ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN
FOR
CONSTRUCTION OF ALTERNATE BRIDGE NO 2 AT EMENE ALONG ENUGU–ABAKALIKI ROAD

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Environmental Social Management Plan for the bridge at Km7+350 along Enugu-Abakaliki road
**LIST OF ABBREVIATIONS AND ACRONYMS**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>ARAP</td>
<td>Abbreviated Resettlement Action Plan</td>
</tr>
<tr>
<td>BOD</td>
<td>Biochemical Oxygen Demand</td>
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<tr>
<td>BP</td>
<td>Bank Policy</td>
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<tr>
<td>CBO</td>
<td>Community Based Organization</td>
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<tr>
<td>CDD</td>
<td>Community Driven Development</td>
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<tr>
<td>CSO</td>
<td>Community Support Organizations</td>
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<tr>
<td>CITES</td>
<td>Convention on International Trade in Endangered Species of Wild fauna &amp; flora</td>
</tr>
<tr>
<td>DO</td>
<td>Dissolved Oxygen</td>
</tr>
<tr>
<td>DS</td>
<td>Dissolved Solids</td>
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<tr>
<td>EA</td>
<td>Environmental Assessment</td>
</tr>
<tr>
<td>EAR</td>
<td>Environmental Audit Report</td>
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<tr>
<td>ESA</td>
<td>Environmentally Sensitive Areas</td>
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<td>ESIA</td>
<td>Environmental &amp; Social Impact Assessment</td>
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<tr>
<td>EIA</td>
<td>Environnemental Impact Assessment</td>
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<tr>
<td>EMP</td>
<td>Environmental Management Plan</td>
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<tr>
<td>EPA</td>
<td>Environmental Protection Agency</td>
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<td>ESMF</td>
<td>Environmental and Social Management Framework</td>
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<tr>
<td>FRDP</td>
<td>Federal Roads Development Project</td>
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<tr>
<td>FGN</td>
<td>Federal Government of Nigeria</td>
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<tr>
<td>GIS</td>
<td>Geographic Information System</td>
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<tr>
<td>HC</td>
<td>Hydrocarbon</td>
</tr>
<tr>
<td>HSE</td>
<td>Health Safety and Environment</td>
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<tr>
<td>IEE</td>
<td>Initial Environmental Examination</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>Human Immuno-deficiency Virus/ Acquired Immune Deficiency Syndrome</td>
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<tr>
<td>IDA</td>
<td>International Development Association</td>
</tr>
<tr>
<td>LB</td>
<td>Land Bureau</td>
</tr>
<tr>
<td>LGA</td>
<td>Local Government Area</td>
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<td>LVO</td>
<td>Land Valuation Office</td>
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<tr>
<td>LFN</td>
<td>Laws of the Federation of Nigeria</td>
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<tr>
<td>MDAs</td>
<td>Ministries, Departments &amp; Agencies</td>
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<tr>
<td>MDG</td>
<td>Millennium Development Goals</td>
</tr>
<tr>
<td>MIGA</td>
<td>Multilateral Guarantee Agency</td>
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<tr>
<td>MOE</td>
<td>State Ministry of Environment</td>
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<tr>
<td>MoH</td>
<td>State Ministry of Housing</td>
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<tr>
<td>NGO</td>
<td>Non-Governmental Organization</td>
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<tr>
<td>NS</td>
<td>Not Specified</td>
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<tr>
<td>OD</td>
<td>Operational Directives (of the World Bank)</td>
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<tr>
<td>NGO</td>
<td>Non-governmental Organization</td>
</tr>
<tr>
<td>NIWA</td>
<td>National Inland Waterways Authority</td>
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<tr>
<td>OP</td>
<td>Operational Policy</td>
</tr>
<tr>
<td>PPE</td>
<td>Personal Protective Equipment</td>
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### Resettlement Policy Framework (RPF)
- Road Rehabilitation Contractor (RRC)
- State Environmental Protection Agency (SEPA)
- State Ministry of Environment (SMENV)
- Suspended Particulate Matter (SPM)
- Total Dissolved Solids (TDS)
- Terms of Reference (TOR)
- Transport Sector Reform Implementation Committee (TSRIC)
- Total Suspended Particulate (TSP)

### Units of Measurement
- Colony forming unit per milliliter (cfu/ml)
- Centimeter (cm)
- Decibel (dBA)
- Feet (ft)
- Gramme (g)
- Kilogramme (k)
- Gramme per Centimeter (g/cm)
- Kilometer (Km)
- Meter (m)
- Meter Cube (m3)
- Milliequivalent (meq)
- Milligramme (mg)
- Milligramme per Kilogramme (mg/Kg)
- Milligramme per Litre (mg/l)
- Millilitre (ml)
- Millimetre (mm)
- Meter per Second (m/s)
- Turbidity Unit (NTU)
- Parts per thousand (°ooo)
- Degree North (°N)
- Hydrogen ion concentration (PH)
- parts per billion (ppb)
- parts per million (ppm)
- Temperature in degrees Celsius (ToC)
- Microgramme (µg)
- micro Siemen (µS)
- micrometer (µm)
- Percentage (%)

### Chemical Elements and Compounds
- Aluminum (Al)
- Carbon (C)
- Calcium (Ca)
- Calcium Carbonate (CaCO3)
- Carbon Tetrachloride (CCl4)
- Cadmium (Cd)
Cl  Chloride
CO  Carbon Monoxide
CO2 Carbon Dioxide
Cr  Chromium
Cu  Copper
Fe  Iron
H  Hydrogen
H2O water
H2S Hydrogen Sulphide
Hg Mercury
K  Potassium
Mg Magnesium
Mn Manganese
N  Nitrogen
Na Sodium
Na2PO4 Sodium phosphate
NaOH Sodium hydroxide
NH3 Ammonia
NH4+ Ammonium ion
NH4F Ammonium flouride
Ni Nickel
NO2- Nitrite ion
NO3- Nitrate ion
NOx Nitrogen Oxides
O2 Oxygen
P  Phosphorus
Pb Lead
PO4 Phosphate
SiO2 Silicate
SO2 Sulphur dioxide
SO4 Sulphate ion
V  Vanadium
Zn Zinc

ORGANIZATIONS
APHA America Public Health Association
FEPA Federal Environmental Protection Agency
FERMA Federal Roads Maintenance Agency
FMENV Federal Ministry of Environment
FMW Federal Ministry of Works
UNEP United Nations Environmental Programme
USDA United States Department of Agriculture
USEPA United States Environmental Protection Agency
WB World Bank
WHO World Health Organisation

Environmental Social Management Plan for the bridge at Km7+350 along Enugu-Abakiliki road
SUMMARY

Introduction
There is an ongoing road construction by the federal government of Nigeria through the Federal Ministry of Works under the World Bank support. This project is being implemented and supervised by Road Sector Development Team (RSDT) arm of the Federal Ministry of works in-charge of all projects under the ministry financed by international donor agencies. Included in this works is the rehabilitation of bridges to ensure easy movement of persons, goods and services.

As part of the on-going rehabilitation of the road and to ensure easy movement of persons, goods and services, it has become most relevant to construct a new bridge (3x20m) at km 7+350 in Emene to replace the 2nd (2x20m) out of the 11 existing bridges from the Enugu end of the road. Due to strong indications of structural failure and its 40 year old composite (Steel & Concrete) existence, the need to construct an entirely alternate bridge became necessary. The proposed bridge is planned as a re-enforced concrete 60m long compared to the 40m existing one which is located 3m away on the right from Enugu to the old bridge beside it with a proposed 500m transition road (250m on either side of the new Bridge) linking the existing Enugu-Abakaliki road.

The bridge construction which is a sub-unit of the entire project will reduce the risk and fright of collapse and thus ensure significant aid to the poor through greatly improved transport infrastructure and access to marketplaces. The construction and operation of the Project will bring a large number of direct and induced employment opportunities to the local economy and further restore confidence on the users.

Existing Policy, Legal and Administrative Frameworks
In Nigeria, environmental legislation, generally, is in a continuing process of development. Amongst the existing pieces of legislations there are a number of national and international environmental guidelines applicable to the projects under the project with regard to both environmental and social concerns.
To make the ESMP responsive to the objectives of good practice as required by the Nigerian government and the World Bank, the relevant EIA/EA requirements and operational procedures (under which ESMPs usually fall) were harmonized. It is especially made responsive with the consideration and inclusion of followings:
- Early consideration of environmental and social issues;
- Identification and early consultation with stakeholders;
- Prevention of adverse impacts through the consideration of feasible alternatives; and
- Incorporation of mitigation measures into planning and design.
- Strengthening the framework for the systematic management of environmental responsibilities, impacts and risks.
Some of these extant legal and policies frameworks include;
- National Environmental Standards and Regulatory Enforcement Agency Act No 25 of 2007
Environmental Impact Assessment (EIA) Act Cap 131 LFN 1992
- Sectoral EIA Guidelines
- Nigerian Urban and Regional Planning Law No 88 of 1992
- Land Use Act Cap 202 LFN 1990; and
- Several other international policies including the World bank Safeguard Policies

The prevailing condition of the existing Bridge is structurally bad and has technical projections of not being there in the next two years. The bank of the river is seriously threatened while the existing score protection by the embankment has failed completely.

In accordance with the provisions of the Nigerian EIA Act, and World Bank Safeguard policies, an ESIA was carried out for the entire corridor (Enugu - Abakaliki Road) which is the bridge is part of in order to comply with the statutory requirements and to identify, evaluate and mitigate the significant potential impacts of the development project on the environment. Specifically in recognition of the fact that environmental and social concerns may arise as a result of the proposed project, the FMW prepared an Environmental and Social Management Framework (ESMF) in fulfillment of the World Bank requirements for project appraisal. The ESMF described the existing environment for those aspects of the physical, biological, social and economic environment within the study area that are relevant to the project. The framework also identifies the project-environment Interactions during operational phase.

Furthermore a Resettlement Policy Framework (RPF) was conducted by RSDT. The objective was to set out the resettlement and compensation principles, organizational arrangements and design criteria to be applied to meet the needs of the people who may be affected by the project, when project activities are identified.

In addition, an ESMP was prepared for the entire corridor of which the bridge is part of. An Abbreviated Resettlement Action Plan (ARAP) was also prepared alongside this ESMP for the bridge.

**The Project Activities**
At about 7+325km in Emene from the Enugu end is the No 2 Bridge out of the 11 bridges along the road corridor. Due to some attribute structural failure on the existing 40 year old composite (Steel & Concrete) Bridge, an alternate (Re-enforced concrete) Bridge has been recommended.

This new Bridge which is 60m in length compared to the 40m existing one is 3m beside it with a proposed 500m transition road (250m on either side of the new Bridge) linking the existing Enugu-Abakaliki road.

**Baseline Conditions**
Biophysical and socio-economic resources as well health of man and natural resources could be impacted by the various activities associated with the implementation of the project. Hence the baseline conditions of a number of these resources were considered.

*Environmental Social Management Plan for the bridge at Km7+350 along Enugu-Abakaliki road*
The proposed site is located in a tropical rain forest zone with a derived savannah. The climate is humid and highest between March and November. The mean daily temperature is 26.7 °C (80.1 °F). Other weather conditions affecting the city include Harmattan, a dusty trade wind lasting a few weeks of December and January. Like the rest of Nigeria, the area is hot all year round.

The mean annual wind speed vary between a narrow range of 4.0 and 6.2m/s. Speeds are higher between July and August, the period of August break. Conversely, at the peak of the rainy season in September and October, wind speeds are lowest, measuring between 4.1and 4.2m/s. From December, wind speeds begin to rise steadily till March, just before the rains begins and later rises during the August break.

The following air parameters NOx, SOx, CO, H2S, NH3, SPM and VOC had these range of values in microgram per meter cube 4.67-14.01, 1.06-8.88, 0.08-0.17,<0.01, <0.01-0.10, 32.0-63.8,10.01-4.01. The result show that the air parameters are within the acceptable limits.

Noise Level ranged from 44.8dB (A) – 61.0dB (A). The highest noise value was recorded at site which is majorly as result of vehicular movements along the Enugu Expressway which is close to the site. The values were below the regulatory levels for noise values which is 70dB (A) for industries and 50-60 residential and small scale industries areas, over a period of 8 working hours.

A very high number (89.7.% of respondents agreed that the project/activity should be encouraged in the areas as against 10.3% who do not agree. Supporters of the project see the project as a welcome idea that will bring about an improved economic life, and improve safety.

**The Project Benefits**

The project is envisaged to have a range of positive environmental and social impacts. Some of these are a function of the objectives of the project and others are a function of the way in which the project is designed to meet its objectives such as the creation of new jobs (fight against poverty) and the provision of good roads for easy trade and commerce.

Specifically, the following are some of the benefits that could be due to the project: creation of job opportunities both during construction and operation, improvement in the crossing facility itself which is a major benefit to the two State capitals and other smaller communities. The proposed infrastructure is of strategic importance to enhance transport links and operations between the two States, especially with regard to ease of movement of goods and people and reduction of transit times considerably thereby strengthen regional integration, trade facilitation and economic growth and development.

