **PDO** of the ACE II Project is to improve the quality, quantity and development impact of postgraduate education in selected universities through regional specialization and collaboration.

Project Components

The Project has 3 components

Component 1: Establishing new Africa Centers of Excellence and scaling up well-performing existing Africa Centers of Excellence (ACE) for development impact. This component aims to build and strengthen the capacity of competitively selected ACE Impact centers based in higher education institutions across West and Central Africa.

- Sub-component 1.1 will establish new centers of excellence for skills and knowledge for development challenges. About 30 centers will be competitively selected based on preestablished selection criteria to receive funding from ACE Impact Project.
- Sub-component 1.2: Scaling up well-performing ACEs: This sub-component will provide additional funding and support to approximately 12 existing ACEs (currently supported through ACE I) to enable them to scale-up their activities.
- Sub-component 1.3 Additional support to the best Engineering and Technology ACE institutions: Institutions will be selected to host an engineering and technology-focused ACE Impact center with capacity in other engineering and technology disciplines.

Component 2: Regional Partnerships and Scholarships. Component 2 seeks to expand the regional scope of impact of the ACEs funded under Component 1 by providing demand-side funding for partnering institutions and regional students to buy the training and services from the ACEs that are most relevant:

- Sub-component 2.1 will support regional institutional partnerships between higher education institutions and the ACEs (under component 1 of the proposed project) to strengthen the capacity of the higher education institutions.
- Sub-component 2.2 will finance two types of regional scholarships to support primarily the training of the next generation of faculty for higher education institutions in the region.

Component 3: Enhancing Regional Policymaking, Monitoring, and Facilitation. Component 3 will support regional policymaking for higher education and regional project monitoring and facilitation. Component 3 will fund, through a Regional IDA grant of US$10 million to the Association of African Universities (AAU), the facilitation of the ACE Impact project's regional activities and support to centers under the project.

C. RATIONALE FOR THE STUDY

The proposed International students hostel of ACEPHAP will involve construction activities that can cause negative environmental and social impacts due to the nature of works. Some of the potential negative impacts that would arise during the construction works will include: generation of hazardous and non-hazardous wastes, noise/air pollution, accident from movement of equipment and materials to site, occupational health & safety risks, risks associated with labour influx (security threat, gender-based violence (GBV) in particular Sexual Exploitation and Abuse due to labour influx, increase in STIs/STDs), grievance, among others. All these trigger the World Bank's operational policy (OP) on Environmental Assessment (OP 4.01). In addition, the Nigeria EIA Act mandates that any construction that would have significant impact on the environment must be subjected to an environmental assessment prior to commencement of the civil works.

Thus, ACEPHAP is proposing to engage a professional consultant who would conduct an Environmental and Social Management Plan (ESMP) to identify the environmental and social impacts

associated with this construction project as well as to proffer mitigation measures to address potential negative impacts.

D. OBJECTIVES OF THE CONSULTANCY

The main objective of this ToR is to provide a framework for ACEPHAP to engage an ESS specialist to develop ESMP for the construction of international students hostel of the Center. The ESMP will provide an overview of the environmental and social baseline conditions of the proposed sub-project, summarize the potential impacts associated with the proposed construction works, and set out the management measures required to mitigate any potential impacts in a series of sector specific Environmental Management Plans (ESMPs).

The proposed construction of international students hostel may have environmental and social impacts that may include noise/air pollution, accident from movement of equipment and materials to site, occupational health & safety risks, risks associated with labour influx (security threat, gender based violence (GBV) in particular Sexual Exploitation and Abuse due to labour influx, increase in STIs/STDs), risk associated with drug misuse, grievance and disturbance to physical resources among others. All these trigger the World Bank's operational policy (OP) on Environmental Assessment (OP 4.01). Furthermore, the Nigeria EIA Act requires that any construction with a substantial environmental impact be subjected to an environmental assessment prior to the start of civil works. This construction will be carried out on an uninhabited piece of land so there is no need to relocate individuals or animals, no deforestation, no disruption of natural or cultural resources.

The ESMP will be utilized by the contractor(s) to be commissioned by ACE Impact Center (ACEPHAP) in the preparation of the required Contractor's ESMP (C-ESMP), which will form the basis of the site-specific management plan prior to works commencing.

The ESMP will be used by the contractor to address all Occupational Health and Safety (OHS) issues and community health and safety issues associated with the proposed construction work.

As the proponent for the sub-projects, it is our objective to avoid, where practical, unacceptable adverse environmental, OHS, social and/or economic impacts.

The ESMP will achieve the following objectives:

- - Provide a detailed description of the main phases of the works (preparation, execution/construction, operation) and key activities of the works to be executed;
- - Conduct public consultations with all the stakeholders of the Project in order to collect their suggestions that will be integrated in the ESMP;
- - Carry out an analysis of the initial environmental status of the sites concerned and describe the biophysical, socio-economic and cultural characteristics of the environment in which the sub-project activities will take place,
- - Highlight the major constraints that need to be taken into account at the time of site preparation, construction and during the construction and installation of equipment and during the operation phase;
- - Identify the environmental and social components that may be impacted by the implementation of the works
- Check to ensure that the design and construction methods and the various components of the works are consistent with the ecological, social, economic and cultural realities of the project areas and, if necessary, propose any necessary readjustments;

- Analyse the legal and regulatory framework for environmental management in relation to national legislation and World Bank safeguard policies;
- Identify and analyse, by implementation phase, the potential social and environmental impacts, both positive and negative (including impacts on physical cultural resources) that may result from the realisation of the rehabilitation, renovation or construction works of the infrastructures
- Assess the significance of these impacts during the project phases, compared to the no-project scenario;
- Propose measures to optimise the positive impacts during the different phases of the works and technically viable and economically feasible mitigation measures to avoid, minimise, mitigate or compensate for the negative environmental and social impacts so as to bring them to acceptable levels; on the environment and the human environment;
- Present the costs of implementing the proposed mitigation measures;
- Assess the need for solid and liquid waste collection, disposal and infrastructure management, and make recommendations;
- Propose a mechanism for managing complaints that may arise in the course of the works.
- Potentially screen out environmentally unsound activities
- Propose modified designs to reduce environmental and social impacts
- Identify feasible alternatives
- Predict significant adverse impacts
- Identify mitigation measures to reduce, offset, or eliminate adverse impacts
- Engage and inform potentially affected communities and individuals
- Influence decision-making and the development of terms and conditions

Legal and Institutional Framework

This study will be guided by the World Bank operational safeguard policies, and the Kano State Government and Federal Government of Nigeria policies and regulatory framework. The project will comply with the Environmental Impact Assessment Decree No 86 of 1992, The National Policy on the Environment, The Land Use Act (Cap 202, 1990), now Cap L5 Laws of the Federation of Nigeria 2004, Harmful Waste (Special Criminal Provisions) ACT CAP H1, LFN 2004, Labour Act - CAP. L1 L.F.N. 2004, Workers' Compensation Act, 1987 and EIA Procedural Guidelines.

The institutional responsibilities for the environmental components of the project will be shared by the three tiers of government: federal, state and local governments. At the federal level, the institutions that will be responsible for this project include the National Council on Environment, the Federal Ministry of Environment and its agency, the National Environmental Standards and Regulations Enforcement Agency (NESREA) which will play a key role of ensuring that the environmental and social requirements of the project are fully adhered to. At the state level, the Kano State Ministry of Environment and Kano State Environmental Planning and Protection Agency (KASEPPA) will provide the institutional framework for the project.

This project is classified under the World Bank safeguards policy as category B, as its adverse effects on the population or areas of environmental importance are limited, site-specific, and likely reversible, and the mitigation measures can be easily designed and

implemented. This project triggers World Bank safeguards Operational Policy (OP) and Bank Procedure (BP), OP/BP 4.01 (Environmental Assessment) that covers impacts on the environment, human health and safety of the project. In addition, the Bank's Environmental, Health and Safety Guidelines, the 2010 Access to Information Policy, and the Guidelines on Labour Influx will all be applied.

TABLE 1: The Roles and Responsibilities of the Stakeholders in the Implementation, Monitoring and Review of the ESMP

S/N	Stakeholder	Roles and Responsibilities
1	ACEPHAP	● Liaise closely with Kano State Ministry of Environment in preparing a coordinated response on the environmental and social aspects of project development respectively as required; ● Safeguards due diligence ● In case of any violations on arising works, PIU will request contractors to amend and correct the violation. ● Receive and supervise the environmental report from the Independent Environmental Consultant (IEC), ● PIU's Safeguard Specialist will be in charge of review environmental report and recommend further actions. ● Cooperate with WB to periodically supervise contractors' activities. ● Weekly meetings will be held between Contractors, PIU, and consultants. In addition, PIU is to have assigned personnel for regular inspection.
2	Kano State Ministry of Environment	● Environmental compliance Coordinator at the State level ● Lead role - provision of advice on screening, scoping, review of draft ESMP report (in liaison with Federal Ministry of Environment) ● Site assessment and monitoring of ESMP implementation
3	Federal Ministry of Environment	● Lead role - provision of advice on screening, scoping, review of draft ESMP report (in liaison with State Ministry of Environment), ● Receiving comments from stakeholders, public hearing/ review of the project proposals, and convening a technical decision-making panel arising from the public disclosures, ● Project categorization for EA, Applicable standards, Environmental and social liability investigations, Monitoring and evaluation process and criteria
4	Other MDAs	● Other MDAs come in as at when relevant areas or resources under their jurisdiction or management are likely to be affected by or implicated by projects. ● They participate in the EA processes and in project decision-making that helps prevent or minimize environmental and social impacts and to mitigate them. These institutions may also be required, to issue a consent or approval for an aspect of a project; allow an area to be included in a project; or allow impact to a certain extent or impose restrictions or conditions, monitoring responsibility or supervisory oversight
5	World Bank (WB)	● Overall supervision and provision of technical support and guidance. ● Recommend additional measures for strengthening the management framework and implementation performance; ● Supervising the application and recommendations of sub- project ESMPs.
6	Independent Environmental Consultant	● Make reference and prepare site specific plans in accordance with ESMP framework approved by WB. The respective contractors will be required to formally commit to requirements of the site-specific Management Plans. ● Establish environmental procedure and notify and obtain formal commitment from contractors. ● Observe directly the performance of the environmental works, ● report mitigation measures of the environmental impact result from contractor's activities; ● Review weekly environmental reports prepared by the Principal Contractor;

		● Undertake assessments and audits and issue environmental supervision reports on a weekly basis ● Report to PIU / World Bank as may be necessary the performance of the contractors and recommend countermeasures if any.
7	Safeguards Unit	**Environmental Aspects** ● Collate environmental baseline data on relevant environmental characteristics of the selected project sites; ● Analyze potential community/individual sub-projects and their environmental impacts; ● Ensure that project activities are implemented in accordance to best practices and guidelines set out in the site specifics; ● Identify and liaise with all stakeholders involved in environment related issues in the project; and ● Be responsible for the overall monitoring of mitigation measures and the impacts of the project during implementation. **Social Aspects** ● Develop, coordinate and ensures the implementation of the social aspects of the ESMP; ● Implement the grievance mechanism on the project ● Identify and liaise with all stakeholders involved in social related issues in the project; ● Conduct impact evaluation and beneficiaries' assessment; and ● Establish partnerships and liaise with organizations, Community Based Organizations (CBOs) and Civil Society Organizations (CSOs).
8	Works Contractor	● After receiving and committing to the environmental procedures and Management Plans, ● Contractors must fully carry out the measures of the environmental protection, health and safety procedure as indicated; ● Any changes related to Environment, health and safety procedure must be informed to PIU for approval ● In case of any violations on arising works either detected by Environmental consultant, Safeguard Specialists, or new arising works proposed by contractors, they must be reported to PIU for further actions. ● If contractors decided to not follow instruction from PIU, construction activities will be halted until necessary actions are taken. ● Contractors must assign at site, personnel in charge of Environment, health and safety procedure. ● Compliance to BOQ specification in procurement of material and construction
9	Site Engineer	● Provide oversight function during construction and decommissioning
10	NGOs and CBOs	● Assisting in their respective ways to ensure effective response actions, ● Conducting scientific research alongside government groups to evolve and devise sustainable environmental strategies and rehabilitation techniques, ● Organizing, coordinating and ensuring safe use of volunteers in a response action, and actually identifying where these volunteers can best render services effectively & providing wide support assistance helpful in management planning, institutional/governance issues and other livelihood related matter, ● Project impacts and mitigation measure, Awareness campaigns

E. DESCRIPTION OF THE PROPOSED SUB-PROJECT ACTIVITIES

The Center is located at Aminu Kano Teaching Hospital Bayero University Kano (11.9634° N, 8.5504° E) Nigeria. It is within the North-Western Zone of Nigeria, which is heavily populated. The ever-growing population in West African region outstrips the already deficient health workforce. This is in addition to other health and demographic challenges posed by a rapidly increasing population.


ACEPHAT Building
College of Health Sciences, BUK
Lecture Areas
Library
Aminu Kano Teaching Hospital
AKTH Doctors' Quarters
Project Site Location
School of Nursing
Google Earth

The proposed activities associated with the project will involve construction of a new building and associated structures and works such as plumbing, electrical fittings, sACEPHAP away, roofing etc to accommodate the international students' hostel. The construction works will be implemented within Aminu Kano Teaching Hospital campus of the Bayero University Kano, as such there will be no involuntary resettlement, acquisition of land, relocation, compensation, loss of physical and economic assets, and/or loss of livelihoods particularly as the project by design cannot finance concerns of involuntary resettlement or land acquisition or compensation.

