GOVERNMENT OF ANAMBRA STATE, NIGERIA

ANAMBRA STATE NIGERIA EROSION AND WATERSHED MANAGEMENT PROJECT (NEWMAP)

FINAL REPORT

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

FEDERAL HIGH COURT (PHASE 2) GULLY EROSION PROJECT
AWKA SOUTH LGA, ANAMBRA STATE. NIGERIA

January, 2020

FINAL REPORT

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

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FEDERAL HIGH COURT AWKA GULLY EROSION PROJECT

AWKA SOUTH LGA, ANAMBRA STATE

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LIST OF ABBREVIATIONS

ANS-NEWMAP	Anambra State Nigeria Erosion and Watershed Management Project
ANSG	Anambra State Government of Nigeria
AQMP	Air Quality Management Plan
ARAP	Abbreviated Resettlement Action Plan
AP	Affected Person
BMP	Best Management Practices
CAI	Community Administrative Institution
CBO	Community Based Organization
CDO	Community Development Organization
CIP	Community Involvement Program
CMP	Chemical Management Plan
COC	Chemicals of Concern
CRMCI	Community Resource Management and Conservation Initiative
ERIP	Emergency Response and Incident Plan
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESMMP	Environmental and Social Management and Monitoring Plan
ESO	Environmental Safeguard Officer
FBO	Faith-Based Organization
FGD	Focused Group Discussion
FGN	Federal Government of Nigeria
FHC	Federal High Court
FMEnv	Federal Ministry of Environment
GEF	Global Environmental Fund
GIS	Geographic Information System

GRASS	Gully Rapid Action and Slope Stabilization
GPS	Global Positioning System
GRM	Grievance Redress Mechanism
LGA	Local Government Area
LORAJ	LORAJ Nigeria Limited
NEWMAP	Nigeria Erosion and Watershed Management Program
NGO	Non-governmental Organization
OP	Operational Procedure of the World Bank
PAH	Project-Affected Household
PAP	Project-Affected Person
PC	Project Coordinator
PCC	Project Complaints Committee
PG	President General
PPE	Personal Protection Equipment
PRS	Government's Poverty Reduction Strategy (PRS)
RAP	Resettlement Action Plan
SCCF	Special Climate Change Fund
SLO	Social & Livelihood Officer
SMEnv	State Ministry of Environment
SMLS	State Ministry of Lands and Survey
SMOW	State Ministry of Works
SPMU	State Project Management Unit
ToR	Terms of Reference
TVMP	Traffic and Vehicle Management Plan
WB	World Bank
WMP	Waste Management Plan

EXECUTIVE SUMMARY

Project Background

The Nigeria Erosion and Watershed Management Project (NEWMAP), initiated by the Federal Government of Nigeria (FGN) and funded by the World Bank, is being implemented in Anambra State, Nigeria and other participating states to help reduce soil erosion vulnerability in the States and to develop the States' watersheds. Nodu village in Okpuno town and Umuzocha in Awka town both in Awka South Local Government Area (LGA) are part of the many towns in Anambra State whose communities are perennially devastated by erosion gullies resulting from stormwater flow. With each passing year, uncontrolled storm water flow threatens lives and properties as the existing gullies become widened and more menacing. Through the NEWMAP opportunity, Anambra State NEWMAP is targeting to remedy and rehabilitate the existing Awka Federal High Court (FHC) erosion gully and reduce the impacts.

The proposed intervention is an extension of the on-going FHC gully erosion control project to include the existing gullies affecting Nodu village of Okpuno Town and Umuzocha village of Awka Town both in Awka South Local Government Area (LGA) of Anambra state, Nigeria. The project will help reverse land degradation within the affected communities.

Description of Proposed Intervention

The proposed Federal High Court Awka (FHC) gully erosion intervention consists of remedial structural and non-structural developments that include civil works and vegetative development along the gully corridor. The intervention will address, prevent and reverse land degradation for the long-term and will involve rehabilitation and reconstruction of the existing gully corridors. The rehabilitation activities will involve civil works as well as biophysical restoration along the gully corridors and will result in disruptions in the physical environment, habitat, and cause inland river siltation as well as involuntary resettlement thereby triggering the relevant World Bank Safeguard Policies.

The key activities for the Civil Construction Works involve:

- Cutting and filling for percentage recovery;
- Compaction of soils;
- Concrete casting;
- Assembling of structures, and,
- Slope stabilization.

The key non-structural work components (Biophysical Works) will involve:

- Terracing;
- Structured vegetation;
- Specific trees planting with known root strength
- Economic trees planting

Rationale for NEWMAP Intervention

The proposed intervention is an extension of the on-going FHC gully erosion control project and includes the existing gullies affecting Nodu village of Okpuno Town and Umuzocha village of Awka Town. The two villages have perennially been devastated by erosion gullies resulting from the uncontrolled storm water flow which continues to threaten lives and properties as the existing gullies become widened and more menacing. The NEWMAP intervention will help rehabilitate the degraded lands within the affected communities, reduce the long-term erosion vulnerability in target areas and significantly contain the socioeconomic impacts on the affected communities.

Need for the ESMP

The scale of the construction and development works for the FHC gully erosion control project will involve a significant disturbance of the environmental conditions, with both

localized and regional impacts. The project activities will result in several environmental and social impacts which must be considered and properly addressed to ensure that the environment is not unreasonably further degraded and the socioeconomic life of the people is not adversely disrupted. Consequent upon these, this ESMP is required to provide necessary procedures and criteria that will guide the proposed gully erosion intervention in accordance with the World Bank Safeguard Policies and the Nigerian national environmental policies, guidelines and assessment procedures as well as those of Anambra State and the local agencies.

Objective of the ESMP

The objective of this study is to prepare an environmental and social management plan (ESMP) for the Federal High Court Gully Erosion Project that specifically identifies, evaluates and documents the set of mitigation, monitoring and institutional actions to be taken before and during site construction and rehabilitation to eliminate adverse environmental and social impacts, offset the impacts or reduce the impacts to acceptable levels. The potential impacts associated with the phases of the designed site interventions consisting of pre-construction, construction, and operation and maintenance (O&M) are developed and appropriate mitigation measures established for the impacts.

The rehabilitation of the existing road corridor that serve the Federal High Court as well as the entire gully corridor providing access to the project area will result in social disruptions in the communities. Large areas of farmlands will also be majorly impacted. It is envisaged that about 5795m^2 of land will be required for the stabilization of the gully walls with the attendant loss of economic trees/crops and the permanent loss of use of that portion of land. Consequently, this ESMP as a site-specific safeguard instrument is required to provide necessary procedures and criteria that will guide the proposed Federal High Court gully erosion control intervention.

Policy, Legal and Administrative Framework

This ESMP is guided by the requirements of the World Bank safeguard policies and the relevant and applicable state, national and international regulation, guidelines, conventions, industrial best management practices that are triggered by the NEWMAP. Based on the environmental and social effects of the project the potentially triggered WB safeguard operational policies (OPs) include:

- Environmental Assessment (OP/BP 4.01)
- Involuntary Resettlement (OP/BP 4.12)
- Cultural Physical Property (OP 4.11)

The basic legal framework for the regulation of the environment in Nigeria is braced in the Environmental Impact Assessment (EIA) Act No. 86 of 1992; the National Guidelines and Standards for Environmental Pollution Control in Nigeria (March 1991); the National Environmental Standards and Regulations Enforcement Agency (establishment) Act 2007 (NESREA), as well as the Land Use Act 1978 (modified in 1990). The power to regulate all environmental matters in Nigeria is vested in the Federal Ministry of Environment (FMEnv).

Biophysical Environment

The climatic condition of the project area is characterized by uniformly high temperatures and a seasonal distribution of precipitations. A tropical wet and dry season prevails in the project area. The dry season runs through the months of October to March and the rainy season that begins in March and ends in October. The months of July and August are usually the wettest period of the rainy season. The conventional nature of the heavy rainfall results in alternating periods of sunny and rainy conditions. Some of the rainfall occurs as violent downpours accompanied by heavy flooding, soil leaching, extensive sheet wash, groundwater infiltration and percolation.

The project area lies within the humid tropical rainforest belt of Southeast Nigeria. The pressure on land mainly in form of commerce has largely reduced the vegetation to mixed

savanna. The vegetation cover is highly heterogeneous due to intense disturbance arising from human activities. A listing of plant species with frequent or abundant distribution in the various categories are shown in Chapter 3. The cultivated species on farmlands include Dioscorea spp (yam) and Manihot esculenta (cassava). There was indication by the people that other species of interest such as Zea mays (maize), Telfairia occidentalis (ugu), Musa paradisiaca (plantain), Abelmuscus esculenta (okoro), Ipomea batata (potato), and Citrullus vulgaris (melon/egusi) are also cultivated.

Soils within the project area are typified by the coastal plain sands characteristics and are highly susceptible to erosion. The baseline physicochemical analysis of representative soils, water and air samples as well as noise readings were carried out at various locations within the project area. The results are presented in Chapter 3. Soil quality is significantly affected by physical, chemical, biological and biochemical properties sensitive to changes in the environment and land management. The analytical results of baseline soil quality indicators show concentrations of key parameters below the regulatory threshold limits.

Surface and groundwater conditions at the site were assessed through laboratory analysis of parameters that affect the quality of water in the environment. The analytical results of baseline chemical and biological parameters for the water quality in the project area show concentrations that are either below the regulatory threshold limits or are considered not significant. Furthermore, the air quality assessment carried out at several locations where active construction operations are anticipated and where human activities are expected to be high, show concentrations below the regulatory threshold limits. The parameters measured as part of the air quality assessment included carbon monoxide (CO), Ammonia (NH_3), hydrogen sulphide (H_2S), sulphur dioxide (SO_2), nitrogen oxides (NOx), hydrogen cyanide (HCN) as well as oxygen (O_2). The matrix of air sampling locations and coordinates across the project site are included in Table 3.1.

Socio-Economic Characteristics

Based on the 2006 national population census records and the 3.0% annual population growth factor recommended by the national population commission (NPC), Awka South LGA has a projected population of 249,155 for 2018. Okpuno has higher female-male ratio population at the household level. There is a seeming low public participation among the women at Okpuno possibly due to their predominant occupation with petty trading activities.

The people of Okpuno and Awka are of the Igbo ethnic group and generally, speak and write mainly the Igbo and English languages. Clanism and kinship are strong elements and driving forces in control of political and cultural institutions and service points. The community however, in recent times, is witnessing an influx of persons from other parts of the state/ country who are settling in the area mainly for trading purposes.

Residents of Okpuno and Awka communities are predominantly of the Christian faith, mostly Catholics and Anglicans with some traditionalists and a very small Muslim group. Three major types of customary land tenure system exist in the village, viz: – (1) individual land ownership; (2) family land ownership; and. (3) communal land ownership. Individual ownership may be for indigenes or for residents of the community. Family lands (as well as individual lands) are inherited from generational relatives. Communities retain family lands which may be sold and mostly used for developmental purposes. About less than 10% of land is committed to agricultural production of food crops.

About 37% of the households in the project area are below the age of 21 years while about 57% are between the ages of 22 and 60 years. About 6% of the household members are above the age of 60 years. The household size distribution ranges from 1-11 persons with an average household size of 6 persons for the area. About 29.5% of the households in Okpuno are married; about 50.5% are single and about 2% are widowed. The literacy level within Okpuno community is relatively high with 98% of the surveyed population having attained the FSLC level of education and higher. There is a high rate of unemployment

(about 14%) in the community. This situation potentially could pose some serious social risk when not properly managed. The community must come together to address unemployment as a social risk within its fold. Establishment of cooperative ventures for its members supported by the community and government may be worthy of consideration.

Solid wastes pose considerable hazards to human health due to the indiscriminate dumping of household wastes at illegal points or dumpsites adjacent to and along the gully corridor. The continued and uncontrolled waste dumping cause regular obstructions to the storm water drainage systems. The common diseases in project area include diarrhea, malaria, typhoid, pneumonia, cough, skin diseases, deficiency diseases, eye diseases, ear diseases, and waterborne diseases resulting mainly from malnutrition and lack of hygiene. The quality of the health services in the area is generally poor with most residents patronizing quacks and medicine shops for their medical treatment. The socioeconomic infrastructures (roads system, electric power and access to water) in the area are also generally in fair to poor state. Public access to potable water is non-existent and power is generally not steady. Market facilities are fairly developed complimented by numerous home-based commercial shops located throughout the community.

Public Consultations and Concerns

The stakeholders' and public consultation methodology adopted in this study includes a qualitative and quantitative mixed method that offers an effective means to interact widely with the project area general public as well as stakeholder groups. Five broad categories of stakeholders were identified for this project based on the degree to which the project activities affected or involved such persons or group of persons. Individual stakeholders and project affected persons (PAPs) were also engaged during the ESMP preparation. To ensure that the rights and interests of PAPs are considered seriously local level consultative forums serve as community voices and become part of the entire project process.

The key environmental and social issues and concerns that were raised during the stakeholders'/community meetings include:

1. Community safety with the next cycle of the rainy season. The community was quite apprehensive of the advancement of the gullies particularly in relation to safety risks posed to existing adjacent homes, human lives and farmlands;
2. Continued gully erosion and flooding in the area would lead to damages and loss of crops and livestock, personal possessions, spread of diseases such as typhoid, cholera, diarrhea, and malaria;
3. Loss of access to roadways, crop lands and pasture.
4. Physical displacement of vulnerable persons during project implementation.

These issues and concerns raised were fully addressed during the community meetings. The specific mitigation measures are also included under the impacts mitigation measures of this ESMP.

Impacts of the Project

Potential Positive Impacts:

This project will effectively:

- Control the gully erosion and perennial flooding of Nodu and Umuzocha communities
- Improve the flow of traffic in and out of the communities
- Reclaim useful land and expectedly will greatly appreciate the value of properties within the area as most erosion threatened properties have lost market value
- Improved livelihoods for the area residents due to increase in agricultural productivity
- Improved landscape vista of the project area
- Provide temporary job opportunities for both skilled and un-skilled labors

Potential Adverse Impacts

***Disturbance of flora and fauna*:** Movement of personnel and vehicles may result in trampling of flora and disturbance of fauna.

***Injuries and accidents*:** Workers may be exposed to injury from machines and equipment
Loss of vegetation and impacts on flora and fauna: Rehabilitation work will involve clearing of vegetation in and around the canals and drains. This may result in a potential disturbance and/or loss of fauna at the project site.
***Soil erosion and soil pollution**:* Excavation, vegetation clearance, leveling and other land preparation works will expose and loosen the soil making it susceptible to both wind and water erosion and subsequent loss of top soil. There is potential for compaction of soil from the use of heavy machinery and contamination of soil from fuels, oils and waste.
Air quality deterioration: Loose soils exposed during land preparation work and movement of vehicles/trucks (including haulage trucks) to and from the project site on the untarred surfaces may result in the increase of airborne particulates.
Vibration and noise nuisance: Movement and operation of machines/equipment, trucks during construction is likely to increase noise levels intermittently in communities; May also experience temporary increase in noise levels from construction activities.
Occupational accidents and risk of injury to workers: Workers' exposure to noise, dust and vibrations and risk of accidents and injury from the use of machinery and equipment, materials management at the construction yards/workplace are concerns that need to be addressed.
Risk of accidents and injury to the public: The movement of trucks and other vehicles and machinery to and from offsite sources to the project site will pose safety risks for the communities along and around the project site. Communities near the project site may also be at risk from unsecured excavations.
Influx of workers and migrants: Migrants who move into the project area for job opportunities may not conform to the societal norms and cultural practices and may upset the social structure of these communities.
Obstruction of access ways to communities: Construction works at the project site may render portions of access roads and existing foot paths inaccessible to users and/or temporarily closed. This may create inconvenience and increase travel time to and from the affected communities.
***Risk of spread of diseases**:* Poorly managed construction sites, site camps, indiscriminate disposal of waste and open defecation will create unsightly conditions and may result in the spread of disease (e.g. malaria, typhoid).
HIV/AIDS and STIs Risks: Construction workers camp give rise to health risks associated with poor sexual practices and prostitution.

About 5795 m^2 of land will be required as setback for the stabilization of the gully wall particularly at the deep sections with the attendant loss of land and economic trees/crops. The project as designed does not envisage any permanent involuntary displacements. No buildings or structures will be impacted by the remedial construction works. No sensitive sites or resources such as forest reserve, cemetery, shrine or other places of historical and cultural interests will be impacted by the project. Additionally, the construction and development works will not affect any utility lines such as water, electricity or telecommunication lines.

Analysis of Project Options and Alternatives
Consideration of alternatives related principally to ways of improving the proposed intervention activities and/or attempting to avoid or minimize potential significant negative impacts. Different options were evaluated consistent with the various components of the FHC project intervention. For the proposed project, the options considered include: delayed project option; a do-nothing option; and the planned project option. The selection of the planned project alternative was premised on several considerations, including the long-term effectiveness of the technology, the implementability at the location under consideration, the desirability/acceptability by the community, the government's position or inclinations to the project, the potential environmental and social impacts of the project, the economic viability of the project and impact to human life.

Identified Significant Adverse Impacts and Mitigation Measures

The designed measures to mitigate identified significant adverse impacts are included in the table below:

Summary of Impacts and Mitigation Measures

Item No	Impacts	Receptor(s)	Proposed Mitigation Measures	Responsibility Party
PRE CONSTRUCTION				
1	**Impacts on Community and PAP Management (Loss of physical assets; Loss of means of livelihood)** • Croplands and economic trees along the gully setback may be destroyed during gully wall stabilization. • Construction activities may affect persons with critical health conditions, including old persons, children and other vulnerable persons within project area may be temporarily relocated for construction phase. • Possible disagreement over siting of staging areas and temporary facilities between community and contractor	Grassland; Shrubs; Crop fields and pastures; Residential homes	• A stand-alone Resettlement Action Plan (RAP) has been prepared for the project addressing impacts on the community and the PAP management. The SPMU shall be required to implement the RAP in accordance with the provisions therein • Appropriate compensations shall be paid for project acquired lands; temporary use of lands; destroyed crops and economic trees. • Compensation to persons (PAPs) within project area who will need to be temporarily relocated prior to beginning of construction activities. • Create awareness among community members and sensitize the people to all project activities • Seek the consent of the landowner to erect the site office for the specified duration of the project;	SPMU-ESO; Focal NGO SMEnv.; SMLS.; Community Leaders; Site Committee
2	**Public/Stakeholders Participation** • Effective project implementation requires active involvement and cooperation of the project community.	Community members	• Build capacities within community • Incorporate community feedback into project implementation process • Disseminate project study findings; • Ensure that period of inaccessibility to land is as short as possible • Awareness campaigns and capacity building. • The Contractor shall be required to prepare and submit a Stakeholders' Engagement Plan to the SPMU for approval and adoption for the contractor's implementation	SPMU-ESO; Focal NGO; SMOW; SMEnv; SMOH; Community Leaders; Site Committee
3	Vegetation and Biomass Removal Management • Damage to the natural and planted vegetation on acquired gully setback	Grassland; Shrubs; Crop fields and pastures;	• Mark out areas for clearance & where possible use manual method of vegetation clearing; • Undertake selective clearance by removing tall woody species leaving saplings for quick	SPMU-ESO; Focal NGO; SMOW; SMEnv; SMOH; Community Leaders;

Item No	Impacts	Receptor(s)	Proposed Mitigation Measures	Responsibility Party
	lands during site clearance, areas for siting of temporary office and workers camp. • Impact on flora and fauna. • Impact on wild life.		regeneration of vegetation; • Prevent colonization by invasive species- • Prevent damage to critical ecosystems and habitats • Prevent destruction of flora and fauna. • The Contractor shall be required to prepare and submit a Vegetation and Biomass Management Plan to the SPMU for approval and adoption for the contractor's implementation	Site Committee
4	**Gender Based Violence/Sexual Exploitation & Abuse Management**	Construction workers; Community members.	• Contractor to submit an ESHS Performance Security to PMU • Contractor to prepare and submit a GBV/SEA Management Plan to PMU for approval and adoption for the contractor's implementation	**Contractor SPMU**
CONSTRUCTION PHASE				
5	**Dust and Air Quality Management** • Air pollution is expected from dust and emissions from construction vehicles, plant and equipment. Dust is generated by excavation and earth moving operations and causes nuisance to residents and other sensitive receptors. Exhaust emissions occur from poor maintenance of plant and equipment or over revving of engines.	Construction workers; Vulnerable persons; Community members; Residential homes;	• Dust generation will be controlled mainly by the use of water, especially in the dry season. • Use of water tanker for purposes of water dousing to control dust emission. • Erection of speed control signals and ramps mounted in communities; • Covering of hauling trucks carrying sand and other aggregates; • Covering of heaped material e.g. sand will be covered; • Use of nose masks by all workers at road maintenance/works sites. • Surfaces of vegetation along the maintenance road will be monitored to verify the effectiveness of dust suppression method. • The Contractor shall be required to prepare and submit an Air Quality Management Plan to the SPMU for approval and adoption for the contractor's implementation.	SPMU-ESO; Focal NGO SMOH.; Community Leaders; Site Committee
6	**Water Resources, Erosion and Sedimentation, Run-off Control Management** • Increased sedimentation and runoff may result from activities during the	Streams; Ponds; Groundwater; Drainage corridors; Roadways.	• Location for heaping construction material (e.g. sand and other aggregates) not less than 50m from water bodies and drainage channels (i.e. a separation distance of 50m will be observed); • Site for fueling of machinery and servicing of equipment will	SPMU-ESO; Focal NGO; SMOW; Community Leaders; Site Committee