In addition to the increased employment opportunities directly in the project, will be increased income generating opportunities from emerging demand for services such as restaurants, small shops and allied activities which tend to favour women, due to the expected increase in traffic.
**The Project Negative Impacts**
The site preparation will cause changes in land forms and water bodies and temporarily increase soil erosion. Project activity during rehabilitation and operation will create a degree of soil erosion and water column disturbance which will increase water turbidity. Oil spills may occur and this has the tendency to affect surface water quality. Road accident may occur during the construction activity. There is the tendency for the activities to adversely affect the existing flora and fauna.

**Mitigation Measures**
A priority in project planning and design is to avoid potential negative environmental and social impacts. For instance, in the design and selection of site, work methods, equipment, for the project, etc. negative impacts are as much as possible mitigated.

Nevertheless, some of the impacts could require additional measures and others will require sound operational procedures and good housekeeping. Provisions have been made for this in the entire arrangement of the project for impacts that are unavoidable to be mitigated.

**ESMP Implementation and Management**
The successful implementation of the ESMP depends on the commitment of the sector and related institutions, and the capacity within the institutions to apply or use the framework effectively, and the appropriate and functional institutional arrangements, among others. Hence these key ESMP areas relevant to its successful implementation were included in the ESMP, namely: institutional arrangements, capacity building, environmental and social monitoring.

**Budget**
To effectively implement the environmental and social management measures suggested as part of the ESMP, necessary budgetary provisions has been be made for the individual sub-projects/road to ensure upfront appreciation of the financial requirements and allows early planning and budgeting accordingly.

Tentative budget for each of the project includes the environmental management costs other than the good engineering practices; cost of environmental monitoring is N3.8m with addition of 10% contingency to this total.

**Disclosure**
This ESMP has been prepared in consultation with the relevant stakeholders. Copies of this ESMP that have been prepared for the project shall be made available to the public by RSDT in the various relevant local government councils, State Ministries of Environment and other stakeholders as well as the Federal Ministry of Environment.

All reasonable efforts must also be made to disclose/display them to the public at strategic points within the project’s areas of influence so as to allow all stakeholders to read and understand how their environment stand to be impacted by the project. RSDT will also disclose this ESMP electronically through the World Bank Info Shop.
SECTION 1 INTRODUCTION

1.1 Context

The Federal Government of Nigeria through the Federal Ministry of Works under the World Bank support is currently embarking on the reconstruction/rehabilitation of a number of roads in Nigeria. One of the roads is Enugu – Abakaliki road which is being rehabilitated under the Federal Roads Development Project (FRDP) managed by the Road Sector Development Team (RSDT) on behalf of the Federal Ministry of Works.

As part of the on-going rehabilitation of the road and to ensure easy movement of persons, goods and services, it has become most relevant to construct a new bridge (3x20m) at km 7+350 in Emene to replace the 2nd (2x20m) out of the 11 existing bridges from the Enugu end of the road. Due to strong indications of structural failure and its 40 year old composite (Steel & Concrete) existence, the need to construct an entirely alternate bridge became necessary. The proposed bridge is planned as a re-enforced concrete 60m long compared to the 40m existing one which is located 3m away on the right from Enugu to the old bridge beside it with a proposed 500m transition road (250m on either side of the new Bridge) linking the existing Enugu-Abakaliki road.

The prevailing condition of the existing Bridge is structurally bad and has technical projections of not being there in the next two years. The bank of the river is seriously threatened while the existing score protection by the embankment has failed completely.

In accordance with the provisions of the Nigerian EIA Act, and World Bank Safeguard policies, an ESIA was carried out for the entire corridor (Enugu - Abakaliki Road) which is the bridge is part of in order to comply with the statutory requirements and to identify, evaluate and mitigate the significant potential impacts of the development project on the environment. Specifically in recognition of the fact that environmental and social concerns may arise as a result of the proposed project, the FMW prepared an Environmental and Social Management Framework (ESMF) in fulfillment of the World Bank requirements for project appraisal. The ESMF described the existing environment for those aspects of the physical, biological, social and economic environment within the study area that are relevant to the project. The framework also identifies the project-environment Interactions during operational phase.

Furthermore a Resettlement Policy Framework (RPF) was conducted by RSDT. The objective was to set out the resettlement and compensation principles, organizational arrangements and design criteria to be applied to meet the needs of the people who may be affected by the project, when project activities are identified.

In addition, an ESMP was prepared for the entire corridor of which the bridge is part of. An Abbreviated Resettlement Action Plan (ARAP) was also prepared alongside this ESMP for the bridge.
Based on the nature of impact triggered by the various amenities around this bridge at 7+325km in Emene, it was considered expedient and necessary to prepare a site specific environmental and social management plan for it. In other words, the Road Sector Development team (RSDT) recognizes that a good and effective ESMP not only protects and minimizes potential adverse environmental consequences, but reduces potential social and commercial risks. Hence this ESMP is seen as an integral part of normal business practices for the entire road corridor.

1.2 Objectives of this Environmental and Social Management Plan

An Environmental and Social Management Plan (ESMP) is a management tool that presents strategies and procedures for managing potential environment and social impacts associated with a proposed project.

With all intent and purpose, the main objective of this Environmental and Social Management Plan is to document the actions necessary to prevent or minimize predicted negative impacts of the Bridge construction projects. Also it stands to provide a framework for systematic managing of the responsibilities associated with the works are well mitigated with a view to ensuring environmental friendliness of the proposed project.

Specifically, this ESMP is designed to ensure the following:

- Compliance with relevant legislative requirements;
- Achievement, enhancement and demonstration of sound environmental performance built around the principle of continuous improvement;
- Provision of standards for overall planning, operation, audit and review;
- Encouragement and achievement of the highest environmental performance and response from individual employee and contractors;
- Rationalizing and streamline environmental activities to add value in term of efficiency and effectiveness;
- Enabling management to establish environment priorities;
- Integrating environment fully into the various activities of the proposed project and ensuring inclusion of environmental requirements into tender documents, continuing management and evaluation of the environmental performance of the project.
- Providing detailed design criteria for specific mitigation measures to be implemented.
- Tracking to ensure the effectiveness of the mitigation measures at meeting the discharge standards.
- Specifying appropriate roles and responsibilities, and outline the necessary reporting procedures, for managing and monitoring environmental and social concerns related to projects.

1.3 ESMP in Context of Other Relevant Socio-Environmental Assessment Tools
For an integrated Socio-environmental impact management plan, it should be understood that there are other tools that share the common aim of promoting sustainable development. Some of these include EMP, RPF, IPMP, ARAP, and RAP.

These tools are applied at different levels and throughout the activity life-cycle (i.e. during the pre-feasibility, feasibility, design and planning, construction/establishment, operation/implementation, and decommissioning stage of an activity) to ensure identified social and environmental impacts are adequately managed with a view to ensuring sustainability of the projects.

- **ESMP** is used as a practical tool during program formulation, design, implementation and monitoring. It describes the steps involved in identifying and mitigating the potential adverse environmental and social impacts of future investment activities. It also provides guidance in cases where the screening results indicate that a separate Environmental Impact Assessment (EIA) or Environmental Management Plan (EMP) is required.

- **Social assessment** is aimed at analyzing the social issues and soliciting stakeholders’ views for the design of projects. Social assessment helps make the project responsive to social development concerns, including seeking to enhance benefits for poor and vulnerable people while minimizing or mitigating risk and adverse impacts. It analyzes distributional impacts of intended project benefits on different stakeholder groups, and identifies differences in assets and capabilities to access the project benefits.

- **RPF** provides the direction to all actors involved in projects implementation, for the identification of resettlement implications and measures to adopt to minimize or address resettlement issues created by each project. Once resettlement issues are identified, a Resettlement Action Plan is prepared for managing the issues. Thus in addition to containing a screening /checklist for determining whether World Bank OP 4.12 is triggered or not it also provides procedures and guidelines to be followed when the policy is triggered.

- **RAP/ARAP** provides a link between the impacts identified and proposed mitigation measures to realize the objectives of involuntary resettlement. RAP/ARAP takes into account magnitude of impacts and accordingly prepare a resettlement plan that is consistent with for Bank approval before the project is accepted for Bank financing. Projects that will affect more than 200 people due to land acquisition and/or physical relocation require a Socio-economic studies and a full Resettlement Action Plan (RAP), while Projects that will affect less than 200 people require an Abbreviated RAP. RAP/ARAP are usually prepared as soon as the project is finalized and cleared prior to approval of the bid documents.

- **EIA/EA/ESIA** evaluates a project’s potential environmental risks and impacts in its area of influence; identifies ways of improving project planning, design and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts, including throughout the project.
implementation. It is a process whose breadth, depth and type of analysis depend on the nature, scale, and the potential environmental impact of the proposed project. The EA EA/EIA determine the extent of impacts and how the impacts will be mitigated, or minimized by planning, approaching the activities in an environmentally sensitive manner and adopting specific mitigation measures.

- ESMPs are usually prepared following an EIA and incorporate the proposed management actions (i.e. actions to mitigate negative impacts and enhance positive benefits).

The ESMP also provide a specific description of institutional arrangements, i.e. who is responsible for carrying out the mitigating and monitoring measures (for operation, supervision, enforcement, monitoring of implementation, remedial action, financing, reporting and staff training).

The ESMP is implemented during the construction phase and, thereafter, throughout the project life-cycle up to, and including, decommissioning. A key reason for this approach is to ensure that environmental management objectives and actions have been investigated and integrated into the project planning and design.

The ESMP for the construction of alternate bridge no 2 at Eleme along Enugu – Abakiliki road project outlines the specific requirements to implement the identified mitigation requirements during the detailed design and planning phase, and as part of the bidding and sub-contracting process for the construction phase.

1.4 Scope/Terms of Reference of the ESMP

This ESMP, which is seen as an integral part of Roads Rehabilitation Projects' overall planning, design, budget, and implementation, provides a generic template for managing and monitoring environmental concerns as they relate to bridge construction. It should be understood that an EIA

In actual operation/use/application of this ESMP for the bridge construction, the peculiar environment or circumstances with regard to biophysical, socio-economic and health components must be taken into context or consideration.

The plan provides a description of the likely impacts and corresponding individual mitigation and monitoring measures and assignment of institutional responsibilities in the implementation of the various aspects of road construction operations.

1.5 Assumption for this ESMP

Generally, this document is intended to be used in the spirit of continual improvement, to assist in promoting best practice in environmental and social management, in a manner that is pragmatic, efficient and cost-effective.

This document:
1. Describes only some of the key components in the management of the ESMP, drawing from experience and other relevant guidelines and literature.

2. It is prescriptive for the particular site. However, it is very flexible and amenable to the arising situation with other bridge sites along the corridor where operation is to take place.

1.6 Integration of this ESMP with Project
This ESMP must be operated and achieved by establishing it within the overall project management (planning, design, budget, and implementation) so that the plan will receive funding and supervision along with the other components. This is because the decision to proceed with a project and the World Bank's decision to support it are predicated in part on the expectation that the ESMP will be executed effectively.

1.7 Existing Policy, Legal and Administrative Frameworks
This sub-section covers Nigeria’s legislative requirements for environmental protection. The essence of the consideration of this legal aspect is to show the commitment of the project to meeting the set standards and guidelines.

17.1 Administrative Framework
In Nigeria, the power of regulation of all environmental matters is vested in the Federal Ministry of Environment (FMENV), hitherto, the now defunct Federal Environmental Protection Agency (FEPA) which was set up by Act 88, of 1988).

The act establishing the Ministry places on it the responsibility of ensuring that all development and industry activity, operations and emissions are within the limits prescribed in the National Guidelines and Standards, and comply with relevant regulations for environmental pollution management in Nigeria as may be released by the Ministry.

In Part III of the Act 88, the State Governments are encouraged to set up “their own Environmental Protection Bodies for the purpose of maintaining good environmental quality in the area of related pollutants under their control.”

Nigeria subscribes to a number of International Regulations and Conventions relating to Environmental Protection.

International Development Partners/Agencies such as World Bank and other financial organizations interested in development projects have sets of environmental categorizations, assessments and management standards, which must be complied with by project proponents before these institutions invest in them.

1.7.2 Some Relevant Regulatory Instruments
Below, an outline of the relevant regulatory instrument framework and administration to this ESMP is given as they relate to the Federal, State and International arenas.
1.7.2.1 Federal Policy/Legislation
There are several Federal policy/legislations that have direct bearing on ESMP. They are discussed in subsequent sections of this report.

1.7.2.2 State Legislations
In consonance with Part III of the FMENV Act and the need to protect public health and safety, and to restore and enhance environmental quality, and sustain economic vitality through effective and efficient implementation of environmental programmes, the three States Government have set up State Ministries of Environment and/or Environmental Protection Agency that takes charge of Environment affairs in the States.

The Ministries and/or EPA are charged with the responsibility of providing decent, orderly and reasonable conducive environment for habitable society, as contained in the assignments of Ministerial responsibilities.

*Inter alia,* the Ministries are empowered to give direction to all issues concerning the environment, monitor and control pollution and the disposal of solid, gaseous and liquid wastes generated by various facilities in the states.