The international students hostel of ACEPHAP is a one storey building that is designed to accommodate the following features:

D. Power House
E. Main Building
F. Gate House

The main building is designed to include the following:

a. GROUND FLOOR:

- Reception and waiting area
- Creche
- Convenience store
- Common area
- Laundry
- Gym
- Restaurant
- Service area
- Central atrium
- Twelve bedrooms, with four rooms designed to accommodate students with disability
- Fourteen toilets
- Two changing rooms
- Three escape stairways
- Three courtyards

b. FIRST FLOOR

- Common area
- Two study areas
- Kitchen
- General store
- Cold store
- Facility office
- Two service shafts
- Central atrium
- Twenty bedrooms
- Twenty-three toilets
- Two changing rooms
- Three escape stairways
- Three courtyards

F. SCOPE OF WORK

The Consultant will work in close collaboration with the engineering design consultants and the project team. The consultant will have to consider the technical variants of the proposed activities and in return, inform the technical design consultants of any major constraint or recommendation that may arise due to the social and environmental situation on ground.

The Consultant will consider the proposed civil, electrical and refrigeration engineering designs, remodeling, landscaping, drainage construction, alternative power sources provision and other activities that would be carried out within the project location. The consultant will assess natural resources and infrastructure potentially affected during project implementation and operation and select the management strategies needed to ensure that environmental and social risks/impacts are appropriately mitigated.

Methodological approach to conduct the study

The consultant is requested to describe precisely and clearly each of the methods and tools he will use for both data collection and data processing. He will examine the interactions between the project's nuisance emitters and the environmental receptors subject to the corresponding interference, while excluding those aspects which have little or no relevance to the environmental impacts of the proposed action. It will identify those elements of the biophysical and social environment which may be affected by the project and for which there is public and/or professional concern. It will identify all the potential environmental impacts of the project and assess them using an appropriate methodology to rank them in order of importance. Only significant impacts will be examined in depth. The Consultant will then propose realistic and feasible mitigation or enhancement measures and a monitoring program for these.

A particular attention will be paid to sensitising the population in the project area and the drivers of construction machines and vehicles on environmental protection and safety aspects. The Consultant will assess the risks associated with the project and propose measures to be taken in case of emergency. The Consultant will propose responses to the environmental feasibility of the project.

The Consultant is advised to use the Participatory Research Method (PRM) for the collection of environmental information.

The study will also propose, among others, the following

- a waste management plan for the project's activities
- a gender and vulnerability assessment plan
- a Grievance Redress Mechanism.

The study will be conducted in compliance with the environmental impact assessment procedures developed by the country. It should also take into account the World Bank's OPs triggered by the project.

The methodology adopted by the consultant will be rigorous and will involve a study of the initial state, the identification of potential impacts, the evaluation of relevant impacts and the identification of insertion measures.

Therefore, the consultant will cover by all means (vehicles and/or feet) the whole area of influence of the project previously well defined in agreement with the Promoter.

Tasks of the Consultant include the following:

- Review the existing PAD, ESMF and other relevant documents, instruments and reports relevant to this project including Covid-19 Protocols and guidelines
- Review Environmental and Social Safeguards policies of the World Bank triggered on the Project;
- Describe the proposed sub-project by providing a description of the Project relevant component and presenting schematic diagrams, maps, figures and tables.
- Review the engineering designs, geotechnical designs etc prepared for this sub project
- Identify the policy, legal and administrative framework relevant to the sub-project activities.
- Define and justify the sub-project study area for the assessment of environmental and social impacts.
- Assess the potential environmental and social impacts including occupational health and Safety as well as community health and safety issues relating to the sub-project activities.
- Assess the occupational health and Safety issues and community health and safety issues related to the renovation/construction activities and recommend mitigation measures.
- Define appropriate mitigation/enhancement measures to prevent, minimise, mitigate, or compensate for adverse impacts or to enhance the sub-project environmental and social benefits, including responsibilities and associated costs.
- Review institutional assessment and framework for environmental and social management.
- Identify actors, roles and their responsibilities for implementing the proposed ESMP.
- Assess the capacity available to implement the proposed mitigation measures and suggest recommendation in terms of training and capacity building with corresponding estimated costs.
- The Consultant is expected to liaise with the PIU in order to understand the project coverage.
- Develop an Environmental and Social Management Plan (ESMP) for ACEPHAP. The ESMP should underline:
  (i) the potential environmental and social impacts resulting from proposed renovation and construction works
  (ii) the proposed mitigation measures;
  (iii) the institutional responsibilities for implementation;
  (iv) the monitoring indicators;
  (v) the institutional responsibilities for monitoring and implementation of mitigation measures;
  (vi) the estimated costs of activities; and
  (vii) calendar for implementation.

- Consultations: The Consultant should carry out consultations with identified primary and secondary stakeholders in order to obtain their views about the sub-project/project. These consultations shall occur during the preparation of the ESMP to identify key environmental and social issues and impacts, and after completion of the draft ESMP to obtain comments from stakeholders on the proposed mitigation/enhancement measures.

***Ethical requirements**

- Before undertaking any activity, the Consultant will ensure that S/He understands all ethical considerations related to gender-based violence (GBV) (in particular Sexual Exploitation and Abuse [SEA]). The consultant should not collect any primary data and should NOT conduct interviews or research using the SEA survivors and will only make use of secondary sources and data. The objective of this is to minimize harm to women and children.

G. ESMP Structure

The ESMP Report shall be presented in a concise format and should contain all studies, processes, analyses, tests and recommendations for the proposed intervention. The report shall focus on the findings, conclusions and any recommended actions, supported by summaries of the data collected and citations for any references used.

The ESMP report will include the following Chapters and Sections:

Preliminary pages

- Cover page
- Table of contents
- List of acronyms and their definitions
- Executive Summary

Chapter 1: Introduction

- Background
- Rationale for ESMP
- Scope of the ESMP
- Discussion of the World Bank safeguard policies triggered by the Project and the proposed sub-project activity
- Applicable Environmental and Social Laws and Regulations

Chapter 2: Project Description

- Description of the proposed construction and equipping the ACE International Students Hostel Laboratories activities
- Project Activities and Schedules
- Relevant Maps and engineering designs for proposed construction activities.

Chapter 3: Baseline Description of Project Area

- Introduction
- Overview of the Project Area including relevant maps and engineering designs for proposed construction activities.
- Socioeconomic Environment of the Project Area
- Biophysical Environment of the Project Area
- Environmental and Social Sensitivities in the project areas (including map of the hubs showing the locations of all sensitivities)
- Gender and Gender Based Violence Statistic including state information as well as those related to the project
- Implication of baseline on the Proposed project activities
- Description of the area of influence and environmental and social baseline conditions

Chapter 4: Assessment of Potential Adverse Environmental and Social Impacts.

- Methods and techniques used in assessing and analyzing the environmental and social impacts of the proposed construction.
- Discussion of the potentially significant adverse environmental and social impacts of the proposed construction.

Chapter 5: Grievance Redress Mechanism

- Introduction
- Expectation When Grievances Arise
- Structure and Protocols for Reporting and Managing Grievances
- Protocol for reporting and managing grievance for this sub project.

Chapter 6: Consultation with Stakeholders

- This chapter shall summarize the actions undertaken to consult the groups affected by the construction. The detailed record of the consultation meetings shall be presented in annex to the ESM

Chapter 7: Environmental and Social Management Plan (ESMP), including:

- Introduction
- Identification of positive impacts
- Identification of negative impacts
- Environmental and Social Management Table (ESMP table) highlighting Environmental and Social Management Table (ESMP table) highlighting Activities, identified adverse impacts, mitigation Measures and corresponding Indicator(s), Mode of Measurement, corresponding Cost of Mitigation, monitoring indicators, Frequency, Monitoring Cost, as well as responsibilities for implementing these measures
- Roles and Responsibilities
- Capacity Building
- Institutional responsibilities for monitoring and implementation of mitigation;
- Monitoring and Reporting
- Implementation Schedule
- Contractual Measures
- Measures for Non-Compliance with the ESMP
- Cost Estimates for ESMP Implementation
- Monitoring indicators;

Chapter 8: Conclusion and Recommendations

The Annexes below must consider COVID-19 requirement. See Annex K for WHO, World Bank and ILO guidance notes on construction, labour, waste management, etc. provisions.

Annex 1: Terms of Reference

Annex 2: Sample of Questionnaire for socioeconomics

Annex 3: List of participants in consultations and summaries of meetings

Annex 4: General Environmental and Social Management Conditions for Construction Contracts

Annex 5: Project Occupational Health and Safety (OHS) Plan

Annex 6: Company Code of Conduct on Preventing Gender Based Violence and Violence Against Children

Annex 7: Manager's Code of Conduct on Preventing Gender Based Violence and Violence against Children

Annex 8: Individual Code of Conduct on Preventing Gender Based Violence and Violence against Children
Annex 9: Waste Management Plan
Annex 10: Traffic Management Plan
Annex 11: Workers Campsite Management Plan
Annex 12: Safeguard guidance on Covid-19 consideration in construction/civil works projects

H. PROCUREMENT METHOD

The request for the engagement of the consultant shall follow due process. Selective tendering method would be used. By this, four re-known environmental consultants would be invited.

The engagement of qualified consultant would be decided by considering their work profile and evidence of proficiency. The most acceptable consultant based on the assessment would be presented to the ministry of environment for approval, this would also be a criterion for award of certificate of compliance in due course.

The consultant would be briefed on the pending assignment and given four weeks to carry out the assignment. After completion of the job, the consultant would be made to host a presentation to a group ACEPHAP team.

I. EXPECTED WORK PRODUCT AND DELIVERABLES

Table 2: The study will be completed within 4 weeks.

Activities	Week 1	Week2	Week3	Week4
Contract Signing and submission of Inception Report	X			
Submission of Draft Reports		X		
Submission of Draft Final Reports			X	
Submission of Final Reports				X

The successful consultant would be paid in accordance with the agreed payment schedule, upon agreed negotiation terms and subject to satisfactory performance, timely receipt as well as approval of deliverables.

J. RENUMERATION AND PAYMENT SCHEDULE

The Consultant will be paid based on negotiations with the ACEPHAP but shall not exceed 1% of the entire project value.

Table 3: Payment Schedule

S/N	Deliverable	Schedule	Payment
1	Inception Report	1 week (after contract signing)	20%
2	Draft Report(s)	2 to 3 weeks (after contract signing)	40%
3	Final Report	4 weeks (after contract signing)	40%

K. REQUIRED QUALIFICATION AND EXPERIENCE

Consultant's Experience

The consultant should have:

- Experience with, and a professional/technical background appropriate for understanding both the environmental and social management implications of chemical/reagent /waste disposals, animal and vectors disposals, and infective/toxic materials, including their design, construction, operation and monitoring.
- At least eight (8) years' experience in practical safeguards, social and environmental management and HSE with demonstrated proficiency in the preparation, review, and approval of EAs/ESIAs/ESMPs to meet World Bank standards
- Excellent analytical, communication and writing skills, with full proficiency of English language.
- It is highly desirable that the consultant have experience with working with international development institutions like the World Bank, and on infrastructure related projects.

L. CLIENT INPUT

The ACE Impact Center (ACEPHAP) shall provide the consultant all relevant/supportive environmental reports/documents previously carried out. Land survey report and the interpretation, soil suitability test and meteorological reports would amongst others be inclusive.

Conclusion

This ToR will guide ACEPHAP in engaging a professional consultant who would conduct an Environmental and Social Management Plan (ESMP) to identify the environmental and social impacts associated with construction of international students hostel, as well as to proffer mitigation measures to address potential negative impacts. It is expected that all the parties involved will strictly adhere to provisions of this ToR to ensure that they follow all the relevant safeguards and environmental policies.

ANNEX 2: Socio-Economic Questionnaire

SOCIO-ECONOMIC QUESTIONNAIRE FOR THE CONSTRUCTION OF INTERNATIONAL STUDENTS HOSTEL FOR THE AFRICA CENTER OF EXCELLENCE FOR POPULATION HEALTH AND POLICY (ACEPHAP), BAYERO UNIVERSITY KANO PROJECT

To be filled in by the interviewer:

1) Name and Signature of Interviewer……...
2) Name and Signature of Supervisor……
3) Date and Time Interview took place…….....

Thank you for taking time to complete this questionnaire, The purpose of this survey is to gain valuable insight on proposed Construction of International Students Hostel for The Africa Centre of Excellence for Population Health and Policy (ACEPHAP), Bayero University Kano Project. The survey provides you the opportunity to contribute to the environmental and social components of the project implementation.

NOTE:

Please read each question carefully. Your answers are completely confidential and will be included only in summaries where individual answers cannot be identified. Unless otherwise instructed, please tick appropriate answer category that best describes your opinion. It will take approximately 20 minutes to complete this questionnaire.