Item No	Impacts	Receptor(s)	Proposed Mitigation Measures	Responsibility Party
	construction works. • Earthworks release suspended particles into watercourses, which can have temporary detrimental effects on water organisms. Spillages of fuel and other petroleum products cause contamination of the soil and water resources. • Excavation at the borrow pits may cause land degradation in the vicinity of the borrow pits; may cause soil erosion and siltation of nearby roads.		be located at a minimum distance of 100m from water bodies, wetlands and drainage channels; • Embankment erection around fueling and other liquid or spill-able storage sites in order to limit or contain such material from escape to potentially pollute water resources; • Side drains (where appropriate) will be provided with settling basins near water bodies to remove silt and debris from road surface and construction site run-off, before discharge to adjoining streams or rivers; • Adequate side drains provided to carry run-off into drainage channels to prevent erosion; • Culverts of suitable capacity constructed to contain and direct flow, especially at peak flow and run-off; • Road maintenance works to be carried out off peak rainy season; • Provision of toilets and urinal at locations not less than 50m away from water bodies; and • Adequate worker awareness on sanitation and measures to avoid water resource contamination. • The Contractor shall be required to prepare and submit a Water management Plan and an Erosion and Sedimentation Management Plan to the SPMU for approval and adoption for the contractor's implementation.	
7	**<u>Noise and Vibration Exposure Management</u>** • Noise will emanate from moving vehicles, excavators, generators, power tools (e.g. for vegetation clearing), and compressors during construction. Vibrations may come from soil compaction equipment and other vibroequipment to be used at the gully heads.	Construction workers; Vulnerable persons; Community members; Residential homes;	• Equipment servicing plan will be prepared and strictly followed to ensure efficient machinery performance and optimum noise generation. • Stationary equipment shall be sited at safe distances from sensitive areas to minimize noise impacts • Workers operating noisy equipment will not be exposed continuously for more than 3 hours a day. • Workers will be provided with ear plugs. • Workers handling vibrating equipment or parts will be	SPMU-ESO; Focal NGO; SMOW; SMOH; Community Leaders; Site Committee

Item No	Impacts	Receptor(s)	Proposed Mitigation Measures	Responsibility Party
			given pads to absorb the vibrations and will not be exposed continuously for longer than 3 hours a day. • Sanctions (ranging from a warning to dismissal) will be instituted by the contractor against workers who do not observe the use of appropriate PPEs	
8	**Occupational/Public Health and Safety Management** • Occupational accident during construction. • Construction operations pose hazards to people living or working near construction areas or employed to work on site. Excavations, construction traffic and stockpiled materials pose particular threats to children and livestock. Children may be inadvertently recruited to work on construction sites.	Construction workers; Vulnerable persons; Community members; Residential homes;	• Health, safety and environmental training and awareness will be extended to community members and local residents; • Erection of warning signals and use of reflective tapes at approaches to excavations, heaped materials, stationary equipment, etc. • Posting of speed limits of 40km/hr at approaches to construction sites; • Safety meetings held twice a week and documented accordingly; • Inductions and awareness programmes held for all employees on occupational health and safety practices; • A First Aid team formed to provide first aid services to workers and where appropriate make referrals to the nearest Health Centre or hospital; • First Aid team to be trained by a medical team from the Health Centre; • Accident records at construction site and neighbourhoods to be maintained both for workers and the public; • Stocks of PPEs to be maintained and supplied to workers regularly as needed; and • Workers required to wear the appropriate PPEs e.g. helmets, ear plugs, nose masks, vibration pads, hand gloves, etc. • The Contractor shall be required to prepare and submit a Community/Occupational Health Management Plan to the SPMU for approval and adoption for the contractor's implementation	SPMU-ESO; Focal NGO; SMOH; Community Leaders; Site Committee;
9	**Gender Based Violence**	Construction	• Inductions and awareness	Focal NGO;

Item No	Impacts	Receptor(s)	Proposed Mitigation Measures	Responsibility Party
	/Sexual Exploitation and Abuse (GBV-SEA) Management	workers; Vulnerable persons; Community members; Residential homes;	programmes held for all employees on GBV-SEA issues; • Contractor to comply with ESHS provisions of the contract. • GBV-SEA awareness will be extended to Nodu and Umudocha community members and local residents; • GBV-SEA records at construction site and neighbourhoods to be maintained both for workers and the public; • Workers required to report any GBV-SEA issues to the construction management. • The Contractor to prepare and submit a GBV-SEA Management Plan to the SPMU for approval and adoption for the contractor's implementation	SPMU-ESO; SMEnv; SMOH; Community Leaders; Site Committee
10	**HIV/AIDS and STIs Management** • Construction workers camp give rise to health risks associated with poor sexual practices and prostitution.	Construction workers; Vulnerable persons; Community members; Residential homes;	• Provide quarterly HIV/AIDS and STIs awareness programmes for workers and nearby communities; • Health and HIV awareness team arranged from the State Health Ministry for the quarterly programmes; • Sponsored educational package put together by the team to be implemented to enlighten both workers and communities; • Training of peer educators within the work force and in communities by the team; and • The contractor to provide free condom supplies and encourage free discussions, counselling and testing.	Focal NGO; SPMU-ESO; SMEnv; SMOH; Community Leaders; Site Committee;
11	**Construction Operation and Slope Stabilization** • Construction operations will result in topographic alterations. • Construction operations may result in landslides, rock cave-ins, and mudflow/flooding. • Construction operations can pose earth movement hazards to people working near the construction areas due to unstable soil profiles from site excavations.	Vulnerable persons; Community members; Residential homes;	• Maximize local employment (including women) on construction works (this should be a contractual requirement to hire a percentage of local workforce including women) • Provide occupational health and safety awareness training and workshops, • Use of child labor shall be strictly prohibited • Monitor and maintain intervention work for continued stability and quality • Shortcomings in the control structures including the check dams (retention basins) along the gully corridor should be corrected before they develop into serious problems. • The Contractor shall be required to prepare and submit	SPMU-ESO; Focal NGO; SMOW; SMEnv; Community Leaders; Site Committee

Item No	Impacts	Receptor(s)	Proposed Mitigation Measures	Responsibility Party
			an ESMP and Emergency Response and Incident Plan to the SPMU for approval and adoption for the contractor's implementation	
12	**Traffic and Transportation Hazards** Impedance to traffic flow and movements. Possible vehicular collisions and accidents. Temporary diversions of traffic.	Construction workers; Community members; Residential homes;	• Traffic wardens to be posted at positions 100m from the construction points on either side of the road to ensure orderly traffic flow; • Actual working areas to be secured with barricades; • Adequate road warning signs to be posted at vantage points to warn and direct traffic; • Traffic and transport associated with project will adhere to existing roads or follow specified routes as established. • The Contractor shall be required to prepare and submit a Traffic and Vehicle Management Plan to the SPMU for approval and adoption for the contractor's implementation	SPMU-ESO; Focal NGO; SMOW; SMEnv; Community Leaders; Site Committee
OPERATIONS PHASE (POST CONSTRUCTION)				
13	**Waste Management (solid and liquid wastes)** Proposed project will generate waste during construction including off specification materials such as wood, plastic, paper and domestic waste from construction areas and worker camps. This could result in increased pressure on local waste dump facilities as well as potential for unauthorized disposal and littering if not properly managed. • Waste bins to be provided for the disposal of waste generated; • Waste will be segregated into three at source - organic (food residues), recyclables (woods, metals) and non-recyclables (plastic and glass wastes);	Streams; Ponds; Groundwater; Drainage corridors; Roadways.	• Topsoil removed from the right of way for maintenance work to be spread on the land to avoid disrupting drainage network; and • Toilets and urinals to be sited at least 100m from any stream or drainage channel and decommissioned at the end of project. • The Contractor shall be required to prepare and submit a Waste Management Plan to the SPMU for approval and adoption for the contractor's implementation	SPMU-ESO; Focal NGO; SMOW; SMEnv; Community Leaders; Site Committee

Item No	Impacts	Receptor(s)	Proposed Mitigation Measures	Responsibility Party
	• Organic waste to be composted near the site office to enrich the soil, while plastics and glass are taken to the district dump-sites;			
14	**Land use restriction** Use of the acquired land associated with gully setback will be altered and restricted to limited community uses. Structures may never be erected on this portion of land but economic trees could be planted. • Create awareness among community members; • Build capacities within community; • Incorporate community feedback mechanism into process	Community members; Residential homes;	• Ensure periodic monitoring of restricted areas • Continuous maintenance of erosion control structures including concrete channels and check dams, and bio-remediated areas for continued effectiveness.	SPMU-ESO; SMEnv; Focal NGO; Community Leaders; Site Committee
15	**Closure of temporary office, staging areas and decommissioning of project** Damage to land forms and vegetation • Ensure that agreements with the community and landowners on post construction hand-over are kept.	Community members; Residential homes;	• Enforce agreed measures to render the site safe and usable post construction to the satisfaction of the community and landowners.	SPMU-ESO; Focal NGO; Community Leaders; Site Committee
16	**Erosion control system failure management** • Check dams that are not properly constructed may suffer damage that could reduce the structural integrity of the erosion control structures during post-construction phase. • Structures built in the channelization for stabilization purposes should be observed for damage especially during rainy seasons and after heavy storms. Any damage observed should be repaired immediately to	Community members;	• Ensure periodic monitoring of erosion control structures • Continuous maintenance of erosion control structures including concrete channels and check dams, and bio-remediated areas for continued effectiveness.	Community Leaders; Site Committee CBOs/CDOs

Item No	Impacts	Receptor(s)	Proposed Mitigation Measures	Responsibility Party
	avoid further damage and the eventual collapse.			

Institutional Arrangements, Responsibilities and Accountabilities

The primary responsibility for the project monitoring and ESMP implementation is on the SPMU. The SPMU through its various officers, and may also employ the services of consultants provide the necessary awareness, mobilization and facilitation, project appraisal, approval & disbursement, capacity building, monitoring & evaluation of all project activities and reporting to the FPMU and the World Bank.

The key actors in the implementation of this ESMP include:

- The contractor - to be awarded the rehabilitation contract and be required to implement the environmental and social safeguard measures;
- SPMU - to ensure that environmental and social (E&S) safeguards and other mitigation measures are duly implemented;
- FMEnv/FPMU - to ensure compliance with the ESMP and other relevant approval conditions;
- SMEnv - to oversee the effective implementation of the flood control project and related E&S safeguards
- PCC - to address complaints of any aggrieved parties on E&S safeguards
- SMLS – to ensure appropriate disposition of land matters in accordance with the statutory requirements.

Environmental and Social Monitoring Plan

Monitoring programmes have been developed for all significant adverse environmental and social impacts identified. In addition to the significant adverse impacts, monitoring plans have been developed for air quality, noise, public complaints/grievances, and environmental compliance.

Provisional Environmental and Social Management Plan

The programmes proposed to meet the mitigation measures and monitoring programmes will include the following:

- Adoption of Environmental, Health and Safety Policies and Operational Procedures;
- Environmental, health, safety and security management structuring;
- Environmental, health, safety and security committee;
- Environmental and social monitoring programmes;
- Audits and reviews;
- Public participation;
- Grievance redress mechanism; and
- Environmental and social management budgeting.

Training Programs

The Contractor shall be required to provide occupational health and safety awareness training and workshops for the workers. The health, safety and environmental training and awareness will be extended to Nodu and Umuzocha community members and local residents.

Grievance Redress Mechanism (GRM)

A mechanism through which complaints and disagreements can be smoothly resolved has been structured for this project. As part of the grievance redress mechanism, formation of a three-level grievance redress committee (GRC) starting with a community grievance redress

committee (C-GRC) has been structured to receive and document all public complaints relating to the project. Currently, there is a system of customary avenue that exist in each of the communities to deal with dispute resolution in the community and this will be employed as the "court of first appeal", where relevant. It is anticipated that this community system together with the structured GRM will allow unencumbered platform for people to express their dissatisfaction over any environmental and social (E&S) issues arising from the project.

The SPMU has also opened toll free lines and a public complaints/suggestion box for Communities to bring up their complaints. This ensures that Communities can forward their grievances at absolutely no cost. The SPMU toll-free and office phone numbers are 081830034431 and 08183034336, respectively. All grievances or complaints must be registered and compiled regularly for project management. The devised mechanisms are fundamental to achieving transparency in the ESMP process. The SPMU shall follow the guidance of the World Bank to put in place a GBV-sensitive GRM system that has strong elements of confidentiality, empathy and protection and services for survivors.

Gender-Based Violence/Sexual Exploitation & Abuse (GBV/SEA)
The Contractor shall be required to prepare and submit a Gender Based Violence/SEA Management Plan to the SPMU for approval and adopted for the contractor's implementation. Specific inductions and awareness programmes shall be implemented for all employees on GBV issues. The GBV/SEA awareness will be extended to Nodu and Umuzocha community members and local residents. Workers will be required to report any GBV/SEA issues to the construction management.

Labor Influx, Child Labor, Health and Safety Issues
Implementation of the FHC project will result in an influx of persons seeking gainful employment with the project contractors or to gain any social previlages within the project communities. There will be increased pressure on existing social service resources like water, electricity, transportation, etc. in the communities due to the influx of persons. The Contractor shall be required to develop and implement an occupational and community health and safety plan that contributes to a healthy workforce and local community, and must ensure that children are not inadvertently engaged to do work on the construction site. The use of child labor shall be strictly prohibited.

The Plan shall evaluate possible hazards that may be associated with labor influx into the project areas. The health and safety plan shall be submitted to the SPMU and FPMU for necessary approvals prior to implementation. The Contractor shall fully comply with ESHS provisions and standards and bear the cost of implementation.

ESMP Budget and Schedule of Work
The budget estimate for the E&S safeguards as determined under this ESMP, including cost for administration, monitoring and evaluation is **N15,433,000.00** (Fifteen Million Four Hundred and Thirty Three Thousand Naira) only. A breakdown of the costs is shown in the table below:

S/No	ITEM	RESPONSIBILITY	COST BREAKDOWN IN (N)			COST ESTIMATE IN NAIRA (N)
			Pre-Construction Phase	Construction Phase	Post-Construction Phase	
1	MITIGATION	Contractor	To be built into Contractor costs (This cost is provided for bidding guidance purposes only and is not part of the grand total below)			N19,000,000.00
2	MANAGEMENT	SPMU/ SMEnv	1,900,000.00	4,600,000.00	2,500,000.00	N9,000,000.00
3	MONITORING	SPMU/ FPMU/ FMEnv/ SMEnv/ Environmental Consultants/ NGOs	550,000.00	2,230,000.00	1,000,000.00	3,780,000.00
4	CAPACITY BUILDING & TRAININGS	SPMU/ MOH/ Consultants/ Contractor	950,000.00	300,000.00	N/A	1,500,000.00

S/No	ITEM	RESPONSIBILITY	COST BREAKDOWN IN (N)			COST ESTIMATE IN NAIRA (N)
			Pre-Construction Phase	Construction Phase	Post-Construction Phase	
Sub-total						N14,030,000.00
5	CONTINGENCY (10%)					1,403,000.00
GRAND TOTAL						N15,433,000.00

The proposed budget will facilitate the implementation of the various measures - management, monitoring plan and capacity building of the ESMP - and should be made an integral part of financing for the Federal High Court gully erosion intervention and development project. The specific E&S safeguards obligations for the contractor should be incorporated into the contract specifications along with other contract provisions.

The estimated mitigation cost for the environmental and social management has been developed with due consideration in the three project phases (pre-construction, construction and post-construction) to the following factors:

- The magnitude of the flood control problem;
- The type of technology to be employed;
- The volume of the project affected households and persons; and,
- The area of coverage of the proposed project.

Disclosures

This ESMP will be subjected to public review and it should be disclosed in the state to the general public for review and comment at designated locations in Anambra State and in World Bank Info Shop. Display centers will include Anambra NEWMAP SPMU office, NEWMAP FPMU office, EA Department of FMEnv., Office of State Commissioner for Environment, LGA NEWMAP Liaison office, Project Community, and Office of the State Commissioner for Local Government matters, the Palaces of Okpuno and Awka Traditional Rulers.

Contractor Responsibility for Implementation of ESMP

The Contractor shall be financially responsible for implementing all impact mitigation measures as detailed in this ESMP Report for the project. Prospective Construction Contractors are therefore required to competitively bid for the implementation of the Impact Mitigation Measures. The Mitigation Measures are contained in Tables 6.1 of the Report and are summarized in the Table below.

Bidding Contractors are also required to include as part of their costs all elements associated with (i) ESMP Management, (ii) Mitigation Monitoring, and (iii) Capacity Building & Trainings as provided in Table 6.8 of the Report. This shall be a one line item in the BEME to ensure adequate budget and funding by the contractor for effective implementation. The SPMU safeguards officers shall oversee and enforce compliance. Bidding Contractors are further required to provide Environmental, Social, Health and Safety (ESHS) Performance Guarantee to the tune of a specified sum or percentage of the project cost in accordance with the new World Bank ESHS requirement.

For purposes of clarity, ALL BIDDING CONTRACTORS shall obtain as part of the bidding process a full copy of the ESMP Report prepared for this project to fully understand the scope of the ESMP implementation and required mitigation actions. In the event that the ESMP Report is not provided, the contractor shall request for it from the SPMU as part of the bidding process requirements.

CHAPTER 1: INTRODUCTION

1.1 Background

The Government of Nigeria is implementing the multi-sectorial Nigeria Erosion and Watershed Management Project (NEWMAP), which is financed by World Bank (WB), Global Environment Facility (GEF), the Special Climate Change Fund (SCCF), and the Federal Government of Nigeria (FGN). NEWMAP is initiated by the FGN and designed to reduce soil erosion vulnerability and to develop watersheds in the participating States of Nigeria. The project is currently being implemented in 20 states, namely **Anambra**, Abia, Cross River, Edo, Enugu, Ebonyi, Imo, Delta, Sokoto, Akwa Ibom, Gombe, Plateau, Kogi, KANO, Ondo, Oyo, Katsina, Borno, Niger, and Nasarawa States. Anambra State is located in the Southeast geopolitical zone of Nigeria and is known to be under severe flood and erosion problems. The State has been identified as the epicenter of gully erosion in Nigeria

The development objective of NEWMAP is to rehabilitate degraded lands and reduce long-term erosion vulnerability in target areas. In Anambra State, NEWMAP activities involve medium-sized civil works such as construction of infrastructure and/or stabilization or rehabilitation in and around erosion gullies and flood plains as well as small works in the small watershed where gullies develop and expand. The lead agency at the FGN level is the Federal Ministry of Environment (FMEnv.), Department of Erosion, Flood and Coastal Zone Management. The Anambra State Government (ANSG) is responsible for the implementation of NEWMAP activities at the State level with the State Ministry of Environment serving as the lead agency. Anambra State is located in the Southeast geopolitical zone of Nigeria. Awka and Okpuno are located within the co-ordinates: $6^0$12'30.4" N, $7^0$02'34.8" E and $6^0$15'21.5"N, $7^0$08'48.9"E and situated in Awka South LGA in the central part of the Anambra State.

Awka and Okpuno towns are one of the many locations in Anambra State whose communities are perennially devastated by erosion gullies resulting from storm water flow. The gully erosion hazards of Federal High Court have caused major loss of properties to residents and remain a serious threat to lives in the community. Many community members have lost their ancestral farmlands and properties to the devastating gullies. With each passing year, uncontrolled storm water flow creates new gullies that threaten lives and properties while existing gullies are deepened and widened. Urgent intervention is therefore needed at the site to salvage the environment, save lives, property and infrastructure and to restore the people's confidence in Government. In an effort to reduce the impacts of erosion on the State, the Anambra State Government (ANSG) has proposed to rehabilitate and remedy the Federal High Court gully erosion corridor through the NEWMAP opportunity. Figure 1 shows the location of Anambra State and Awka South Local Government Area (LGA) within the Southeast of Nigeria.