Some of the functions of the State Ministries of Environment include:

(i) Liaising with the Federal Ministry of Environment, FMENV to achieve a healthy or better management of the environment via development of National Policy on Environment

(ii) Co-operating with FMENV and other National Directorates/Agencies in the performance of environmental functions including environmental education/awareness to the citizenry

(iii) Responsibility for monitoring waste management standards,

(iv) Responsibility for general environmental matters in the State, and

(v) Monitoring the implementation of EIA studies and other environmental studies for all development projects in the State.

Largely, the federal legislation serves as the benchmark in the execution of standards in the states.

1.7.2.3 International Laws and Regulations
Nigeria is a signatory to a number of guidelines/conventions/treaties, some of these are which are relevant and to which Nigeria is a Signatory.

However, since the proposed project is co-sponsored by the World Bank, it is of paramount importance to consider the World Bank Requirements on Environmental and Social issues relating to the Projects.
1.7.2.3.1 World Bank’s environmental and social guidelines
The World Bank's environmental and social safeguard policies are a cornerstone of its support to sustainable poverty reduction. The objective of these policies is to prevent and mitigate undue harm to people and their environment in the development process. These policies provide guidelines for bank and borrower staff in the identification, preparation, and implementation of programs and projects.

The effectiveness and development impact of projects and programs supported by the Bank has substantially increased as a result of attention to these policies.

Safeguard policies have often provided a platform for the participation of stakeholders in project design, and have been an important instrument for building ownership among local populations.

The Bank requires environmental assessment (EA) and Social Assessment of projects proposed for Bank financing to help ensure that they are both socially and environmentally sound and sustainable, and thus to improve decision making.

1.7.2.3.2 Nigeria EA Guidelines and World Bank EA Guidelines
The Environmental Impact Assessment Act No. 86 of 1992 requires that development projects be screened for their potential impact. Based on the screening, a full, partial, or no Environmental impact assessment may be required. Guidelines issued in 1995 direct the screening process.

According to these guidelines,
- Category I projects will require a full Environmental Impact Assessment (EIA).
- Category II projects may require only a partial EIA, which will focus on mitigation and Environmental planning measures, unless the project is located near an environmentally sensitive area—in which case a full EIA is required.
- Category III projects are considered to have “essentially beneficial impacts” on the environment, for which the Federal Ministry of the Environment will prepare an Environmental Impact Statement.

With regard to environmental assessment, the Bank has also categorized projects based on the type of EA required, namely:
- **Category A** - projects are those whose impacts are sensitive, diverse, unprecedented, felt beyond the immediate project environment and are potentially irreversible over the long term. Such projects require full EA.
- **Category B** - projects involve site specific and immediate project environment interactions, do not significantly affect human populations, do not significantly alter natural systems and resources, do not consume much natural resources (e.g., groundwater) and have adverse impacts that are not sensitive, diverse, unprecedented and are mostly reversible. Category B projects will require partial EA, and environmental and social action plans.
- **Category C** - Projects are mostly benign and are likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project, although some may require environmental and social action plans.
- **Category FI** - A proposed project is classified as Category FI if it involves investment of Bank funds through a financial intermediary, in subprojects that may result in adverse environmental impacts.

This World Bank categorization (A, B, & C) corresponds in principle with the Nigeria EIA requirements of Category I, II and III, which in actual practice is done with regard to the level of impacts associated with a given project. However, in the event of divergence between the two, the World Bank safeguard policy shall take precedence over Nigeria EA laws, guidelines and or standards.

Thus for this ESMP, the Nigeria’s EIA requirements and World Bank operational procedures were harmonized as far as possible, hence it is made responsive to the objectives of good practice. It is especially made responsive with regard to the followings:

- Early consideration of environmental and social issues (starting at the screening stage);
- Identification and early consultation with stakeholders;
- Prevention of adverse impacts through the consideration of feasible alternatives; and
- Incorporation of mitigation measures into planning and (engineering) design.
SECTION 2 SUMMARY OF PROPOSED DEVELOPMENT

2.0 Introduction
This Section enables the placing of the ESMP in context; a brief summary is given of the proposed project development and associated processes involved in all the phases (construction and operation) of the project.

2.1 Location of the Proposed Project
The project site is located at about 7+350km in Emene Enugu State South Eastern Nigeria from the Enugu end of the Enugu – Abalaliki road. The proposed bridge to be constructed is an alternative Bridge to the existing Bridge No 2 out of the 11 bridges along the said road corridor as shown in table 3.1. The Ekulu River which is a 25km River and the largest body of water in the city of Enugu passes through it.

2.2 The Project
The Federal Government of Nigeria through the Federal Ministry of Works’ (FMW) Federal Highways Department has proposed to rehabilitate the Enugu-Abakaliki Road and the Abakaliki-Ogoja Junction-Ikom-Mfum Road. The highway route No. 25 which is a strategic part of the national trunk highway system will link the Federal Republic of Nigeria and the Cameroon Republic as a segment of the Trans-African Highway linking Lagos on the West African Atlantic coast with Kenya town of Mombassa on the East African Indian ocean coast.

At about 7+350km in Emene from the Enugu end is the No 2 Bridge out of the 11 bridges along the road corridor. Due to some attribute structural failure on the existing 40 year old composite (Steel & Concrete) Bridge, an alternate (Re-enforced concrete) Bridge has been recommended.

This new Bridge which is 60m in length compared to the 40m existing one is 3m beside it with a proposed 500m transition road (250m on either side of the new Bridge) linking the existing Enugu-Abakaliki road. Figure 2.1 is a schematic illustration of the project.

Table 2.1: List of Bridges along the Enugu – Abakaliki Road

<table>
<thead>
<tr>
<th>CHAINAGE</th>
<th>SPAN</th>
<th>BRIDGE WIDTH</th>
<th>WALKWAY WIDTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1+093</td>
<td>20m (1 – Span)</td>
<td>11.40m</td>
<td>1.3m</td>
</tr>
<tr>
<td>7+350</td>
<td>40m (2 – Span)</td>
<td>7.30m</td>
<td>1.3m</td>
</tr>
<tr>
<td>20+592</td>
<td>20m (1 – Span)</td>
<td>7.30m</td>
<td>1.4m</td>
</tr>
<tr>
<td>20+916</td>
<td>30m(1 – Span)</td>
<td>7.30m</td>
<td>1.3m</td>
</tr>
<tr>
<td>23+181</td>
<td>10m (1 – Span)</td>
<td>7.30m</td>
<td>1.3m</td>
</tr>
<tr>
<td>27+254</td>
<td>9m(1 – Span)</td>
<td>7.30m</td>
<td>1.3m</td>
</tr>
<tr>
<td>29+529</td>
<td>9m(1 – Span)</td>
<td>7.35m</td>
<td>1.3m</td>
</tr>
<tr>
<td>37+104</td>
<td>75m(3 – Span)</td>
<td>7.40m</td>
<td>1.3m</td>
</tr>
<tr>
<td>45+112</td>
<td>10m(1 – Span)</td>
<td>7.40m</td>
<td>2.0mm</td>
</tr>
<tr>
<td>53+467</td>
<td>30m(1 – Span)</td>
<td>7.30m</td>
<td>1.3m</td>
</tr>
</tbody>
</table>
2.2 Scope Of Work
The scope of the work is a permanent and enduring solution geared towards the replacement of the existing bridge. This includes 3-spans of 20m, totaling 60m long to be situated at 3m away on the RHS of the existing bridge while going towards Abakaliki and they shall specifically include the following:

- Confirming sub-soil investigation which shall include rock coring
- Drilling and installation of 20 No. 1000mm diameter bored piles of about 32-meter length each. Compression load test on 1 selected pile to 1.5 times above stated safe working load.
- Construction of Sub-Structures: The abutments are 6m high cantilever with return walls supported on 5 No.1000mm diameter piles. The length of each pile is 32m.
- Construction of super-structure: The 20m span bridge deck will be precast reinforced concrete beams and situ reinforced concrete deck slab. Each precast beams will be 1.3m deep, 0.40m wide and 19.80m long, with an average cross-sectional area of 0.41m², 8.11m³ volume and approximately 20.3 tones weight. There are 8 beams per span, giving a total of 24 beams.
- Construction of approach roads on either side of the new bridge, placed beside the existing one with a gap of 3m between the bridges, to link the existing road, including earthworks and pavement.

Figure 3.2: Proposed Project plan and profile drawings
SECTION 3 EXISTING ENVIRONMENT OF THE PROPOSED PROJECT SITE

3.0 Introduction
This section provides an overview of the environment and social characteristics of the project location, particularly those elements of the environment that may be impacted upon by the project and which should be included in the monitoring programme. The environment in this context includes the biophysical, economic and social components. Below are some of the key information about the Nigerian environment and the environment in the project location:

3.1 General Description of Study Area
It is geographically located between N06°27.762’, E007° 35.096’ and N06° 27.775’, E007° 35.175’. It also has an average elevation of 430ft above the sea level.

Figure 3.1 is the Map of Nigeria showing the Eastern region with arrow pointing at Enugu State, the project site location while the project plan and profile drawings is shown as figure 3.2. Plate 3.1 is the bridge to be replaced showing the Ekulu River passing under it.

Figure 3.1: Nigeria showing the Eastern Region with green arrow pointing at Enugu the proposed project site location
Plate 3.1: The existing threatened bank of Ekulu River with score protection by the embankment completely failed.

Fig. 2.3: Some of the NNPC facilities that will be affected by the project; water pipe lines, manhole & access gate

Fig. 2.4: Consultation & enumeration of the items to be affected by the 8m encroachment with the Otukwu village exco & PAP's

Fig. 2.5: ESMP Consultant with the Aim Engineering Design Consultants & RSDT – ESE Engr. Fidelis Anokwu
3.2 Environmental Characteristics at the Project Location

3.2.1 Vegetation
The Vegetation of the area is characterized by tropical rain forest and derived savannah while farming activities are predominant. The cultivated crops include rice, yam, maize, cassava, etc.

3.2.1.1 Enugu
The high human population densities, factory sites (mainly Petrol stations), construction and extension of infrastructures have greatly transformed the complex structure and species richness of this route. The entire area has been converted to Derived Savannah with a large portion of it under cultivation (cropland vegetation). The oil palm (*Elaeis guineesis*) is still abundant on this route in which typical Savanna species are *Daniella oliveri, Lophira lanceolata, Vitellaria paradoxa, Terminalia spp Naucles spp. Parkia biglobosa, Azadirachta indica, Spondias mombin* and *Ceiba pentandra. Parkia* spp occurs more on this route than on other routes. The dominant grasses are *Andropogon gayanus, Andropogon tectorum, Loudetia arundinacea, Hyparrhehnia*
rufa, and Schizachyrium sanguineum. The herbaceous plant species encountered on this route include Chromolceana odoroata, Sida acuta and Urena lobata.

Fig 3.1: Oil palm and Savannah Species-Enugu-Abakaliki road Fig 3.2: Andropogon gayanus. Andropogon, tectorum, and oil palm

3.3. Physical Environment

3.3.1 Climatic Conditions and Air Quality

The highway route is situated within sub-equatorial south climatic region characterised by high annual rainfall high relative humidity and temperatures. Rainfall distribution is double maxima rainfall. The mean annual rainfall is over 2500 mm while the mean annual temperature is between 24°C and 27°C. Relative humidity is normally over 90% in the early morning but falls to between 60% and 80% in the afternoon (Iloeje, 1981). Runoff is high and is estimated to be as high as 90% in the study area (Offodile, 1992).

3.3.2. Wind

The project area is dominated by two seasonal reverse winds, the dry tropical wind or the north-easterly winds from January to March and the tropical maritime wind or the south-westerly winds from April to December. The prevailing wind direction in the area is southwest at an average speed of 1.4 m/s. The dominant wind direction places the major communities upwind relative to potential emission sources from the project.

3.3.3 Relative Humidity and Ambient Air Temperature

Relative humidity is high, usually over 90% in the early morning but falls to between 60% and 80% in the afternoon. It is highest between May and October. Temperatures are high all year round with mean annual temperatures of between 24°C and 27°C. Highest temperature values are recorded during the dry season months (December to March) with maximum value attaining 33°C while during the wet months, temperatures are lower and can get to as low as 22°C.
3.3.4 Rainfall
Rain falls in all the months of the year, averaging 2500 mm annually. The rainfall pattern shows a double maxima resulting in two identifiable seasons: the raining season (April to October) typified by the southwest trade winds and the dry season (November to March) characterized by the northeast trade winds which bring harmattan. Rainfall is heaviest during the months of July and September and relatively low between November and March. About 80% of the total rainfall occurs between June and September whilst only about 12% of annual total fall between November and February.

3.3.5 Air Quality
The project area has excellent ambient air quality, with all the measured pollutant indicators being below FMENV regulatory limits. The ambient air concentrations ranged between 0.021ppm and 0.177 (ppm) for SOx, between 0.012ppm and 0.482ppm for NOx, and between 0.020ppm and 0.775ppm for CO. The concentration of H2S was not detectable. SPm ranged between 20.4 (μg.m\(^{-3}\)) and 180 (μg.m\(^{-3}\)).