NO	QUESTION AND FILTERS	CODING CATEGORIES	CODES	SKIP
SECTION A. IDENTIFICATION AND BACKGROUND CHARACTERISTICS				
A1	Name of Respondent			
A2	Email (Optional)			
A3	Phone number (Optional)			
A4	State			
A5	LGA			
A6	Name of Town/City/Community			
A7	Stratum	Urban	1	
		Rural	2	
A8	Are you a native of this Town/Village?	Yes	1	
		No	2	
A9	If no, where are you from?			
A10	How old are you now?	10 years	1	
		11-20 years	2	
		21-30 years	3	
		31-40 years	4	
		41-50 years	5	
		Above 50	6	
A11	Do you live in this area?	Yes	1	
		No	2	
A12	How long have you lived here?	0-5 years	1	
		6-10 years	2	
		11-15 years	3	
		16-20 years	4	

		Over 21 years	5	
A12	Do you rent or own your home?	Rent	1	
		Own	2	
A13	Gender of Respondent	Male	1	
		Female	2	
A14	Highest Educational Attainment	No Formal	1	
		Primary School Not Completed	2	
		Primary School Completed	3	
		Secondary School Not Completed	4	
		Secondary School Completed	5	
		Post-Secondary Education	6	
		University Education Completed	7	
		University Education not Completed	8	
		Post Graduated Education	9	
		Post Graduated Education Not Completed	10	
		Koranic Education	11	
		Others (Specify)	12	
A15	What is your household size?	1	1	
		2	2	
		3+	3	
A16	What is your major occupation?	Craft making/artisan	1	
		Trading	2	
		Civil servant	3	
		Company worker	4	
		Farming	5	
		Fishing	6	
		Self-employed	7	
		Housewife	8	
		Student	9	
		Others (specify)	10	
CONSTRUCTION OF INTERNATIONAL STUDENTS HOSTEL FOR THE AFRICA CENTRE OF EXCELLENCE FOR POPULATION HEALTH AND POLICY (ACEPHAP), BAYERO UNIVERSITY KANO.				
B1	Are you aware of the proposed Construction of International Students Hostel for The Africa Centre of Excellence for Population Health and Policy (ACEPHAP), Bayero University Kano Project?	Yes	1	
		No	2	
B2	If yes, what is the source of awareness?	Television	1	
		Radio	2	
		Newspaper	3	
		Friend/Relative	4	
		Government	5	

		Others Specify-------	6	
B3	Describe the level of awareness about the project within your community.	Very aware	1	
		Moderately aware	2	
		Not aware	3	
		Don't know	4	
		Others specify-------	5	
B4	What is your opinion on the project?	Very Good	1	
		Good	2	
		Bad	3	
		Very Bad	4	
		Others specify-----	5	
B5	In your Opinion, do you think the project can Increase Employment Opportunity?	Yes	1	
		No	2	
		Don't know	3	
		Maybe	4	
B6	Do you think the Project has any negative Impact?	Yes	1	
		No	2	
		Maybe	3	
		Don't Know	4	
B7	If yes, what could be the Negative Impact?			
B8	Do you think the project can have any negative impact effect on the health of people within the community	Yes	1	
		No	2	
		Maybe	3	
		Don't know	4	
		Others	5	
B10	If yes in B8, what could be the negative impact on health of people within the community	Skin Disease	1	
		Cough	2	
		Catarrh	3	
		Malaria	4	
		Water Bourne Disease	5	
B11	How do you think this impact can be mitigated?			
B12	How will the proposed Infrastructure intervention project impact on your livelihood and environment?			
B13	Can you name some of the animals and other habitat that may be affected by the proposed Infrastructure intervention project?			
	WASTE DISPOSAL			
C1	**Are there rules and regulations guiding waste dumping in your community?**	Yes	1	
		No	2	
		Maybe	3	
		Don't know	4	
C2	If yes, have you ever reported any illegal dumping?	Yes	1	
		No	2	
C3	If yes, to whom?	Community Head	1	
		Local Government Authorities	2	

		Ministry of Environment	3	
		State Government	4	
		NGOs	5	
		Others	6	
C4	What are the common method of waste disposal in this community?	Cart pusher	1	
		Disposal site	2	
		Backyard burning	3	
		Open dump	4	
		Into river/lagoon/stream	5	
		Organised collection	6	
		Others (Specify)	7	
C5	What constitute most of the waste in this community?	Wet waste (vegetable and fruit peels, eggshells, fish scales, cooked food, coffee ground)	1	
		Dry waste (paper, plastic, metal, rubber, leather, wood. Etc.)	2	
		Hazardous waste (paint cleaning agent, insecticides & their containers, solvents, other chemicals)	3	
		E-waste (computer parts, batteries, bulbs etc.)	4	
		Biomedical waste (sanitary napkins, disposable diapers, bandages and any material that is contaminated with blood or other body fluids)	5	
C6	Is there any dumpsite(s) in this community?	Yes	1	
		No	2	
		don't know	3	
C7	What sort of materials or products are reused for the same or different purposes in your community?	Plastic bottles	1	
		Glass containers	2	
		Tins	3	
		Don't know	4	
		Others (Specify)	5	
C8	Are you aware that dumping of refuse in the river can cause flooding to your community?	Yes	1	
		No	2	
		Don't know	3	
		Maybe	4	

ANNEX 3: Participants in the Consultation

S/N	Name	Position
1.	Dr. Faisal S. Dankishiya	Environmental and Social Safeguards ACEPHAP
2.	Mr Kayode Oluwagbuyi	Team Leader
3.	Mal. Usman Shehu Kabir	Admin Officer Sustainabiliti Limited
4.	Mr. Fabian Ogulaba	Env. Field Officer
5.	Mr. Segun Akaaba	Asst. Field Officer
6.	Mr. Sunday Ademola	Asst. Field Officer
7.	Monica Ameh	Staff
8.	Mal Tijjani	
9.	Sakina Adamu	
10.	Khadija S. Abubakar	
11.	Mal. Ibrahim Lawal	

Minutes of Consultation

Date of the Consultation	**22nd September, 2022**
Venue for the Consultation	**Africa Center of Excellence for Population Health and Policy, AKTH Meeting Hall**
Stakeholder	**Project Team**
Language of Communication Used	**English And Hausa**
Main Issues Discussed	**Stakeholder Responses/Views about the Project.**
N.B; Stakeholder consultations were carried out with key stakeholders to obtain their comments and concerns on the proposed project with respect to the potential environmental and socio-economic issues and impacts. Below is the detailed discussion on the Consultation.	
Briefing of project questionnaire Awareness of the proposed Africa Center of Excellence for Population Health and Policy (ACEPHAP) project;	The ESMP Consultant hinted the Faisal S. Dankishiya, MBBS Research Fellow, and Environmental and Social Safeguards Officer, Africa Center of Excellence for Population Health and Policy, Bayero University Kano. the ACEPHAP questionnaire is a series of questions asked to individuals to obtain statically and useful information on the project, the consultant further explain How and Why the ACEPHAP ESMP questionnaire should be answered by the stakeholder and other individuals within the project area. Faisal S. Dankishiya on behalf of the ACEPHAP Project team showed satisfaction and backing for the project. He further expressed that there is an earnest requirement for ESMP in order to find out the reasonable environmental and social issues on the undertakings combined with its related alleviation measures. He showed that the university local area knows about the project while the project team are very much informed about the project.
View about the proposed project;	He acknowledged that the project is a welcome improvement especially for postgraduate students to acquire knowledge, skills and competences.

	▯ He also added, ACEPHAP, awarded a contract to conduct an Environmental and Social Management Plan (ESMP) to identify the environmental and social management and mitigation measures required to implement the project.
▯ Importance of the Proposed Project	▯ He stated that persons responsible for undertaking work during the life of the project must be trained on the contents of the ESMP as it is important that all site personnel have a basic level of environmental awareness.
▯ Choice of the project location;	▯ The ACEPHAP project location was carefully chosen based on the requirement for the site. Part of the requirements includes: it must not be a disputed land; it must be free of human activities that could warrant relocation and compensation. These requirements were met to arrive at the project location site.
▯ Concerns	▯ No main pressing issues were communicated. In any case, on the ESMP specialist perception of need to guarantee that rigid moves and measures are made against the aimless unloading of refuse (waste) in and around the site as well as the close by stream channel so as not to heighten the event sedimentation that might prompt flooding in the projection area. ▯ The project team indicated that understand their responsibilities with regard to the immediate environment
Concerns raised	**How it was addressed by the Consultant**
A concern was raised about the negative effect the ACEPHAP project will cause.	The ESMP Consultant shaded light and explain the basic positive and negative effects of the various phases of the project and further stated that the project is construction of international hostel for student set out with developing the University.
▯ Remarks	▯ It was further stated that every necessary cooperation that would be require from the university and the project team would be promptly provided at every stage of the project processes ▯ Faisal S. Dankishiya lead, inspected and explained the goal of the project and he also assisted in administering and explained how the questionnaire should be answered. ▯ Faisal S. Dankishiya and the ESMP Consultant facilitated the management of the project and its stakeholders, including their environmental and social effects and risks. After initial introductions, proposed project activities were also presented and discussed.

ANNEX 4: Recommended Training Courses

Table Annex 4: RECOMMENDED TRAINING COURSES

S/N	Proposed Training Topics	Course Content	Proposed Schedule	Target audience	Duration	Estimated Cost/ Budget (US$)
1	Understanding Safeguard Policies of the World Bank and its linkages to projects and sub- projects	● What Is Meant by World Bank Safeguards Policies? ● How Projects / sub project execution Activities Can Impact on the Environment. ● Screening of projects to categories ● Understanding of tools for implementing Safeguard Policies	Within the first Six months of Project commencement	Officers of PIU Relevant staff of Kano State Ministry of Environment & FMEnv (EA) Safeguard Specialist other relevant MDAs, LGA departments, NGOs, CBOs., Contractor	3 days	8,500
	Environmental & Social Safeguard Monitoring, Reporting and due diligence on projects	Awareness of Emergency and Spills Response Provisions. ● Social Responsibility during Construction E.g., Being Considerate to Local Residents. ● Rain harvesting to manage storm run-off in project area. ● The Environmental and Social Management Plan (ESMP); ● Environmental and Social Monitoring and Audit; ● Solid Waste Management; Proper selection, handling, storage, application, use, and disposal of all hazardous materials and chemicals used in the Project activities in accordance with the Chemical Management Plan; ● GBV / SEA				
2	Introduction to Construction HSE	● Overview of Health and Safety Hazards in ● Construction ● Incidents: Causation, Investigation & ● Reporting ● Excavation Safety ● Construction Site Inspection ● Personal Protective Equipment ● GBV / SEA		Contractor 's Personnel, Local community	2 days	6,000
3	**Estimated Total Cost**					**14,500**

Capacity Building Requirements

Based on the assessment of the institutional capacities of the different agencies that will be involved in the implementation of the ESMP, the following broad areas of capacity building have been identified and recommended for the PIU and other relevant agencies for effective implementation of the ESMP.

It is important to ensure that all site personnel have a basic level of environmental awareness training. Topics covered should include among others:

- What Is Meant By "Environment"?

- World Bank Safeguards Policies
- Why the Environment Needs to Be Protected and Conserved.
- How Construction Activities Can Impact on The Environment.
- Construction Health Safety and Environment
- What Can Be Done to Mitigate Against Such Impacts?
- Awareness of Emergency and Spills Response Provisions.
- Social Responsibility during Construction e.g. Being Considerate to Local Residents.
- The Environmental and Social Management Plan (ESMP);
- Environmental and Social Monitoring and Audit;
- Solid Waste and Waste Water Management;
- Environmental Reporting.

ANNEX 5: General Environmental Management Conditions for Construction Contracts

1. In addition to these general conditions, the Contractor shall comply with any specific Environmental Management Plan (EMP) or Environmental and Social Management Plan (ESMP) for the works he is responsible for. The Contractor shall inform himself about such an ESMP, and prepare his work strategy and plan to fully take into account relevant provisions of that EMP. If the Contractor fails to implement the approved ESMP after written instruction by the Project Implementation Unit (PIU) to fulfill his obligation within the requested time, the ACE reserves the right to arrange through the PIU for execution of the missing action by a third party on account of the Contractor.

2. Notwithstanding the Contractor's obligation under the above clause, the Contractor shall implement all measures necessary to avoid undesirable adverse environmental and social impacts wherever possible, restore work sites to acceptable standards, and abide by any environmental performance requirements specified in an ESMP. In general, these measures shall include but not be limited to:

(a) Minimize the effect of dust on the surrounding environment resulting from earth mixing sites, asphalt mixing sites, dispersing coal ashes, vibrating equipment, temporary access roads, etc. to ensure safety, health and the protection of workers and communities living in the vicinity of dust producing activities.

(b) Ensure that noise levels emanating from machinery, vehicles and noisy construction activities (e.g. excavation, blasting) are kept at a minimum for the safety, health and protection of workers within the vicinity of high noise levels and nearby communities.

(c) Ensure that existing water flow regimes in rivers, streams and other natural or irrigation channels is maintained and/or re-established where they are disrupted due to works being carried out.

(d) Prevent bitumen, oils, lubricants and waste water used or produced during the execution of works from entering into rivers, streams, irrigation channels and other natural water bodies/reservoirs, and also ensure that stagnant water in uncovered borrow pits is treated in the best way to avoid creating possible breeding grounds for mosquitoes.

(e) Prevent and minimize the impacts of quarrying, earth borrowing, piling and building of temporary construction camps and access roads on the biophysical environment including protected areas and arable lands; local communities and their settlements. In as much as possible restore/rehabilitate all sites to acceptable standards.

(f) Upon discovery of ancient heritage, relics or anything that might or believed to be of archaeological or historical importance during the execution of works, immediately report such findings to the SE so that the appropriate authorities may be expeditiously contacted for fulfillment of the measures aimed at protecting such historical or archaeological resources.

(g) Discourage construction workers from engaging in the exploitation of natural resources such as hunting, fishing, and collection of forest products or any other activity that might have a negative impact on the social and economic welfare of the local communities.

(h) Implement soil erosion control measures in order to avoid surface run off and prevents siltation, etc.

(i) Ensure that garbage, sanitation and drinking water facilities are managed properly in construction areas.

(j) Ensure that, in as much as possible, local materials are used to avoid importation of foreign material and long distance transportation.

(k) Ensure public safety, and meet traffic safety requirements for the operation of work to avoid accidents.

3. The Contractor shall indicate the period within which he/she shall maintain status on site after completion of civil works to ensure that significant adverse impacts arising from such works have been appropriately addressed.
4. The Contractor shall adhere to the proposed activity implementation schedule and the monitoring plan / strategy to ensure effective feedback of monitoring information to project management so that impact management can be implemented properly, and if necessary, adapt to changing and unforeseen conditions.
5. Besides the regular inspection of the sites by the PIU for adherence to the contract conditions and specifications, the on a need basis the PIU shall appoint an Inspector to oversee the compliance with these environmental conditions and any proposed mitigation measures. State environmental authorities may carry out similar inspection duties. In all cases, as directed by the PIU, the Contractor shall comply with directives from such inspectors to implement measures required to ensure the adequacy of rehabilitation measures carried out on the bio-physical environment and compensation for socio-economic disruption resulting from implementation of any works.