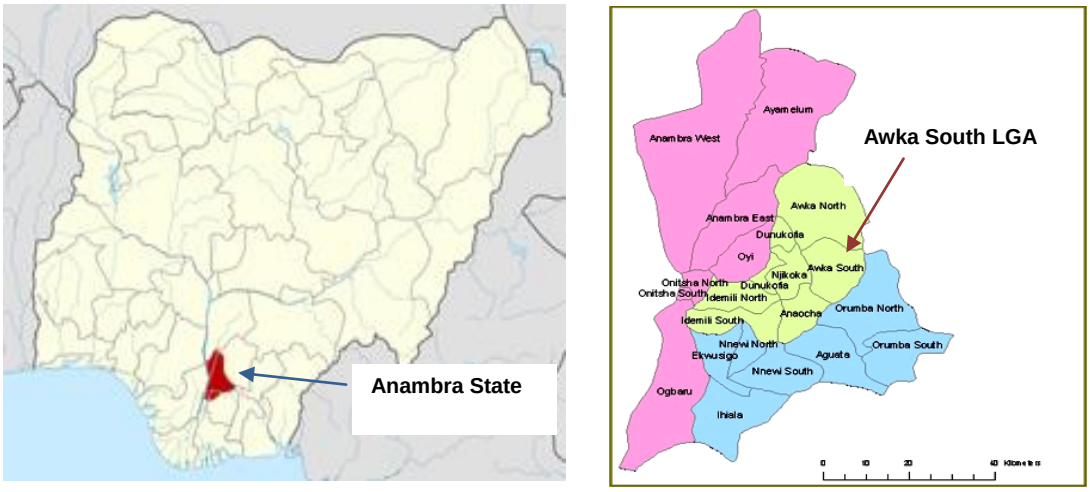


Fig. 1: Map of Nigeria Showing Anambra State & Awka South LGA

1.2 Description of the Proposed Intervention

1.2.1 Gully Terrain Features and Properties at Risks:

The Federal High Court Awka gully erosion site is located about one kilometer off the Onitsha-Enugu Road on the western valley side behind the Alex Ekwueme Square. The gullied areas lie within the co-ordinates: $6^0$14'13.3"N, $7^0$04'53.2"E and $6^0$14'37.2"N and $7^0$04'33.7"N. The main access to the gully heads is through the Judiciary Road off the Onitsha-Enugu Express Road by ABS Junction. The landscape slopes gently from Alex Ekwueme Square to the Obibia River. The gully-heads located by the fence of the Federal High Court and at the abandoned State Secretariat Complex form part of the gully system receiving emergency intervention.

Construction work is currently ongoing beyond the gully heads at the site as well as along the first 500 meters of the gully corridors. The ongoing construction works consist of cascading lined canals with vertical impact wall drop structures and junctions made of reinforced concrete. The gully heads receive flow from the Federal High Court Area, the abandoned State Secretariat construction area side drains through 2m wide and 1.5m high concrete lined canal and then flows downstream for about 250-500m through the newly constructed concrete drain channels to discharge into a main concrete drain channel that then flows through the gully to finally discharge into Obibia River via the Imo Oka stream. The main gully is about 3.6km long with the width ranging over 50m wide. The deep sections of the main gully has a depth of up to 12m and the flow meanders within the gully system until it discharges into the river downstream.

The gully system includes one Main Gully (MG) running through the unpopulated areas of Umuzocha and Nodu within the lower watershed and causing damage to existing lands. There are also two finger gullies (FG) designated as Finger Gully 1 (FG-1) and Finger Gully 2 (FG-2) with associated numbers to identify each finger gully. The gully corridor can be seen from the satellite view of the Federal High Court Awka gully area shown in Fig. 2.

At the gully head banks, major destructions have occurred and some structures have collapsed. Additionally, gully bank failures have occurred at several locations subjecting those buildings and land masses in the area to the imminent risk of collapsing. The upper elevation areas are releasing their surplus water directly to the main collector trunk over the gully wall/bank resulting in sloughing of the gully bank walls.

1.2.2 Activity Description:

The proposed project consists of remedial structural and non-structural developments that include civil works (drop structures, drainage channels, check dams, etc) and vegetative works (gabion protection, tree planting, etc) to prevent erosion and provide aesthetic view along the channel as well as prevent further encroachments of the floodplain. The Loraj remedial design concepts for the gully corridor include the main structures for the gully bed system and the bank stabilization measures. The gully bed system comprises of the following structures:

- Drain Inlet Structure;
- Lined canal for a total length of 1.2km;
- Chute structure with stilling basins;
- Drop structures; and,
- Exit system/outlet structure

The designed bank stabilization measures include:

- Gabion retaining wall;
- Slope cutting with geo-textile and Vetiver grass; and,
- Bio-remediation using Vetiver grass and bamboo planting.

Fig. 2: Satellite View of Federal High Court Awka Gully Site Showing the Gully Corridor

The principal features of the remedial measures based on the project design concepts prepared by LORAJ Nigeria Limited (LORAJ) include:

i) The construction of concrete and Reno-mattress drainage canals, gully bank protection works, chutes and stilling basin structures for the main gully and the finger gully sections. There will also be the upgrading of the access road approach and road side longitudinal and cross-drainage structures.
ii) Stabilization of the existing components of the Main Gully (MG) (head, gully wall, gully bed) using stone pitching and Vetiver grass; Provision of toe protection for the MG and finger gullies (FGs) through installation of a collector or trunk drain at the toe and bed of the gullies;
iii) Gully bank stabilization measures that include gabion retaining wall, Reno-mattress bedding, slope cutting with geogrid bedding and Vetiver grass, bio-remediation using Vetiver grass protection.
iv) Bio-remediation measures will be used to protect the gully bank walls. This provides important resistance to erosion forces and will be more aesthetic and environmentally friendly than other structures.

<u>Civil Construction Works:</u>

- The key activities in putting up the civil works include:
  - cutting and filling for percentage recovery
  - concrete casting
  - assembling of structures and,
  - slope stabilization.
- The foundations of the lattice structures and concrete casting may be dug mechanically. The depth will be consistent with the geotechnical study and the engineering designs.
- Vegetation clearing will be done manually.

- A number of transport vehicles shall be employed in the project but there will be no on-site maintenance of vehicles.
- Powered equipment is expected to be used in the construction (as required) as well as earth moving equipment such as excavators, compactors, bulldozers and pay loaders;
- Skilled and unskilled labour shall be employed in the project.

The ESMP development takes into account the proposed civil engineering designs, vegetative land management measures and other activities aimed at reducing or managing runoff that could be carried out within the Awka South LGA watershed. The ESMP documentation includes measures needed to implement the identified actions, addressing the adequacy of the monitoring and institutional arrangements for the upper and lower watersheds of the gully corridor on a sustainable basis. The potential impacts associated with the phases of designed site interventions consisting of pre-construction, construction, and operation and maintenance (O&M) have been developed and appropriate mitigation measures established for the impacts. The mitigation measures adopted are guided by recommendations in the ESMF.

Although there are other grasses such as crown grass, lemon grass, etc and economic trees such as rubber plant, bread fruit plant, mango tree, etc, which may be used for bioremediation, Vetiver grass is considered the most suitable. This is due to its unique characteristics that include - wide adaptability, inexpensive, easy to handle, sediment control, low maintenance, and its effectiveness in stabilizing and rehabilitating land, etc. as well as the usefulness in combating erosion.

1.3. Rationale for ESMP:

In fulfillment of the World Bank safeguard policy requirements, the ESMP serves as a safeguard instrument that documents the necessary mitigation, monitoring and institutional actions to be carried out with the implementation of the subproject to eliminate adverse environmental and social impacts or reduce them to an acceptable level.

The study also aims at satisfying both legal and institutional obligations and the relevant World Bank Safeguard Policies and Procedures. In doing so, reference was made to the World Bank Group Environmental, Health and Safety Guidelines.

1.4 Phases of Intervention Works:

The proposed project scope of work can generally be divided into three phases, namely:

1. Pre-construction phase;
2. Construction phase; and,
3. Post-construction (maintenance) phase.

1.5.1 Pre-construction Phase

As part of the pre-construction stage, SMEnv/ANS-NEWMAP commissioned Loraj Nig. Ltd. to develop the detailed engineering design for the remedial intervention and development of the Federal High Court gully corridor. The preparation of this ESMP and a separate Resettlement Action Plan (RAP) forms part of the pre-construction phase. The commencement of the remedial construction activities is expected to begin after the completion of the ESMP and RAP process.

1.5.2 Construction Phase

The construction of the gully erosion control infrastructure and the site development activities, will require the use of existing access roadways to reach sections of the project location. The access roadways will need to be rehabilitated as part of the construction works.

The preparation of the construction staging areas will require some localized vegetation clearance along the gully corridor and the removal of incipient solid waste materials.

Materials arising from the excavation for the gully corridor, foundations, stabilization walls (soil, rock etc.) and installation of gabions would be used to fill appropriate areas. The foundations will be in-filled with cement supplied via ready-mix-cement trucks or alternatively mixed on site. Vegetation clearing may be done manually or mechanically. A number of transport vehicles will be employed in the project but there will be no on-site maintenance of vehicles. The power equipment is expected to be used in the construction including power saws and compressor to break hard ground (if required). Earth moving equipment such as excavators, compactors, bulldozers and pay loaders will also be used at the site. Additionally, skilled and unskilled labor will be employed during the project implementation.

1.5.3 Post-Construction (Operations & Maintenance) Phase

Routine visual inspection and maintenance of the rehabilitated gully corridor are expected. Access rights may need to be retained through the community watershed association to allow for maintenance works in the future. The erosion and flood control corridor will require routine periodic maintenance of the site infrastructure (culverts, gabions, drainage channels, roadways etc) as well as necessary oversight of any economic trees associated with the project.

This ESMP is guided by the requirements of the relevant and applicable state, national and international regulation, guidelines, conventions, industrial best management practices including the World Bank safeguard policies that are triggered by the project. The relevant legal and institutional framework applicable to NEWMAP has been fully discussed in the ESMF. These legal requirements and regulations are summarized below:

2.1 World Bank Environmental and Social Safeguard Policies

2.1.1 Triggered WB Safeguard Policies

The WB Integrated Safeguard Data Sheet (ISDS) for NEWMAP indicates that only three of the WB Safeguard Policies may be triggered by the project. These include OP 4.01 Environmental Assessment; OP 4.12 Involuntary Resettlement and OP 7.50 Projects on International Waterways. Based on the scope of construction and rehabilitation works required in the Federal High Court gully erosion intervention as well as the specific intervention activities proposed, Table 2.1 (FHC Triggered Safeguard Policies) summarizes the World Bank Safeguard Policies determined to be triggered by the FHC Sub-project.

Table 2.1: Triggered Safeguard Policies

WB Safeguard Policy	Triggered by NEWMAP?		Triggered by FHC Gully Project?		Applicable To Project Due To	How Project Addresses Policy Requirements
	YES	NO	YES	NO		
Environmental Assessment (OP/BP4.01)	[x]	[ ]	[x]	[ ]	Civil works with site-specific impacts	ESMF prepared for NEWMAP & site specific mitigation measures developed in this ESMP
Natural Habitats (OP/BP4.04)	[ ]	[x]	[ ]	[x]	NA*	NA
Pest Management (OP 4.09)	[ ]	[x]	[ ]	[x]	NA	NA
Physical Cultural Resources (OP/BP 4.11)	[x]	[ ]	[ ]	[x]	NA	NA
Involuntary Resettlement (OP/BP4.12)	[x]	[ ]	[x]	[ ]	Restriction of access to sources of livelihood.	RPF prepared for NEWMAP & a standalone RAP spells out site specific issues to be addressed & how.
Indigenous Peoples (OP/BP4.10)	[ ]	[x]	[ ]	[x]	NA	NA
Forests (OP/BP4.36)	[ ]	[x]	[ ]	[x]	NA	NA
Safety of Dams (OP/BP4.37)	[ ]	[x]	[ ]	[x]	NA	NA
Projects in Disputed Areas (OP/BP7.60)*	[ ]	[x]	[ ]	[x]	NA	NA
Projects on International Waterways (OP/BP7.50)	[x]	[ ]	[ ]	[x]	NA	NA

NA* = Not Applicable

The applicable World Bank safeguard policies identified for FHC subproject include: OP 4.01 Environmental Assessment and OP 4.12 Involuntary Resettlements. These World Bank safeguard policies are summarized as follows:

2.1.2 Environmental Assessment (EA) (OP 4.01):

An EA is conducted to ensure that Bank-financed projects are environmentally sound and sustainable, and that decision-making is improved through appropriate analysis of actions and of their likely environmental impacts. Any World Bank project that is likely to have potential adverse environmental risks and impacts in its area of influence requires an EA indicating the potential risks, mitigation measures and environmental management framework or plan.

2.1.3 Involuntary Resettlement (OP 4.12):

Key objectives of the World Bank's policy on involuntary land acquisition are to avoid or minimize involuntary resettlement where feasible, exploring all viable alternative project designs; assist displaced persons in improving their former living standards, income earning capacity and production level, or at least in restoring them; encourage community participation in planning and implementing resettlement; and provide assistance to affected people regardless of the legality of land tenure. The policy covers not only physical relocation, but any loss of land or other assets resulting in relocation, or loss of shelter; loss of assets or access to assets; loss of income sources or means of livelihood whether or not the affected people must move to ANOther location. When the policy is triggered, a Resettlement Action Plan (RAP) must be prepared. An abbreviated plan may be developed when less than 200 people are affected by the project. In situations, where all the precise impacts cannot be assessed during project preparation, provisions are made for preparing a Resettlement Policy Framework (RPF). The RAP/RPF must ensure that all Bank's policy provisions detailed in OP 4.12 are addressed particularly the payment of compensation for affected assets at their replacement cost.

2.2 Federal Policy, Legal, Regulatory and Administrative Frameworks

Pursuant to Section 20 of the Nigerian 1999 Constitution, the state is empowered to protect and improve the environment and safeguard the water, air, and land, forest, and wildlife of Nigeria. The power to regulate all environmental matters in Nigeria is vested in the Federal Ministry of Environment (FMEnv) – a mandate that previously rested with the now defunct Federal Environmental Protection Agency (FEPA) set up by Federal Act 88, of 1988.

The applicable environmental laws include the Environmental Impact Assessment Act No. 86 of 1992; the National Guidelines and Standards for Environmental Pollution Control in Nigeria (March 1991); the National Environmental Standards and Regulations Enforcement Agency (establishment) Act 2007 (NESREA), the Land Use Act 1978 (modified in 1990); the Forestry Act 1958; and the National Agricultural Policy 1988.

2.2.1 National Policy on Environment

The national policy on environment, 1989 (revised 1999), provides for "a viable national mechanism for cooperation, coordination and regular consultation, as well as harmonious management of the policy formulation and implementation process which required the establishment of effective institutions and linkages within and among the various tiers of government – federal, state and local government". The defined guidelines and strategies provide for the effective management of the environment in the following 14 major areas:

> Human population; Land use and soil conservation; Water resource management; Forestry; Wildlife & protected areas; Marine & coastal area resources; Toxic & hazardous substances; Energy production & use; Air pollution; Noise pollution; Toxic & hazardous substances; Recreational space; Greenbelts movements; & Cultural property.

2.2.2 National Environmental Impact Assessment Act 1992:

National EIA Act 1992, Clause 2 provides that public or private sector of the economy shall not undertake or embark on or authorize projects or activities without prior consideration of the effects on the environment. The act makes an EIA mandatory for any development project, and prescribes the procedures for conducting and reporting EIA studies. As part of the effective utilization of the EIA tool, the ministry has produced sectarian guidelines.

2.2.3 Nigerian Land Use Matters

The basic legal framework for the acquisition of land in Nigeria is the Land Use Act 1978 as amended under the Amended Land Use Act of 2004, Chapter L5 under the laws of the Federation of Nigeria. The Part 1 of the amended Act 2004 vests all land within the urban areas of any Nigerian State in the Executive Governor of that state. Land within the rural areas of the state is vested on the Local Government. The Part VI, Section 29 of the law provides for compensation to the holder of any land title when such land is to be acquired for public purposes. For developed land, the Governor (in the case of urban areas) or Local Government (in the case of rural areas) may, in lieu of compensation, offer resettlement in any other place as a reasonable alternative accommodation and in acceptance of resettlement, the holder's right to compensation shall be deemed to have been duly satisfied.

Although the Land Use Act is not strictly an Act for environmental protection, protection of the environment is one of the considerations which a holder of certificate of occupancy has to observe.

2.2.4 National Erosion and Flood Control Policy 2005:

The general soil erosion & flood control guidelines provide necessary instructions for soil and water resources users to develop, implement and monitor plans that are to assure erosion and flood hazard mitigation. The maintenance of levees and other protective structures are also to be developed at areas with potential impacts. In addition to this, all requests for project plan approvals must include soil type and drainage pattern/structures in and around project area and the likely impact of the project on these duly certified.

2.2.5 NESREA Establishment Act, 2007.

The National Environmental Standards and Regulations Enforcement Agency (NESREA) has responsibility for the enforcement of the environment regulations and biodiversity conservation, including coordination and liaison with relevant stakeholders within and outside Nigeria on matters of enforcement of environmental standards, regulations, rules, laws, policies and guidelines.

2.2.6 National Guidelines and Standards for Environmental Pollution (March, 2001):

The National Guidelines and Standards for environmental pollution control in Nigeria (March, 2001) is the basic instrument for monitoring and controlling industrial and urban pollution.

2.2.7 Waste Management Regulations of 1991

This regulation mandates the collection, treatment, and disposal of solid and hazardous waste from municipal and industrial sources.

2.2.8 Approved National Forestry Policy 2006

The extant national forest policy which is included within the document "Agricultural Policy for Nigeria" published by the Federal Ministry of Agriculture in 1988 recognized forestry as the management and utilization of forests as renewable natural resources. The policy overall objective is to achieve sustainable forest management that would ensure sustainable increases in the economic, social and environmental benefits from forests and trees for the present and future generation including the poor and the vulnerable groups.

The Forest Policy encourages and supports an aggressive establishment of plantations of economic trees of both exotic and indigenous species. It provides for the preservation of forest and the setting up of forest reserves, and also provides goals, targets and implementation strategies for the management, development and use of forests and their resources and products. Nigeria is at present a wood deficit nation. The policy on forest resources management and sustainable use is aimed at achieving self-sufficiency in all aspects of forest product through the use of sound forest management techniques as well as the mobilization of human and material resources. The overall objectives of forest policy are to prevent further deforestation and to recreate forest cover, either for productive or for protective purposes, on already deforested fragile land.

The national biodiversity conservation strategy continues to be based on a system of Protected Areas, including Forest Reserves, National Parks and Game Reserves. In recognition of the fact that the local communities must share from the benefits of these Protected Areas, there must be a meaningful participation of these communities in their management. Efforts to safeguard biodiversity in private forests and to improve agricultural biodiversity through farm forestry initiatives must be supported.

Government has signed a number of international agreement and conservators that are relevant to the forestry development. It is obligatory that Government should honour these agreements and instruments through domestic legislation; and action. Intergovernmental, bilateral and multilateral cooperation will be upheld to promote sustainable development of forest resources.

2.3 Other Relevant Acts and Legislations at Federal Level

Nigeria subscribes to a number of international regulations and convections relating to Environmental Protection. The assessments and management standards of these international development partners/agencies, such as World Bank and other financial organizations, must be compiled with by project proponents before these institutions will invest in the projects. These guidelines/conventions/treaties to which Nigeria is a signatory are summarized below.

2.3.1 The Basel Convention on the Control of Transboundary Movement of Hazardous Waste and Disposal, 1989

The convention focuses attention on the hazards of the generation and disposal of hazardous wastes. Convention defines the wastes to be regulated and controls their trans-boundary movement to protect human and environmental health against adverse effects.

2.3.2 UN Framework Convention on Climate Change – Kyoto Protocol (1992)

In order to achieve sustainable social and economic development, energy consumption for developing countries needs to grow taking into account the possibilities for achieving greater energy efficiency and for controlling greenhouse gas emissions in general. This also includes the application of new technologies on terms which make such an application economically and social beneficial, determined to protect the climate system for present and future generations.

2.3.3 Agenda 21 - UN Conference on Environment and Development

At the United Nations Conference on Environment (also the Earth Summit) – held in Rio de Janeiro (1992), with recommendations from the WHO Commission, more than 150 member states adopted Agenda 21 - an action plan to guide future strategies for health and environment activities on a national and international level. This fact provided the background for FEPA's EIA framework to ensure environmental sustainability of all types of activities in the oil and gas industry (FEPA, 1995).

2.3.4 Public Health Legislations and regulations

Several countries have legislation and regulations that stipulate the administrative and policy framework for conducting health impact assessment for a development project, whether as

part of an EIA or a standalone study. In addition, a number of international agencies have endorsed this process, such as the World Banks, Asian Development Commission, and the World Health Organizations. In Nigeria, the Public Health Law (L.N47 of 1955, Cap 103) provides justification for the execution of developmental projects under guidelines that promote health by protecting the environment and safeguarding the health of humans.

2.3.5 WHO Health and Safety Component of EIA, 1987

WHO in its report on health and safety component of environment impact assessment (EIA) to protect human health indicates that:

i. One of the fundamental considerations in the approval of projects, policies and plans should be the health of communities affected by them; greater consideration should be given to the consequence of development policies/programs for human health;
ii. Environmental Impact Assessment should provide the best available factual information on the consequence for health of projects, policies and plan; and
iii. Information on health impact should be available to the public.

2.3.6 Convention on Conservation of Migratory Species of Wild Animals, Bonn, 1979

The Bonn convention concerns the promotion of measures for the conservation (including habitat conservation especial for endangered species and management of migratory species.)

2.3.7 United Nations Guiding Principle on the Human Environmental

The United Nation (UN) published the concept of guiding principles on the Human Environment in 1972. Ten of these Guiding Principles were defined as formal declarations that express the basis on which an environmental policy can be built and which provide a foundation for action.

2.3.8 The Rio Declaration on Environmental and Development

The UN Conference on Environment and development met at Rio de Janeiro in June 1992, at which time it reaffirmed the 1972 declaration on the Human Environment, and sought to build upon it. This was done with the goal of establishing a new and equitable global partnership through the creation of new levels of cooperation among states, key sectors of societies and people. It was also to aid work towards international agreements, which respect the interest of all, protect the integrity of the global environmental development system, and recognize the integral and interdependent nature of the earth.