3.3.6 Noise
A total of 60 receptors along the expressway alignment have been identified as sensitive to increased noise because of their nature and close proximity (within 200 m) to the proposed expressway. These are 55 settlements or residential centres, schools, and one medical care facility. The existing roads pass through or close by 53 villages, which will also be sensitive to increased noise from the roads after development. Villages and other facilities beyond the 200-m range are considered less sensitive to noise from expressway traffic because of the attenuation of noise intensity over distance. As part of the EIA, one-day noise monitoring program was conducted at the 18 noise-sensitive locations near the expressway and four of the sensitive receptors near the roads. The results — 44-75 decibels [dB (A)] during daytime and 30-44 dB(A) at night — were well below the applicable national noise standard of 90 dB(A) (day) and 50-55 dB(A) (night), indicating a high quality acoustic environment under existing conditions.

3.3.7 Soils
3.3.7.1 Classification of the soils
Pedon I WRB System: Eutric Nitisol Physiographic unit (Locations of the soils: Found on a flat to undulating terrain. The slopes are generally between 1-5%. Soil Parent material: In-situ, primarily shale along with fine grained sandstones of the Asu River Formation Distribution: It is the predominant soil in the study area.

3.3.7.2 Interpreted characteristics of the soils:
The texture varied from loamy clay in the surface (0-15 cm) to clay at the subsurface layers (below 15 cm). The soil has a good potential to support tree crops and arable crops. The high clay contents of the soil especially with increased depths make it incompetent as road bed materials. The swelling and shrinking properties of clay with wetting and drying cycles may make the road susceptible to failure on this soil. The cone index of penetrometer resistance (CI) which is an indirect measure of the soil’s shear strength varied from 3.1 kg cm\(^{-2}\) at about 15 cm depth to 3.45 kg cm\(^{-2}\) to a depth of 50 cm from surface. As a result of the soil’s high clay
content the soil shear strength is expected to reduce significantly with increased soil wetness and will yield readily to pressure. Soil Chemical Properties: As shown in Tables 5.8a to 5.8d, the soil reaction (pH) is acidic, with pH ranging from 4.9 in surface to about 5.0 in the subsurface soil. The heavy metals (Cr, Cd, Hg, Ni and Pb) contents of the soil is generally far below the WHO critical levels for these metals in soils. However with increased traffic after rehabilitation this is expected to increase as a result of deposition from vehicle exhaust, spent engine oil, and worn tires.

**Pedon V WRB System**: Orthic Ferralsol:

**Physiographic unit (Locations of the soils)**: The soil is located in on the middle to crest of the slope.

**Soil Parent material**: In-situ, primarily shale and lime stone of the Agwu-Ndeaboh and Nporo group.

**Distribution**: It is predominant around Enugu-Nkalagu sector of the route where it exist with Eutric Gleysol. It is predominant in the sector km 191–230 (6° 24.489’N, 7° 53.640’E to 6° 27.660’N, 7° 32.542’E).

**Interpreted characteristics of the soils**: The soil texture ranged from silty loam at the surface (0-15 cm) to clay at a depth of about 80 cm. The upland variant is well-drained while lowland variant is seasonally swampy. The soil content has a high percent of plinthithes and indurated ironstones. The soil material is very competent as roadbed materials.

**Soil Chemical Properties**: The soil reaction is acidic with pH ranging from a mean of 5.4 on the surface, to a mean of 5.5 at 50-80 cm depth. The soil’s heavy metal contents are also below the WHO critical levels specified for the metals in soils.

### 3.3.8 Water Quality

The results of the physico-chemical analysis of the waters from rivers, the hand-dug wells and borehole sampled in the Project area are summarized as follows: The waters are slightly acid to slightly alkaline (pH 6.6-7.3), fresh and non-saline with conductivities ranging between 200 and 360μScm-1; medium levels of dissolved oxygen (DO = 0.95-1.09mg/l) and low concentrations of organic matter and biogenic nutrients. Turbidity is generally high ranging from 69-168NTU. Compared to WHO standards, the levels of phosphate (0.0.18-0.07mg/l), nitrates (0.05-0.34mg/l), sulphate (1.10-9.10mg/l) and chloride (9.8.3-18.5 mg/l) are generally low. The nutrient levels as expressed by SO4, PO4 and NO3 are low indicating a low trophic water body, while those of alkali earth metals (Na, K, Ca, Mg) are relatively high. The concentrations of heavy metals especially the pollution indicators - Cr, Pb, Ni and Zn, are very low or below both detectable limits and FMENV limits. The water thus shows no evidence of contamination when compared to WHO potable water standards.

### 3.3.9 Wildlife

#### 3.3.9.1 Wildlife and Forestry

The wildlife seen in the project area is dominated by birds, reptiles and mammals. Direct observations in the field and interviews with local communities, confirm that the most visible birds are crows, black kites, ravens, crows, hornbills, doves and weaver birds, while the reptilians are mainly various types of snakes and lizards. Six Snake species and two other reptilian species were reported as being domicile within and around the proposed project area.
The mammals occasionally encountered within and around the project site include rats, rodents, squirrels, grass cutters, small deer, antelopes and monkeys. The mammalian group includes a member of cat family (Civet), a monkey, five rodents (i.e. Giant bush rat, tree hyrax, oil palm squirrel, grass cutter and ground squirrel) and two members of the deer family (bushbuck and Maxwell’s duiker). Historical records mention the presence of tigers, jackals and antelopes in the forests, but today they are already extinct due to long-standing farming pressure and persistent uncontrolled hunting by the indigenes. Domesticated animals such as goats, cow, ducks, and chickens are the main fauna in the communities. The project Area has been exposed to human impacts such as clearance for agriculture and, in addition has been used for hunting which would suggest that the occurrence of rare or endangered species is less likely.

3.4 Socio-economics

3.4.1 General Demographic characteristics of the project Areas.
The basic-line socio-economic and health status of the project areas was obtained using questionnaires, in depth interview (key information interview), Focus Group discussions, social mapping and transit walks. Data collection from all of these sources is presented below. Sex Distribution The people has a distribution of 48.4% female and 51.6% males. Notably there tends to be more male influx into the urban areas than to the rural areas. In the rural sample 58.8% are males and 41.2% are females, while in the urban.

3.4.2 The sex distribution

60.7% males and 39.3% females. The importance of this variation is that any significant project impact on the rural settings. Likely affect women more than men (because more women tend to stay back in the rural towns, while men migrate to the cities for opportunities). Age Distribution The ages of the survey sample ranged between 15 to 68 years in the urban community.

3.4.3 Marital Status
Both married and single categories recorded high figures. in the rural communities, 45.4% were single, and 53% married; while in the urban communities, 53.2 were single, and 42.3% married. The high percentage of the 'single' category is an indication that the study populations are relatively young, and economically active. Whatever happens to the environment is therefore their concern.

3.4.4 Type of Households
Majority of the households were male-headed households (92.99%), while female headed households constitute just 7.1% of the sample. Although, there is preponderance of male headed households across the selected communities, the fact that female-headed households are as much as 7.1 % is an indication that this category needs special attention, and should be aided mostly in community driven intervention programs.
In most cases, women who are female heads shy away from stigmatizing themselves as 'head' and would rather want to camouflage with a pseudo-head (usually the husband's relation) so as to be more acceptable in a typical patriarchal society that abhors a women being a head family. It is
assumed that in reality, there are may be more 'female heads' of families than reported in this study.

3.4.5 Housing Types
Survey data from interviews showed that in the rural population, an average of 36.7% lived in traditional zinc roof, and cemented houses. Many of the rural people still live in thatched-roofed houses, and sometimes the houses are built with planks. In the urban areas, a fairly large percentage live in zinc/cemented/ modern houses.

3.4.6 Property Owned
Common properties owned in the households and/or by individuals are farmland, plantations, houses, cars, and Lorries among others. For instance, in the rural areas, sizeable numbers 37.6% , Enugu. This experience is equally the same in the urban towns. Other important assets are house and cars/ Lorries, few own transport businesses. The construction of the new highway and other road repairs may be a mixture of hope and fear for the local communities i.e. expansion of transport trade on one side, and on the other, the destruction of farmland and even housing units.

Fig 3.3: Typical house in Enugu State

3.4.7 Religion
Christianity is the most common religion, reported by 96.6% of the sample. It is however important to note that almost all the communities held ownership of shrines, and community rituals in high esteem, this points to the fact that even though many professed to be Christians,
much importance still accrues to traditional religion and rituals (this is particularly more pronounced in the rural settings). Each community has a sacred land that must be considered in highway construction such as this.

**3.4.8 Migration patterns**
Most of the people in the selected communities are natives, except in the urban Enugu area where the natives are 40.9% of the sample population. FDG discussions and in-depth interview with the key informants revealed that the general shortage of land in the South East Region makes access to land very competitive, it is often common pattern for Igbo to move out of their enclaves to other region because of difficulty of securing both physical and social space. The Igbo, more than any tribe in Nigeria therefore tend to migrate much more frequently seeking economic opportunities. It was reported that more Igbo men compared to their women would readily migrate to other regions.

**3.4.9 Environment and Sanitation**
Although the government takes responsibility for the disposal of wastes, it is far from being effective. Organic wastes are used for manure purposes. Public facilities are not adequate.

**3.4.10 Economics**
The general family income of the people of the project area is almost the same as that earned from individual income. In the rural area, families that earn less than N10,000 (about $80.00) per month are 84.2%. Only very few of the population (as low as 9% in rural Enugu) ventured into business (the population is largely farmers, government workers, and petty traders). For those in business, the main source of capital is the cooperative society. In rural areas, for instance, some of those who got loans (67.7% in Enugu) got the loans from various cooperative societies. Largely, the people depend more on self-help programs, than receive any support from the government. A significant proportion of the population is still witnessing a decline in standard of living. Today, 60% of Nigerians live below the poverty line against 47% in 1993.

**3.4.11 Production and Marketing**
The principal activity of the rural inhabitants of all the zones is subsistence as well as cash crop farming. In Enugu, farming is dominated by Yams, Cassava and Rice and oil palm growing, which are the main sources of cash incomes. Subsistence farming concerns plantains, bananas, corn, tomatoes, soft bananas and squash, and cash crop farming Palm Plantations and cocoa. Hunting concerns mainly rodents and reptiles. The hunting and fishing products are intended for sale and for household consumption. Plantains, cassava, and fruit are primarily intended for consumption. The main fruit trees are: bananas, mango, avocado, orange, guava and papaw. The principal livestock products are: cows, goats, sheep, pigs and chicken. Logging companies are rare along the highway but logging trucks traverse Ikom to Mfum Border suggestive of illegal logging activity. Therefore measures should be taken to combat illicit logging and poaching.

**3.4.12 Gender**
At the level of the household, women do not have same access as men, to available critical resources (even in very poor homes- here, the case of women is that of double subordination). In
very poor homes, women and children (especially the girls) bear the responsibilities of doing odd jobs to provide subsistence for the family. At this level women do not have same inheritance rights, nor could they directly access critical resources such as land, credit, and the labour of others. On the whole, women are less mobile than men because of family responsibilities, and in particular, the need to care for the children. Women and girls engage in road trading, much more than men. Hence, any structural changes in this respect e.g. road construction, would tend to affect more women (and girls) than men. Women hardly take part in decision making at the community level. In fact most of the project communities, women are hardly recognized as part of the ruling council. They are often allowed to socialize by forming their own group, but could hardly influence decisions of men. Women are generally treated as 'children'. Generally, girls drop out of school much more than the boys, this trend is often hidden because according to key information - "girls cover up with marriage".

3.4.13 Health
Common health facilities reported are: Chemist Store, hospitals, and clinics, (private and/or government owned). Chemist or patent medicine store is the most common and he most used health facility in the rural communities, being reported as 77.8% in Enugu. On the average, 84.7% of the total sample reported the use of chemist store as a major health facility used by households in these rural communities.

In the urban sites, hospitals and clinics were reported as the popularly used health facilities. This was reported as 87.9% in Enugu (urban). An average of 82.83% reported hospitals and clinics as major health facilities for the urbanities. Communities are now very scared of the HIV/AIDS pandemic. HIV /AIDS epidemiological situation, especially among the 15-24 and 25-34 age groups is slightly below the national average. Many argue that local communities are now being exposed to these diseases through migrant workers. Subsequently, many of the local youth have been affected.

3.4.14 Cultural heritage Shrines /Common Taboo / Sacred Side/ Animals
One of the important culture rituals is the parading of masquerades ceremony. A common taboo in the community is that certain masquerades should not be seen. Such masquerade comes out at night. Prior announcements are made to inform members of the community on the days/ night masquerades will come out. Some of the common sacred animals across the 3 states (either ruler or urban) are Snakes and Crocodiles.