Material Excavation and Deposit
6. The Contractor shall obtain appropriate licenses/permits from relevant authorities to operate quarries or borrow areas.
7. The location of quarries and borrow areas shall be subject to approval by relevant local and national authorities, including traditional authorities if the land on which the quarry or borrow areas fall in traditional land.
8. New extraction sites:
a) Shall not be located in the vicinity of settlement areas, cultural sites, wetlands or any other valued ecosystem component, or on high or steep ground or in areas of high scenic value, and shall not be located less than 1km from such areas.
b) Shall not be located adjacent to stream channels wherever possible to avoid siltation of river channels. Where they are located near water sources, borrow pits and perimeter drains shall surround quarry sites.
c) Shall not be located in archaeological areas. Excavations in the vicinity of such areas shall proceed with great care and shall be done in the presence of government authorities having a mandate for their protection.
d) Shall not be located in forest reserves. However, where there are no other alternatives, permission shall be obtained from the appropriate authorities and an environmental impact study shall be conducted.
e) Shall be easily rehabilitated. Areas with minimal vegetation cover such as flat and bare ground, or areas covered with grass only or covered with shrubs less than 1.5m in height, are preferred.
f) Shall have clearly demarcated and marked boundaries to minimize vegetation clearing.
9. Vegetation clearing shall be restricted to the area required for safe operation of construction work. Vegetation clearing shall not be done more than two months in advance of operations.
10. Stockpile areas shall be located in areas where trees can act as buffers to prevent dust pollution. Perimeter drains shall be built around stockpile areas. Sediment and other pollutant traps shall be located at drainage exits from workings.
11. The Contractor shall deposit any excess material in accordance with the principles of these general conditions, and any applicable EMP, in areas approved by local authorities and/or the PIU.
12. Areas for depositing hazardous materials such as contaminated liquid and solid materials shall be approved by the PIU and appropriate local and/or national authorities

before the commencement of work. Use of existing, approved sites shall be preferred over the establishment of new sites.

Rehabilitation and Soil Erosion Prevention

13. To the extent practicable, the Contractor shall rehabilitate the site progressively so that the rate of rehabilitation is similar to the rate of construction.
14. Always remove and retain topsoil for subsequent rehabilitation. Soils shall not be stripped when they are wet as this can lead to soil compaction and loss of structure.
15. Topsoil shall not be stored in large heaps. Low mounds of no more than 1 to 2m high are recommended.
16. Re-vegetate stockpiles to protect the soil from erosion, discourage weeds and maintain an active population of beneficial soil micro-organisms.
17. Locate stockpiles where they will not be disturbed by future construction activities.
18. To the extent practicable, reinstate natural drainage patterns where they have been altered or impaired.
19. Remove toxic materials and dispose of them in designated sites. Backfill excavated areas with soils or overburden that is free of foreign material that could pollute groundwater and soil.
20. Identify potentially toxic overburden and screen with suitable material to prevent mobilization of toxins.
21. Ensure reshaped land is formed so as to be inherently stable, adequately drained and suitable for the desired long-term land use, and allow natural regeneration of vegetation.
22. Minimize the long-term visual impact by creating landforms that are compatible with the adjacent landscape.
23. Minimize erosion by wind and water both during and after the process of reinstatement.
24. Compacted surfaces shall be deep ripped to relieve compaction unless subsurface conditions dictate otherwise.
25. Revegetate with plant species that will control erosion, provide vegetative diversity and, through succession, contribute to a resilient ecosystem. The choice of plant species for rehabilitation shall be done in consultation with local research institutions, forest department and the local people.

Water Resources Management

26. The Contractor shall at all costs avoid conflicting with water demands of local communities.
27. Abstraction of both surface and underground water shall only be done with the consultation of the local community and after obtaining a permit from the relevant Water Authority.
28. Abstraction of water from wetlands shall be avoided. Where necessary, authority has to be obtained from relevant authorities.
29. Temporary damming of streams and rivers shall be done in such a way avoids disrupting water supplies to communities downstream, and maintains the ecological balance of the river system.
30. No construction water containing spoils or site effluent, especially cement and oil, shall be allowed to flow into natural water drainage courses.
31. Wash water from washing out of equipment shall not be discharged into water courses or road drains.
32. Site spoils and temporary stockpiles shall be located away from the drainage system, and surface run off shall be directed away from stockpiles to prevent erosion.

Traffic Management

33. Location of access roads/detours shall be done in consultation with the local community especially in important or sensitive environments. Access roads shall not traverse wetland areas.
34. Upon the completion of civil works, all access roads shall be ripped and rehabilitated.
35. Access roads shall be sprinkled with sufficient water at least five times a day in settled areas, and three times in unsettled areas, to suppress dust emissions.

Blasting

36. Blasting activities shall not take place less than 2km from settlement areas, cultural sites, or wetlands without the permission of the PIU.
37. Blasting activities shall be done during working hours, and local communities shall be consulted on the proposed blasting times.
38. Noise levels reaching the communities from blasting activities shall not exceed 90 decibels.

Health and Safety

39. In advance of the construction work, the Contractor shall embark upon an awareness and hygiene campaign. Workers and local residents shall be sensitized on health risks particularly of AIDS.
40. Adequate road signs to warn pedestrians and motorists of construction activities, diversions, etc. shall be provided at appropriate points.
41. Construction vehicles shall not exceed maximum speed limit of 40km per hour.

Repair of Private Property

42. Should the Contractor, deliberately or accidentally, damage private property, he shall repair the property to the owner's satisfaction and at his own cost. For each repair, the Contractor shall obtain from the PIU, a certificate that the damage has been made good satisfactorily in order to indemnify the Client from subsequent claims.
43. In cases where compensation for inconveniences, damage of crops etc. are claimed by the owner, the ACE has to be informed by the Contractor through the PIU.

ANNEX 6: Waste Management Plan

1. All vessels (drums, containers, bags, etc.) containing oil/fuel/surfacing materials and other hazardous chemicals shall be enclosed in a bund wall in order to contain spillage. All waste containers, litter and any other waste generated during the construction shall be collected and disposed of at designated disposal sites in line with applicable government waste management regulations.

2. All drainage and effluent from storage areas, workshops shall be captured and treated before being discharged into the drainage system in line with applicable government water pollution control regulations.

3. Used oil from maintenance shall be collected and disposed off appropriately at designated sites or be re-used or sold for re-use locally.

4. Entry of runoff to the site shall be restricted by constructing diversion channels or holding structures such as banks, drains, dams, etc. to reduce the potential of soil erosion and water pollution.

5. Construction waste shall not be left in stockpiles along the road, but removed and reused or disposed of on a daily basis.

6. If disposal sites for clean spoil are necessary, they shall be located in areas, approved by the ACEPHAP centre PIU, of low land use value and where they will not result in material being easily washed into drainage channels. Whenever possible, spoil materials shall be placed in low-lying areas and shall be compacted and planted with species indigenous to the locality.

Disposal of Unusable Elements

7. Unusable materials and construction elements such as electro-mechanical equipment, pipes, accessories and demolished structures will be disposed of in a manner approved by the PIU. The Contractor has to agree with the PIU which elements are to be surrendered to the Client's premises, which will be recycled or reused, and which will be disposed of at approved landfill sites.

8. As far as possible, abandoned pipelines shall remain in place. Where for any reason no alternative alignment for the new pipeline is possible, the old pipes shall be safely removed and stored at a safe place to be agreed upon with the PIU and the local authorities concerned.

9. AC-pipes as well as broken parts thereof have to be treated as hazardous material and disposed of as specified above.

10. Unsuitable and demolished elements shall be dismantled to a size fitting on ordinary trucks for transport.

ANNEX 7: Construction Environmental and Social Management Plan

1. Within 6 weeks of signing the Contract, the Contractor shall prepare a construction ESMP to ensure the adequate management of the health, safety, environmental and social aspects of the works, including implementation of the requirements of these general conditions and any specific requirements of an ESMP for the works. The Contractor's ESMP will serve two main purposes:

- For the Contractor, for internal purposes, to ensure that all measures are in place for adequate ESMP management, and as an operational manual for his staff.
- For the Client (PIU) to ensure that the Contractor is fully prepared for the adequate management of the HSE aspects of the project, and as a basis for monitoring of the Contractor's ESMP performance.

2. The Contractor's ESMP shall provide at least:

- a description of procedures and methods for complying with these general environmental management conditions, and any specific conditions specified in an ESMP;
- a description of specific mitigation measures that will be implemented in order to minimize adverse impacts;
- a description of all planned monitoring activities (e.g. sediment discharges from borrow areas) and the reporting thereof; and
- the internal organizational, management and reporting mechanisms put in place for such.

3. The Contractor's ESMP will be reviewed and approved by the Client before start of the works. This review shall demonstrate if the Contractor's ESMP covers all of the identified impacts, and has defined appropriate measures to mitigate any potential impacts.

ESMP Reporting

4. The Contractor shall prepare bi-weekly progress reports on compliance with these general conditions, the project ESMP if any, and his own Construction ESMP. An example format for a Contractor ESMP Report is given below. It is expected that the Contractor's Reports will include information on:

- ESMP management actions/measures taken, including approvals sought from local or national authorities;
- Problems encountered in relation to ESMP aspects (incidents, including delays, cost consequences, etc. as a result thereof);
- Lack of compliance with contract requirements on the part of the Contractor;
- Changes of assumptions, conditions, measures, designs and actual works in relation to ESMP aspects; and
- Observations, concerns raised and/or decisions taken with regard to ESMP management during site meetings.

5. It is advisable that reporting of significant HSE incidents be done "as soon as practicable". Such incident reporting shall therefore be done individually. Also, it is advisable that the Contractor keeps his own records on health, safety and welfare of persons, and damage to property. It is advisable to include such records, as well as copies of incident reports, as appendixes to the bi-weekly reports.

Training of Contractor's Personnel

6. The Contractor shall provide sufficient training to his own personnel to ensure that they are all aware of the relevant aspects of these general conditions, any project ESMP, and his own C-ESMP, and are able to fulfil their expected roles and functions. Specific training

should be provided to those employees that have particular responsibilities associated with the implementation of the C-ESMP. General topics should include:

- ESMP in general (working procedures);
- Emergency procedures; and
- Social and cultural aspects (awareness raising on social issues and GBV potentials).

ANNEX 8: Traffic Management Plan

- The contractor(s) shall install appropriate safety/traffic signages both at the construction corridor and borrow pit.

- Ensure that drivers and equipment operators are adequately satisfied.
- Specify and enforce speed limits (minimum 20km/k and 40km/h) particularly in built up areas and locations around sensitive infrastructures (schools, religious, recreational and health)
- Periodically revise traffic protocols and training staff on safety, speed limits. Also carry out traffic inspection and/or speed signs to encourage safe and responsible driving.
- Investigate and take necessary policy modification and punitive measures in the case of traffic incidents/complaints.
- The contractor(s) shall also notify the public through signages that will be install at different locations while access control must be provided.
- The contractor shall have trained and dedicated traffic officers at designated or at areas of important landmarks such as schools, religious and health centre.
- The contractor(s) shall develop and implement dust suppression or watering mechanism (particularly during the dry season)

ANNEX 9: Cultural and Physical Resources Management Plan

The contractor(s) shall implement the following cultural resources plan.

- Carry out sensitization and capacity building on identification, management and reporting of cultural and physical resources including chance find.
- Integrate the process of cultural and physical resources management plan with the HSE mechanism
- Build the capacity of both Field/HSE personnel for cultural and physical resource management, chance find and reporting protocols.
- Avoid activities around known cultural and physical resources such as shrines, grooves, burial sites/cemetery etc.
- Clearly mark the boundaries of identified site from project and create appropriate buffer for the protection and possibly design and erect signages for awareness.
- Keep record of such cultural and physical resources (including names, address, geographic location, maps)
- Keep equipment away from such resources
- Site office and general operational areas should not be located close to such resources.
- Ensure appropriate measures are taking to prevent or reduce soil disturbance around such cultural and physical resources area.

Chance Find Plan (for Cultural and Physical Resources)

- Avoid further work in such area
- Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be present until the responsible local authorities and Bureau of Art and Culture take over;
- Report chance find to the local community, PIU and authorities (LGA and Osun State Ministry of Culture and Tourism)
- Mark and protect such areas for restrictions
- Implementation for the authority decision concerning the management of the finding shall be communicated in writing by Osun State Ministry of Culture and Tourism
- These procedures must be referred to as standard provisions in construction contracts, when applicable, during project supervision, the Site Engineer shall monitor the above regulations relating to the treatment of any chance find encountered are observed.
- Relevant findings will be recorded in World Bank Project Supervision Reports (PSRs), and Implementation Completion Reports (ICRs) will assess the overall effectiveness of the project's cultural property mitigation, management, and activities, as appropriate.
- Construction work could resume only after permission is given from the responsible Local Government Osun State Ministry of Culture and Tourism concerning safeguard of the heritage

ANNEX 10: Indicative Environmental and Social Code of Conduct and Clauses for Contractors

1. Environmental and Social Code of Conduct for Infrastructure Development

S/No.	Environmental and Social Issues	Potential Impact	Codes of Conduct
Pre-construction/Construction Phase			
1.	Land Use	● Construction works may affect cultivated and forested land resulting in a permanent loss of the resources. ● While the landowner has to part away with his land ownership, the environmental effects can amplify if proper operation and maintenance schedules are overruled. There is however no land acquisition issue on this project.	minimize loss of resources. Demarcate RoW to avoid unnecessary encroachment.
2.	Material Use	Excess extraction of local resources, such as wood, sand, soil, boulders, etc. Degradation of forests, erosion and landslide at steep locales due to boulder, stone extraction. Change in river/stream ecosystem due to unchecked sand extraction.	Extract materials only on need basis. Avoid sensitive areas, such as steep slopes and water-ways.
3.	Slope Stability	Extraction of forest products and cutting of trees in the steep slopes increases soil erosion/landslide due to loss of soil binding materials. Wrong alignment can trigger slope failure Haphazard disposal of construction waste can disturb slopes Improper drainage facilities can result in erosion and landslides	Extract carefully and secure the top soil within 25 cm from the surface. If down grading exceeds 70, construction of side drainage is necessary. Keep optimum balance in extraction and filling of soil works. geo-hazardous assessment and mapping Use designated disposal site and avoid side casting of spoil Provide proper drainage Use bio-engineering on exposed slopes
4.	Wildlife	Wildlife and human conflicts increase as wildlife might destroy the crops or attack the construction worker.	Avoid as much as possible areas with high biodiversity. Efficient movement of machinery and other traffic. Control poaching activities and regulate movement of labor force and their dependents into the forest area to minimize wildlife harassing, trapping and poaching.