Other relevant international conventions include:

- Africa Convention on the Conservation of Natural Resources of 1969
- Convention on the Law of the Seas of 1982
- The Ramsar Convention on Wetlands of 1971

2.4 State Legislations

2.4.1 Anambra State Waste Management Act

This Acts provides for the effective development and maintenance of sanitation in all areas of the State. The law further provides for proper disposition of excavated silt or earth and other construction materials after any construction project or repair works. Open burning of wastes is prohibited with stipulated penalties.

2.5 Gaps between Nigerian Legislation and World Bank Policies

The gaps between the Nigerian current legislation and WB policies triggered as they relate to this project are summarized in Table 2.2 below:

Table 2.2: Gaps between Nigeria Legislation and WB Policies

Project Triggered Policies	Nigerian Legislation	World Bank Policy	Gaps Between the Policies
OP 4.01 Environmental Assessment	National EIA Act 1992, Clause 2 provides that public or private sector of the economy shall not undertake or embark on or authorize projects or activities without prior consideration of the effects on the environment. The act makes an EIA mandatory for any development project, and prescribes the procedures for conducting and reporting EIA studies. As part of the effective utilization of the EIA tool, the ministry has produced sectarian guidelines. Responsibility for monitoring of EIA activities lies with the NESREA and State ministries of environment but these agencies lack the logistic capability to carry out the tasks assigned to it by the law	An EA is conducted to ensure that Bank-financed projects are environmentally sound and sustainable, and that decision- making is improved through appropriate analysis of actions and of their likely environmental impacts. Any World Bank project that is likely to have potential adverse environmental risks and impacts in its area of influence requires an EA indicating the potential risks, mitigation measures and environmental management framework or plan.	Nigeria currently has a comprehensive framework for assessing and managing the environmental impacts of development projects. However, in comparison with the World Bank Safeguard Policies, it would appear that the Nigeria framework lacks the provision of clear requirements or guidance in the assessment of the impact of an activity on public health. In this case the policy of the bank prevails.
OP 4.11 Physical Cultural Resources	National Commission For Museums and Monuments Act of 1990, Chapter 242 seeks to protect and preserve any objects of archaeological interest wherever they may be found. Any person who discovers an object of archaeological interest in the course of operations permitted under section 19 of this Act shall notify the Commission.	The Bank seeks to assist countries to manage their physical cultural resources and avoid or mitigate adverse impact of development projects on these resources. This policy is triggered for any project that requires an EA.	No difference in framework. Responsibility for monitoring of activities and enforcement under this Nigerian Regulations is effectively lacking. In this case the policy of the bank prevails.
OP 4.12 Involuntary Resettlement	The basic legal framework for the acquisition of land in Nigeria is the Land Use Act 1978 as amended under the Amended Land Use Act of 2004, Chapter L5 under the laws of the Federation of Nigeria. The Part 1 of the amended Act 2004 vests all land within the urban areas of any Nigerian State in the Executive Governor of that state. Land within the rural areas of the state is vested on the Local Government. The Part VI, Section 29 of the law provides for compensation to the holder of any land title when such land is to be acquired for public purposes. For developed land, the Governor (in the case of urban areas) or Local Government (in the case of rural areas) may, in lieu of compensation, offer resettlement in any other place as a reasonable alternative accommodation and in acceptance of resettlement, the holder's right to compensation shall be deemed to have been duly satisfied. Although the Land Use Act is not strictly an Act for environmental protection, protection of the environment is one of the considerations which a holder of certificate of occupancy has to observe.	Key objectives of the World Bank's policy on involuntary land acquisition are to avoid or minimize involuntary resettlement where feasible, exploring all viable alternative project designs; assist displaced persons in improving their former living standards, income earning capacity and production level, or at least in restoring them; encourage community participation in planning and implementing resettlement; and provide assistance to affected people regardless of the legality of land tenure. The policy covers not only physical relocation, but any loss of land or other assets resulting in relocation, or loss of shelter; loss of assets or access to assets; loss of income sources or means of livelihood whether or not the affected people must move to ANOther location. When the policy is triggered, a Resettlement Action Plan (RAP), must be prepared. An abbreviated plan may be developed when less than 200 people are affected by the project. In situations, where all the precise impacts cannot be assessed during project preparation, provisions are made for preparing a Resettlement Policy Framework (RPF). The RAP/RPF must ensure that all Bank's policy provisions detailed in OP 4.12 are addressed particularly the payment of compensation for affected assets at their replacement cost	Essentially, there is no difference between the main framework of both policies. Lands that would be acquired for this project shall be fully compensated for in accordance with the World Bank policy and principles. The Nigerian regulations while also lacking clear responsibility for monitoring of activities associated with compensations further lack the logistic capability for any agency to carry out the tasks assigned to it by the law. In this case the policy of the bank prevails.

The summary descriptions of the WB Safeguard Policies are included as Annexure 3.

CHAPTER 3: DESCRIPTION OF AREA OF INFLUENCE AND ENVIRONMENTAL BASELINE CONDITIONS

3.1 Introduction

This Section discusses the project area of influence as well as the general and specific baseline conditions that characterize the project areas. The discussions are in three parts consisting of (i) the project area of influence; (ii) general environmental conditions; and, (iii) site specific environmental conditions focusing on the four gully sites that make up the project areas.

3.1.1 General Conditions

The project area environmental characteristics which cut across the FHC gully site is discussed under Sections 3.2 through 3.7. The geologic and soil characteristics of the project area and the extent to which implementation of the proposed project could be affected by soil characteristics and other natural environmental factors are summarized below. The natural environmental factors include climate and vegetation, topography and landforms, hydrogeology and hydrologic patterns. Information sources for this evaluation include published literature, preparation of surface geologic map, geotechnical investigation conducted by Loraj Nig Ltd – the engineering design Consultant for this project, and the physical observations made during site assessments in the course of the Consultancy.

Prevailing climatic conditions were sourced from the nearest meteorological center with existing literature complimenting field data to establish the sub-project area rainfall, ambient temperature, wind direction and speed, atmospheric pressure and relative humidity. Information and data relating to the vegetation, topographic, geological, hydrogeological, hydrological and hydraulic nature of the area were used to fully characterize the sub-watershed. Road transect or quadrates method was used to sample flora/fauna.

3.2 Baseline Environmental Setting

3.2.1 Climate

The project area is situated within the sub-equatorial south climatic region characterized by uniformly high temperatures and a seasonal distribution of precipitation and high relative humidity. Figure 3-1 shows the plot of average monthly temperature and rainfall distribution through the year. The climate is of humid tropical climatic condition. Harmattan is felt between December & January. The average annual temperatures range from a minimum of about 24^{0}C to a maximum of about 30^{0}C.

The area experiences distinct wet and dry seasons (eight months of rainfall and four months of dryness) in the year. The rainy season begins in March and ends in October while the dry season runs through the months of November to February of each year as shown in Figure 3.1.

The rainfall shows bimodal peaks which occur in June/July and September with a short break between July and August. The average annual rainfall in the area is about 1828 mm. The rainy season follows the northward advance of maritime air from the Atlantic Ocean. The months of July and September are usually the wettest periods of the rainy season with average monthly

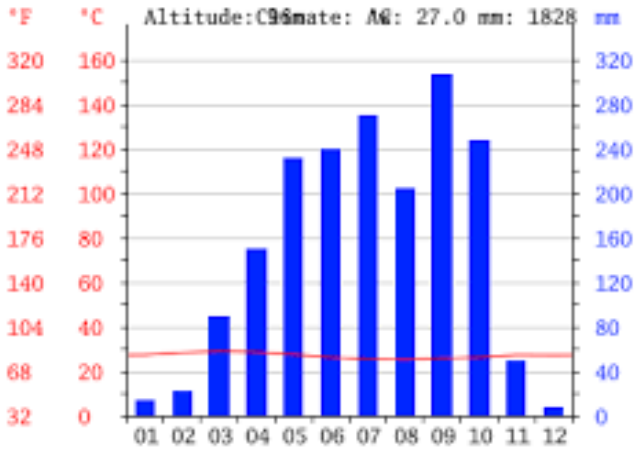


Fig. 3.1: Temperature and Rainfall Distribution in Project Areas (Source: Climate-data.org)

rainfall of over 240mm. Relative humidity is high during this period, usually over 90% in the early morning but falls between 60% and 80% in the afternoon.

The weather is highly influenced by the south western winds and the north-eastern winds. The south-western winds are full of moisture and blusters from the Atlantic Ocean whereas the northern easterlies are dry and dirt-laden winds that primarily blow from the deserts of Sahara. The dry and rainy seasons in Nigeria come into existence due to the movement of the north-east winds and the south-west winds, respectively. The hot and dry Harmattan (north-east) winds from the Sahara sweep across Anambra State and the project area between December and January at wind speeds of between 2.3 mph and 6.15 mph, carrying a reddish dust from the desert. The southwest winds bring cloudy and rainy weather between March and October of each year.

3.2.2 Geology and Hydrology

The project area forms a part of the Anambra sedimentary basin of the southeastern Nigeria. The Anambra basin covers about 40,000sq.km. The southern boundary coincides with the deltaic swamps of the Niger Delta basin and extends northwards beyond the Bende-Ameki formation. The basin is said to have originated contemporaneously with the folding and uplift of the Abakaliki – Benue area during the santonian stage. The Anambra basin constitutes a major depocenter of clastic sediments and deltaic sequences and resulting from the second tectonic activities of the lower Benue Trough. Figure 3-2 shows the geologic map of the southern Anambra basin.

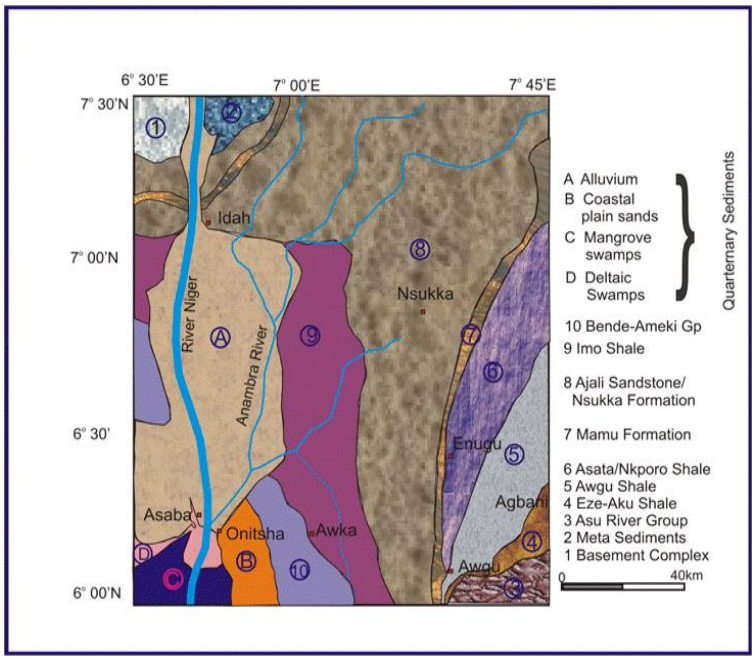


Figure 3-2: Geology Map of the Southern Anambra Basin

3.2.3 Soil Types

The soils of Anambra State particularly have groundwater reservoirs that severely contribute to ecological problems in the region. The project area soils are typified by the coastal plain sands characteristics and are highly susceptible to erosion. Beneath the weak lateritic and acidic soils are unstable and poorly consolidated geologic rocks and material. The sandy members of these geologic units contain huge groundwater reservoirs in aquifers with attendant pore water pressures that become threatening when overlying structures carry uncompromising loads. The lateritic and sandy soils are easily eroded by storm water runoffs. The lithostratigraphic units of the Anambra Basin are shown in Table 3-1.

Table 3-1: Lithostratigraphic section of the Anambra Basin

AGE	LITHOSTRATIGRAPHIC UNITS	
TERTIARY	EOCENE	AMEKI FORMATION / NANKA SAND
	PALEOCENE	IMO SHALE
CRETACEOUS	DANIAN	NSSUKA FORMATION
	MAESTRICHTIAN	AJALI SANDSTONE
		MAMU FORMATION
	CAMPANIAN	ENUGU / NKPORO SHALE

Source: Agagu et al., 1985

3.2.4 General Field Observations

Generally, the soil is poorly graded, often dominated by uniformly and gap graded soils as well as porous soils making it easily erodible. There are two streams and a river along the gully corridor namely; Iyi–Owa and Imo-Oka streams, and Obibia River. The Iyi-Owa stream flows into the Imo-Oka stream which then drains into Obibia River.

As a result of sediment deposition, the Iyi-Owa stream has been completely silted at the source area. However, this source area appears to remain perpetually saturated allowing water seepage that results in trickled flow towards the Imo Oka stream. The Imo-Oka stream corridor is heavily silted resulting from the upstream soil erosion and sediment deposition. At the time of field inspections, sand mining activities were observed along the Imo-Oka stream corridor exacerbating the already degraded project area.

Iyi Owa Stream (N 06^0 14.435"; E 7^{0}04.682')

Imo Oka Stream (N 06^{0}14.360''; E 007^{0}04.587')

Imo Oka Stream (N 06^{0}14.360''; E 007^{0}04.573')

Obibia River (N 06^{0}14.453''; E 007^{0}04.498') Gully Outfall Area

3.2.5 Biodiversity

The ecological survey of the immediate project area provides necessary information about the wildlife (vegetation cover and fauna) of the area, which is a vital indicator of its ecological dynamics. It also provides baseline information that can be useful for monitoring and the assessment of project implementation effectiveness.

3.2.5.1 Vegetation

The project area is semi-urbanized and not completely developed. The project area lies within the humid tropical rainforest belt of southeastern Nigeria and evidences savannah type vegetation. But pressure on land in form of agriculture and commerce has largely reduced the vegetation to mixed savanna. Along Imo Oka stream course and in few preserved areas, some rain forest flora such as Iroko, Silk cotton tree, Tridax, and assorted grasses, domesticated species like Velvet Tamarind, mangoes, Palm trees etc. exist.

The vegetative cover of the project area is highly heterogeneous due to severe anthropogenic disturbance. Sampling of flora and fauna in the project area was conducted using quadrates in each of the identified land use categories and100% enumeration of trees within each quadrate was carried out. Known species and others species of interest were identified and classified using standard taxonomic procedures. A listing of plant species with frequent or abundant distribution identified in the various categories are shown in Table 3-2

Table 3-2: Listing of Frequent/ dominant Plant Species in Project Corridor

S/NO	SPECIES	COMMON NAMES	LOCAL NAMES	FAMILY	LIFE FORM
1	Sida acuta	Common wireweed/ broom weed	Udo/Eshioku	Malvaceae	Herb
2	Tridax procumbens	Coat buttons	Igbalode	Asteraceae	Herb
3	Eleusine indica	Goose grass	Ichite	Poaceae	Herb
4	Aspilia Africana	Wild sun flower	Oramejina	Asteraceae	Herb
5	Dialium guineense	Velvet tamarind	Ichekwu	Fabaecae	Tree
6	Mimosa pudica	Touch and die	Uke	Fabaceae	Herb
7	Ageratum conyzoides	Billy goat weed/ white weed	Agadi isi Awo	Asteraceae	Herb
8	Mimosa pigra	Catclaws mimosa	Aluro	Fabaceae	Herb
9	Pentaclethra macrophylla	Oil bean tree	Ukpaka	Fabaceae	tree
10	Acacia ataxacantha	Flame worm	Uhie	Fabaceae	Herb
11	Chromolaena odorata	Siam seed/ Christmas bush	Awolowo	Asteraceae	Herb
12	Bambusa vulgaris	Bamboo	Otosi	Poaceae	Tree
13	Elaeis guineensis	African Palm Tree	Ukwu akwu	Areceae	Tree
14	Newbouldea leavis	Boundary tree	Ogrisi	Bignoniaceae	Shrub
15	Manihot esculenta	Cassava	Akpu	Euphorbiaceae	Shrub
16	Canarium schweinfurthii	African Elemi	Ube osa/ubengba	Burseraceae	Tree
17	Azadirachta indica	Neem tree	dogoyaro	Meliaceae	Tree
18	Mucuna pruriens	Devil bean/ velvet bean	Agbara	Fabaceae	Herb
19	Paspalum conjugatum	Buffalo grass/hilograss	Oji ikpere eje	Poaceae	Herb
20	Paspalum scrobiculatum	Rice grass	Ikute ala	Poaceae	Herb
21	Eleusine indica	Goose grass	Ichite	Poaceae	Herb
22	Eragrostis tenella	Japanese lovegrass	Ilulu nza	Poaceae	Herb
23	Pennisetum polystachyon	Mission grass	Achara ibeku/ Achara ngwa	Poaceae	Herb
24	Pennisetum polystachyon	mission grass	Achara ibeku/ Achara ngwa	Poaceae	Herb
25	Morinda lucida	Brimstone tree	Eze Ogu/ Njisi	Rubiaceae	Herb
26	Gliricidia sepium	Cocoa	Ujuju	Fabaceae	Tree
27	Emilia sonchifolia	Red tassel flower	Ogbunizu	Asteraceae	Herb
28	Calopogonium mucunoides	Wild groundnut	Abriba	Fabaceae	Herb
29	Vitex doniana	Black Plum	Ucha koro	Verbenaceae	Tree
30	Ipomea vagans	Moon flower	Ekimako	Convolvulaceae	Herb
31	Pterocarpus rohrii	N/A	N/A	Fabaceae	Tree
32	Amaranthus spp	Spinach	Inine	Amaranthaceae	Herb
33	Talinum fruticosum	Water leaf	Mgbolodi	Talinaceae	Herb
34	Mangifera indica	Mango	mangolo	Anacardiaceae	Tree

Source: Field Survey, March, 2019.

The major farm crops cultivated in the project areas as observed include Cassava *(Manihot esculenta),* Spinach (*Amaranthus spp),* Water leaf (*Talinum fruticosum)* and Cocoyam (*Colocasia esculenta)*, Major Fruit trees grown include Mango (*Mangifera indica*), Paw paw

(*Carica papaya),* African Elemi *(Canarium schweinfurthii*), Oil bean tree (*Pentaclethra macrophylla),* Velvet tamarind (*Dialium guineense),* Neem (*Azadirachta indica) and* Palm tree (*Elaeis guneensis*). The complete listing of plant species and their distribution found in the vegetation cover are given in Annexure VII

Table 3-3: Farm Crops and Economic Trees in the Project Area

Species	Botanical Name	Species	Botanical Name
Major Farm Crops			
Cocoyam	*Colocasia esculenta*	Spinach	*Amaranthus* spp
Cassava	*Manihot esculenta*	Water leaf	*Talinum fruticosum*
Major Fruit Trees Grown In Homesteads			
Velvet tamarind	(*Dialium guineense)*	African Elemi/Ube Osa	*(Canarium schweinfurthii*)
Paw paw	(*Carica papaya*),	Mango	(*Mangifera indica*),
Oil bean tree	(*Pentaclethra macrophylla)*	Oil palm	(*Elaeis guineensis*),
Neem	*Azadirachta indica*	Africa breadfruit	(*Treculia africana*)
Ornamental Trees			
Ficus	(*Ficus exasperata*).	Masquerade tree	(*Polyathia latiflora*).

Source: Field Survey, March, 2019

3.2.5.2 Animal Inventory of the Watershed

Domestic Animals: These include mammal such as goats, sheep, ram and dogs; and aves such as local fowls and agricultural fowls.

Wild Animals: These terrestrial animals were observed to be present in the site: *Xerus erythropus* (Ground squirrel), Milipedes, Centipedes, Snails, Crabs, Ants, Butterflies and Birds. Other animals reported by locals include: *Thryonomys swinderianus* (Grass cutter/nchi), *Cricetomys gambianus* (Bush/giant rat), Snake. Of the above mentioned, *Thryonomy's swinderianus* (Grass cutter) and Cricetomys gambianus (Bush/giant rat), were reported to be the most abundant species in the site. It was reported by the locals that these animals are gradually disappearing. This could be attributable to habitat loss due to urbanization and farming activities occurring at the site since some of these animals are burrowing animals. Another factor could be uncontrolled hunting. None of existing reported animals are listed on the International Union for the Conservation of Nature (IUCN) endangered red list.

3.2.6 Slope Instability and Subsidence

The stability or instability of a slope is greatly dependent upon factors such as gradient, available water content, existing vegetation, and stresses (natural and anthropomorphic) affecting the slope. For example, a denuded, saturated slope could be further destabilized and fail if it was to be stressed by considerable earth moving activities. The terrain of the project area is relatively of undulating surfaces.