Sacred site include burial grounds, shrines, and archaeological sites (these have different names and descriptions in different communities. Soil infertility is also linked with desecrating of land and community acts that could offend the gods. This is believed, could manifest in form of erosion, and/ or pest attack or invasion. Shrines are sacred places which must not be desecrated. The Ikom people would even like that buildings should be erected in such site, and thereby protected from influx of civilization. Most homes have their own specific shrines in Enugu apart from community shrines. It is a taboo for married women to commit adultery. Most of the festivals take place during the dry season. Some of these festivals are: New yam festival, Cassava festival, and Masquerade festival.
3.4.15 Detailed Demographics of Project States

i) Enugu State

Enugu State, with a project population of 2,399,639 for the year 2002, has 17 Local Government Areas (LGAs), while each LGA is made up of several communities. The state shares boundaries with Kogi, Benue, Ebonyi, Abia, and Anambra States. The two communities selected for the study in Enugu State are i.e. Nike communality in Enugu East LGA (a rural community), and Enugu town in Enugu North LGA (an urban community), and main criterion for the selection of communities for the study is the nearness to the proposed highway.

Enugu Community in Enugu North LGA (urban Community)

The community selection is on the outskirt of Enugu city, North LGA. Enugu city is the capital of Enugu State. The study community spreads from the Abakpa junction to Polo roundabout inside Enugu town. The community selection has about 5,000 housing units, most of which are the traditional cemented/zinc-roofed type. The predominant ethnic group is Igbo, while there are other minority groups like the Hausa, Yoruba, Tivs, Edo, Efiks and Fulani’s. The Igwe (Head of the community) takes responsibilities for the leadership of the community. His administration is supported by the Town Union Executives who serve as liaison officers to other community members. The Igwe and members of his Council are responsible to the LGA Chairman.

Nike Community (Rural) In Enugu East LGA

The people of Nike are Igbos, with the sub-ethnic groups identified as Ibagwe, Umehigbo, Umeenwene and Aupuoga. Other minority sub-ethnic groups are Amoupo, Aluhi, Eziama and Amaowelle.

The population of Nike is about 37,000. Nike community follows this network of about 24 villages. Its paramount ruler, Igwe- James Agbo is supported by the Village Heads, Youths and Women. At Nike, women are subsidiary to men. And they are hardly involved in community governance. Field reports indicated that the Nike Youths (males) possess more value of importance in politics than their women.

3.5. Stakeholders Consultation

An extensive Stakeholders consultation was embarked on to interact with all stakeholders and Project Affected Persons on the proposed bridge construction. It aimed at determining their existing socio-economic conditions, and how the project impact may affect them. Some of the concerns along the corridor that are probably to be displaced are shown in plate 3.1.
Some of the pictures taken during the consultation with the Aim consultants

Consultation & enumeration of the items to be affected by the 8m encroachment with the Otukwu village exco & PAP’s

A petty trader (Mrs Patricia Anyanwu) along the corridor of project

Specifically, some of those consulted include the following:

- Local sand miners
- African Tinkers block industry
- NNPC depot manager
- PHCN distribution manager
- A woman’s (Patricia Anyanwu) local shop along the transition corridor
- Otukwu village executives and people

There were several meetings held with these groups and some of the minutes and agreements reached are attached as appendix.

*Environmental Social Management Plan for the bridge at Km 7.350 along Enugu-Abakaliki road*
SECTION 4: SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS

4.1 Introduction
This Section contains a summary of the impacts that are likely to result from the project as a result of the interaction between the project components and the environmental elements. The method of impact identified and evaluated is also given in this Section.

4.2 Impact Identification and Evaluation
The identification and management of impacts associated with project activities were based on a risk management involves:

- Identification of project activities that may interact with the project environment.
- Implementing controls to reduce risk of impacts.
- Monitoring the effectiveness of controls.

The key project activities of the proposed development were identified. The pathways (or events) that may cause impacts to the environment were determined, and their associated potential impacts listed. The risk of the impacts occurring was analysed by determining the consequence severity of the impacts and the likelihood of consequences being realised. The severity of the consequences was determined using a Consequence Severity Table and the likelihood of an impact resulting from a pathway was determined with a Likelihood Ranking Table and then the level of risk was determined using a Risk Matrix (Table 2).

To prevent or minimise the impacts, controls were placed on the pathways in this order of priority:

- Elimination of the activity.
- Substitution with a lower risk activity.
- Engineering solutions to reduce the impact of the event.
- Implementation of administrative procedures to control the activity.
- Clean up or remediation measures to mitigate impacts after an event.

| Table 2: Consequence Severity, Likelihood Ranking & Risk Matrix Tables |
|---|---|
| **Consequence Severity Table** | **Consequence** |
| Level | 1 | Insignificant | No detectable impact to the existing environment. |
| | 2 | Minor | Short term of localized impact |
| | 3 | Moderate | Prolonged but recoverable impact on the environment and commercial industries. |
| | 4 | Major | Prolonged impact to the environment which may not be recoverable and threatens an ecological community, the conservation of species or the sustained viability of commercial industries. |
| | 5 | Catastrophic | Non-recoverable change to existing environment leading to loss of endangered species or creation of human health risk |
| **Likelihood Ranking Table** | **Likelihood** |
| Level | A | Almost certain | The incident is expected to occur most of the time (i.e. every time). |
| | Likely | The incident will probably occur in most circumstances (i.e. regularly, weekly) |
| | Moderate | The incident should occur at some time (i.e. quarterly) |
4.3 Potential Impacts of the Project

4.3.1 The Project Benefits

The project is envisaged to have a range of positive environmental and social impacts. Some of these are a function of the objectives of the project, while others are a function of the way in which the project is designed to meet its objectives.

Specifically, the following are some of the benefits that could be due to the project:

- Creation of job opportunities both during construction and operation;
- Improvement in the linking bridge which is a major benefit to the two State capitals and other smaller communities. The proposed infrastructure is of strategic importance to enhance transport links and operations between the two States, especially with regard to ease of movement of goods and people and reduction of transit times considerably thereby strengthen regional integration, trade facilitation and economic growth and development.

In addition to the increased employment opportunities directly in the project, will be increased income generating opportunities from emerging demand for services such as restaurants, small shops and allied activities which tend to favour women, due to the expected increase in traffic.
4.3.2 The Project Negative Impacts
The proposed development unfortunately is also likely to exert adverse impacts on the social and physical environment within which it is executed. These impacts can be divided into short-term construction related impacts and long-term operation unavoidable impacts. The short-term impacts include construction traffic, dust, increased sediment transport from the site, construction related noise, and disruption of vehicle and pedestrian traffic as well as aquatic species in the river.

4.3.3 Irreversible Environmental Changes
The proposed site will neither consume nor alter significant land, environmental and socio-cultural resources. The proposed project will not generate other significant demands on natural resources of the immediate or surrounding area nor disturb archaeological sites. Thus no long-term losses of significant resources are anticipated in the construction and operation of the proposed project.

4.3.4 Analysis of Project Alternatives

In the context of this ESMP, analysis of project alternatives refers to the performance of the natural and socio-economic resources with or without the project or with or without the implementation of the measures of this ESMP and/or other safeguard instrument considered appropriate.

The need for analysis of project alternatives is based on being able to judge the sustainability in time, as a complement to the evaluation phase of the project, it is considered relevant to establish the behavior of the environment into the future. For this purpose, some alternatives are analyzed to evaluate the character, magnitude and time within which alterations are caused over each one of the environmental elements, considering or not the implementation of the ESMP for the project.

For projects of this nature, there are usually a number of viable options that can be considered. These alternatives include: the no project option; delayed project; alternative site/location and project execution option. For this project, analysis of the various alternatives is presented as follows:

4.3.4.1 No Project Option
The no project option implies that the proposed project shall not be executed; hence there is no need to carry out this study. This option though it is environmentally friendly, nevertheless, it keeps every user of that road on risk as it can collapse at any time. Also, since this is the only road linking Enugu State and Ebonyi State, it will be economically unviable, as it will distort trade and transportation business which is the means of livelihood of many. The business opportunities that the project will create to Enugu State indigenes and Nigeria in general will be lost. Substantial amount of money had already been spent on the feasibility, planning and logistics for the project. In addition, the project is designed to mitigate any negative impacts that may arise during the life of the project.
Therefore, choosing the no project option will mean a loss of preliminary investments made by the project proponents on the project, risk of loss lives and loss of job opportunity to Nigerians. The ‘no project option’ is therefore not considered a viable option.

4.3.4.2 Delayed Project Option
This option implies that the planned project will be delayed until a much later date. Such option is usually taken when conditions are unfavourable to project implementation such as in war situation, or where the host community is deeply resentful of the project. Also, if the prevailing economic climate is not quite favourable to the project, then delayed project option may be feasible. None of these conditions is applicable. Indeed, both the economic and the political environment are most favourably disposed towards the project. Also considering that any little delay in the discontinuation of using the existing bridge may mean doom to the road users. Therefore, the implication of delayed project option will mean that all the preliminary work and associated efforts/ costs incurred would have come to nothing. Also, because of inflationary trends, such a delay may result in unanticipated increase in project costs, which may affect the final target from the project. These, and other related problems make impracticable to adopt the delayed option.

4.3.4.3 Rehabilitation of the existing bridge instead of the proposed new bridge

Ideally, this could have been a better option considering the cost implication but expert review has identified it as none feasible since the pier of the existing 2x20m bridge no 2 has settled, and is still settling. This can lead to collapse. It is not possible to repair the bridge either by underpinning the pier or jacking up the bridge deck.

These reasons make it technically not feasible to embark on the rehabilitation and such the option was not considered viable.

4.3.4.4 Go Ahead and Construct a New Alternate Bridge Option
This option means going ahead to construct an alternate bridge beside the existing Bridge No 2 at Emene along Enugu-Abakaliki Road. This also entails harkening to professional advice on the most practicable option. This will definitely reassure the road user of their safety. It will also aid in trade and commerce and create employment.

The decision for a new bridge located 3m away on the right hand side of the existing bridge was taken in anticipation of the on-going dualization of the road and the relatively less difficult terrain along the chosen alignment after sessions of brainstorming at different meetings and a visit within Enugu metropolis to a similar project with the PM-RSDT. This option is therefore considered the most viable and recommended for implementation.
<table>
<thead>
<tr>
<th>S/No</th>
<th>Project Identification</th>
<th>Impact</th>
<th>Potential Impact Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Construction</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 1    | Habitat Disruption due to site clearing and/or leveling (Plants and wildlife) | • Damage or destroy sensitive terrestrial ecosystems (trees being removed & disturbance to wildlife)  
• Produce areas of bare soil which cause erosion, siltation, changes in natural water flow, and/or damage to aquatic ecosystems  
• Damage or destroy sensitive terrestrial ecosystems | |
| 2    | Use of heavy equipment and hazardous materials | • Cause erosion due to machinery tracks, damage to roads, stream banks  
• Compact soil, change surface and groundwater flows, and adversely affect future use for agriculture  
• Contaminate ground or surface water when hydraulic oil, motor oil or other harmful mechanical fluids are spilled or dumped  
• Put workers at risk from exposure to hazardous materials  
• Noise and Dust | |
| 3    | Water management       | • Scour and erosion below unprotected drainage out falls  
• Disruption of drinking or irrigation water | |
| 4    | Slope stability/Excavation, cutting, and filling | • Mass instability on slopes  
• Development of erosion or gullying  
• Road crosses major areas of deep-seated instability  
• Cause erosion, siltation, changes in natural water flow, and damage to aquatic ecosystems when excavated soil is piled inappropriately  
• Expose inhabitants and crew to risk of falls and injuries in excavation pits  
• Block water courses when fill is inappropriately placed  
• Destroy valuable ecosystems when fill is inappropriately placed  
• Cause land subsidence or landslides when fill is inappropriately placed, causing injuries and damages  
• Degrade water quality  
• Alter hydrology | |
| 5    | Traffic Disruptions and interruption of local traffic | • Carelessly planned detours and road closures.  
• Increased vehicular speed that could lead to significant increases in accident rates for both human and animal populations | |
<table>
<thead>
<tr>
<th>S/No</th>
<th>Project Activities/Impact</th>
<th>Potential Impact Description</th>
</tr>
</thead>
</table>
| 6    | Land use/Land take        | • Kiosk and facilities may be removed  
|      |                           | • Loss of agricultural land  
|      |                           | • Loss of economic trees  |
| 7    | Involuntary Resettlement  | • Displacement due (i) affected persons living or engaged in livelihood activity within the right of way; or (ii) for technical or safety reasons, the road departs from the existing alignment and affects persons living or engaged in livelihood activities with the altered right of way.  |
| 8    | Utility Disruptions       | • Construction activities and the need to realign utility supply lines  |
| 9    | Public Safety and Health  | • Injury/accident due to lack of warning signs, site barricaded and safeguards  
|      |                           | • Exposure to atmospheric emissions from construction equipment  
|      |                           | • Exposure to excessive and continuous noise and vibration from construction activities  |
| 10   | Occupational Health and Safety | • Accidents from operation of construction equipment  
|      |                           | • Accident due to disorganized site  
|      |                           | • Operation of machinery endangers both operators and laborers  
|      |                           | • Poorly planned borrow pits and quarries pose threats, ranging from falls from quarry faces to drowning in quarry pits that have become standing water reservoirs  |
| **B** | Operation and Maintenance |                           |
| 1    | Maintenance               | • Create gullies and standing pools  
|      |                           | • Create mud holes, potholes  
|      |                           | • Breed disease vectors in settling basins and retention ponds  
|      |                           | • Remove ruts, potholes, wash boarding, and standing water  |
| 2    | High-speed driving        | • Road Safety: faster traffic resulting from a new, smoother road surface -Cause injury and death of people and animals  
|      |                           | • Sudden application of break before using the transition road may cause accident  |
| **C** | Decommissioning          |                           |
| 1    | Dismantling of bridge components after they have become weak | • Injuries  
|      |                           | • Solid wastes  
|      |                           | • Dust  
|      |                           | • Noise  |
SECTION 5  ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

5.0  Introduction

In the project design the impacts identified were duly incorporated. While the design stands to strengthen the positive impacts, a priority in the project planning and design has been to avoid potential negative environmental and social impacts. Thus as much as possible in the design and selection of site, work methods, equipment, for the project, etc. identified negative impacts are already mitigated.