S/No.	Environmental and Social Issues	Potential Impact	Codes of Conduct
5.	Drainage	Higher flow rate of surface water and water logging induce landslides and erosion. Quality of infrastructural works diminishes due to poor drainage such as water logging, immense flow rate of surface water.	It is strongly recommended that the cross drainage outlets must be channeled to the confirmed natural drains. If horizontal slope exceeds 5%, construction of flow control device necessary every 20m.
6.	Protection of Vegetation	Protected areas and highly forested areas. Degradation of forest areas. ▪ Degradation of agricultural land.	Use minimum and efficient use of wood products for construction. Initiate plantation at damaged and damage prone areas. Increase liability of local forest user groups. Avoid protected areas or densely forested areas
7.	Disposal of Construction Wastes	Dumping of wastes along the road or elsewhere.	Selected spoil dumping sites should be used. After disposal, the area should be leveled and compacted. It is recommended to conserve the soil by planting indigenous plants including grasses.
8.	Disposal of Sanitary Wastes	Unmanaged sanitary waste disposal creating health problems and public nuisance.	Proper sanitation area needs to be demarked. Check for hygiene of work force.
9.	Impacts on amenities along RoW	Road crossings at water supply, irrigation lines may be disturbed/damaged.	Avoid as much as possible the crossing over such amenities.
10.	Pollution	Dust generation from construction activities, construction vehicular movement increases air pollution. Noise pollution likely from construction machinery operation and vehicular movement. Sanitary problems likely at the construction and workforce quarters.	minimize pollution during construction. Consider enclosure of construction areas from settlement. Enforce speed limit of vehicles
11.	Child abuse including sex and violence	Engaging in child exploitation Workforce engaging in sexual and physical abuse of minors Violence against minors	Ensure that contractors sign the code of conduct. Ensure zero tolerance to any form of child abuse. Monitor the adherence to the code of conduct. Issue stiff penalties to non-adherence.
12.	Violence against vulnerable groups	Sexual and/or physical violence against minors, women and other vulnerable groups	Ensure that contractors sign the code of conduct. Monitor the adherence to the code of conduct. Issue stiff penalties to non-adherence.

S/No.	Environmental and Social Issues	Potential Impact	Codes of Conduct
13.	Grievance Mechanism	Sub-project activities likely to result in grievances.	Use existing traditional methods to address grievances. Set time-frame for grievance redress and response.
14.	Communication	Information not properly disseminated. Likelihood of not using appropriate communication channel	● Ensure continuous information dissemination on environmental and social risks using appropriate local media (print and electronic). Disseminate information in local languages for wider coverage.
15.	Protection of vulnerable population	Exposure of vulnerable population including women and minors to forms of abuse including exploitation, sex and violence.	Adherence to code of conduct. Integrate CBOs/NGOs in monitoring activities.
17.	Exclusion of local people	Influx of diverse workforce may likely infringe on cultural values and resources. Sub-project activities may affect cultural resources such as trees, shrines, graves etc.	● Ensure compliance to native customs. ● Ensure workers and contractors obey native customs. ● Avoid impacts due to project. ● Protection of boundaries from impacts due to construction. Relocation in case impacts are unavoidable.
		Non-consideration of local skills.	Considerations should be given (where possible) to local labour. Certain contracts viz; supply of construction materials e.g. granites, sand, planks etc should be considered for the local people.
18.	Road safety and traffic management	Likely closure and detour. Increase in road accident due to construction activities.	Develop and implement a sound traffic management plan. Liaise with project communities on alternative roads and timing of possible closures and detours. Install safety signage's in appropriate places including the interpretation in local languages. Deploy dedicated staff for road/traffic monitoring. Install ramp where necessary.
19.	Campaign on STIs including HIV/AIDS	Sexual interactions during project may lead to the transmission of STIs including HIV/AIDS in project communities.	Develop and implement a roboust STIs campaign. Embark on sensitization programme targeting youths and other vulnerable groups such as girls and sexually active women, the commercial sex workers– in collaboration with the National HIV/AIDS Coordination

S/No.	Environmental and Social Issues	Potential Impact	Codes of Conduct
			Agency (NACA) on protection and treatment.
20.	Overstretching of infrastructure	Workforce migration may exacerbate pressure on available social infrastructure (accommodation, transport etc). Likely upsurge in the prices of goods and services due to population avalanche.	Give adequate employment consideration to local population. Where possible contractors to provide means of transportation to workforce.
Operation Phase			
1.	Encroachment	Unmanaged settlement, construction along the RoW.	Establish RoW properly and enforce its limits.
2.	Interruption of Water Flow along RoW	Concentrated flow left unattended might have severe impact at the downhill alignment of the road.	Cross drain structures, namely pipe culverts, slab culverts, box culverts, need to be maintained. Outlet of these structures would be carrying the concentrated run off flow of the respective catchment, which will be quite high during rainy season, which in turn would require proper planning of drainage systems.
3.	Pollution/Vehicular emission	Dust generation from vehicular movement increases air pollution. Noise pollution likely from vehicular movement.	Enforce speed limit of vehicles. Maintain traffic size movement. Discourage use of horns.
4.	Aesthetics	Road construction is likely to increase landscape scars along the road alignment. In addition if the construction spoils are disposed off improperly, the ground vegetation would be destroyed which will be visible from a distance.	Such damage cannot be avoided but can be minimized through re-plantation of indigenous species and greenery development.
5.	Increased traffic and vehicular accident	Better road condition would increase vehicular traffic and the rate of accident due to over-speeding.	Install traffic signs and specify speed limits for appropriate places. Construct speed breakers. Where possible, traffic signs would be interpreted in local languages.

ANNEX 11: Company Code of Conduct for Implementing ESHS and OHS Standards, Preventing Gender Based Violence and Violence against Children

Our company ---------- acknowledge that adhering to environmental, social health and safety (ESHS) standards, following the project's occupational health and safety (OHS) requirements, and preventing gender based violence (GBV) and violence against children (VAC) is important.

The company considers that failure to follow ESHS and OHS standards, or to engage workers to partake in GBV or VAC activities- be it on the work site, the work site surroundings, at workers' camps, or the surrounding communities-constitute acts of gross misconduct and are therefore grounds for sanctions, penalties or potential termination of workers' employment. Prosecution by the Police of those who commit GBV or VAC may be pursued if appropriate.

We agree that while working on the project we will:

1. Attend and actively partake in training courses related to ESHS, OHS, HIV/AIDS, GBV and VAC as requested by our client and provide same to our workers.
2. Provide and ensure our workers wear their personal protective equipment (PPE) at all times when at the work site or engaged in project related activities.
3. Develop and kake all practical steps to implement the contractor's environmental and social management plan (CESMP).
4. Implement the OHS Management Plan.
5. Ensure workers adhere to a zero-alcohol policy during work activities, and refrain from the use of narcotics or other substances which can impair faculties at all times.
6. Consent to Police background check.
7. Treat women, children (persons under the age of 18), and men with respect regardless of race, color, language, religion, political or other opinion, national, ethnic or social origin, property, disability, birth or other status.
8. Not use language or behavior towards women, children or men that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate.
9. Not engage in sexual harassment-for instance, making unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct, of a sexual nature, including subtle acts of such behavior (e.g. looking somebody up and down; kissing, howling or smacking sounds; hanging around somebody; whistling and catcalls; giving personal gifts; making comments about somebody's sex life; etc.).
10. Not engage in sexual favors-for instance, making promises or favorable treatment dependent on sexual acts-or other forms of humiliating, degrading or exploitative behavior.
11. Not participate in sexual contact or activity with children-including grooming, or contact through digital media. Mistaken belief regarding the age of a child is not a defense. Consent from the child is also not a defense or excuse.
12. Unless there is the full consent' by all parties involved, I will not have sexual interactions with members of the surrounding communities. This includes relationships involving the withholding or promise of actual provision of benefit (monetary or non-monetary) to community members in exchange for sex-such sexual activity is considered "non-consensual" within the scope of this Code.

13. Mandate our workers to consider reporting through the GRM or to their managers any suspected or actual GBV or VAC by a fellow worker, whether employed by our company or not, or any breaches of this Code of Conduct.

With regard to children under the age of 18:

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

Use of children’s images for work related purposes

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

21. Before photographing or filming a child, assess and endeavor to comply with local traditions or restrictions for reproducing personal images.
22. Before photographing or filming a child, obtain informed consent from the child and a parent or guardian of the child. As part of this we must explain how the photograph or film will be used.
23. Ensure photographs, films, videos and DVDs present children in a dignified and respectful manner and not in a vulnerable or submissive manner. Children should be adequately clothed and not in poses that could be seen as sexually suggestive.
24. Ensure images are honest representations of the context and the facts.
25. Ensure file labels do not reveal identifying information about a child when sending images electronically.

Sanctions

We understand that if we breach this Company Code of Conduct, our client can authorize disciplinary action and sanctions as appropriate and Report to the Police if warranted.

We therefore understand that it is our responsibility to ensure that the environmental, social, health and safety standards are met. That we will adhere to the occupational health and safety management plan. That we will avoid actions or behaviors that could be construed as GBV or VAC. Any such actions will be a breach of this company Code of Conduct. we do hereby acknowledge that we have read the foregoing company Code of Conduct, do agree to comply with the standards contained therein and understand our company’s roles and responsibilities to prevent and respond to ESHS, OHS, GBV and VAC issues. we understand that any action inconsistent with this company’s Code of Conduct or failure to act as mandated by this company’s Code of Conduct may result in disciplinary action and may affect our ongoing tasks.

Company representative

Signature: _____
Printed Name: _____
Title: _____
Date: _____

ANNEX12: Occupational Health and Safety Management (OHS) Plan

The management of OHS must be in accordance with the general principles, which should be applied to control workplace hazards in order to:

- eliminate the risks;
- assess the risks, which cannot be avoided;
- reduce the risk at source;
- give priority to collective protective measures over individual protective measures;
- adapt the work to the individual, especially with regard to the design of workplaces and the choice of work equipment and production methods;
- adapt working methods to technical progress;
- develop a coherent overall prevention policy, which covers technology and work organization and
- give appropriate instructions to employees.

The application of prevention and control measures to be taken against occupational hazards should be based on job safety and its hazard analyses. The risk assessment of jobs should be evaluated, and related protection/prevention actions should be designed. In order to identify priorities, risk ranking table should be used as given in Table 1.

Table 1. Risk Ranking to Classify Worker Scenarios

Likelihood	Consequences				
	Insignificant	Minor	Moderate	Major	Catastrophic
Almost certain	Low risk	Moderate risk	Extreme risk	Extreme risk	Extreme risk
Likely	Low risk	Moderate risk	High risk	Extreme risk	Extreme risk
Moderate	Low risk	Moderate risk	High risk	Extreme risk	Extreme risk
Unlikely	Low risk	Low risk	Moderate risk	High risk	Extreme risk
Rare	Low risk	Low risk	Moderate risk	High risk	High risk

Above-mentioned rankings in Table 1 help to define potential consequences of exposure to a hazard. Low risk can be managed by routine procedures. In order to manage moderate risk class, management responsibilities should be specified. The jobs with high risk classification require senior management attention. Extreme risks require immediate actions and it should be avoided as much as possible.

The Project operations and facility itself should be designed according to reduction of high-risk classifications and protection of employees. Training and drills to practice the procedures and plans should be undertaken periodically to minimize the risks of occupational hazards.

In this Occupational Health and Safety Management Plan, management approaches of physical, chemical, biological and radiological hazards are defined. The mitigation measures are not limited with the ones mentioned in this plan. During the operational phase, the Project operations may require additional actions to be taken. The risk assessment should be undertaken periodically,

site-specific occupational hazards should be identified, and related actions should be defined and undertaken.

It will be ensured that all the personnel (including contractors) are aware of their responsibilities, risks of their jobs and precautions to be taken on the workplace. Related training with communication codes for any occupational hazard and personal protective equipment will be provided to all personnel by the Project.

OHS Management Approaches

OHSMP provides implementing programs that contribute to mitigation of health and safety risks that may arise as a direct or indirect result of the Project. By implementing the measures provided in this Plan, it is aimed to mitigate the potential risks that arises from the work during construction and operation phases of the International Students Hostel Project. Following issues are specified in the main approach of this OHSMP:

- Identifying and controlling occupational hazards and eliminating OHS risks,
- Ensuring that all necessary actions which are suggested in laws, regulations, standards and guidelines are taken to prevent any OHS incident,
- Ensuring third parties such as contractors, subcontractors, visitors and suppliers understand and comply with site safety rules,
- Ensuring safe procurement and proper use of hazardous materials,
- Raising OHS awareness of all employees and third parties by providing suitable and adequate site safety information, training and instructions,
- Ensuring minimization or elimination of risks regarding points of entry and exit to the site,
- Ensuring that actions regarding risks associated with falling object, excavation work, working at height, lifting operations, working in confined spaces, working alone, etc. are taken,
- Raising driving safety awareness of employees and ensuring the compliance of safe driving provisions for all vehicles,
- Ensuring the prevention of adverse impacts of chemicals/waste on human health and the environment,
- Raising OHS awareness of employees and third parties who use, store or transport hazardous materials/wastes,
- Ensuring the compliance of all standards established in Turkish legislation,
- Ensuring that measures for fire are taken and providing to all personnel about emergency preparedness and response,
- Ensuring the prevention of traffic accidents and promoting traffic safety with all personnel and third parties.

General Facility and Operation

General Site Rules

General site rules will be applied to all employees on the project, including employees of contractors and subcontractors, all related personnel from third parties and visitors. Those rules are comprised of brief information about site emergency response plan, emergency contacts, map with permission marks and all other necessary information, and those will be shared with all employees and third parties.