Land subsidence is the loss of surface elevation due to removal of subsurface support. Subsidence has many causes, including seismically induced stresses and the extraction of mineral or liquid and gas deposits. Although mineral and gas can and do cause subsidence, it is more common for subsidence to occur as a result of groundwater extraction in excess of groundwater recharge. There are no known studies on subsidence in the project area or surrounding region. However, subsidence in the region as a whole may be limited because the various geologic and hydrologic conditions associated with subsidence are not known to occur in the area

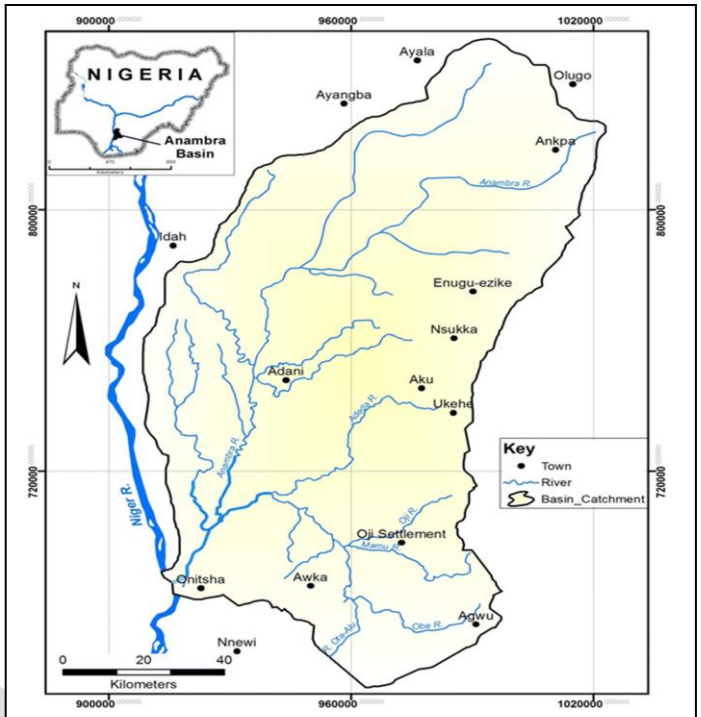


Fig. 3-3: Drainage Map of Anambra Basin
(Source: Ayogu, C.N., Phil-Eze, P.O., Ayogu, N.O., et al. (2019).

3.2.7 Natural Drainage Corridors

Survey maps that included Satellite Imagery and Topographic profiles were used to guide interpretations of storm water flows throughout the project area. The watershed drainage features were identified through interpretation of 5-meter contour intervals topographic map. Drainage features within the scope of this investigation included any topographic feature that could potentially concentrate surface runoff, including convergent topography, swales and existing channels. The Okpuno watershed is drained by the Obibia River. Figure 3-3 is the digital elevation model of the study area showing the drainage systems in the area

3.2.8 Main Agents of Site Gully Erosion

Based on field observations of project area landscape, soil erosion at the project site and indeed all areas of Nodu and Umuzocha communities, is a result of gravity-driven surface water flow enhanced by the topography of the area. Furthermore, development in the area is not in tandem with the natural storm water flow routes within the catchment and sub-catchment areas thereby creating flow blockades. The major cause of the erosion problem at Federal High Court is the abrupt termination of drainage channels built as part of the construction of the Judiciary road.

The Obibia River outfall empties into the Omambala River. This means that the pollution effects from the waste dumps within the gully corridor have a wider impact area beyond the local. It is also noted that previous self-help interventions have been carried out to control or abate the erosion scourge at this site and adjacent areas. These interventions by community members have not been successful or effective

3.2.9 Archaeology and Cultural Heritage:

There are no World Heritage Sites or areas of cultural importance that would be impacted by the proposed project, nor are there any archeologically sensitive areas.

3.2.10 Traffic and Transport Infrastructure:

The upper sections experience the most traffic as it is the developed part in the project area and is served by some intra-linkage roads which are now destroyed by the gully. This is envisaged to gradually increase once the gully erosion control intervention project is completed, and as additional residential areas develop and the road surfacing is improved.

3.2.11 Waste Management:

Waste management provision in the project area is generally lacking. Solid wastes are generally handled in individual homesteads and are either burnt or disposed of in small earth fills to rot. There are haphazard commercial waste collections within the Federal High Court corridor community resulting to a large extent in wastes being indiscriminately dumped in isolated places. There are also no effective sewerage works in the project area with many homesteads using septic tanks.

3.3 Site-Specific Baseline Environmental Setting

Soil, water and air samples were collected from various locations within the gully corridor. The matrix of sampling media and sampling locations for the gully corridor are shown in Table 3.4. The collected soil and water samples were submitted to MGG Laboratory for analyses to assess the baseline environmental conditions within the project areas. Air samples were analyzed in-situ.

Table 3.4: Sampling Locations and Coordinates along the Gully Corridor

SAMPLING LOCATIONS AND COORDINATES ACROSS				
SAMPLE MEDIA	**SAMPLE CODE**	**SAMPLE LOCATION**	**LOCATION DESCRIPTION**	**COORDINATES**
SURFACE WATER SAMPLE	SWS/001	IYIOWA STREAM	The surface water sample (SWS/001) was collected from Iyi-Owa.	N 06^0 14.435" E $7^0$04.682'
	SWS/002	IMO-OKA STREAM	Sample was collected from Imo-Oka stream.	N $06^0$14.360'' E $007^0$04.587'
	SWS/003	OBIBIA RIVER	Sample was collected from Obibia River.	N $06^0$14.453'' E $007^0$04.498'
SOIL SAMPLE	SS/001	GULLY HEAD	Soil sample (SS/001) was collected at the gully head	N $06^0$14.357'' E $007^0$04.775''
	SS/002	MID SECTION OF GULLY	Soil sample was collected at the collapsed underlaid pipes about 450m to the gully head.	N 6^0''14.409 E$7^0$04.705'
	SS/003	OUTFALL OF GULLY	Soil sample was collected at the flood plain of the gully erosion site in-between Imo-Oka stream and Obibia River.	N $06^0$14.361'' E 704.628
AIR QUALITY	AS/001	FEDERAL HIGH COURT	Air sample was collected at the gully head	N $06^0$14.357'' E $007^0$04.775
	AS/002		Air Sample was collected at the collapsed Fence about 200m from the gully head.	N $06^0$14'388'' E $007^0$04'743
	AS/03	MID SECTION OF GULLY	Air Sample was collected at the spot where Iyi – Owa springs out. This is 300m from Imo-Oka stream.	N $06^0$14'409'' E $007^0$04'705''
	AS/004	IMO-OKA STREAM	Air Sample was collected at the flood plain of the gully erosion between Imo-Oka stream and Obibia River	N $06^0$14'407'' E $007^0$04'628''
	AS/005	IMO-OKA STREAM	The last air sample was collected at about 50m away from the sand mining point at Imo Oka stream	N $06^0$14'414'' E $007^0$04'534''

3.3.1 Physico-Chemical Analysis of Soil Samples

To assess the soil conditions, three soil samples for laboratory analysis were collected from three locations along the gully corridor – first sample near the gully head, second sample in the middle of the gully stretch and third sample near the outfall. The sampling locations are shown in Table 3.4. Each near surface soil sample (0 - 6 inches depth) was collected using the Dutch hand auger and put in a properly labeled self-sealing plastic bag for shipment to the FMEnv-certified MGG Resources Laboratory at Nsukka for chemical analysis. The analytical results of the soil samples are summarized in Table 3.5.

Table 3.5: Summary of Analytical Results of Soil Samples

S/N	Parameters	Units	Sample Results	FMENV/ NESREA	METHOD
1	pH (KCl)	-	4.6	-	pH meter
2	pH (10% solution @ 25^{o}C	-	5.5 – 7.3	-	pH meter
3	Nitrate	mg/kg	10.49 – 16.08	-	ASTM, 2005.
4	Moisture	%	5.49 - 17.61	-	ASTM, 2005.
5	Electrical conductivity	µS/Cm	8.80 – 12.0	-	Conductivity meter
6	Soil colour	-	Whitish/ Reddish	-	Visual Inspection
7	Potassium (K^{+})	mg/kg	0.03 - 0.04	-	ASTM, 2005.
8	Magnesium (Mg^{2+})	mg/kg	0.4 - 2.0	-	ASTM, 2005.
9	Calcium (Ca^{2+})	mg/kg	0.60 - 0.80	-	ASTM, 2005.
10	Sodium (Na^{+})	mg/kg	0.20	-	ASTM, 2005.
11	Available Phosphorus	mg/kg	2.93 - 7.66	-	ASTM, 2005.
12	Organic Matter	%	0.31	-	ASTM, 2005.
13	Nitrogen	%	0.014 - 0.05	-	ASTM, 2005.
14	Organic Carbon	%	0.18	-	ASTM, 2005.
15	Iron (Fe^{2+})	mg/kg	0.12 – 0.61	-	AAS
16	Lead (Pb^{2+})	mg/kg	Bdl – 0.25	-	AAS*
17	Copper (Cu^{2+})	mg/kg	0.06 – 0.48	-	AAS
18	Zinc (Zn^{2+})	mg/kg	0.04 - 0.07	-	AAS
19	Grain Size Distribution (Coarse Sand)	%	52 - 58	-	ASTM, 2005.
20	Grain Size Distribution (Clay)	%	9 - 17	-	ASTM, 2005.
21	Grain Size Distribution (Silt)	%	1 - 3	-	ASTM, 2005.
22	Grain Size Distribution (Fine Sand)	%	4 - 28	-	ASTM, 2005.
23	Textural Class	-	Sandy loam	-	Visual Inspection

*Instrument detection limit (Bdl) = 0.001mg/kg

3.3.2 Physico-Chemical Analysis of Surface Water Samples

To assess the surface water condition, three representative samples of surface water were collected along the gully corridor. The location of each surface water sample collected is shown in Table 3.4. The water samples were collected in a clean sampling bottle for laboratory analysis. The water sample bottles were sealed, labeled and preserved in an ice-filled chest before shipping to the MGG Resources Laboratory at Nsukka for chemical analyses. The summary of analytical results of the water samples are as shown in Table 3.6.

Table 3.6: Summary of Analytical Results of Surface Water Samples

S/N	PARAMETERS TESTED	UNITS	Average Value/Results	NESREA/FMENV LIMITS	METHOD
1	Temperature	0 C	20.8 - 20.90	40	In-situ
2	pH	-	5.2 – 5.8	6.5 - 8.5	In-situ
3	Taste	-	Slight taste	NS	Organoleptic
4	Appearance	-	Turbid	NS	Organoleptic
5	Odour	-	Has odour	NS	Organoleptic
6	Total Dissolved Solids	mg/l	51.0 – 70.0	2100	ASTM, 2005.
7	Conductivity	µS/Cm	112.2 – 154.0	1000µS/Cm	In-situ
8	Total hardness	mg/l	46.0 – 54.0	NS	ASTM, 2005.
9	Chloride	mg/l	25.56 – 26.98	350	ASTM, 2005.
10	Fluoride	mg/l	0.05	NS	ASTM, 2005.
11	Sodium	mg/l	0.99 – 6.7	120	ASTM, 2005.
12	Potassium	mg/l	1.16 – 7.81	50	ASTM, 2005.
13	Sulphate	mg/l	8.16 - 14.35	250	ASTM, 2005.
14	Sulphide	mg/l	0.16 - 0.20	NS	ASTM, 2005.
15	Ammonia	mg/l	0.03 - 0.06	2.0	ASTM, 2005.
16	Nitrate	mg/l	12.32 - 24.20	40.0	ASTM, 2005.
17	Phosphate	mg/l	4.14 - 10.56	3.5	ASTM, 2005.
18	BOD	mg/l	8.10 - 9.40	6	ASTM, 2005.
19	COD	mg/l	10.00 – 14.20	30	ASTM, 2005.
20	Chromium	mg/l	0.05 - 1.28	0.5	AAS
21	Copper	mg/l	0.03 – 0.06	0.01	AAS
22	Iron	mg/l	0.12 – 3.91	0.5	AAS
23	Zinc	mg/l	0.03 – 0.07	0.2	AAS
24	Lead	mg/l	Bdl - 0.25	0.1	AAS*
25	Nickel	mg/l	0.41 - 1.02	0.1	AAS
26	Manganese	mg/l	0.06 – 0.16	0.01	AAS
27	Silver (Ag+)	mg/l	0.02 - 0.14	< 1	AAS
28	Calcium	mg/l	30.0 - 32.0	180	ASTM, 2005.
29	Magnesium	mg/l	16.0 – 22.0	40.0	ASTM, 2005.
30	Total Alkalinity	mg/l	1.40 – 2.60	NS	ASTM, 2005.
31	Hydroxide	mg/l	Nil	NS	ASTM, 2005.
32	Bicarbonate	mg/l	0.60 – 2.20	NS	ASTM, 2005.
33	Carbonate	mg/l	Nil	NS	ASTM, 2005.
	Microbial Analysis				
34	Total Coliform	cfu/ml	$1.0x10^3$ - $2.6x10^3$	NS	ASTM, 2005.
35	E-Coli	cfu/ml	$1.1x10^2$ - $4.3x10^2$	Nil	ASTM, 2005.

*Instrument detection limit (Bdl) = 0.001mg/kg

3.3.3 Air Quality

Air quality assessments were carried out at several locations where active construction operations are anticipated and where human activities are expected to be high. Samples were collected using the Dragner CMS Gas Analyzer. Ambient air was drawn into the calibrated equipment at the targeted locations and subsequently the digital readings for the various parameters were read off the instrument. The location coordinates for each sampling location are also given. The parameters measured as part of the air quality assessment included carbon monoxide (CO), Ammonia (NH_3), Hydrogen Sulphide (H_2S), Sulphur Dioxide (SO_2), Nitrogen Oxides (NOx), Volatile Organic Carbon (VOC) as well as suspended particulate matter (SPM). Analytical results obtained were reviewed against the appropriate regulatory limits to determine any potential health risk levels. The analytical results of the baseline air pollution indicators within and around the project corridor show concentrations below the regulatory threshold limits as shown in Table 3.7.

Table 3.7: Summary of Analytical Results of Air Samples

S/N	Parameters	Unit	NESREA	RESULT	METHOD
1	Hydrogen Sulphide(H_2S)	Ppm	5	0 - 1	M40 Gas Analyser (direct reading method) (MGA)
2	Carbon monoxide (CO)	Ppm	500	0 - 1	
3	Nitric Oxide (NO)	Ppm	300	6.24 – 7.72	
4	Nitric dioxide (NO_2)	Ppm	300	1.373 - 1.377	
5	Sulphur dioxide	Ppm	500	1.122 – 1.51	
6	Hydrogen Cyanide (HCN)	Ppm	NS	1.25 – 3.89	
7	Ammonia (NH_3)	Ppm	NS	3.124 – 3.126	
8	Oxygen	Ppm	NS	20.8	

3.3.4 Noise and Vibration:

The project area is generally a quiet neighborhood being a village. Noise levels were measured using the Digital Sound Level Meter (BAFX Products), Type BAFX3370. Ambient noise exposure levels were taken at five locations along the gully corridor. The recorded ambient levels ranged from 39.7dB to 64.1dB. These noise levels may be considered moderate ambient levels due to the nearby busy Expressway but are well below the FMEnv regulatory standard of 90dB Mitigation measures will be identified for increase in noise levels during the various phases of the project.

CHAPTER 4: SOCIOECONOMIC CHARACTERISTICS & CONSULTATION WITH STAKEHOLDERS

4.1 Description of Cultural and Socioeconomic Environment

4.1.1 Introduction:

The cultural/socioeconomic elements and characteristics of Federal High Court project area (Nodu and Umuzocha villages of Okpuno and Awka towns, respectively) considered in this Consultancy include population, land use and tenure system, social setups, economic activities, education, vulnerability profile, gender, religion, settlement and migration patterns and health services system. Qualitative and quantitative mixed method of assessment was adopted in this project. Participatory community meetings as well as discussions with key informants (Community elders, Local leadership, and Anambra NEWMAP Officers, among others) were held in the course of the Consultancy.

4.1.2 Socioeconomic Survey:

This involved detailed enumerations/inventories of households/persons resident or doing business within the project area as well as formal and informal discussions with the community traditional and administrative leadership. A comprehensive questionnaire for data collection was used for this purpose. The questionnaire captured the following information:

a) Household bio-data (demographic information);
b) Livelihoods;
c) Inventory of structural and nonstructural assets including land, common properties, houses, economic trees and cash crops.

Also, census of the PAPs was also conducted to fully characterize the impact on each affected person.

4.1.3 Public/Stakeholder Consultation:

This was conducted as part of the participatory approach aimed at gaining good knowledge of the social issues/risks associated with the project as perceived by the communities. Public meetings were held in one location within the project immediate impact areas. The meeting location was the Nodu Community Village Hall. Minutes of, and attendance to, these meeting are included in Annexure V.

4.1.4 Use of Maps and GIS:

Survey maps as well as high resolution imagery were used to identify and map out the project area identifying any locations of structures relative to the project corridor.

The qualitative analysis involved an assessment of information obtained during the stakeholders' consultations and public participation forums and discussions. The socioeconomic study provided necessary primary quantitative data for the project assessment. This quantitative data included:

- Household census of the people identified as PAPs;
- Establishing the socioeconomic profile of the project area population including health related status of respondents;
- Establishing the structural assets to be affected by project;
- Establishing area of land to be affected.

4.2 Cultural Environment

4.2.1 Population

Based on the 2006 national population census records and the 3.0% annual population growth factor recommended by the national population commission (NPC), Awka South LGA has a projected population of 249,155 for 2018.

4.2.2 Ethnic Groups

The people of Nodu and Umuzocha villages consist of one of Nigeria's major ethnic groups – the Igbos. The ethnic group has its unique culture, social organization and traditions. The social and cultural aspects in the project area are closely intertwined with the ethic groupings. The Igbos have elaborate cultural practices that include strong kinship linkages with organizations spanning from localized social groups to strong clan relations. The cultural associations and social interactions are epitomized during cultural and religious ceremonies and festivities. The people generally speak and write mainly the Ibo and English languages.

Nodu and Umuzocha villages are essentially a semi-urban communities whose residents are generally businessmen and women. The local dwellers rear domestic animals such as goats and sheep, and maintain chicken farms most of which are carried out within their residential compounds. Each town traces its origin from genealogical ties. Politics in the town are done within the framework of clanism. Clans are the basic point of cultural and political identity for the citizens. Clanism and kinship are the elemental forces in control of political and cultural institutions as well as service points. As previously stated, the project area, FHC gully corridor, is not significantly urbanized.

4.2.3 Religion

The people of Nodu and Umuzocha villages are predominantly of Christian religion, mostly Catholics and Anglicans. There are however a few traditionalists in the community.

4.3 Land Use Pattern

There are three major types of customary land tenure system in Igboland – (1) individual land ownership; (2) family land ownership; and. (3) communal land ownership. Individual ownership may be for indigenes or for residents of the community. Family lands (as well as individual lands) are inherited from generational relatives. Communities retain family lands which may never be sold. Such family lands are generally retained for communal development and sometimes are rotationally shared among the members of the community for agricultural purposes but are not for sale.

Federal High Court gully corridor can be characterized as a predominantly semi-urbanized area with residential and commercial properties occupying mostly the upper sections of the community while the area close to the outfall is used for agricultural purposes. Less than 10% of the community land use is committed to agricultural production of food crops. The crops include maize, cassava, yams, plantain, vegetables, etc.

A review of the land use pattern within the project areas reveals the following:

i) The frontal land areas in the vicinity of, and along the Judiciary Road corridor, are predominantly residential and commercial property development areas;
ii) There are some structures (both residential and commercial) in close proximity to the upper section of the gully corridor. These structures are proposed to be appropriately protected during the remedial construction phase of the project.
iii) The land areas closest to the gully corridor towards the hinterland are essentially dominated by agricultural farmlands and protective bamboo trees.

4.3.1 Cultural Resources

There are no known designated historical, archaeological or cultural resources within the project area.

4.4 Analysis of Socioeconomic Survey

The measurement of precise impacts of the project on persons living or earning their living along the gully corridor cannot be effectively established without appropriate and accurate social and economic baseline data. The socioeconomic study helps to assess the social

economic changes that may occur in the living conditions of the project area population as a result of the project impacts.

4.4.1 Objectives of the Socioeconomic Survey

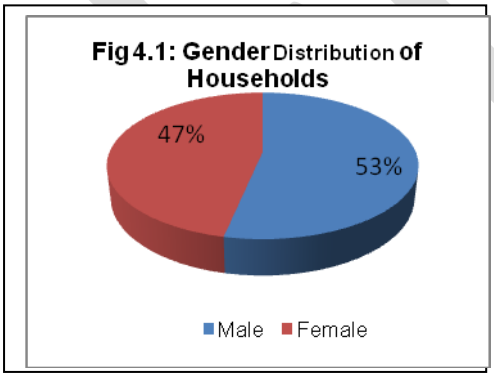
The primary objectives of the socioeconomic survey are as follows:

1. To collect information regarding existing socioeconomic conditions of Federal High Court project area population;
2. To use the collected socioeconomic information to develop baseline data for the assessment of the social and economic impacts of the project;
3. To analyze the patterns of relationships that exist among various socioeconomic or demographic components of the project area;
4. To obtain perceived views of respondents on the effects of project on the environment and their vulnerability to socioeconomic changes due to the project; and,
5. To provide a benchmark for any further information needed to monitor and evaluate improvements in the future.