Nevertheless, some of the impacts will require additional measures outright and purchase of abatement equipment such as wastewater/sewage treatment plant, while others will require sound operational procedures and good housekeeping. Provisions have been made for this in the entire arrangement of the planned work for construction and operation of the facility, for impacts that are unavoidable.

With all intent and purpose, the proposed project activities whether during construction or operation shall not constitute environmental and social burdens to the environment that cannot be managed effectively.

5.1  Approaches to Developing a good Environmental and Social Management Plan

Options to address the various environmental and social issues identified have been worked out based on review of good practices and requirement of compliance with the legal provisions as well as consultations with the relevant stakeholders. The principle that guides the approach to mitigation measure development is outlined in Table 4.

<table>
<thead>
<tr>
<th>Management Plan/Mitigation Measure</th>
<th>Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Seek Alternatives to avoid particular impacts.</td>
<td>Consider alternatives to a proposed project activity. Examine alternative ways to achieve the objectives to maximize benefits and minimize undesirable impacts.</td>
</tr>
<tr>
<td>2 Arrange Compensation where particular impacts are unavoidable.</td>
<td>Restore damaged resources, such as, water source, irrigation system, forest. Proper rehabilitation scheme, such as, skills training, new employment. Adequate compensation payments to affected persons for damage or loss of property, livelihood and provision of rehabilitation measures.</td>
</tr>
<tr>
<td>3 Take Corrective Measures to reduce unavoidable effects.</td>
<td>Consider corrective measures to reduce adverse impacts to acceptable standards, such as, remove spoil material during construction, replace or relocate community water source, assist in school expansion to handle influx of laborers' children, and others.</td>
</tr>
<tr>
<td>4 Implement Preventive Measures to avoid some impacts altogether.</td>
<td>Pre-preparation for minimizing adverse impacts, such as, implement health education program, initiate public awareness programs.</td>
</tr>
</tbody>
</table>

5.2 Environmental and Social Management Plan Measures

Based on the impacts, potential problems and effects, and taking into consideration the above environmental and social management plan that will involve a good mitigation measure development approaches, responsibilities and cost of implementation, suggested measures suitable to the project are suggested in Table 5.

5.3 Mitigation Measures- integrating into project design and tender documents

The mitigation measures developed herewith and especially developed in respect of the specific project and site subsequently, should be integrated into the project design and tender documents. Using this approach, the mitigation measures will automatically become part of the project construction and operation phase. By including mitigation measures in the contract or in specific items in the Bill of Quantities, monitoring and supervision, mitigation measure implementation could be covered under the normal engineering supervision provisions of the contract.

Project Design.
The mitigation measures should be integrated in the design of the project itself. Such a step will enhance the mitigation measures in terms of specific mitigation design, cost estimation of the mitigation measure, and specific implementation criteria. The mitigation measure integration in the design phase will also help in strengthening the benefits and sustainability of the project.

Project Contract
The project contractor should be bound by the parameters identified in the environmental and social assessment pertaining to specific mitigation measures in the contract. The final acceptance of the completed works should not occur until the environmental clauses have been satisfactorily implemented.

Bill of Quantities
The tender instruction to bidders should explicitly mention the site-specific mitigation measures to be performed, the materials to be used, labor camp arrangements, and waste disposal areas, as well other site specific environmental requirements. Such a definition would clearly exhibit the cost requirement to undertake mitigation measures, which otherwise might be lost as the bidders in an attempt to be more competitive may not include the price realistic enough to fund mitigation measures and other protection measures.

Supervision and Monitoring
The purpose of supervision is to make sure that specific mitigation parameters identified in the environmental and social assessment and as bound by the contract is satisfactorily implemented. Likewise, monitoring is necessary such that the mitigation measures are actually put into practice.
<table>
<thead>
<tr>
<th>S/N</th>
<th>Activities</th>
<th>Potential Impact</th>
<th>Mitigation Measures</th>
<th>Responsibility</th>
<th>Cost (Naira)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>CONSTRUCTION STAGE</td>
<td>Impact Description</td>
<td>Parameter/indicator</td>
<td>Who</td>
<td>Estimated how much</td>
</tr>
</tbody>
</table>
| 1   | Habitat Disruption due to site clearing and/or leveling (Plants and wildlife) | • Damage or destroy sensitive terrestrial ecosystems (trees being removed & disturbance to wildlife)  
• Produce areas of bare soil which cause erosion, siltation, changes in natural water flow, and/or damage to aquatic ecosystems  
• Damage or destroy sensitive terrestrial ecosystems | First identify sensitive ecosystems and protect them. Do clearing only on approved corridor. Give early notice. Replant and replace species were necessary. Pay compensations were necessary and properly relocate were agreed. | RSDT-FMW, Contractor | 0.1m |
| 2   | Use of heavy equipment and hazardous materials | • Cause erosion due to machinery tracks, damage to roads, stream banks  
• Compact soil, change surface and groundwater flows, and adversely affect future use for agriculture  
• Contaminate ground or surface water when hydraulic oil, motor oil or other harmful mechanical fluids are spilled or dumped  
• Put workers at risk from exposure to hazardous materials  
• Noise and Dust | Source for good equipment & HSE certified careful driver, Wholesomeness of mat, frequency of accident. Provide nose guards, wet site. Growth of seedlings, health of site workers | RSDT-FMW, Contractor | 0.3m |
| 3   | Water management | • Scour and erosion below unprotected drainage out falls  
• Disruption of drinking or irrigation water | Provide good drainage, safety gadgets, dispose solid waste properly. No of workers wearing s/gadgets, site hygiene/house keeping. Regular analysis of water | RSDT-FMW, Contractor, State Ministry of water Resources | 0.2m |
| 4   | Slope stability/Excavation, cutting, and filling | • Mass instability on slopes  
• Development of erosion or gullying  
• Road crosses major areas of deep- seated instability  
• Cause erosion, siltation, changes in natural water flow, and damage to aquatic ecosystems when excavated soil is piled inappropriately  
• Expose inhabitants and crew to risk of falls and injuries in excavation pits  
• Destroy valuable ecosystems when fill is inappropriately placed  
• Degrade water quality | Adhere strictly to design specifications. Ensure wearing of PPP. Stabilize slopes by planting vegetation. Work with agronomists to identify native species with the best erosion control properties, root strength, site adaptability, and other socially useful properties. Set up nurseries in project areas to supply necessary plants. Do not use non-native plants. Use soil stabilizing chemicals or geo-textiles (fabrics) where feasible and appropriate (P&D) (C) | RSDT-FMW, Contractor | 0.3m |
| 5   | Traffic Disruptions and interruption of local traffic | • Carelessly planned detours and road closures.  
• Increased vehicular speed that could lead to significant increases in accident rates for both human and animal populations | Carry out early warning system to road users before project implementation. Put caution road signs for diversion. | RSDT-FMW, Contractor, FRSC | 0.2m |
|   | Land use/Land take | • Kiosk and facilities may be removed  
• Loss of agricultural land  
• Loss of economic trees | Identify real land owners through consultation. Do appropriate compensation as applicable. | RSDT-FMW, Contractor, World Bank | 0.3m |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Involuntary Resettlement</td>
<td>• Displacement due (i) affected persons living or engaged in livelihood activity within the right of way; or (ii) for technical or safety reasons, the road deviates from the existing alignment and affects persons living or engaged in livelihood activities with the altered right of way.</td>
<td>Identify the key stakeholders and PAPs. Engage in a wide stakeholders’ consultation. Properly valuate assets. Adhere to compensation and relocation terms. Establish a grievance redress mechanism.</td>
<td>RSDT-FMW, Contractor, World Bank</td>
<td>0.7m</td>
</tr>
<tr>
<td>8</td>
<td>Utility Disruptions</td>
<td>• Construction activities and the need to realign utility supply lines</td>
<td>Engage in consultation. Replace and relocate as appropriate.</td>
<td>RSDT-FMW, Contractor, World Bank</td>
<td>0.2m</td>
</tr>
</tbody>
</table>
| 9 | Public Safety and Health | • Injury/accident due to lack of warning signs, site barricaded and safeguards  
• Exposure to atmospheric emissions from construction equipment  
• Exposure to excessive and continuous noise and vibration from construction activities | Adhere to all safety standards. | RSDT-FMW, Contractor | 0.2m |
| 10 | Occupational Health and Safety | • Accidents from operation of construction equipment  
• Accident due to disorganized site  
• Operation of machinery endangers both operators and laborers  
• Poorly planned borrow pits and quarries pose threats, ranging from falls from quarry faces to drowning in quarry pits that have become standing water reservoirs | Adhere to all occupational Health and Safety standards. Train and retrain staff. Establish a safety committee and ensure daily safety briefing. | RSDT-FMW, Contractor | 0.3m |
| B | OPERATION STAGE |   |   |   |   |
| 1 | Maintenance | • Create gullies and standing pools  
• Create mud holes, potholes  
• Breed disease vectors in settling basins and retention ponds  
• Remove ruts, potholes, wash boarding, and standing water | Fill mud holes and potholes with good quality gravel; remove downed trees and limbs obscuring roadways (O&M). Ensure a combined approach, with a private contractor performing mechanized maintenance and subcontracting labor-intensive maintenance to the communities. Ensure maintenance contracts that are performance-based with penalties in case of non-compliance with the agreed standards (e.g. flouting safety rules, number of potholes per km of roads). | Government enforcement agents/FMW/Contractor | 0.3m |

*Environmental Social Management Plan for the bridge at Km7+350 along Enugu-Alakaliki road*
<table>
<thead>
<tr>
<th></th>
<th>High-speed driving</th>
<th>• Road Safety: faster traffic resulting from a new, smoother road surface -Cause injury and death of people and animals • Sudden application of break before using the transition road may cause accident</th>
<th>Adherence to road signs, adherence to speed limits, use of fire extinguishers Reduction in fire hazard records</th>
<th>Government enforcement agents/FMW/Contractor</th>
<th>0.3m</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>DECOMMISSIONING STAGE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Dismantling of bridge and road structures</td>
<td>Injuries Solid waste-damaged parts Dust Noise</td>
<td>- Sell wastes to factory recycling - Store wanted parts - Wear safety gadgets Level of hygiene of mill environment after dismantling</td>
<td>RSDT-FMW, Contractor, Consultant</td>
<td>0.3m</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.8m</td>
</tr>
</tbody>
</table>
5.4 IMPLEMENTATION PROGRAMMES

The successful implementation of the ESMP depends on the commitment of a budget as well as other related institutions such as role definition and capacity building. The Budgets for the ESMP must include the environmental management costs other than the good engineering practices, cost of environmental and resettlement monitoring. All administrative costs for implementing the ESMP shall be budgeted for as part of the project costing.

Some of the management programmes that must be part of the ESMP are highlighted below:

5.4.1 ENVIRONMENTAL MONITORING AND AUDITING

In order to effectively and efficiently implement this ESMP, a system for monitoring and auditing has been built into the overall management plan. Monitoring and auditing assist in the examination of management, employee knowledge, programme responsibilities, records & effectiveness.

Specifically, these help to:
- Improve environmental and social management practices;
- Check the efficiency and quality of the environmental management processes;
- Establish the scientific reliability and credibility of the ESMP for the project and;
- Provide the opportunity to report the results on safeguards and impacts and proposed mitigation measures implementation.

The Environmental monitoring activities shall be based on direct or indirect indicators of emissions, effluents, and resource use applicable to the project. Monitoring frequency shall be sufficient to provide representative data for the parameter being monitored. Monitoring shall be conducted by trained individuals who can carry out the monitoring and record-keeping effectively using properly calibrated and maintained equipment.

Monitoring data shall be analyzed and reviewed at regular intervals and compared with the operating standards so that any necessary corrective actions can be taken. As part of monitoring programme, visual inspections and quality monitoring for light attenuation will be conducted daily, for instance.

5.4.2 Reporting Procedure

The nature of issues to report and manner of reporting are outlined below:

5.4.2.1 Complaints Register and Environmental Incidents

Any environmental or social incidents shall be documented. The report shall be transmitted to the relevant authority by the Management, where necessary/applicable. The reporting shall be with a view to taking appropriate mitigation measures.