Site Entrance and Exit

The entry to the Project area will be subject to the security personnel's supervision to ensure that all entries are performed in accordance with health and safety system and to prevent unauthorized access. Security personnel should be trained to meet both legislative and international standards by HSE Manager. Emergency exits of buildings and Project site should be clearly marked to be visible even in total darkness and be unobstructed at all the times.
There should be minimum two exits from any work area.

Safe Access

Passageways for pedestrians and vehicles within and outside buildings should be segregated and provide for easy, safe, and appropriate access. Equipment and installations requiring servicing, inspection, and/or cleaning should have unobstructed, unrestricted, and ready access. Only authorized personnel have access to dangerous operation areas and measures will be taken by locked door to prevent unauthorized access to dangerous areas should be in place.

Parking in Project Area

Parking at the Project site will only be restricted to the designated area. Parking shall be reverse and in the direction of exit. It is forbidden to park in front of fire extinguishers or hydrants, waste storage areas and emergency exits. Plant Management takes the necessary measures and informs the entire plant personnel.

Smoking

Smoking in the construction site, in the plant and in offices is strictly forbidden. There will be a designated open-air area or areas for smoking, where smoking is allowed only. Warning signs will be placed in accordance with standard regulations. Moreover, employees smoking other than at the designated areas will be warned and fined, if necessary.

Vehicles, Construction Machinery and Trucks

Back-up alarms of construction machinery and trucks shall be operational, and all vehicles will have a fire extinguisher and a first aid kit. If there is no sight during maneuvers, a banksman shall be present. It is forbidden to dump for trucks and reverse maneuver for construction machinery without a banksman.

Industrial Hygiene

Industrial hygiene training will be included in general OHS training for all employees and further training, awareness sessions, etc. organized by workplace/company doctor to raise industrial hygiene awareness. Eating in the plant and construction site is forbidden. Only designated areas shall be used for eating purposes. Restrooms shall be cleaned, and soap and tissue dispensers shall be refilled daily.

Working environment in terms of dust, noise, lighting, temperature, airflow and quality, etc. will be adjusted according to related regulations and measurements should be completed according to the Regulation on Occupational Hygiene Measurement, Testing and Analysis Laboratories during the construction and operational phases.

Working Hours

The working hours in construction and operation phases of the Project will be in accordance with the legal work and overtime hours stated in the Labor Law. Working hours can be shortened and additional required resting hours can be provided to the workers as a result of risk assessments and exposure to a hazardous situation.

Special working hour arrangements will be made under extreme conditions such as exposure to extreme hot, cold and humid environments to prevent health risks of employees. Work and rest periods can be determined and implemented by work-specific risk assessments for the activities such as working in confined spaces, gaseous, dusty or noisy areas.

Office Works

Offices will be cleaned and ventilated regularly. If it is not ensured, necessary warning signs shall be placed indicating the floor is slippery. Deteriorations, shelves and other materials will be repaired and/or fixed. Cleaning materials will be used with proper PPE and informed with the Material Safety Data Sheets (MSDSs).

Air conditioning devices will be regularly controlled according to industrial hygiene necessities. Sufficient lighting will be provided to the personnel working in the office. All employees shall be trained on office ergonomics.

Electrical equipment will be checked and labelled color codes in every three months by the electricians. Electrical distribution panels and fuse boxes will be kept locked, labelled and prevented from unauthorized use. Office will be equipped with detectors and fire extinguishers in case of fire hazards. Emergency exit doors and roads will be set at least 80 cm in length.

Employees who are exposed to workplace violence, retaliation, mobbing or any types of discrimination will be encouraged to report the situation in accordance with the Grievance Mechanism Procedure.

Housekeeping

Employees will be informed through training that the major sources of hazards are negligence of keeping the site clean and tidy during all phases of the Project. Those training will include the some of the following consequences of lack of cleanliness and tidiness:

- Trip and fall hazards: Materials and equipment left on the floor can cause trip and fall of an employee. The result can be bone fractures and severe injury. If trip and fall is happened in a higher place without fall protection equipment, the incident may result with fatality.
- Drop of a Material: Materials left in higher places may fall down and cause injuries.
- Hygiene: Non-clean areas threaten employees' health. Biological risks that may arise in the site are also assessed in this context and are tried to be avoided. All employees should wash their hands regularly, especially prior to eating and drinking.

All wastes generated in the site will be stored in the designated waste storage areas, by segregating according to their type. Waste management implementations are specified in Waste Management Plan for all phases of the Project.

Storage Conditions

Spare parts and materials will be stored in designated areas by considering their availability in the market and storage conditions. Maximum stacking height should be 3 meters. Heavy materials will be stored on lower shelves while lighter ones on the higher shelves as a measure against falling.

Chemicals will be stored according to their hazardousness classifications and MSDSs. All chemicals will be ordered according to need and stored according to MSDSs. Bulk buying and storage will not be allowed. Hazardous materials will be stored in accordance with the relevant national regulations.

Emergency Preparedness and Response

Existing Emergency Response Plan (see Appendix A) will be followed, and the following issues should be prepared and implemented, if they are not included in the existing ERP. Moreover, existing Covid-19 Emergency Response Plan (see Appendix B) should be followed and updated, if the standards differ and become more stringent.

- Emergency scenarios and relevant emergency preparedness and response actions with the allocations of responsibilities to local communities and authorities where appropriate,
- First Aid training,
- Specific stakeholder engagement based on consultation and participation with government and communities regarding the nature and potential consequences of the Project-related risks,
- Training of the personnel for the response to emergencies in accordance with the requirements outlined in the specifications,
- Emergency drills to be conducted, frequencies and formats according to Regulation on Emergencies in Workplaces,
- Evaluation of findings and lessons learnt from drills and corrective actions.

Management of Physical Impacts

Noise and Vibration

In the construction and operation phases of the Project, noise sources include the machinery and equipment as well as the Project units such as cogeneration and wastewater treatment plant. Noise limits of workplaces is defined by the NESREA Regulations.

Mitigation measures for reducing noise both in construction and operation phases including the measures against the occupational noise exposures are provided below:

- Equipment will be selected with lower sound power levels.
- Silencers will be installed where possible.
- High noise areas will be identified and marked, and personnel will wear personal noise protecting gears all the time when working in such high noise areas where the noise level is over 85 dBA.
- Structures will be designed and constructed with effective noise isolation.
- No employee will be exposed to a noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection.
- The grievance mechanism will be used effectively.

Mitigation measures in order to minimize the impact of vibration are listed below:

- Tools and equipment with lower vibration levels will be selected.
- Protective clothing to keep the employees warm and dry will be supplied.
- Task rotation and time limits will be implemented on activities with high exposure levels.
- Right equipment for works with risks are needed to be provided and well maintenance in good condition will be ensured.
- Information on self-protection and training will be provided to employees in tool maintenance and usage, for example avoiding gripping the tool too tightly.

Electrical Works, Electrical Equipment and Hand Tools

Recommended measures to prevent, minimize and control electrical hazards that might result from electrical works, equipment and/or hand tools are presented below:

- All energized electrical devices and lines will be marked with warning signed.
- Devices will be locked-out and tagged-out during service and maintenance.
- Locked-out and tagged-out awareness will be provided by HSE Manager before the work.
- All electrical cords, cables and hand power tools for worn-out or exposed cords and manufacturer recommendations for the maximum permitted operating voltage of the portable hand tools will be checked.
- Power cords and extension cords will be protected against damage.
- Only approved extension cords will be used.
- No approach zones around or under high voltage power lines will be established.
- Rubber tired construction or other vehicles that come into direct contact with, or arching between high voltage wires will be taken out of service for periods of 48 hours and the tires will be replaced to prevent catastrophic tire and wheel assembly failure potentially causing serious injury or death.
- Detailed identification will be performed and all buried electrical wiring before any excavation work will be marked.
- Flexible cords to be used on construction site will be rated as heavy duty, and those cords will be either protected by a suitable enclosure or barrier or located where protected from mechanical damage, damaged by liquids or high temperature.
- Cords will not exceed the maximum length stated in the related regulations.

- Hazard warning lights will be installed inside electrical equipment enclosures to warn of inadvertent energization.
- Appropriate labelling of service rooms housing high voltage equipment and where entry is controlled or prohibited will be ensured.
- Voltage sensors will be used before and during workers' entrance into enclosures containing electrical components.
- Specialized electrical safety training will be given to those personnel working with or around exposed components of electrical works.
- Deactivation and proper grounding of live power equipment and distribution lines according to applicable legislation and guidelines whenever possible before work will be performed.
- Electrical hand tools will be inspected by a qualified electrician every three months and by workers any time before starting the work.
- Electrical equipment that does not have a control mark on it will not be used.
- Electrical equipment shall only be repaired by electricians.
- Protective parts of any electrical hand tool will not be removed.
- If the electrical hand tool is sparkling, it will be used with Hot Work Permit or in the general permitted area.
- After the completion of work, electrical hand tools will be kept with pulling their plug out to prevent trip and falls.
- When the work with electrical hand tool is finished, it will be returned to its storage place.
- The employees that will use the electrical hand tool will be trained.
- The employees conducting electrical works or using electrical equipment and tools will use the relevant PPE.

Eye Hazards

Eye hazards should be assessed in detail in risk assessment reports/plans. The protective equipment for eyes will be used depending on the work to be conducted.

Hot Works

The mitigation measures on the hot works such as welding, cutting, grinding, and post-weld heat treatment works to be conducted during the construction and operational phases of the Project are explained in this section.

Work permits will be required for the hot works and employees without Hot Work Permit will not conduct any hot work. The Work Permit might be given with necessary training, licenses or certificates. Risks of the work or related risk assessment should be read and understood by the employees who are going to involve in hot works. Minimum OHS requirements to start a hot work are: Work Permit, approved fire work equipment, fire extinguisher or fire extinguishing system, fire blanket, fire observe (if necessary) and hot work specific PPE according to related risks.

The area where the hot work will be conducted will be free of any flammables and explosives, and the area will not be left without cooling.

Industrial Vehicle Driving and Site Traffic

Traffic and traffic-related risks and impacts will be eliminated, minimized or prevented through the following measures:

- Unauthorized vehicles will not be allowed to enter the Project area.
- All drivers will comply with the Highway Traffic Regulation.
- Pedestrian walkways will be marked and kept clear.

- For pickups, heavier vehicles and all construction vehicle operators, SRC certificate is obligatory.
- On-site and off-site speed limits, which is determined by national legislation, will be complied with by employees.
- Drivers and passengers shall fasten the seat belts. Seat belts shall be fastened before driving and cannot be unfasten until the vehicle is properly parked.
- Regular and legal maintenance of the vehicles will be performed in line with the related regulations.
- Each vehicle will carry first-aid kit, fire extinguisher, reflector and spare tire.
- Overloading of the vehicles is forbidden, even if the vehicle tonnage is appropriate.
- Headlights, mirrors, windows and seat belt system of the vehicles will be operational and maintenance of those will immediately be provided when these systems have problems.
- No passenger is allowed to be carried on the back of a pickup or in heavier vehicles, or in the cabinets of construction machinery.
- Tires will be controlled regularly.
- Smoking is prohibited on vehicles.
- Cell phone usage in vehicles on the road is prohibited.

Working with Construction Machinery

Measures to be taken when working with or around the construction machinery are listed as:

- Construction machinery will be accepted to the site according to site entry rules.
- Daily and periodic maintenance of construction machinery will be ensured and shared with OHS team and the operator will perform a visual check before each use.
- Obeying general rules for operators, which are summarized below, will be ensured.

  Operators will have a valid operator license.

  Operators will have induction training.

  Operator will visually control his/her construction machinery from top and bottom.

  Operator will check any leakages such as oil, engine fluids, accumulator etc.

  Operator will check engine, gearbox, hydraulic oil and radiator fluid levels.

  Operator will check the pallets/tires, bolts, pins etc. whether they are broken or not.

  Operator will be sure there is nobody around the work area and work with the guidance of flagman.
  Operator will start the engine while parking brake is set.

  Operator will check all the displays while the engine is warming up for 2-3 minutes.
  Operator will control all the lights before night work.
  Operator will not work if his/her view is blocked or continue to work with one or more flagmen.
  Operator will not use cell phone while using the machinery.

  Helmet usage is not obligatory for closed cabin machinery, but the operator will use safety shoes and reflector vests.
  Operator will pay attention to power lines. If there is a risk of contact, energy will be cut-off first.
  At the end of the work, the operator will also control the machine surroundings and park the machine at a safe location. If there are malfunctions or areas to improve, the operator will inform the next shift's operator.
  When the work is finished, the operator will turn off the engine and lock and secure the machinery.

- Obeying general rules for employees, which are listed below, will be ensured.

  Employees must be aware of the hazards and dangers of nearby working machines before starting the work.
  All employees will use reflective vests/work clothes.

  Pedestrian walkways should be used. The construction machinery's work area will not be used as a shortcut.
  Employees will have the eye contact with the operator during works they perform nearby the machinery in motion.
- Refueling of construction machinery will be performed in designated areas or outside of the Project area.
- Construction machinery will not reverse without a flagman.

Working Environment Temperature

Mitigation measures for prevention and control of occupational exposure to heat occurring during the Project activities are listed below:

Pressure vessels and piping will be inspected and maintained regularly.

- Adequate ventilation will be supplied to the work areas to reduce heat and humidity.
- The time required for work in elevated temperature environments will be reduced and access to drinking water will be ensured.
- Surfaces where personnel come in close contact with hot equipment will be shielded.
- Appropriate warning signs and PPE will be used near high temperature surfaces and environments.

Ergonomics

Employees will be provided with the appropriate tools, equipment, parts and materials. Controlling and identification of ergonomic risk factors and reduction of hazards will be provided through the following means when and where necessary:

- Engineering controls; which are the most reliable means to controlling or preventing injury. This is achieved by focusing on the physical modifications of jobs, workstations, tools, equipment, or processes.
- Administrative controls; which means controlling or preventing injury by implementing administrative changes such as job rotation, job enlargement, rest/recovery breaks, work pace adjustment, redesign of methods and/or worker education.
- Work practice controls; which means controlling or preventing injury through proper work practices. These include proper work techniques, posture and conditioning.
- PPE; which is personal protective equipment and can control or prevent injury.