The respondents to the socioeconomic survey included the following:

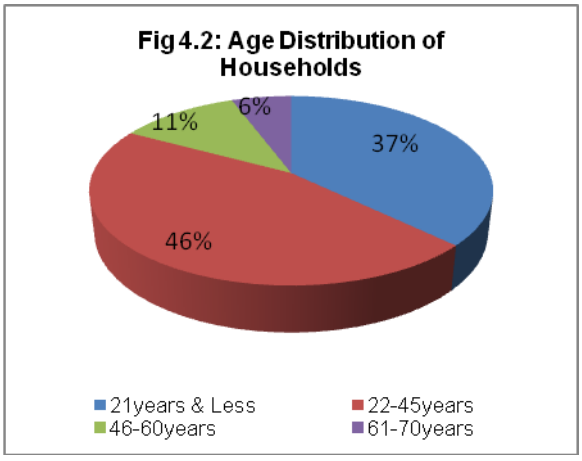
(1) Owners of any buildings or structures located within 5 meters from the edges of the Federal High Court gully corridor;
(2) Owners of any buildings or structures located in areas to be used as construction staging areas during the construction phase of the project;
(3) Residents/tenants of the buildings or structures identified in items (1) and (2) above whether the structures are permanent or temporary; residential or commercial;
(4) Land owners along the proposed gully rehabilitation corridor whose lands would be required for the purpose of the project;
(5) Economic trees/crops owners along the gully side Setbacks whose lands would be required for the purpose of stabilizing the gully edges.

The socioeconomic survey was conducted in conjunction with the census of the project affected persons to profile the impacted project area and provide baseline data against which mitigations measures and support will be measured. The analysis is based on respondents to the questionnaire administered to residents of Nodu and Umuzocha villages who are most likely to be impacted by the project. On the basis of the responses obtained in the exercise, the following determinations are made.



4.4.2 Respondent and Household Distribution in Project Area

The following Sections show how the residents of the project area responded to the socioeconomic survey administered to them. A total of 17 questionnaires were administered with a 100% return. The 17 respondents have a total of 105 household members.



4.4.3 Gender, Age and Household Size Distribution

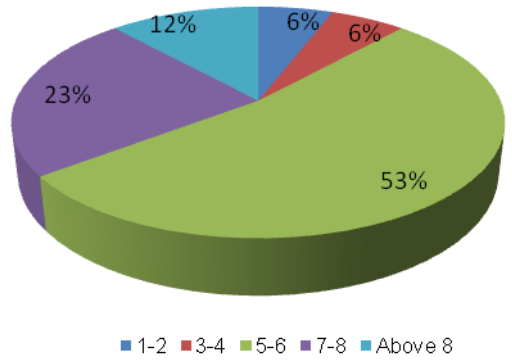
The survey data indicates that of the respondents' household data reflects a 6% difference on the Male/female distribution for the project area as shown in Figure 4-1.

Women in the project area are mainly

involved in petty trading and home-keeping. Both men and women are mobile and both are equally involved in general pursuits to provide for the family.

The age distribution data (Figures 4-2) of household members indicate that 37% of the household members are 21 years of age and below while only 6% are above 60. The survey further shows that 46% of the household members are within the youthful ages of 21 and 45 years. 11% of the household members are between the ages of 45 and 60 years. There is clearly an increasing trend of youthful persons taking up residency within Nodu and Umuzocha villages as reflected in the percentage of youths in the households (Figure 4-2).

Fig 4.3: Household Size Distribution

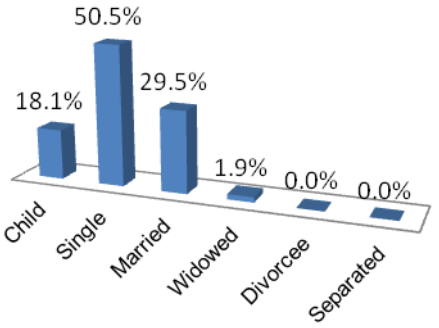


The household size distribution from the survey ranged from a minimum of one person to a maximum of 11 persons. The average size of households is 6 persons for the respondents. On the extreme household size ends, 6% of the respondents have household sizes of one to two members while ANOther 12% have household members of more than 8 persons (Figure 4-3). A majority (53%) of the respondents has household sizes of 5 or 6 persons and 23% has sizes of 7 or 8 persons. The data shows 82% have household sizes of between 3 and 8 persons.

4.4.3 Marital Status of Respondents

Figure 4-4 shows the marital status of respondents in the project area. About twenty-nine percent (29.5%) of the respondents are married while about 50.5% are single and 18.1% are children. Over one percent (1.9%) of the respondents are widowed.

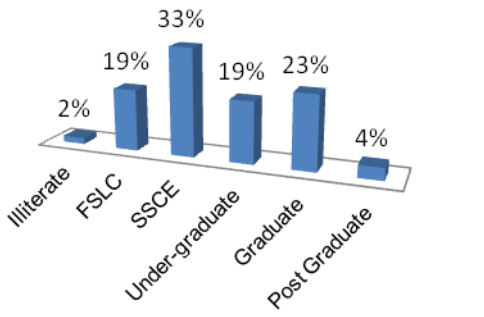
Fig 4.4: Marital Status of Household



4.4.4 Access to Education

The survey responses indicate that only 2% of the population of schooling age never attended school (Figure 4-5). The level of basic education for the project area is relatively high with 98% of the surveyed population having attained the basic primary (FSLC) level of education and higher. The data further shows that 23% of households are graduates of universities while 52% attended and/or have graduated from the primary and secondary education. This high literacy level within the project area is also a reflection of the literacy rate in the Awka and Okpuno communities as a whole. Generally, education in Awka and Okpuno communities and indeed the entire LGA seem to be strengthened by the existing educational infrastructure support within the area. There are several primary and secondary schools located within and around project area to serve the communities.

Fig 4.5: Educational Distribution of Households

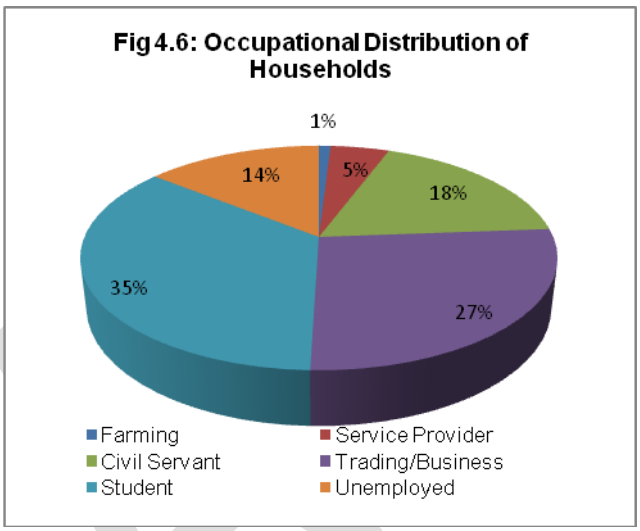


4.4.5 Access to Health Infrastructure

The common diseases in project area (Nodu and Umuzocha villages) include diarrhea, malaria, typhoid, pneumonia, cough, skin diseases, deficiency diseases, eye diseases, ear diseases, and waterborne diseases resulting mainly from malnutrition and lack of hygiene. Several private clinics and hospitals exist within one kilometer of the project area. However, due to poverty, the quality of the health care services in the area is generally poor with most residents patronizing quacks and medicine shops for their medical treatment.

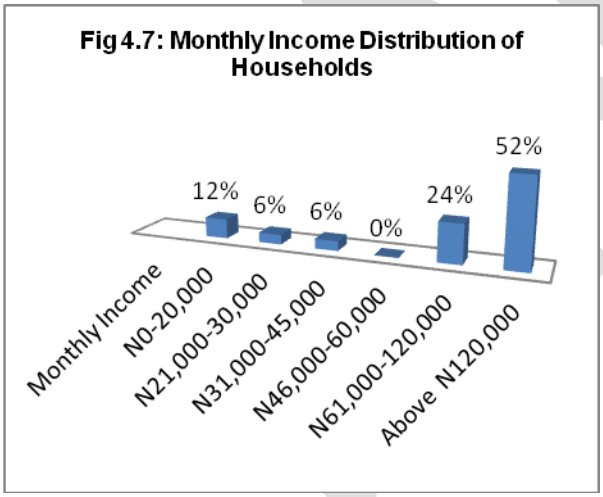
4.4.6 Access to Socioeconomic Infrastructure

The socioeconomic infrastructures (roads system, electric power and access to water) in the area are also generally in poor to fair state. Public access to potable water is non-existent and power is generally not steady. Some medium market facilities exist in Awka and Okpuno town, and these are fairly complimented by numerous home-based commercial shops located throughout the project community.



4.4.5 Occupational and Income Distribution of Respondents

The occupational distribution data indicate that 14% of Nodu and Umuzocha households are unemployed and 35% of them are students. Only about 1% are engaged in farming, 5% are self-employed while 18% are employed in either the private sector or civil service (Figure 4-6). The main source of income for the households surveyed is income from trading/business across the community. About 27% of the respondents reported owning a business. Based on the income data provided by respondents in the survey, 12% of households earn less than N20,000 monthly with 6% earning up to N30,000 monthly (Figure 4-7). Worthy of note is that over 82% of the households in the Nodu and Umuzocha earn more than N30,000 per month. The margin of error in the information provided on incomes may be significant considering that some of the respondents may have grossly inflated the data provided with the intent to receive compensations in accordance with incomes indicated in the survey. The data provided could not be independently verified.



4.4.6 Household Waste Disposal

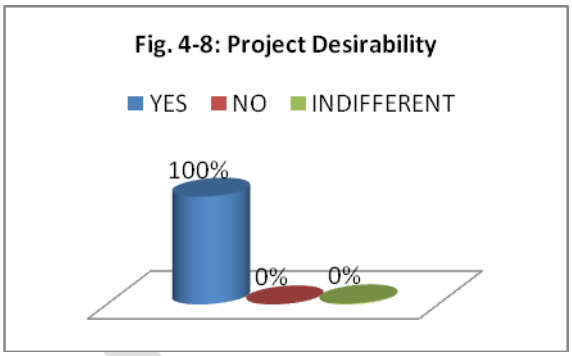
Most of the respondents indicate that their household wastes are disposed of at convenient locations including crevices. In many areas, the wastes are also indiscriminately dumped inside the gullies or at illegal dumpsites created only as a matter of convenience. Solid waste management in the project area is a considerable hazard to the health of the population and the effective functioning of the storm water drainage systems. The unmanaged refuse causes regular obstruction of the storm water drainage systems.

Most residents dispose their domestic refuse randomly outside their residential compounds and the flood-prone areas are also treated as de facto waste disposal sites. The situation in

the project area indeed is a reflection of the poor waste management and waste disposal mechanisms in most part of the state. As with other parts of the country, majority of households typically dispose of their domestic refuse inappropriately outside their residences. During the wet season, solid waste is transported by flowing storm water through unplanned drainage paths leaving a trail of refuse.

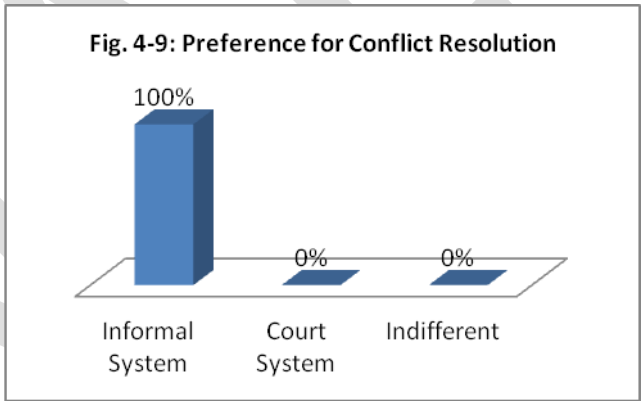
4.5 Desirability of the Project

Most of the respondents in the survey (100%) indicated immense desirability for the project to proceed as shown in Figure 4-8. Many of them expressed a clear wish for the project to proceed before the next round of rainfall.



4.6 Conflict Resolution

All respondents in the survey (100%) prefer and find it most convenient to have conflicts resolved through informal traditional modes of conflict resolution which currently exist within the communities. The court system is seen as an alternative means to resolve issues but no respondent favoured it as a means of resolving conflict. None of the respondents remained indifferent to the preferred approach as shown in Figure 4.9.



4.7 Community Participation

The direct involvement and active participation of relevant stakeholders and the local level people in the planning and management processes of the project assures that any potential disharmonious issues within the community are resolved speedily. There will also be maximization of resource use and increased benefits and expanded opportunities for the communities in the project area.

Community participation improves understanding of the project and communication between the SPMU, the consultants or contractors and the community. The decision-making process for the project will also be enhanced by actively involving relevant stakeholders, especially the project affected persons and organizations with a stake in the project.

Table 4.1: Summary of Findings for All Socioeconomic Indicators

S/No	Socioeconomic Indicator	Findings
1	Population	Based on the 2006 national population census records and the 3.0% annual population growth factor recommended by the national population commission (NPC), Awka South LGA has a projected population of 249,155 for 2018. The survey data indicates that Nodu village in Okpuno and Umuzocha village in Awka have male-female populations with about 6% differential higher female ratio between them at the household level. It is noted that most of the women appeared to be grossly involved with petty trading activities.
2	Ethnic Groups and Language Spoken	The people of Nodu and Umuzocha villages consist mostly of one major Nigerian ethnic group – the Igbos. The people generally speak and write mainly the Igbo and English languages. Clanism and kinship are strong elements and driving forces in control of political and cultural institutions and service points. The villages consist of groups of households whose families are inter-related

S/No	Socioeconomic Indicator	Findings
		through marriages. The community however, in recent times, has witnessed an influx of persons from other parts of the state/ country who have settled in the area mainly for trading purposes.
3	Religion	The members of Nodu and Umuzocha villages are predominantly of the Christian faith, mostly Catholics and Anglicans with some traditionalists and negligible Muslim community.
4	Land Use System	The major customary land tenure system existing within Nodu and Umuzocha villages is the individual land ownership. The lands have essentially changed hands from family and/or communal land ownership to individual land ownership. Individual ownership may be for indigenes or for residents of the community. Family (as well as inherited individual lands) and Communities lands have been sold to individuals who have built up the area for residential purposes. The less than 5% land left is committed to agricultural production of food crops which include maize, cassava, yams, plantain, vegetables, etc.
5	Household Distribution in Project Area	Based on the survey, 17 respondents with 105 household members were documented in Nodu and Umuzocha villages.
6	Gender, Age and Household Size of Respondents	The survey shows that about 37% of the households in the communities are below the age of 21 years while about 57% are between the ages of 22 and 60 years. The percentage of the respondents' household members that are above the age of 60 years is about 6%. Household size distribution in the project area range from 1-11 persons with an average household size of 5 persons for the community.
7	Marital Status of Respondents	About 29.5% households in Nodu and Umuzocha villages are married while about 68.6% are single and about 1.9% of the households are widowed
8	Access to Education	There is a relatively high literacy level within Nodu and Umuzocha villages with 98% of the surveyed population having attained the FSLC level of education and higher. Only about 2% of respondents have not attained the basic primary education
9	Occupational and Income Distribution of Respondents	The occupational distribution data shows a moderately high rate of unemployment (17%) in the community. This situation could pose some serious social risk when not properly managed
10	Household Waste Disposal	Household wastes are indiscriminately dumped at illegal points or dumpsites adjacent to the gully corridor. Solid waste management is a considerable hazard to health and the effective functioning of the stormwater drainage systems. Unmanaged refuse disposal causes regular obstruction of the stormwater drainage systems.
11	Health Services	Records show that common diseases in project area include diarrhea, malaria, typhoid, pneumonia, cough, skin diseases, deficiency diseases, eye diseases, ear diseases, and waterborne diseases due to malnutrition and lack of hygiene. The quality of the health services in the project area is generally poor. Most people go to quacks and medicine shops for minor medical treatment.
12	Desirability of Project	100% of survey respondents indicated immense desirability for the project to proceed.
13	Conflict Resolution Mechanism	100% of survey respondents prefer that their conflicts be resolved through informal traditional modes of conflict resolution. No respondent favoured resolution through the court system or expressed indifference.

4.8 Objective of Community Consultation

The aims of the public participation and consultation process are:

1. Solicit inputs, views and concerns from the four affected communities as they relate to the project and obtain local and traditional knowledge that may be useful for decision-making;
2. Facilitate consideration of alternatives, mitigation measures and trade-offs, and ensure that important impacts are not overlooked and that benefits are maximized;
3. Reduce conflict through the early identification of contentious issues; and increase public confidence in the project.
4. Provide opportunity for the public to influence the project designs and implementation in a positive manner and improve transparency and accountability in decision-making;

4.8.1 Public Consultation Methodology

The methodology adopted in this ESMP for carrying out the consultation process include a qualitative and quantitative mixed method that offers an effective means to interact widely with the project communities and stakeholder groups. Essentially, the approach is based on a participatory approach that included community meetings, public discussions as well as discussions with key informants (Chiefs, Traditional Council members, Local Authorities, and Anambra NEWMAP Officers among others). A brief description of these methods is as follows:

1. Rapid Assessment Technique:
   This involved a quick professional assessment of the project potential impacts based on nearness of residential/commercial assets to the gully edge, anticipated nature and intensity of impacts, and the significance of the impacts along the proposed project corridor. Any affected property owner is directly engaged in discussions to create and gain better understanding between the parties.
2. Socioeconomic Survey:
   This involved the administration of structured questionnaire designed to provide socioeconomic profile of households/families resident or doing business within the project area as well as formal and informal discussions with focus groups, including the community traditional and administrative leadership.
3. Public Meetings:
   This was conducted as part of the participatory approach aimed at gaining good knowledge of the social issues/risks associated with the project as perceived by the communities. Public meetings were held at different locations within the project immediate impact areas.

4.9 Public Participation Process

The potential project-affected individuals or group of persons identified as stakeholders in this project include those who live in close proximity to gully corridor; those who by virtue of their proximity to the project site will be directly affected by noises, odors or activities; those who may be forced to temporarily relocate because of the project; those who have interest either traditionally or administratively, over developmental activities or policy changes in the project area (they may or may not necessarily live in proximity of the project); and, those who infrequently use the land on which the project is located.

Community consultation was driven in a manner that encouraged active and sustained participation of the Nodu and Umuzocha villages, particularly areas through which the active gully traverses. This was to promote community ownership of the project and to enhance sustainability.

A pre-defined socio-economic questionnaire at the household level was administered for the Nodu and Umuzocha villages. The consultations are expected to remain an ongoing exercise throughout the duration of the project to give the communities the opportunity to

make contributions aimed at strengthening the development while avoiding negative impacts as well as reducing possible conflicts. Issues relating to project displacements and compensations, particularly with the project affected persons will continue to be handled to minimize chances of possible conflicts.

4.9.1 Stakeholders' Identification

Generally, five broad categories of stakeholders were identified by the Consultant for this project based on the degree to which the project activities may affect or involve such persons or group of persons. These stakeholders are grouped as shown in Table 4-2.

The adopted process consists of:

i) Identification of any parties whose line of duties whether officially, socially, economically or culturally have direct or indirect bearing on any aspects of project activities. These parties may include individuals, groups, institutions or organizations that may be affected by the gully remedial activities;
ii) Establishment of the stakeholders list and identification of specific stakeholder interests in relation to the project. The issues considered include: (a) the project's benefit(s) to the stakeholders; (b) potential changes to the routine activities of the stakeholders that may occur due to the project; and, (c) the project activities that may cause damage or conflict for the stakeholder;

Table 4-2 gives an initial list of identified stakeholders including their activities and operational areas in the villages traversed by the project. The list includes government functionaries, NGOs, FBOs and CBOs among others.

Table 4-2: Identified Stakeholder Groups

GROUP	DESCRIPTION	ROLE(S) IN COMMUNITY PROCESS
Group-1	Individuals or group of persons whose day-to-day lives/livelihoods may be directly affected by project activities. These people either reside or carry out their daily livelihood activities within 5meters of the gully edge.	The identified persons or group of persons in this category will ultimately represent the project potentially-affected persons (PAPs) or households (PAHs)
Group-2	Individuals or group of persons whose day-to-day traditional or administrative functions include oversight of developmental activities within the project areas.	This category of persons served as mobilization points around which the Consultant reached out to the other members of the community.
Group-3	Individuals or group of persons whose daily activities (including farming) bring them in close proximity to the project area. These people may either reside or carry out their daily livelihood activities outside of the project area but within the communities in which the project is located.	The category of persons may or may not be affected by the project but may be significant contributors to the long term sustainability of the project.
Group-4	CBOs, FBOs and NGOs who provided frequent interface with the community members who may be directly or indirectly affected by the project activities.	This group of organizations essentially contributes to and/or provide on a regular basis to the spiritual and physical welfare as well as environmental health of the community.
Group-5	Individuals or group of persons who are political office holders and have significant responsibilities toward community members within the project area.	This group of individuals is collectively responsible for the political and general socio-economic development of the communities among others within their respective political zones.