All complaints received will be investigated and a response (even if pending further investigation) is to be given to the complainant within 5 days.
The following information must be provided:

- Time, date and nature of the incident/report;
- Type of communication (e.g. telephone, personal meeting);
- Name, house location and contact telephone number of person making the complaint. If this person wishes to remain anonymous then “not identified” is to be recorded;
- Details of response and investigation undertaken as a result of the incident/complaint;
- Name of person undertaking investigation of the incident/complaint;
- Corrective action taken as a result of the incident/complaint.

The report shall be rendered for both internal (in-house) uses all phases of the project for internal and external (public) consumption through the regulators.

### 5.4.2.2 Record keeping

Good records are the paper trail that will prove that this ESMP is working as intended. Keeping records of inspection of maintenance programme, waste management, training programme, etc will be useful to demonstrate that the ESMP is being complied with or not. The type of records from the various management and monitoring programmes include:

- completed forms, checklists and maintenance logs
- identified problems and corrective actions undertaken
- monitoring data / results

Some other types of records will also be valuable for assisting with the implementation of the ESMP and/or ESMP Review such as:

- Incident forms (especially pollution incidents and response, accidents, etc.)
- Internal and external communications regarding the ESMP (e.g. with waste management)
- Results of internal or external assessments and compliance visits.

### 5.4.3 Institutional Arrangements

Since one of the main purposes of ESMPs is to establish responsibility for the activities that have to be undertaken, this sub-section details below, institutional arrangements and the roles and responsibilities of the various institutions in the implementation of the ESMP as outlined in Table 5.2.

#### Table 5.2: Institutional Responsibilities

<table>
<thead>
<tr>
<th>S/No</th>
<th>Category</th>
<th>Roles &amp; Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Federal Ministry of Works</td>
<td>Implementing authority, has the mandate to:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Co-ordinate all policies, programmes and actions of all road construction across the States</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ensure the smooth and efficient implementation of the project’s various technical programmes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Cooperate through a Steering Committee that provides guidance to the</td>
</tr>
<tr>
<td>2.</td>
<td>State Ministries of works</td>
<td>• Maintain and manage all funds effectively and efficiently for the projects</td>
</tr>
<tr>
<td>3.</td>
<td>Federal Government MDAs (Federal Ministry of Environment and her agencies (Such as NESREA))</td>
<td>• Lead role - provision of advice on screening, scoping, review of draft RAP/EA report (in liaison with State Ministry of Environment), receiving comments from stakeholders, public hearing of the project proposals, and convening a technical decision-making panel, Project categorization for EA, Applicable standards, Environmental and social liability investigations, Monitoring and evaluation process and criteria</td>
</tr>
<tr>
<td>4.</td>
<td>State Government MDAs (Ministry of Lands, Survey and Urban Development, Ministry of Environment, etc.)</td>
<td>• Compliance overseer at State Level, on matters of Land Acquisition and compensation and other resettlement issues, • Lead role -provision of advice on screening, scoping, review of draft RAP/EA report (in liaison with Federal Ministry of Environment), receiving comments from stakeholders, public hearing of the project proposals, and convening a technical decision-making panel, Monitoring and evaluation process and criteria</td>
</tr>
<tr>
<td>Other MDAs</td>
<td>• Come in as and when relevant areas or resources under their jurisdiction or management are likely to be affected by or implicated projects, • They participate in the EA processes and in project decision-making that helps prevent or minimize impacts and to mitigate them. These institutions may also be required, 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</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>World Bank</td>
<td>• Assess implementation • Recommend additional measures for strengthening the management framework and implementation performance.</td>
</tr>
<tr>
<td>6.</td>
<td>Service Provider/ Contractor</td>
<td>• Compliance to BOQ specification in procurement of material and construction</td>
</tr>
<tr>
<td>7.</td>
<td>Site Engineers/Supervisors</td>
<td>• Provide oversight function during construction and decommissioning</td>
</tr>
<tr>
<td>8.</td>
<td>Local government</td>
<td>• Provide oversight function across subproject in LGAs for ESMP compliance</td>
</tr>
<tr>
<td>9.</td>
<td>Local Community</td>
<td>• Promote environmental awareness • Assist and Liaise with other stakeholders to ensure proper siting and provision of approval for such sites • Support with provision of necessary infrastructures and engage/ encourage carrying out comprehensive and practical awareness campaign for the proposed projects, amongst the various relevant grass roots interest groups.</td>
</tr>
<tr>
<td>10.</td>
<td>CDA</td>
<td>• Ensure Community participation by mobilizing, sensitizing community members;</td>
</tr>
<tr>
<td>11.</td>
<td>NGOs/CSOs</td>
<td>• Assisting in their respective ways to ensure effective response actions, Conducting scientific researches 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 &amp; Providing wide support assistance helpful in management planning, institutional/governance issues and other livelihood related matter, Project impacts and mitigation measure, Awareness campaigns</td>
</tr>
<tr>
<td>12.</td>
<td>Others/General Public</td>
<td>• Identify issues that could derail the project • Support project impacts and mitigation measures, Awareness campaigns</td>
</tr>
</tbody>
</table>

### 5.4.4 Institutional Capacity Building & Training

It is worthy to note that each person and indeed all persons that shall work on any aspect of the road rehabilitation would have a role to play in preventing pollution and making the ESMP work. Everyone will need some form of HSE training to help them behave responsibly. The most well written ESMP will not prevent pollution if staff is not trained about the risks associated with their activities and how to deal with them.

*Environmental Social Management Plan for the bridge at Km7+350 along Enugu-Abakaliki road*
To enhance the respective roles and collaboration of the relevant stakeholders, the following broad areas for capacity building have been identified as deserving of attention for effective implementation of the ESMP:

- Induction and refresher training on HSE issues for all staff (and contractors as appropriate)
- Occupational Health and Safety
- Pollution Control management
- Environmental Impact Assessment (EIA);
- Environmental Management Planning;
- Monitoring and Environmental Audit;
- Annual Environmental Report preparation and other reporting requirements;

It is worthy to note that each person and indeed all persons that shall work on any aspect of the road rehabilitation project would have a role to play in preventing pollution and making the ESMP work. Everyone will need some form of HSE training to help them behave responsibly. The most well written ESMP will not prevent pollution if staff is not trained about the risks associated with their activities and how to deal with them.

To enhance the respective roles and collaboration of the relevant stakeholders for effective implementation of the ESMP, an induction presentation on the importance and implications of the ESMP shall be carried out.

The following focus area shall serve as a minimum of the type of training:

- Explanation of the importance of complying with the ESMP.
- Discussion of the potential environmental impacts of construction activities.
- The benefits of improved personal performance.
- Employees’ roles and responsibilities, including emergency preparedness.
- Explanation of the mitigation measures that must be implemented when carrying out their activities.
- Explanation of the specifics of this ESMP and its specification (no-go areas, etc.)
- Explanation of the management structure of individuals responsible for matters pertaining to the ESMP.
- Explanation of pesticide/chemical handling and use
- Explanation of waste and pollution control management
- Monitoring and Environmental Audit;
- Annual Environmental Report preparation and other reporting requirements;

The presentation shall be conducted, as far as is possible, in the language of choice of trainees.

5.5 **Budgets for the ESMP**

ESMPs have associated costs. Thus to effectively implement the environmental and social management measures suggested as part of the ESMP, necessary budgetary provisions shall be made for the project components. The cost of each measure have been estimated and included in
the overall ESMP budget. The tentative budget for each of the project measures shall include the environmental management costs other than the good engineering practices, cost of environmental monitoring. All administrative costs for implementing the ESMP shall be budgeted for as part of the costing.

5.6 Review and Revision of the ESMP
There is need to review and update the ESMP regularly to ensure it reflects the current situation on site and take into account changes that have occurred since the first version. The changes could be in the project description or new requirements/legislation coming into effect in the course of the project execution.

Any changes to the ESMP need to be reflected in the information in the ESMP about the site, pollution controls and/or programmes and systems. Each of these will therefore also need to be updated. A copy of the revised version will be sent to relevant regulatory authorities as the case maybe.

5.7 Disclosures
The ESMP is prepared in consultation with the State MDAs, CBOs/NGOs and relevant community groups.
All reasonable efforts must also be made to disclose/display them to the public at strategic points within the project’s area of influence so as to allow all stakeholders read and understand how they stand to be affected by the project.
It should also be disclosed at the Ministry of Environment and the World Bank Info Shop.

5.8 Implementation Schedule
The key elements of the implementation schedule which are shown in Table 5.3 are as listed below:

- Preparation and submission of the Action plan;
- Nominating Environmental Management Representative;
- Finalizing site(s) and layout plan(s) for construction of temporary yards incorporating environmental requirements;
- Preparation and submission of construction schedule;
- Implementation of mitigation and enhancement measures;
- Environmental auditing;
- Monitoring and reporting on ESMP implementation
### Table 5.3: ESMP Implementation Schedule

<table>
<thead>
<tr>
<th>S/N</th>
<th>Activity Description</th>
<th>Responsible</th>
<th>Pre-Construction</th>
<th>Construction</th>
<th>Operatio n</th>
<th>Budget* (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Disclosure of ESMP Report</td>
<td>FMW</td>
<td></td>
<td></td>
<td></td>
<td>0.50m</td>
</tr>
<tr>
<td>2.</td>
<td>Allocating Budget for ESMP</td>
<td>FMW</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Appointing Support Staff for ESMP</td>
<td>Contractor</td>
<td></td>
<td></td>
<td></td>
<td>0.50m</td>
</tr>
<tr>
<td>4.</td>
<td>Review and Approval of Contractor’s ESMP and Safety Plan</td>
<td>FMW</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Finalising site and layout plan of construction plan</td>
<td>Contractor</td>
<td></td>
<td></td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>6.</td>
<td>Implementation of Mitigation Measures</td>
<td>Contractor</td>
<td></td>
<td></td>
<td></td>
<td>1.0m</td>
</tr>
<tr>
<td>7.</td>
<td>Supervising ESMP Implementation</td>
<td>Contractor/FMW</td>
<td></td>
<td></td>
<td></td>
<td>0.50m</td>
</tr>
<tr>
<td>8.</td>
<td>Environmental Auditing</td>
<td>FMW/MoE/ HSE Consultant</td>
<td></td>
<td></td>
<td></td>
<td>0.50m</td>
</tr>
<tr>
<td>9.</td>
<td>Monitoring &amp; Reporting on EMP Implementation</td>
<td>FMW/Contractor</td>
<td></td>
<td></td>
<td></td>
<td>0.30m</td>
</tr>
<tr>
<td>10.</td>
<td>Environmental Training</td>
<td>Contractor/HSE Consultant</td>
<td></td>
<td></td>
<td></td>
<td>0.50m</td>
</tr>
<tr>
<td></td>
<td><strong>Total Budget</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>3.80m</strong></td>
</tr>
</tbody>
</table>

*indicative only
References

- Federal Ministry of Agriculture and Water Resources (2003): Third National Fadama Development Project (Fadama III), Rural Infrastructure, Manual No. 4, August

*Environmental Social Management Plan for the bridge at Km7+350 along Enugu-Abakaliki road*
Appendix 1: Example of an ESMP Report Structure

- **CONTEXT**
  - Legal & Policy Requirements
    - Background
    - Establishes the regulatory policy and industry best practice
    - Framework standards and norms
    - Proposed Development and Impacts
    - Description of the project environment
  - **SECTIONS 1-3**

- **MANAGEMENT**
  - Impact Avoidance/Impact Mitigation
    - Potential impacts and mitigation measures for impacts identified
    - Mitigation measures
  - **SECTIONS 4**

- **MONITORING**
  - Monitoring & Auditing, Roles & Responsibilities
    - Roles as responsible for implementing the EMP
    - Implementation of the management actions
    - Verification and assurance of mitigation measures in place
  - **SECTION 5**
### Appendix 2: Some Federal Policy/Legislation

<table>
<thead>
<tr>
<th>S/N</th>
<th>Regulations</th>
<th>Year</th>
<th>Provisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>National Environmental Protection (Effluent Limitation) Regulations</td>
<td>1991</td>
<td>The regulation makes it mandatory for industrial facilities to install anti-pollution equipment, makes provision for effluent treatment and prescribes a maximum limit of effluent parameters allowed.</td>
</tr>
<tr>
<td>2</td>
<td>National Environmental Protection (Pollution and Abatement in Industries in Facilities Producing Waste) Regulations</td>
<td>1991</td>
<td>Imposes restrictions on the release of toxic substances and stipulates requirements for monitoring of pollution. It also makes it mandatory for existing industries and facilities to conduct periodic environmental audits.</td>
</tr>
<tr>
<td>3</td>
<td>National Environmental Protection (Management of Solid and Hazardous Wastes) Regulations</td>
<td>1991</td>
<td>Regulates the collections, treatment and disposal of solid and hazardous wastes from municipal and industrial sources.</td>
</tr>
<tr>
<td>4</td>
<td>Harmful Wastes (Special Criminal Provisions etc) Decree No. 42</td>
<td>1988</td>
<td>Provides the legal framework for the effective control of the disposal of toxic and hazardous waste into any environment within the confines of Nigeria</td>
</tr>
<tr>
<td>5</td>
<td>Environmental Impact Assessment Act (Decree No. 86)</td>
<td>1992</td>
<td>The decree makes it mandatory for an EIA to be carried out prior to any industrial project development</td>
</tr>
<tr>
<td></td>
<td>National Guideline and Standard for Environmental Pollution Control</td>
<td>1991</td>
<td>The regulations provide guidelines for management of pollution control measures.</td>
</tr>
<tr>
<td>---</td>
<td>---------------------------------------------------------------</td>
<td>------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>7</td>
<td>Workmen Compensation Act</td>
<td>1987 – reviewed 2010</td>
<td>Occupational health and safety</td>
</tr>
<tr>
<td>8</td>
<td>Urban and Regional Planning Decree No 88</td>
<td>1992</td>
<td>Planned development of urban areas (to include and manage waste sites)</td>
</tr>
<tr>
<td>9</td>
<td>Environmental Sanitation edicts, laws and enforcement agencies</td>
<td></td>
<td>General environmental health and sanitation. Enforcing necessary laws</td>
</tr>
<tr>
<td>10</td>
<td>State waste management laws</td>
<td></td>
<td>Ensure proper disposal and clearing of wastes</td>
</tr>
<tr>
<td>11</td>
<td>Public Health Law</td>
<td></td>
<td>Covering public health matters</td>
</tr>
</tbody>
</table>