Working at Height

Working from a level difference and the possibility of injury as a result of falling are considered for the employees as "working at height". Travelling, conducting a stationary job, or any time under risk of exposure to a fall from a surface that is not protected by approved handrails, guardrails or some other/similar types of approved arrest or restraint devices are included in the scope of working at height.

The hazard distance for falling is measured from the employee's feet to the walking/working ground. The prevention of fall should be planned during the design stage as possible, and continuously controlled. Hazards resulting from fall risks can be eliminated by several measures. These are:

Elimination of the works at height: performing the work on the ground as much as possible or maximizing the pre-assembly works on the ground for the structural components

- Design safety and engineering controls: reviewing the project drawings, interfacing with the project owners and material suppliers to design safety features into structure, material or equipment to be used, or addition of the safety features such as attachment points for guardrail system, etc. to the project design.
- Fall prevention and protection systems: fall prevention and protection systems differ in terms of the work type. Guardrail systems, fall restraints, fall arrest systems, barricades, etc. are some of them. The most effective one should be selected depending on the work to be performed.
- Elevated equipment: this equipment are the ones which the employees are required to be tied-off 100% of the time when conducting the job such as crane suspended works or scissors lifts.
- Housekeeping: housekeeping is also another important factors which may cause falling. The whole area should be enforced daily clean-up and free of debris, materials, unnecessary equipment and provided a sufficient number of trash containers for cleanup.

Working with Ladders

General procedures for the portable ladders are listed below in the scope of the Project:

- Handmade ladders are forbidden.
- The ladders will be checked daily before usage and controlled by the maintenance team and tagged.
- Ladder steps will be clean and anti-slide.
- There will be insulating caps on the ends of the ladders; ladders without caps will not be removed from the site.
- Ladders will not be considered as working platforms and no work will be performed on ladders more than 15 minutes.
- Ladders will be installed at 1:4 and it will be 90 cm longer than the climbed level.
- Last two steps of the ladders will not be used.
- Damaged ladders or ladders with broken steps will not be removed from the site and those ladders will be notified to the maintenance team.
- When climbing, 3-point rule (two hands and a foot, or two feet and a hand) will be maintained at all time. While climbing and going down, manual handling is forbidden.
- For vertical ladders, a cage is required after 2.5 m length and a resting platform for longer than 4 m.
- Conductive (metal) ladders will not be used in electrical works and in areas where power lines are present. In such works and areas, fiberglass and nonconductive ladders will be used.
- The ladders will not be used in strong windy weathers. Strong wind speed is determined as 12 m/s unless otherwise specified.
- The ladders will not be placed at door entrances. If it is inevitable to do so, the door will be locked.
- The ladders will not be placed on ice or snow. If it is necessary to do so, it will be fixed.
- The ladders will not be placed at places where there is active traffic. If it is necessary to do so, appropriate barriers and warning signs will be placed. This measure must be effective enough to remove vehicle crash risks.

While there is an employee on the ladder, it is forbidden to change the position or location of it.

Ladders will be carried horizontally to minimize the chance of its contact with power lines.

- Ladders will only be used for their purpose of manufacture. Ladders will not be used in a horizontal position like a walking platform, bridge, etc.
- For fixed ladders, handrails will be installed for ladders with more than four steps.
- There will be a minimum gap of 18 cm between the steps, and between the ladder and wall (or another fixed part).
- The distance between the steps will be equal and never exceed 30 cm.
- The ladder will be kept oil- and grease-free.
- Worn-out or damaged ladders will not be used.

Excavation Works

Mitigation measures for the excavation works are listed below:

- Work Permit shall be obtained to establish excavation works.
- Excavation works shall be performed under supervision.
- Excavation equipment shall be checked before use.
- Excavation team shall have training on Excavation Risks.
- Excess excavated material shall be disposed of at least 1 meter away from the excavation area.
- Risk assessment shall be done during the planning of excavation works.
- If there is a live line (electricity, gas, steam, etc.) in the excavation area, energy shall be cut off or if it is not required to cut it off, the precautions that should be taken shall be specified by Work Permit.
- If vibration will likely cause subsidence, special precautions shall be taken.
- Depending on the condition of the excavated soil, it shall be strengthened by excavation or lining or by 45 degrees angling, after the opinion of HSE Manager.
- Working in the excavated area subjects to Confined Spaces Work Permit.
- For excavations deeper than 5 m, vehicle operation around the excavation area shall be prohibited. At least two locations shall be determined to go down, if it is necessary and the slope of the excavated area shall be checked by supervisor before going down.
- The excavation area shall be normally closed within the same day. If it is not possible, the excavation area shall be surrounded by barriers and warning lights shall be located for the night.

  Manual excavation shall not be preferred if it is not compulsory due to technical reasons. Excavations deeper than 50 cm shall not be performed manually. Special training shall be conducted for workers who will perform manual excavation.
- The working hours of employees are evaluated according to the condition of the ground and the working hours are shortened according to this assessment

Illumination

Light intensity of working areas should be adequate for the general purpose of the location and type of activity. Minimum limits for workplace light intensity as defined by NESREA regulations shall be adhered to. Measures regarding the illumination of the project site area are provided below:

- Energy-efficient light sources with minimum heat emission shall be used.

- Measures shall be undertaken to eliminate glare/reflections and flickering of lights.
- Precautions shall be taken to minimize and control optical radiation including direct sunlight. Exposure to high-intensity UV and IR radiation and high-intensity visible light shall also be controlled.
- Measurements shall be done according to Regulation on Health and Safety Measures to be taken in Workplace Buildings and Annexes and TS EN 12464-1: 2013.
- Emergency lighting shall be installed to all necessary areas and buildings.

Lifting Operations

Mitigation measures regarding lifting operations are provided below:

- Before lifting machinery and vehicles start to work, they shall be checked by their operators. The steel ropes, chains, hooks, sling, chain blocks, and automatic stoppers shall be checked by authorized technical personnel once a year. This period might be shortened by risk assessments.
- The crane that will be used during lifting operations shall be accepted in accordance with site acceptance rules.
- Minimum requirements of the crane are crane license (official registration certificate),periodic maintenance documentation, operation of the detection devices, condition of the operator cabin, presence of at least fire extinguisher and first-aid kit
- Minimum requirements of the operator are operator license, insurance of the operator, the medical condition of the operator, induction training of the operator and PPE usage of the operator.
- Before starting the lifting operation, the whole area or the area where the load will travel shall be enclosed with barriers to protect working under the load. If this is not possible, the area shall be controlled by several watchmen.
- Standing under the suspended load is forbidden in any case. If it is necessary to do so, the risks to people must be minimized by safe systems of work and appropriate precautions.
- The lifting shall be performed by tying down the load by a trained rigger.
- Even though the operation can be performed by only one rigger, another rigger with greater experience can be used as superintendent together with several flagmen.
- If the flagmen are more than one, the operator shall follow the only one flagman's instructions and this flagman shall be selected before the operation starts.
- The communication method between the flagman and operator shall be determined before the operation by considering any malfunctions in communication devices. For the lifting with high risks or for human lifting, free heave and barge are forbidden by considering the risk of communication gaps.
- Riggers, flagmen and superintendent shall start to the work as trained in lifting operations. This shall be recorded in the Training Plan.
- The operation shall not start without lifting plan

Management of Chemical Impacts

Air Quality

Air quality of working environment will be maintained and measured according to NESREA regulations and standards. Necessary PPE and training will also be decided according to risk assessments.

Fire and Explosions

Mitigation measures regarding fires and explosions resulting from self-heating fuel piles, ignition of flammable materials and sources are presented:

- Flammables shall be stored away from ignition sources and oxidizing materials.

- Flammables storage area shall be remote from entry and exit points into buildings, away from plant ventilation and intakes or vents. It should have natural or passive floor and ceiling level ventilation and explosion and use spark-proof mixtures.
- Electrical grounding, spark detection and if needed quenching systems shall be provided where the flammable material is mainly comprised of dust.
- Fire hazard areas shall be defined and labelled to warn of special rules such as prohibition in use of smoking materials, cellular phones, or other potential spark generating equipment.
- Specific worker training in handling of flammable materials and fire prevention and suppression shall be provided.
- Fire extinguisher equipment (ladders, ventilation devices, fire extinguishers, etc.) will be purchased and will be kept in good condition.
- Fire extinguisher equipment will be labelled /signed according to related regulations and will be placed at easily accessible locations.
- Fire extinguishers will be placed close to areas that have fire risks such as chemical storage and welding areas.
- Personnel shall not be allowed to interfere with electrical appliances; only authorized personnel will be allowed to change the electrical installation. Electrical appliances will be closed and unplugged when they are not in use.
- Personnel who are responsible for the management of inflammable materials shall be appointed and shall be trained. Storage, transportation, and use of these inflammables will be established in compliance with national and international standards.
- Leakage and spillage of inflammable liquids shall be immediately cleaned and repaired.
- Fire exits and exit doors will be installed in both temporary and permanent structures/buildings and will be kept open all the time.
- A smoking area out of the plant will be designated and a fire extinguisher will be provided for this area.
- Fire practices will be established according to health and safety regulations.

Working in Flammable and Explosive Environments

Risk assessment shall be performed before working in flammable and explosive environments. Necessary signs should be placed on the site. Emergency communication numbers shall be placed. Conditions and situations to be aware of are defined under this section. These conditions and related mitigation measures are as follows:

Flammable and explosive liquid storage shelves and barrels shall be earthed against static electricity hazards. Static electricity is the most important fire cause.

- Hot works such as welding, cutting etc. shall not be performed near flammable and explosive liquids. Special precautions shall be taken when it is necessary to do so.
- It shall be ensured that there is no spill, leakage etc. where flammable and explosive liquids are present.
- Fire extinguishers shall be placed to appropriate locations where there is a work with flammable and explosive liquids.
- Training shall be conducted on the use of fire extinguishers.
- The storage areas of flammables and explosives shall have ventilation and the area shall be ventilated three times in an hour. The frequency might be increased in special occasions.
- Flammable and explosive materials shall be stored in their original packages. For small usage quantities, they shall be carried with special safety containers, not in glass or plastic containers.
- Gasoline and thinner shall not be used in cleaning works. Non-flammable solvents shall be used.
- During the operation of the Project classification should be assessed beforehand where explosive mixtures could be generated by biogas releases,

- The employees shall be trained on the explosive gases and their potential impacts.
- In order to prevent unauthorized access, area limitations and labelling shall be done.
- Places, where potentially explosive atmospheres to be able to occur, are marked with specific signs.

Hazardous Materials

Measures shall be taken to avoid or minimize the potential for occupational exposure to hazardous materials and substances that may be released by the Project. Mitigation measures regarding hazardous materials are presented below:

- All hazardous materials shall be assessed in accordance with relevant regulatory and international requirements.
- All chemicals purchased from suppliers used on the site will be accompanied by their MSDSs that meet the standards.
- Storage of fuel will be in tanks equipped with locking devices and which have secondary containment (with %110 volume capacity) that are located on a platform in a designated area located away from any watercourse or drain.
- Spill kits, protective equipment, and other necessary equipment will be available where hazardous materials are handled, to enable any spills to be cleaned up.
- Appropriate first aid will be located close to hazardous material storage areas such as eyewash, showers, and first aid kits.
- Hazardous materials will only be transported in vehicles authorized for the transport of hazardous substances.

  The transfer of hazardous materials from vehicles to storage tanks shall be conducted on impervious hard standing, which is sloped to a collection or a containment structure, not connected to municipal wastewater/storm water collection system.
- Incompatible materials (acids, bases, flammables, oxidizers, reactive chemicals) shall be stored in separate areas, and with containment facilities separating material storage areas.
- The storage and use of hazardous substances shall be done under conditions of maximum security.
- Drummed hazardous materials shall be stored in areas with impervious surfaces that are sloped to retain any spills/leaks.
- Containers holding flammable and/or toxic materials will be kept permanently closed and covered. They shall be kept in their original packaging and they shall be handled and transported under maximum security.
- Any accidental leaks of fuel or oil will be immediately cleaned up with absorbent material and collected in closed and labelled containers - temporarily stored in specially designed spaces until delivery to an operator.
- Chemicals with different hazard symbols shall not be stored together.
- All Hazardous Materials shall be disposed of according to the requirements of relevant regulation.

Gas Cylinders and Chemicals

Mitigation measures developed to be implemented during works with compressed gas cylinders and chemicals are presented below.

- Cylinders shall be kept in vertical position all the time and be stored separately as full or empty and in accordance with their gassiness. The storage areas shall be away from the smoking areas.
- Manual handling of the compressed cylinders shall be forbidden.
- It shall be forbidden to roll full or empty gas cylinders on the ground.
- The flammable gas cylinders shall be stored with 6 m interspaces.

- Working with chemicals shall not be performed without MSDSs.
- MSDS shall be read by the person who assigns the work to workers and he/she shall be sure that it is completely understood.
- A copy of MSDSs should be kept with chemicals in languages that all employees can understand and if it is necessary copies and MSDSs should be shared with workers.
- Special risk assessments shall be performed for working with chemicals. The work shall not be initiated without taking the precautions recommended in MSDSs.
- The work shall not be started without ensuring the minimum PPE usage as recommended in MSDSs.
- Areas, containers, pipes and similar installations that contain hazardous chemicals shall be labelled or marked in accordance with the relevant legislation and Chemicals and Hazardous Materials Management Plan in a way that the label shall indicate the chemical and its hazards.
- Containers that will be used for temporary transportation shall be suitable for chemical transportation and shall be labelled. The label shall indicate at least name of the chemical, hazard description (corrosive, poisonous, suffocative, irritant, etc.) and pictogram.
- Chemicals that are transported to the application area with temporary containers shall be taken back to the Storage Area after the work is finished.
- The environmental hazards of the chemical shall be assessed before the work and proper spill kits shall be placed in the work area.
- Chemical spill drills and training should be repeated at least once in a year.
- For the works performed in confined spaces, the chemicals and the risks shall be indicated in Work Permit.
- The volatilization of the chemical shall be assessed for the works that will be conducted in confined spaces. Toxic and suffocating chemicals shall only be used in confined spaces after special risk assessments have been made.
- Corrosive, oxidizing and reactive chemicals shall be segregated from flammable materials and from other chemicals of incompatible class (acids vs. bases, oxidizers vs. reducers, water sensitive vs. water-based, etc.), stored in ventilated areas and in containers with appropriate secondary containment to minimize intermixing during spills.
- Workers who are required to handle corrosive, oxidizing, or reactive chemicals shall be provided with specialized training and provided with, and wear, appropriate PPE (gloves, apron, splash suits, face shield or goggles, etc.).
- Where corrosive, oxidizing, or reactive chemicals are used, handled, or stored, qualified first aid shall be ensured at all times. Appropriately equipped first-aid stations shall be easily accessible throughout the place of plant, and eye-wash stations and/or emergency showers shall be provided close to all workstations where the recommended first-aid response is immediate flushing with water.