Table 4-3: List of Stakeholders and Their Responsibilities

GROUPS	IDENTIFIED STAKEHOLDER	AREA OF INTEREST IN PROJECT
Group-1	Residents of Nodu and Umuzocha Gully corridor	PAPs/PAHs
Group-2	Office of the Nodu and Umuzocha Community Association Chairmen	Development and welfare of Nodu and Umuzocha villages
Group-3	Residents whose daily activities brings them to the gully corridor	Individualized livelihood issues
Group-4	Community-based Organizations	Watershed protection and management
	Faith-based Organizations in the Community (churches)	Community spiritual and physical welfare
	Non-governmental Organizations	Protection of environmental health of communities
Group-5	Office of the Chairman – Awka South LGA	Development of the Awka South LGA
	Office of the Hon. Member – Anambra State House of Assembly	Development of the Awka South in the state constituency
	Office of the Hon. Member – Awka South Federal Constituency	Development of Awka South federal constituency
	Office of the Distinguished Senator – Anambra Central Senatoral Zone	Development of Anambra Central Senatoral Zone

4.9.2 Community Consultations and Meetings

Community consultations began with courtesy calls to the Traditional Rulers of Okpuno and Awka towns and then subsequent with meetings between the Consultant team and the respective community leaders of Nodu and Umuzocha villages to discuss the best and most effective approach towards mobilizing the community members as it relates to the proposed project. The several meetings helped to structure effective participation of all other relevant stakeholders and segments of the community including the PAPs in the project process. The community members were actively engaged in all matters relating to the project and eagerly assisted the Consultant in identifying pertinent socio-cultural issues relevant to the project.

4.9.3 Summary of Meetings with Stakeholders/Communities

The stakeholders'/community meetings discussed the need for the project and the associated potential impacts to the community members living or farming within the project corridor. The community members' concerns and general thoughts were solicited and noted. The minutes of these meetings are included as Annexure V. The community members particularly welcomed the project and expressed anxiety that remedial work should commence expeditiously to prevent occurrence of further flooding damages from the next rainy season. Issues pertaining to relocations and compensations for losses (means of livelihoods and properties) were discussed at the meetings.

During the community meetings, it was clearly indicated by community members present that all the land areas affected by the FHC gullies are owned jointly by the Okpuno and Awka Communities. The joint ownership of the lands has a historical background as was subsequently confirmed by the respective Traditional Rulers of the two communities. Letters attesting to joint ownership of the lands from the Traditional Rulers are included in Annexure V. The communities' joint ownership implied that only very few persons (all males) are directly affected by the project. Consequently no females attended the focus group discussions that were held.

4.10 Social Issues/Risks/Concerns of Stakeholders/Communities

The evaluation of the social environment and existing environmental conditions that impact on human health and safety indicate the imminent risks that may be associated with the project. The key social issues and concerns that emerged during the stakeholders'/community meetings include:

5. Community safety – Concerns regarding community safety with the next cycle of the rainy season was keenly expressed. The community is quite apprehensive of the advancement of the gullies particularly in relation to safety risks posed to existing adjacent homes, human lives and farmlands;
6. Continued gully erosion and flooding in the area would lead to damages and loss of crops and livestock, personal possessions, spread of diseases such as typhoid, cholera, diarrhea, and malaria, and may cause pit latrines to overflow;
7. Livelihoods – loss of access to roadways, crop lands and pasture.
8. Resettlement – impacts and compensation measures for economic and physical displacement during project implementation.
9. Awareness creation was necessary for the long-term success of the project; and manpower development should be included in the programme to enhance project sustainability.

CHAPTER 5: ASSESSMENT OF POTENTIAL IMPACTS & ANALYSIS OF ALTERNATIVES

5.1 Introduction

This chapter discusses the methods/techniques used in assessing and analyzing the potential social and environmental impacts of the project and, also discusses the alternatives to the proposed project and reasons for their rejection. The likely future scenario without the project is also considered. The details of method used in arriving at the significant potential social and environmental impacts of the project are included in Annexure IX.

The beneficial and adverse potential environmental, economic, social and cultural impacts are identified based on professional judgment and the use of unranked pair-wise comparison approach (Canter, L and Sadler, B; 1997). Other factors in predicting the potential impacts include the results of public consultations. The potentially significant environmental and social impacts of the project as well as the suitable mitigation measures are discussed. The assignment of responsibilities for implementation of the ESMP and the associated costs are presented in Chapter 6.

As previously indicated under Chapter 1, the envisaged project activities will include:

1. Civil Construction Works:
    - cutting and filling for percentage recovery
    - compaction of soils
    - concrete casting
    - assembling of structures
    - Slope stabilization
    - Digging of the foundations of the lattice structures
    - Vegetation clearing
    - Deployment and movement of transport vehicles and power equipment on site.
    - Use of earth moving equipment such as excavators, compactors, bulldozers and pay loaders;

2. Biological Remedial Construction Works:
    - Terracing;
    - Structured vegetation;
    - Specific trees planting with known root strength
    - Economic trees planting

Overall, this project is aimed at halting or minimizing the environmental and social damages being caused by the incidence of flooding in the project area and beyond. This is, in the overall a positive impact. The envisaged areas of potential impacts (positive and negative) on the socioeconomic, cultural and biophysical environments which could result from the proposed project include:

<u>Environmental Impact Areas:</u>

1) Air quality
2) Surface water quality
3) Groundwater quality
4) Noise and vibrations
5) Degradation of arable land in the project area.
6) Biodiversity conservation.
7) Siltation of stream.
8) Ecological diversity in stream watershed.
9) Public Health and safety
10) Visual effects.
11) Traffic and transportation

12) Earth movements
13) Solid and liquid wastes
14) Soil erosion and flooding vulnerability
15) Climate change
16) Landscape change

Social Impact Areas:

1) Economic Activities:
   - Sources of livelihoods.
   - Employment generation
2) Damage to Infrastructure:
   - Residential & commercial buildings
   - Roads, drainages, utilities, etc.
3) Community Effects:
   - Displacement of persons.
   - Isolation of settlements.
   - Migration of communities.
4) Gender Based Violence (GBV)/Sexual Exploitation Abuse (SEA)
5) Damage to archaeological and cultural resources
6) Land use restrictions

The evaluation of the social environment requires assessment of the need for land for the project as proposed and the remedial alternatives by conducting the following:

- Analysis of watershed to determine drainage corridors and the consequential storm water flow path resulting from anthropogenic activities for each of the gully sites;
- Development of conceptual remedial alternatives based on the field surveys and the analysis of the watershed for each of the gully sites;
- Evaluation of the availability of land for proposed project or alternatives.

5.2 Analysis of Potential Impacts Triggered by FHC Project

The potential impacts as listed above are organized considering the critical phases of the project from the construction phase to the operation (post-construction) phase and summarized based on whether the envisaged project impact area will result in positive or negative impacts. Impact emphasis is placed particularly on the construction and operation phases of the project. These are summarized as shown in Table 5.5.

Table 5.5: Summary of Potential Impact Areas Triggered by Project

S/No	Potential Positive Impact		Potential Negative Impact	
	Impact	**Aspects of Project that Trigger Impact**	**Impact**	**Aspects of Project that Trigger Impact**
PROJECT PRE CONSTRUCTION PHASE				
1	Preparation of safeguard instruments (ESMP & RAP)	Community sensitization and awareness creation for the project which will promote ownership and sustainability of the project.	Siting of staging area and construction site offices	This may involve loss of livelihood for the people whose lands will be used for the purposes of setting up work spaces and camps for workers. Negotiations should help with individuals whose lands will be used for this purpose.
2			Delivery of construction equipment	There will be delivery of equipment to be used in construction to the staging areas. There may be increase in traffic within the project area at this time.
3			Delivery of initial construction materials	Materials to be used in construction will be delivered to the site and this may lead to increased noise levels as well as reduction in the air quality during this period.

S/No	Potential Positive Impact		Potential Negative Impact	
	Impact	**Aspects of Project that Trigger Impact**	**Impact**	**Aspects of Project that Trigger Impact**
4			Loss of vegetation	There will be loss of natural and planted vegetation on lands for staging areas, temporary office, workers camp and gully setback during site clearance. No impacts however, are anticipated on wildlife habitats and migratory birds.
PROJECT CONSTRUCTION PHASE				
1	Rehabilitation of Affected Lands and Vegetation	The main objective of the project is to rehabilitate the gully eroded lands within the project area. It is envisaged that at end of project the degraded lands will have potentially increased value and usefulness.	Displacement of people.	There will be no permanent displacements of persons. However, persons with critical health conditions, including old persons and children, within project area may be temporarily relocated during construction phase. PAPs will be compensated for temporary displacement and inconveniences.
2	Safety of Lives and Properties	Many properties and assets have been lost to the erosion gullies over time. The gullies also continue to be a major threat to the lives of the people living in the area. The project will promptly provide needed safety to the peoples' lives and properties	Degradation of off-site land	Soils for necessary backfills in the project shall be sourced from identified borrow pits. Owners of the borrow pits will be compensated for soil excavated. Additionally, excavation at the borrow pits may cause land degradation in the vicinity of the borrow pits particularly with respect to erosion and siltation of nearby roads and water courses.
3	Employment Generation	Project will provide short term, local employment opportunities for community members in the areas of site clearance, excavation, loading and offloading of materials and delivery services; drivers, security services, provision of goods and services to construction workers e.g. food kiosks and other shops.	Loss of means of livelihoods.	There will be loss of some croplands and economic trees along the proposed project corridor. Compensations will be required for the PAPs in accordance with WB policies.
4	Protection to building structures.	The buildings or structural assets within the project corridor are not expected to be damaged during construction. The buildings/structures will become stabilized with the project completion.		
5	Gender Based Violence & Sexual Exploitation and Abuse	Gender disparity is generally transmitted into the societal domestic/workplace gender violence which inadvertently bedevils the society at large. Heightened efforts must be made to curtail these unacceptable behaviors. Women as well as men will benefit from the short-term local employment opportunities to be created during construction phase. There will also be income generating activities for women in catering/restaurants for workers on construction sites and from sale of local products to construction workers.	Damage to archaeological and cultural resources	Proposed project will not pass through or be sited close to any known World Heritage or archaeological sites. Project is also not located within any United Nations (UN) Classified Indigenous Peoples Land. There are also no shrines or other cultural relics in the vicinity of the gully corridor which could be impacted during construction activities.
6	**PROJECT OPERATIONS PHASE (POST-CONSTRUCTION)**		Air quality	Air pollution is expected from dust and emissions from construction vehicles, plant and equipment. Dust is generated by excavation and earth moving

S/No	Potential Positive Impact		Potential Negative Impact	
	Impact	Aspects of Project that Trigger Impact	Impact	Aspects of Project that Trigger Impact
				operations and causes nuisance to residents and other sensitive receptors. Exhaust emissions occur from poor maintenance of plant and equipment or over revving of engines.
7	Increased community awareness and enhancement of local capacity	The effective implementation of the project will require the active involvement of the project communities through awareness campaigns and capacity building. Health, safety and environmental training and awareness will be extended to respective community members and local residents.	Surface and ground water quality	Construction works have both short-term and long-term impacts on water resources. Earthworks release suspended particles into watercourses, which can have temporary detrimental effects on water organisms. Spillages of fuel and other petroleum products cause contamination of the soil and water resources.
8	Erosion and flood control capacity	Project will lead to improved community knowledge of causes of erosion and flooding, and capacity to prevent and control flooding and erosion throughout the watershed.	Noise and vibrations	Noise will emanate from moving vehicles, excavators, generators, power tools, and compressors during construction. Permissible human noise levels may be temporarily exceeded during construction and may cause hearing impairment and nuisance to local residents and other sensitive receptors such as schools and hospitals. Vibrations from equipment can also be an issue for residences and other sensitive receptors close to the gully heads where such equipment may be in use.
9	Improved and Sustained infrastructure (drainages, electric poles, etc).	Gully erosion control infrastructure as proposed are expected to remain for a long time and sustainably maintained for continued effectiveness.	Public and Occupational Health and safety	Construction operations pose hazards to people living or working near construction areas or employed to work on site. Excavations, construction traffic and stockpiled materials pose particular threats to children and livestock. Children may be inadvertently recruited to work on construction sites. Construction workers camp give rise to health risks associated with poor waste disposal practices, sanitation and prostitution.
10	Improved site access roadways	Proposed project will require site access roads to be rehabilitated before and/or after construction to allow for movement of machinery and for the delivery of materials. These roads shall be reinstated to good condition at the conclusion construction works. The improved roads would be of long term benefit to the community since the roads are essential trading links with the neighboring villages and communities.	Visual effects.	Adverse visual impact will arise as construction works will be visible to local residents or pastoralists. Construction visual impacts will however be short term in nature and remains an effect at a socio-cultural level in terms of aesthetics.
11	Enhanced community leadership	Project will enhance community/local leadership with formation of various committees to facilitate sustainable post-construction monitoring and maintenance. Committee membership nomination is expected to follow existing community structures which rely on opinion of community leaders.	Traffic and transportation	Traffic movements associated with site staff, delivery of materials and the removal of waste during the construction is likely. Occasional movement of abnormal vehicular loads on local roads may result in temporary diversions.
12	Creation of community	The gully setback land shall be altered through bio-remediation	Earth movements	Construction operations can pose earth movement hazards to people working

S/No	Potential Positive Impact		Potential Negative Impact	
	Impact	Aspects of Project that Trigger Impact	Impact	Aspects of Project that Trigger Impact
	public recreation areas through land use restrictions	and adapted for a long term use of the community. Structures may never be erected on this portion of land but economic trees could be planted. The community shall be required to sustainably maintain all erosion control structures after the construction of works.		near the construction areas due to unstable soil profiles from site excavations. Additionally check dams that are not properly constructed may suffer damage that could reduce the structural integrity of the erosion control structures during post-construction phase.
13	Restoration of vegetation and other vital trees	There will be loss of natural and planted vegetation during construction due to vegetation clearing. All de-vegetated areas will be replanted after construction and maintained by the community post-construction.	Solid and liquid wastes	Proposed project will generate waste during construction including off specification materials such as cement, wood, plastic, paper and domestic waste from construction areas and worker camps. This could result in increased pressure on local waste dump facilities as well as potential for unauthorized disposal and littering if not properly managed.
14	Maintenance of erosion control structures post construction	Erosion control structures and bio-remediated areas are expected to be continuously maintained for continued effectiveness. Poorly constructed structures including concrete channels and check dams tend to fail after some time and if not properly maintained.	Climate change	Exhaust emissions from construction vehicles, plant and equipment may result in ozone depleting compounds. Emissions occur from poor maintenance of plant and equipment or over revving of engines.
15			Landscape change	Project involves significant cut and fill and soil movement in most areas of the project corridor. This will result in significant landscape changes across the project area.
16			Pressures on Off-site Resources	Sourcing construction materials such as sand from river beds or burrow pits may cause adverse environmental impacts if not conducted in a sustainable manner. Project may also lead to increased demand for construction materials and impact on availability of such materials for other projects going on at the same time in the area.

N/A = Not Applicable

5.3 Potential Impacts Significance Rating

Table 5-6 shows the detailed analysis of the impact significance rating for each of the potential project impact areas.

Table 5-6: Impact Significance Rating

S/No	Potential Impact Area	Consequence Rating	Probability Classification	Impact Significance
PRE-CONSTRUCTION PHASE				
1	Preparation of safeguard instruments (ESMP & RAP)			
2	Siting of staging area and construction site offices	Medium	Definite	**Medium**
3	Delivery of construction equipment	Medium	Definite	**Medium**
4	Delivery of initial construction materials	Medium	Definite	**Medium**
5	Loss of vegetation	High	Definite	**High**

S/No	Potential Impact Area	Consequence Rating	Probability Classification	Impact Significance
PROJECT CONSTRUCTION PHASE				
1	**Loss of means of livelihood**	High	Definite	**High**
2	**Loss of physical assets**	High	Definite	**High**
3	**Displacement of persons**	Low	Possible	Very Low
4	**Degradation of land**	Medium	Improbable	Insignificant
5	**Vegetation loss**	High	Definite	**High**
6	**Loss of archaeological and cultural resources**	Low	Possible	Very Low
7	**Air Quality**	Medium	Definite	**Medium**
8	**Surface/ground Water**	Medium	Definite	**Medium**
9	**Noise and Vibrations**	Medium	Definite	**Medium**
10	**Stream ecological diversity**	Very Low	Improbable	Insignificant
11	**Safety and health**	High	Probable	**High**
12	**Visual Effects**	Very Low	Improbable	Insignificant
13	**Traffic and transportation**	Very High	Definite	**Very High**
14	**Earth movements**	Very High	Possible	**High**
15	**Solid wastes**	Medium	Definite	**Medium**
16	**Liquid wastes**	Medium	Definite	**Medium**
17	**Climate change**	Medium	Possible	**Low**
18	**Landscape change**	Very High	Definite	**Very High**
19	**Gender disparity**	High	Probable	**High**
20	**Off-site Resources**	High	Probable	**High**
OPERATION & MAINTENANCE PHASE				
1	**Damage to erosion control structures**	Medium	Definite	Medium
2	**Site access roadways rehabilitation**	Medium	Possible	Low
3	**Erosion & flood control capacity**	Medium	Improbable	Low
4	**Enhanced community leadership**	Medium	Possible	Low
5	**Land use restrictions**	High	Definite	**High**

5.4 Identified Social and Environmental Impacts

A combination of the outcome of Table 5.5 and Table 5-6 indicates that the following social and environmental impact categories will suffer medium to very high impact levels during the Construction and Post-Construction Phases of the project implementation: The Tables further indicate that the other environmental and social impact categories will suffer low to insignificant impact levels as a result of the project.

<u>Pre-Construction Phase</u>

- Siting of staging area and construction site offices
- Delivery of construction equipment
- Delivery of initial construction materials
- Loss of vegetation

Project Construction Phase:

- Loss of means of livelihood
- Loss of physical assets
- Dust and air quality
- Surface and ground water quality
- Noise and vibration
- Public/Occupational Health and Safety
- Traffic and Transport
- Earth movement (during construction and post construction phases)
- Solid wastes
- Liquid wastes
- Landscape change
- Off-site Resources

Operation & Maintenance (Post Construction) Phase:

- Land use restriction
- Damage to erosion control structures post construction

5.5 Analyses of Project Options and Alternatives

The consideration of alternatives relates principally to ways of improving the proposed intervention activities and/or attempting to avoid or minimize potential significant negative impacts. Usually there are several alternatives to any project.

This section discusses the alternatives to the proposed project and reasons for their rejection. The likely future scenario without the project is also considered. The selection of a particular alternative is premised on several considerations, including the desirability/acceptability of the project, the government's position or inclinations to the project, the potential environmental and social impacts of the project, the economic viability of the project, etc. For the proposed FHC gully erosion project, a number of alternatives were considered and these include: delayed project alternative; a do-nothing alternative; and the planned project alternative. A summary of these alternatives is presented below:

Delayed Project Option

This option means that the project will not be implemented at this time; rather, a delay will be in effect until such a time when certain conditions are met or requirements fulfilled. This kind of option is usually adopted when there are regulatory requirements that need to be met, when the political and economic climate is inclement for project implementation or in a period of war. Presently, the country is not at war neither is Anambra State. Furthermore, the government of Nigeria is vigorously encouraging and courting foreign direct investment and socio-economic development. The planned project can attract foreign investment, in addition to all the added values indicated earlier. Therefore, delaying the project will in turn delay the realization of the positive benefits expected from the project. In addition, given the very high level of inflation in Nigeria's economy, a delay of one year could potentially cause up to a 25% increase in project costs. Therefore, the option of delaying the project is not considered a viable option.

The Do-Nothing (No-Project) Option

This alternative assumes that the entire project concept will be cancelled and scrapped. There will be no improvement or changes in the present state of Federal High Court gully erosion as well as the access road to and from the gully area. This is an inferior alternative when compared to the option of going ahead with the project. Although if this option is taken, it would mean that the negative environmental and social impacts of the project would be completely avoided; however, not implementing the project will also result in:

(i) Continued fears and anxiety over potential loss of lives, people's homes, farmlands and ancestral assets, including cultural heritage will persist with each rainy season;
(ii) Continued lack of rural access and mobility and increased pains in movement within Ire community;
(iii) Continued lack of economic empowerment, development and transformation in Ire community.
(iv) Failure to generate employment opportunities as anticipated;

Therefore, the "Do-Nothing" or No-Project Alternative will worsen the present situation and worsen poverty at the same time. In addition, most of the affected Ire community where agricultural activities dominate will still be cut off due to lack of effective road linkages. The "Do-Nothing" or No-Project Alternative is therefore not a viable option.

The Federal High Court Gully Erosion Project (Proposed Project) Option

The Federal High Court gully erosion intervention project option requires the rehabilitation of the existing gully corridor and improving (upgrading, rehabilitation and maintenance) of the existing access roads and drainage channels to an acceptable safety and environment standard. The advantages associated with this alternative far outweigh the disadvantages. Although initial costs would be high; the accrued economic and cultural benefits far outweigh the no-project alternative. The objective of the intervention project is to eliminate gully erosion in the project area while salvaging the agricultural lands of the affected areas and also boost agricultural production through the provision of access roads for easy transportation of products. Moreover, hitherto post-harvest losses will be reduced and thus creating more benefits to the farmers in particular and Anambra State in general.

This option involves a lot of construction work, along with the associated positive and negative impacts. The essence of a project of this nature is to ensure that activities are undertaken in a way that minimizes the negative impacts of the project while enhancing the positive impacts. To this end, there is a need to ensure any activity that can result in negative impacts on the environment (biophysical and socio-economic) are identified and mitigating measures planned for each negative impact.