**Appendix 3; Some Relevant World Bank's Safeguard Policies**

<table>
<thead>
<tr>
<th>Policy</th>
<th>Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OP 4.01 Environmental Assessment</strong></td>
<td>Core requirement of this Policy is that screening should be done as early as possible for potential impacts and selection of an appropriate instrument to assess, minimize and mitigate potentially adverse impacts. Environmental Assessment (EA) ensures that appropriate levels of environmental and social assessment are carried out as part of project design. It also deals with the public consultation process, and ensures that the views of PAPs and local NGOs are incorporated as early as possible for Category A and B projects. It is worth noting that OP 4.01 applies to all components of a project with financing from the World Bank, including co-financed components by the Borrower or by other funding agencies.</td>
</tr>
<tr>
<td><strong>OP/BP 4.12 Involuntary Resettlement</strong></td>
<td>Based on assisting the displaced persons in their efforts to improve or at least restore their standards of living. The impetus of this Policy is that development undertakings should not cause</td>
</tr>
</tbody>
</table>
the impoverishment of the people who are within the area of influence of the undertakings. In cases where resettlement of people is inevitable, or in cases where loss of assets and impacts on the livelihood of the PAPs is experienced, a proper action plan should be undertaken to at least restore, as stated above, their standard of life prior to the undertakings.

Concerning public consultation, resettlers as well as the host communities should be consulted for the successful implementation of the resettlement process. The views of the consulted resettlers and the host communities should be incorporated into the resettlement action plan (RAP) including the list of their choices.

| OP/BP 4.36 Forestry | Envisages the protection of forests through consideration of forest-related impact of all investment operations, ensuring restrictions for operations affecting critical forest conservation areas, and improving commercial forest practice through the use of modern certification systems.
In the process of forest conservation interventions, especially the local people, the private sector and other pertinent stakeholders should be consulted.
In general, the Policy aims at reducing deforestation and enhancing the environmental and social contribution of forested areas. Experience with the Bank reveals that the Bank does not support commercial logging in primary tropical moist forest. |
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>4.09 - Pest Management</td>
<td>Recognizes that pesticides can be persistent and harmful to the environment for a long time. If pesticides must be used, the policy requires that Pest Management Plan (PMP) be prepared by the borrower, either as a stand-alone document or as part of an Environmental Assessment for</td>
</tr>
<tr>
<td>OP 4.04 Conservation of Natural Habitats</td>
<td>Seeks to ensure that World Bank-supported infrastructure and other development projects take into account the conservation of biodiversity, as well as the numerous environmental services and products which natural habitats provide to human society</td>
</tr>
</tbody>
</table>
| OPN 11.03 Management of Cultural Property | Bases itself on investigating and inventorying cultural resources potentially affected. It includes mitigation measures when there are adverse impacts on physical cultural resources.
The management of cultural property should be undertaken in conjunction with consulting the appropriate agencies including NGOs and academic institutions.
The Bank avoids undertakings that will significantly damage non-replicable cultural property, and will assist only those undertakings that are sited or designed so as to prevent such damage. |
The Bank’s Policy on Disclosure

It is the belief of the Bank that the peoples residing in the project areas have the right to be informed of the proposed development project(s) in their respective areas. Therefore, prior to project appraisal, the summary of the study of undertakings along with other relevant information should be disclosed at the Bank’s as well as the project area’s (local) level.

The World Bank policy on disclosure is currently under review, but the present proposals state that Category B Environmental Assessment reports should be self-standing documents, and thus disclosure is a pre-requisite for appraisal of the project.

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Appendix 3: General Environmental Management Conditions For Construction Contracts

General
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 EMP, 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 EMP after written instruction by the Supervising Engineer (SE) to fulfil his obligation within the requested time, the Owner reserves the right to arrange through the SE 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 EMP. 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 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 fulfilment 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, 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 provided in construction workers camps.
   (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.

*Environmental Social Management Plan for the bridge at Km7+350 along Enugu-Abakaliki road*
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 SE for adherence to the contract conditions and specifications, the Owner may 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 SE, the Contractor shall comply with directives from such inspectors to implement measures required to ensure the adequacy rehabilitation measures carried out on the bio-physical environment and compensation for socio-economic disruption resulting from implementation of any works.

Worksites/Campsite Waste Management

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

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

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

9. 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.

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

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

Material Excavation and Deposit

12. The Contractor shall obtain appropriate licenses/permits from relevant authorities to operate quarries or borrow areas.

13. 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.

14. 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 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.

15. 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.

16. 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.

17. The Contractor shall deposit any excess material in accordance with the principles of the general conditions, and any applicable EMP, in areas approved by local authorities and/or the SE.

18. Areas for depositing hazardous materials such as contaminated liquid and solid materials shall be approved by the SE 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**

19. To the extent practicable, the Contractor shall rehabilitate the site progressively so that the rate of rehabilitation is similar to the rate of construction.

20. 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.

21. Topsoil shall not be stored in large heaps. Low mounds of no more than 1 to 2m high are recommended.

22. Re-vegetate stockpiles to protect the soil from erosion, discourage weeds and maintain an active population of beneficial soil microbes.

23. Locate stockpiles where they will not be disturbed by future construction activities.

24. To the extent practicable, reinstate natural drainage patterns where they have been altered or impaired.

25. 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.

26. Identify potentially toxic overburden and screen with suitable material to prevent mobilization of toxins.

27. 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.

28. Minimize the long-term visual impact by creating landforms that are compatible with the adjacent landscape.

29. Minimize erosion by wind and water both during and after the process of reinstatement.

30. Compacted surfaces shall be deep ripped to relieve compaction unless subsurface conditions dictate otherwise.

*Environmental Social Management Plan for the bridge at Km 7+350 along Enugu-Abakaliki road*
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**

32. The Contractor shall at all costs avoid conflicting with water demands of local communities.

33. 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.

34. Abstraction of water from wetlands shall be avoided. Where necessary, authority has to be obtained from relevant authorities.

35. Temporary damming of streams and rivers shall be done in such a way avoids disrupting water supplies to communities down stream, and maintains the ecological balance of the river system.

36. No construction water containing spoils or site effluent, especially cement and oil, shall be allowed to flow into natural water drainage courses.

37. Wash water from washing out of equipment shall not be discharged into water courses or road drains.

38. 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**

39. 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.

40. Upon the completion of civil works, all access roads shall be ripped and rehabilitated.

41. Access roads shall be sprinkled with water at least five times a day in settled areas, and three times in unsettled areas, to suppress dust emissions.

**Blasting**

42. Blasting activities shall not take place less than 2km from settlement areas, cultural sites, or wetlands without the permission of the SE.

43. Blasting activities shall be done during working hours, and local communities shall be consulted on the proposed blasting times.

44. Noise levels reaching the communities from blasting activities shall not exceed 90 decibels.

**Disposal of Unusable Elements**

45. 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 SE. The Contractor has to agree with the SE 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.

46. 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 SE and the local authorities concerned.

*Environmental Social Management Plan for the bridge at Km7+350 along Enugu-Abakaliki road*
AC-pipes as well as broken parts thereof have to be treated as hazardous material and disposed of as specified above.

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

**Health and Safety**

In advance of the construction work, the Contractor shall mount an awareness and hygiene campaign. Workers and local residents shall be sensitized on health risks particularly of AIDS.

Adequate road signs to warn pedestrians and motorists of construction activities, diversions, etc. shall be provided at appropriate points.

Construction vehicles shall not exceed maximum speed limit of 40km per hour.

**Repair of Private Property**

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 owner a certificate that the damage has been made good satisfactorily in order to indemnify the Client from subsequent claims.

In cases where compensation for inconveniences, damage of crops etc. are claimed by the owner, the Client has to be informed by the Contractor through the SE. This compensation is in general settled under the responsibility of the Client before signing the Contract. In unforeseeable cases, the respective administrative entities of the Client will take care of compensation.

**Contractor’s Environment, Health and Safety Management Plan (EHS-MP)**

Within 6 weeks of signing the Contract, the Contractor shall prepare an EHS-MP 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 EMP for the works. The Contractor's EHS-MP will serve two main purposes:

- For the Contractor, for internal purposes, to ensure that all measures are in place for adequate EHS management, and as an operational manual for his staff.
- For the Client, supported where necessary by a SE, to ensure that the Contractor is fully prepared for the adequate management of the EHS aspects of the project, and as a basis for monitoring of the Contractor's EHS performance.

The Contractor’s EHS-MP 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 EMP;
- 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.

The Contractor’s EHS-MP will be reviewed and approved by the Client before start of the works. This review should demonstrate if the Contractor’s EHS-MP covers all of the identified impacts, and has defined appropriate measures to counteract any potential impacts.

**EHS Reporting**

The Contractor shall prepare bi-weekly progress reports to the SE on compliance with these general conditions, the project EMP if any, and his own EHS-MP. An example format for a Contractor EHS report is portrayed in Annex 6. It is expected that the Contractor's reports will include information on:

*Environmental Social Management Plan for the bridge at Km7+350 along Enugu-Abakaliki road*
• EHS management actions/measures taken, including approvals sought from local or national authorities;
• Problems encountered in relation to EHS 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 EHS aspects; and
• Observations, concerns raised and/or decisions taken with regard to EHS management during site meetings.

58. It is advisable that reporting of significant EHS incidents be done “as soon as practicable”. Such incident reporting shall therefore be done individually. Also, it is advisable that the Contractor keep 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. A sample format for an incident notification is shown below. Details of EHS performance will be reported to the Client through the SE’s reports to the Client.

Training of Contractor’s Personnel

59. 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 EMP, and his own EHS-MP, 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 EHS-MP. General topics should be:
• EHS in general (working procedures);
• emergency procedures; and
• social and cultural aspects (awareness raising on social issues).

Cost of Compliance

60. It is expected that compliance with these conditions is already part of standard good workmanship and state of art as generally required under this Contract. The item “Compliance with Environmental Management Conditions” in the Bill of Quantities covers this cost. No other payments will be made to the Contractor for compliance with any request to avoid and/or mitigate an avoidable EHS impact.

3. Example Format: EHS Report

Contract: Period of reporting:

EHS management actions/measures:
Summarize EHS management actions/measures taken during period of reporting, including planning and management activities (e.g. risk and impact assessments), EHS training, specific design and work measures taken, etc.

EHS incidents:
Report on any problems encountered in relation to EHS aspects, including its consequences (delays, costs) and corrective measures taken. Include relevant incident reports.

EHS compliance:
Report on compliance with Contract EHS conditions, including any cases of non-compliance.

Changes:
*Environmental Social Management Plan for the bridge at Km7+350 along Enugu-Abakaliki road*
Report on any changes of assumptions, conditions, measures, designs and actual works in relation to EHS aspects.

**Concerns and observations:**
Report on any observations, concerns raised and/or decisions taken with regard to EHS management during site meetings and visits.

**Signature (Name, Title Date):**
Contractor Representative

4. Example Format: EHS Incident Notification

<table>
<thead>
<tr>
<th>EHS Incident Notification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide within 24 hrs to the Supervising Engineer</td>
</tr>
<tr>
<td>Originators Reference No:..........................................................................................................................</td>
</tr>
<tr>
<td>Date of Incident:................................................................. Time:..........................</td>
</tr>
<tr>
<td>Location of incident:.................................................................................................................................</td>
</tr>
<tr>
<td>Name of Person(s) involved:..........................................................................................................................</td>
</tr>
<tr>
<td>Employing Company:........................................................................................................................................</td>
</tr>
<tr>
<td>Type of Incident:...........................................................................................................................................</td>
</tr>
</tbody>
</table>

**Description of Incident:**
Where, when, what, how, who, operation in progress at the time (only factual)

**Immediate Action:**
Immediate remedial action and actions taken to prevent reoccurrence or escalation

**Signature (Name, Title, Date):**...................................................................................................................
Contractor Representative

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