Management of Biological Impacts

Biological agents, which include bacteria, viruses, fungi (mold), other microorganisms and their associated toxins, have the ability to adversely affect human health in a variety of ways, ranging from relatively mild, allergic reactions to serious medical conditions, even death. These organisms are widespread in the natural environment; they are found in air, water, soil, plants, and animals. Because many microbes reproduce rapidly and require minimal resources for survival, they are a potential danger in a wide variety of occupational settings.

Exposure to Biological Hazards

Exposure to biological hazards may occur during demolition, renovation, sewer work, work on air handling systems, or other construction work from contact with contaminated or diseasecarrying materials, such as soil, water, insects (mosquitoes, ticks) and animals. In the site, biological health hazards will be most commonly found from an accumulation of animal waste and the presence of rodents and insects. Common areas has potential of biological hazards.

Fungi (Mold) Hazards

Fungi (mold) are found both indoors and outdoors, all year round. There are many thousands of species of mold and most, if not all, of the mold found indoors comes from outdoor sources. Mold seems likely to grow and become a problem only when there is water damage, high humidity, or dampness. Molds are organized into three groups according to human responses: Allergenic, Pathogenic and Toxigenic. Potential health effects and symptoms associated with mold exposures include allergic reactions, asthma, and other respiratory complaints. There is no practical way to eliminate all molds and mold spores in the indoor environment; the way to control indoor mold growth is to control moisture.

- If mold is a problem in the workplace, the mold and eliminate sources of moisture must be cleaned up.
- Fixation of the source of the water problem or leak is needed to prevent mold growth.
- Reduction of indoor humidity (to 30-60%) is required to decrease mold growth.
- Cleaning mold off from hard surfaces with water and detergent, and drying it completely is required.
- Absorbent materials, such as ceiling tiles that are moldy may need to be replaced.
- Condensation on cold surfaces can be prevented by adding insulation.
- In areas where there is a perpetual moisture problem, do not install carpeting.

Respiratory protection for exposure to mold will depend on the size of the particle and its level of toxicity. It is important to take precautions to limit your exposure to mold and mold spores. To limit the exposure to airborne mold, at a minimum, an N-95 respirator is suggested. If oil is present in the air, make sure to use either an R or a P designed filter.

Poisonous and Infectious Animals

Many different poisonous and infectious animals might be found in or around the Project site and workers should be aware of these health hazards before starting work in a specific location. All bites by such wildlife must be considered a possible exposure to the biological hazards. Rodents can exist around the Project site. The most sensible way to avoid contact with rodents is to prevent them from infesting the work site. Safety precautions should be taken. Safe disposal of rodents and proper cleaning and disinfection of rodent-inhabited areas are keys to minimizing exposure to the virus.

Management of Radiological Hazards

Some of the project personnel may have high exposure to electric and magnetic fields due to working in proximity to electric power generator, equipment and connecting transmission lines. Occupational exposure shall be prevented or minimized through the mitigation measures provided below:

- Potential exposure levels in the plant shall be identified and personal monitors shall be used during working activities.

- Personnel shall be given training in the identification of occupational electric and magnetic field levels and hazards.

Special Hazard Environments

Working in Confined Spaces

Management measures for confined spaces are presented:

- Engineering measures shall be implemented to eliminate, to the degree feasible, the existence and adverse character of confined spaces.
- Permit-required confined spaces shall be provided with permanent safety measures for venting, monitoring, and rescue operations, to the extent possible. The area adjoining access to a confined space shall provide ample room for emergency and rescue operations.
- Confined spaces shall be identified and labelled by HSE Manager.
- Works in confined spaces shall require a Work Permit. Working without a permit shall require disciplinary action.
- Work Permits for confined spaces shall be given after the following inspections:

  Control of proper entrance and escape,

  Gas measurement,

  Confirmation that all workers are trained (at least two employees go in and one employee as watchmen),
  If a continuous gas measurement is required, the measurement device shall be given to the employees that go in,
  Ventilation and lighting control.
- The works to be performed inside the confined areas shall be performed for the periods determined by the risk assessments.
- The watchmen shall not leave his/her workplace. If he/she needs to do so, another watchman shall be appointed, or the work shall be stopped.
- If there is no natural ventilation or if there is hazardous gas accumulation, a ventilation system shall be installed.
- A rescue kit shall be ready for fainting and other situations in confined spaces.
- Employees entering the confined space shall use PPE in accordance with the risk assessments.
- If lighting is not enough in confined spaces, lighting shall be provided. In case of a presence of gas in the environment, ex-proof lightning equipment shall be used to prevent any possible explosion risks.
- Instead of using 220 V electrical hand tools, air-powered or low power hand tools shall be preferred for confined spaces. However, if the work requires 220 V or more, an isolation transformer shall be used.
- The decision on the power of the isolation transformer shall be made depending on the work to be done and the opinion of the electricity team.

Working Alone

General procedure for Working Alone are presented below:

Risk Assessment: Risks arising from the conditions and circumstances of the work site will be assessed with the Occupational Health and Safety Committee and Risk Assessment Team, including input from the worker, in order to reduce the probability of an incident. Refer to the Risk Assessment Procedure.

Eliminate or Reduce the Risk: All reasonable measures will be taken to eliminate the risks identified, which include the development of safe work procedures, establishment of an effective communication system, training of workers, and ensuring access to emergency services in case of injury or incident.

Key Steps to Follow:

- Perform a risk assessment.
- Identify the risks in working alone.

- Establish safe work procedures.
- Keep work alone procedures current.

Certain circumstances make working alone hazardous. Identifying the hazards inherent to these circumstances depends on accurately defining what working alone is and evaluating the situation and the degree of risk. Whether a situation poses, a high or low risk will depend on the type of work activity, the work environment, and the potential consequences of an emergency, accident, or injury. The wide range of factors makes it important to assess hazards specific to each work alone situation; determine the level of risk; and consider the employee's knowledge, skills, and training. Working Alone or Working in Isolation describes situations when a worker performs a job function during employment, where they:

- Are the only worker for the employer at a workplace at any time;
- Work at a worksite remote from other workers;
- Work in circumstances where assistance is not readily available;
- Do not have direct supervision by the employer or a supervisor;
- Are not in the presence of another employee directly associated with the same employer;
- Work in an area where the worker does not have visual contact with a co-worker; or
  Travel away from a base office to perform job tasks; for example, client meetings.

Employees who travel alone may be exposed to the risks of injury from a vehicle accident, extreme weather conditions, or being stranded in remote areas. Doing fieldwork alone carries a degree of risk in relation to the location and access to communication and emergency response. The employer must identify workplace hazards to ensure the health and safety of the employee who works alone. Determining the level of risk involved with the type of activity, task, and environment helps form safe work procedures and develop controls to eliminate or reduce the risks.

A worker representative must participate in assessing the hazards and risks and developing the necessary controls. Employers must inform affected workers of the hazards identified and the methods they will use to control or eliminate the hazards in working alone. The worker should also receive a copy of the hazard assessment.

Factors to consider in hazard identification will be:

- Locations where employees work alone.
- Type of work activity (for example, welding).
- Hazards inherent to the work activity (for example, equipment failure, toxic gasses).
- Hazards inherent to the work environment (for example, heat, cold, hostility, drug abuse).
- Previous incidents, injuries, reports, and near misses.
- Control measures and precautions currently in use.
- Details on how to seek or provide emergency assistance.
- Evacuation and emergency procedures.
- Equipment needed for employees working alone.
- Information and training provided to the worker.
- Gaps or patterns to address.

After all hazards have been identified, reducing risks requires safety measures and systems suitable to the worker's needs. Before any employee can work alone or in isolation, employers must develop a procedure that both the employer and employee sign. Each working alone activity requires procedures specific to that activity and work environment. The worker must have adequate training in the use of the equipment, systems, and procedures for their effective application.

Consulting with the occupational health and safety committee representing the worker or with the worker directly is key to developing and successfully implementing safe work practices.

Workers experience the hazards first-hand and can help identify controls.

Written safe work procedures shall include an effective communication system and a way for employees to get help if there is an incident. The communications system must be responsive to the type and level of risk of the work and worksite. The three main components of effective communication are the frequency of check-in, dependability of the system, and training.

Effective communication systems include:

- Radio communication;
- Phone or cellular communication; and
- Any means that provide effective communication considering the risks involved (for example, satellite phone, two-way radios, silent alarms).

Effective communication may require constant or intermittent mechanical or electrical surveillance or use of security systems, personal pagers, two-way radios, emergency sounding devices, visual monitoring systems, or similar equipment. Post telephone numbers of the regular and emergency contacts in easily visible locations.

The level of risk identified in the hazard assessment will determine the frequency of check-in or call-in times to contact the worker. Using the telephone for communication at regular intervals may be adequate in low risk situations. For personnel working in high hazard environments or at night in work environments that attract criminal victimization, check-in would be more frequent.

Check-in scheduled at regular intervals ensures the safety and well-being of the employee working alone. Check-in procedures must clearly define time intervals (time between checkins), shift end check-in, and procedures to follow when you cannot contact the worker. The employer, another employee, or the person the employer designates to check on the employee who is working alone, must know about that employee's activities and be capable of putting the emergency response plan into effect.

Personnel Protective Equipment (PPE)

Other than office and allowed areas, minimum acceptable PPE that shall be used in the plant area are not limited with but determined as below.

- Helmet (TS EN 397 +A1)
- Eye Protection Goggles (TS 5560 EN 166)
- Work Shoes (TS EN ISO 20345, TS EN 13832-3)
- Ear Protection PPE according to Decibel (dB), comply with standards (TS EN 352-1, 352-2, 352-3)
- Working at Height PPE;

  Positioning Points and Safety Rope (TS EN 358)

  Parachute Type Seat Belt (TS EN 361)

  Personnel Protective Equipment to prevent falling from a height-seat belt (TS EN 813)

  Rescue Equipment-Rescue Belts (TS EN 1497)

  Rescue Equipment-Rescue Rings (TS EN 1498)
- High Visibility Jacket (According to weather conditions) (TS EN ISO 20471)
- Respiratory Protection – Face Mask against dust biological risks FFP-1,2,3 (TS EN 12942/A2)

The requirements of special PPE or any change according to site needs shall be determined by HSE Manager. Mitigation measures for PPE usage are provided below:

- If alternative technologies, work plans or procedures cannot eliminate, or sufficiently reduce a hazard or exposure, work-appropriate PPEs shall be used actively.
- Appropriate PPE that offers adequate protection to the worker, co-workers, and third parties, without incurring unnecessary inconvenience to the individual shall be identified and provided.
- PPE shall be maintained properly including cleaning when dirty and shall be replaced when damaged or worn out.
- Training programs for employees shall include proper use of PPE.
- Selection of PPE shall be based on the hazard and risk ranking and selected according to criteria on performance and testing established.

Implementation Schedule

This Plan will be reviewed on a minimum of a three-monthly basis during construction phase and annually during operation. During steady state operations, this Plan will be reviewed on an annual basis and any necessary revisions made to reflect the changing circumstances or operational needs of the Project. Revision of this Plan will be the responsibility of project Contractor HSE Manager during construction and the environmental safeguard specialist during operations.

If the circumstances change, this Plan may be updated on an "as required" basis.

Any revisions to this Plan will be uploaded to the Document Control Centre (DCC) to ensure that all Project staff and Contractors have access to the latest version of this OHSMP.

MONITORING

Overview of Monitoring Requirements

The monitoring measures that are to be implemented during the construction and operation phase to assess the compliance of the Project with the relevant Project Standards are described in this section. In case that any non-conformances with the Project Standards are identified, these will be investigated, and appropriate corrective actions will be put forward.

Key Performance Indicators (KPI)

The table below summarizes the key performance indicators and associated key monitoring measures that can be used to assess the progress and effectiveness of the proposed mitigation strategies.

Table 2:Key Performance Indicators (KPI)

KPI	Target	Monitoring Measure
Number of the recorded worker (internal) grievances relevant to OHS	Minimize and achieve continuous improvement in the number of the recorded internal grievances related to OHS (Target: Zero)	Internal Grievance records
Number of the reported OHS incidents	Minimize and achieve continuous improvement in the number of the reported OHS incidents (Target: Zero)	Regular internal inspections (incident reports) and audits
Total number of non-compliances with the measures identified in this Plan.	Minimize the number of non-compliances (Target: Zero)	Audit records

Record Keeping and Reporting

The records of audits, inspections, complaints, trainings and incidents will be managed in accordance with the Project's ESMS and DCC.

ANNEX 13: Physical and Cultural Resources Plan

In the event of a chance find of cultural/traditional/religious artefact, grave site etc. the following procedure should be adopted:

- work should be suspended immediately, and the area protected and untouched. However, works can go on in other locations on site
- immediately inform the ESO-ACEPHAP
- the ESO to call the attention of the Centre Director, ACEPHAP
- the Director should in turn call the attention of the National Council Arts & Culture through the office of the Vice Chancellor
- Proper evaluation should be conducted by the Ministry to ascertain the best procedure to adopt to secure the artefact
- Upon conclusion, work can resume at that particular site
- The whole process should be well documented and stored in the Project Office for future reference