Each of the project options and components were also evaluated in terms of the following alternative considerations:

i) Long-term effectiveness of the technology under consideration;
ii) Implementability at the location under consideration;
iii) Reduction in the toxicity, mobility and volume of wastes associated with each option considered;
iv) Community acceptance of the option being considered; and
v) Implementation cost of the option being considered.

CHAPTER 6: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

This Environmental and Social Management Plan (ESMP) is necessary to achieve the health, safety, and environmental regulatory compliance objectives of this project. To this end, the Plan has focused on specific steps to be taken with respect to implementation of the mitigation measures and monitoring activities for the environmental and social impacts identified in Chapter 6. The plan highlights the specific mitigation measures that would be taken and the entities responsible for carrying out the mitigating measures. The ESMP also contains a monitoring plan indicating the responsible parties, the frequency of monitoring, key indicators and the reporting format, and provides for necessary capacity building to facilitate the ESMP implementation. Cost estimates for implementation of the various measures, monitoring plan and capacity building are also given. The projected implementation budget will enable the ESMP to be an integral part of financing for the construction and maintenance works in the project.

6.1 Mitigation Measures for Implementation

Based on the environmental and social impact categories identified in Chapter 5 (see Section 5.5), the ESMP implementation will address measures that cover the following impacts during the construction and the post construction (operation and maintenance) phases of the project implementation:

Social Impacts:

- Loss of means of livelihood
- Loss of physical assets
- Land use restriction

These impacts are addressed hereunder as Community and PAPs issues management.

Environmental Impacts:

- Dust and air quality
- Surface and ground water quality
- Noise and vibration
- Vegetation loss
- Public/Occupational Health and Safety
- Traffic and Transport
- Earth movement
- Solid and liquid wastes
- Landscape change

These impacts are addressed hereunder as:

1) Dust control and air quality management;
2) Water resources, erosion control and flood prevention management;
3) Noise and vibration exposure management;
4) Flora and fauna removal management;
5) Public and occupational health and safety management;
6) Construction operation and slope stabilization;
7) Road diversion and accident prevention;
8) Waste management;
9) Temporary project office site management; and,
10) Post construction management.

The above environmental and social impact categories and the associated mitigation measures including monitoring and responsibility roles for the different phases of the project implementation are shown in Table 6.1.

6.2 Environmental and Social Impact Mitigation Measures

The environmental and social impacts mitigation measures to address the identified impact categories for this project are presented in Table .6-1. These mitigation measures will be implemented by the Contractor who shall be solely responsible through the course of the project and shall be contractually required to develop all the necessary management plans associated with the mitigation of each impact area. The monitoring aspects of the project implementation shall be carried out by other identified Agencies and organizations including the SPMU-ESO, SMEnv., SMoW, SMLS, Community leaders, Site Committees, NGOs/CBOs, etc in accordance with the provisions and requirements of this ESMP.

Table 6.1: Summary of Impacts and Mitigation Measures

S/No.	Project Activities	COLUMN 1 Environmental and Social Impact Source	COLUMN 2 Mitigation Measures	COLUMN 3 Monitoring	COLUMN 4 Responsibility
PRE CONSTRUCTION					
1	• Permanent acquisition of land for gully setback to be used for gully wall stabilization; • Temporary use of land for project staging areas, erection of workers' camp and temporary offices. • Vehicular and equipment movements; compaction of soils, etc	**Impacts on Community and PAP Management (Loss of physical assets; Loss of means of livelihood)** • Possible damage to building structures and other structural elements along the gully corridor; • Croplands and economic trees along the gully setback may be destroyed during gully wall stabilization. • Construction activities may affect persons with critical health conditions, including old persons, children and other vulnerable persons within project area may be temporarily relocated for construction phase. • Possible disagreement over siting of staging areas and temporary facilities between community and contractor	• Appropriate compensations shall be paid for structural damages; project acquired lands; temporary use of lands; destroyed crops and economic trees. • Compensation to persons (PAPs) within project area who will need to be temporarily relocated prior to beginning of construction activities. • Create awareness among community members and sensitize the people to all project activities • Seek the consent of the landowner to erect the site office for the specified duration of the project; • Identify the landowner through the Assembly member and/or traditional ruler of the community; • Agree with the landowner to hand over the agreed structure to be erected to the landowner; and • Agree on other measures to render the site safe and	• No. of public complaints recorded; • Level of awareness and understanding of community members; • No of community members that attend trainings; • Level of satisfaction among PAPs; • No of women gainfully employed by project; • No of other businesses induced by project • Questionnaires, direct observations and interviews.	SPMU-ESO; Focal NGO SMEnv.; SMLS.; Community Leaders; Site Committee

S/No.	Project Activities	COLUMN 1 Environmental and Social Impact Source	COLUMN 2 Mitigation Measures	COLUMN 3 Monitoring	COLUMN 4 Responsibility
			usable to the satisfaction of the landowner. • A stand-alone Resettlement Action Plan has been prepared for the project addressing impacts on the community and the PAP management. The Contractor shall be required to implement the RAP in accordance with the provisions therein		
2	Project stakeholders' buy-in	**Public/Stakeholders Participation** • Effective project implementation requires active involvement and cooperation of the project community.	• Build capacities within community • Incorporate community feedback into project implementation process • Disseminate project study findings; • Ensure that period of inaccessibility to land is as short as possible • Awareness campaigns and capacity building. • The Contractor shall be required to prepare and submit a Stakeholders' Engagement Plan to the SPMU for approval and adoption for the contractor's implementation	• No of active participants from the community and other stakeholders	SPMU-ESO; Focal NGO; SMOW; SMEnv; SMOH; Community Leaders; Site Committee
3	• Development of project staging areas, erection of workers' camp and	Vegetation and Biomass Removal Management • Damage to the natural and	• Mark out areas for clearance & where possible use manual method of vegetation clearing;	• Areas of stressed vegetation;	SPMU-ESO; Focal NGO; SMOW; SMEnv; SMOH;

S/No.	Project Activities	COLUMN 1 Environmental and Social Impact Source	COLUMN 2 Mitigation Measures	COLUMN 3 Monitoring	COLUMN 4 Responsibility
	temporary offices.	planted vegetation on acquired gully setback lands during site clearance, areas for siting of temporary office and workers camp. • Impact on flora and fauna. • Impact on wild life.	• Undertake selective clearance by removing tall woody species leaving saplings for quick regeneration of vegetation; • Prevent colonization by invasive species- • Prevent damage to critical ecosystems and habitats • Prevent destruction of flora and fauna. • The Contractor shall be required to prepare and submit a Vegetation and Biomass Management Plan to the SPMU for approval and adoption for the contractor's implementation	• Size of cleared vegetation areas	Community Leaders; Site Committee
4	Social interface between construction workers and the community members and general public	**Gender Based Violence/Sexual Exploitation & Abuse Management**	• Contractor to submit an ESHS Performance Security to PMU • Contractor to prepare and submit a GBV/SEA Management Plan to PMU for approval and adoption for the contractor's implementation	• No of awareness sessions conducted and frequency; • No of active participants from the community and other stakeholders	**Contractor**
CONSTRUCTION PHASE					
5	Grading of site construction areas; Movement of	**Dust and Air Quality Management**	• Dust generation will be controlled mainly by the use of water, especially in the dry	• No. of public complaints; • Level of particulates	SPMU-ESO; Focal NGO SMOH.;

S/No.	Project Activities	COLUMN 1 Environmental and Social Impact Source	COLUMN 2 Mitigation Measures	COLUMN 3 Monitoring	COLUMN 4 Responsibility
	construction vehicles, plant and equipment. Excavation and earth moving operations; Maintenance of plant and equipment or over revving of engines.	• Air pollution is expected from dust and emissions from construction vehicles, plant and equipment. Dust is generated by excavation and earth moving operations and causes nuisance to residents and other sensitive receptors. Exhaust emissions occur from poor maintenance of plant and equipment or over revving of engines.	season. • Use of water tanker for purposes of water dousing to control dust emission. • Erection of speed control signals and ramps mounted in communities; • Covering of hauling trucks carrying sand and other aggregates; • Covering of heaped material e.g. sand will be covered; • Use of nose masks by all workers at road maintenance/works sites. • Surfaces of vegetation along the maintenance road will be monitored to verify the effectiveness of dust suppression method. • The Contractor shall be required to prepare and submit an Air Quality Management Plan to the SPMU for approval and adoption for the contractor's implementation.	• Level of air pollutants • Vegetation surfaces free of dusts • Ambient air monitoring using standard methods	Community Leaders; Site Committee
6	Release of construction liquid and solid waste into the environment; Excavations at the borrow pits	**<u>Water Resources, Erosion and Sedimentation, Run-off Control Management</u>** • Increased sedimentation and runoff may result from activities during the	• Location for heaping construction material (e.g. sand and other aggregates) not less than 50m from water bodies and drainage channels (i.e. a separation distance of 50m will be observed); • Site for fueling of machinery	•No of complaints from community members; •Absence of sediment build up; •Absence of flooding in construction areas; •No of spills & repairs made; •Use of standard monitoring methods	SPMU-ESO; Focal NGO; SMOW; Community Leaders; Site Committee

S/No.	Project Activities	COLUMN 1 Environmental and Social Impact Source	COLUMN 2 Mitigation Measures	COLUMN 3 Monitoring	COLUMN 4 Responsibility
		construction works. • Earthworks release suspended particles into watercourses, which can have temporary detrimental effects on water organisms. Spillages of fuel and other petroleum products cause contamination of the soil and water resources. • Excavation at the borrow pits may cause land degradation in the vicinity of the borrow pits; may cause soil erosion and siltation of nearby roads.	and servicing of equipment will be located at a minimum distance of 100m from water bodies, wetlands and drainage channels; • Embankment erection around fueling and other liquid or spill-able storage sites in order to limit or contain such material from escape to potentially pollute water resources; • Side drains (where appropriate) will be provided with settling basins near water bodies to remove silt and debris from road surface and construction site run-off, before discharge to adjoining streams or rivers; • Adequate side drains provided to carry run-off into drainage channels to prevent erosion; • Culverts of suitable capacity constructed to contain and direct flow, especially at peak flow and run-off; • Road maintenance works to be carried out off peak rainy season; • Provision of toilets and urinal at locations not less than 50m away from water bodies; and • Adequate worker awareness		

S/No.	Project Activities	COLUMN 1 Environmental and Social Impact Source	COLUMN 2 Mitigation Measures	COLUMN 3 Monitoring	COLUMN 4 Responsibility
			on sanitation and measures to avoid water resource contamination. • The Contractor shall be required to prepare and submit a Water management Plan and an Erosion and Sedimentation Management Plan to the SPMU for approval and adoption for the contractor's implementation.		
7	Grading of site construction areas; Movement of construction vehicles, plant and equipment. Excavation and earth moving operations; Maintenance of plant and equipment or over revving of engines.	**Noise and Vibration Exposure Management** • Noise will emanate from moving vehicles, excavators, generators, power tools (e.g. for vegetation clearing), and compressors during construction. Vibrations may come from soil compaction equipment and other vibroequipment to be used at the gully heads.	• Equipment servicing plan will be prepared and strictly followed to ensure efficient machinery performance and optimum noise generation. • Stationary equipment shall be sited at safe distances from sensitive areas to minimize noise impacts • Workers operating noisy equipment will not be exposed continuously for more than 3 hours a day. • Workers will be provided with ear plugs. • Workers handling vibrating equipment or parts will be given pads to absorb the vibrations and will not be exposed continuously for longer than 3 hours a day. • Sanctions (ranging from a warning to dismissal) will be instituted by the contractor	• No of complaints from community members; • Absence of structural failures; • Absence of debris accumulation; • No of complaints from community members; • Absence of structural failures; • Absence of debris accumulation; • No of debris removals & repairs made; • Sensor measurements around workplace	SPMU-ESO; Local NGO; SMOW; SMOH; Community Leaders; Site Committee

S/No.	Project Activities	COLUMN 1 Environmental and Social Impact Source	COLUMN 2 Mitigation Measures	COLUMN 3 Monitoring	COLUMN 4 Responsibility
			against workers who do not observe the use of appropriate PPEs		
8	Grading of site construction areas; Movement of construction vehicles, plant and equipment. Excavation and earth moving operations; Maintenance of plant and equipment.	**Occupational/Public Health and Safety Management** • Occupational accident during construction. • Construction operations pose hazards to people living or working near construction areas or employed to work on site. Excavations, construction traffic and stockpiled materials pose particular threats to children and livestock. Children may be inadvertently recruited to work on construction sites.	• Health, safety and environmental training and awareness will be extended to community members and local residents; • Erection of warning signals and use of reflective tapes at approaches to excavations, heaped materials, stationary equipment, etc. • Posting of speed limits of 40km/hr at approaches to construction sites; • Safety meetings held twice a week and documented accordingly; • Inductions and awareness programmes held for all employees on occupational health and safety practices; • A First Aid team formed to provide first aid services to workers and where appropriate make referrals to the nearest Health Centre or hospital; • First Aid team to be trained by a medical team from the Health Centre; • Accident records at construction site and neighbourhoods to be	•No. of sanitary facilities provided at start of project; •Adherence to stipulated speed limit •Record of incidents; •Use of PPEs by workers; •Records of appropriate workers' training; •Record of reinstatement plan for burrow pits; •Record of health and safety meetings •Record of first aid exercises •Hazards assessment	SPMU-ESO; Focal NGO; SMOH; Community Leaders; Site Committee;

S/No.	Project Activities	COLUMN 1 Environmental and Social Impact Source	COLUMN 2 Mitigation Measures	COLUMN 3 Monitoring	COLUMN 4 Responsibility
			maintained both for workers and the public; • Stocks of PPEs to be maintained and supplied to workers regularly as needed; and • Workers required to wear the appropriate PPEs e.g. helmets, ear plugs, nose masks, vibration pads, hand gloves, etc. • The Contractor shall be required to prepare and submit a Community/Occupational Health Management Plan to the SPMU for approval and adoption for the contractor's implementation		
9	Social interface between construction workers and the community members and general public	**Gender Based Violence /Sexual Exploitation and Abuse (GBV-SEA) Management**	• Inductions and awareness programmes held for all employees on GBV-SEA issues; • Contractor to comply with ESHS provisions of the contract. • GBV-SEA awareness will be extended to Nodu and Umudocha community members and local residents; • GBV-SEA records at construction site and neighbourhoods to be maintained both for workers and the public; • Workers required to report any GBV-SEA issues to the construction management. • The Contractor to prepare and submit a GBV-SEA Management	• No. of GBV-SEA awareness workshops held; • Level of GBV-SEA awareness of workers & others; • No. of reported GBV-SEA cases	Focal NGO; SPMU-ESO; SMEnv; SMOH; Community Leaders; Site Committee

S/No.	Project Activities	COLUMN 1 Environmental and Social Impact Source	COLUMN 2 Mitigation Measures	COLUMN 3 Monitoring	COLUMN 4 Responsibility
			Plan to the SPMU for approval and adoption for the contractor's implementation		
10	Social interface between construction workers and the community members and general public	**HIV/AIDS and STIs Management** • Construction workers camp give rise to health risks associated with poor sexual practices and prostitution.	• Provide quarterly HIV/AIDS and STIs awareness programmes for workers and nearby communities; • Health and HIV awareness team arranged from the State Health Ministry for the quarterly programmes; • Sponsored educational package put together by the team to be implemented to enlighten both workers and communities; • Training of peer educators within the work force and in communities by the team; and • The contractor to provide free condom supplies and encourage free discussions, counseling and testing.	• No. of HIV/AIDS workshops held; • Level of awareness of workers & others; • Records of peer educators' training; • Records of condoms distributed	Focal NGO; SPMU-ESO; SMEnv; SMOH; Community Leaders; Site Committee;
11	General Construction operations	**Construction Operation and Slope Stabilization** • Construction operations will result in topographic alterations. • Construction operations may result in landslides, rock cave-ins, and mudflow/flooding. • Construction operations can pose earth movement	• Maximize local employment (including women) on construction works (this should be a contractual requirement to hire a percentage of local workforce including women) • Provide occupational health and safety awareness training and workshops, • Use of child labor shall be strictly prohibited	• No. of accidents/ incidents; • No. of visible warning signs; • Level of public awareness; • Record of safety meetings held;	SPMU-ESO; Focal NGO; SMOW; SMEnv; Community Leaders; Site Committee

S/No.	Project Activities	COLUMN 1 Environmental and Social Impact Source	COLUMN 2 Mitigation Measures	COLUMN 3 Monitoring	COLUMN 4 Responsibility
		hazards to people working near the construction areas due to unstable soil profiles from site excavations.	• Monitor and maintain intervention work for continued stability and quality • Shortcomings in the control structures including the check dams (retention basins) along the gully corridor should be corrected before they develop into serious problems. • The Contractor shall be required to prepare and submit an ESMP and Emergency Response and Incident Plan to the SPMU for approval and adoption for the contractor's implementation		
12	Movement of construction vehicles, plant and equipment. Traffic movements associated with site staff transportation, delivery of materials and the removal of waste during the construction is likely. Occasional movement of abnormal vehicular loads on local roads.	**Traffic and Transportation Hazards** Impedance to traffic flow and movements. Possible vehicular collisions and accidents. Temporary diversions of traffic.	• Traffic wardens to be posted at positions 100m from the construction points on either side of the road to ensure orderly traffic flow; • Actual working areas to be secured with barricades; • Adequate road warning signs to be posted at vantage points to warn and direct traffic; • Traffic and transport associated with project will adhere to existing roads or follow specified routes as established. • The Contractor shall be required to prepare and submit a Traffic and Vehicle Management Plan to the	•Effective traffic flow with vehicular & worker safety; •Appropriate positioning of road signs, reflectors, speed ramps, control limits, traffic wardens; •Records of accidents and near misses	SPMU-ESO; Focal NGO; SMOW; SMEnv; Community Leaders; Site Committee

S/No.	Project Activities	COLUMN 1 Environmental and Social Impact Source	COLUMN 2 Mitigation Measures	COLUMN 3 Monitoring	COLUMN 4 Responsibility
			SPMU for approval and adoption for the contractor's implementation		
OPERATIONS & MAINTENANCE PHASE (POST CONSTRUCTION)					
13	• Development of project staging areas, erection of workers' camp and temporary offices. • Construction works	**<u>Waste Management (solid and liquid wastes)</u>** Proposed project will generate waste during construction including off specification materials such as wood, plastic, paper and domestic waste from construction areas and worker camps. This could result in increased pressure on local waste dump facilities as well as potential for unauthorized disposal and littering if not properly managed. • Waste bins to be provided for the disposal of waste generated; • Waste will be segregated into three at source - organic (food residues), recyclables (woods, metals) and non-recyclables (plastic and glass wastes); • Organic waste to be	• Topsoil removed from the right of way for maintenance work to be spread on the land to avoid disrupting drainage network; and • Toilets and urinals to be sited at least 100m from any stream or drainage channel and decommissioned at the end of project. • The Contractor shall be required to prepare and submit a Waste Management Plan to the SPMU for approval and adoption for the contractor's implementation	•Waste segregation and littering; •Emptying of bins at waste dump sites; •Waste composting; •Indiscriminate defecation; •Toilets decommissioning	SPMU-ESO; Focal NGO; SMOW; SMEnv; Community Leaders; Site Committee

S/No.	Project Activities	COLUMN 1 Environmental and Social Impact Source	COLUMN 2 Mitigation Measures	COLUMN 3 Monitoring	COLUMN 4 Responsibility
		composted near the site office to enrich the soil, while plastics and glass are taken to the district dump-sites;			
14	• Alteration of gully setback and dedication and restriction of use of such areas for maintenance purposes	**Land use restriction** Use of the acquired land associated with gully setback will be altered and restricted to limited community uses. Structures may never be erected on this portion of land but economic trees could be planted. • Create awareness among community members; • Build capacities within community; • Incorporate community feedback mechanism into process	• Ensure periodic monitoring of restricted areas • Continuous maintenance of erosion control structures including concrete channels and check dams, and bio-remediated areas for continued effectiveness.	Sustained treated gully healing process	SPMU-ESO; SMEnv; Focal NGO; Community Leaders; Site Committee
15	• Contractor land agreements with community members for the use of land	**Closure of temporary office, staging areas and decommissioning of project** Damage to land forms and vegetation • Ensure that agreements with the community and landowners on post construction hand-over are kept.	• Enforce agreed measures to render the site safe and usable post construction to the satisfaction of the community and landowners.	Agreements entered with community and landowners for use of land; Terms of Agreement fulfilled with community and landowners; Handover of office site as agreed	SPMU-ESO; Focal NGO; Community Leaders; Site Committee

S/No.	Project Activities	COLUMN 1 Environmental and Social Impact Source	COLUMN 2 Mitigation Measures	COLUMN 3 Monitoring	COLUMN 4 Responsibility
16	General Construction operations	**<u>Erosion control system failure management</u>** Check dams that are not properly constructed may suffer damage that could reduce the structural integrity of the erosion control structures during post-construction phase. • Any treated gullies should be checked regularly and the healing process monitored closely. Structures built in the channelization for stabilization purpose should be observed for damage especially during rainy seasons and after heavy storms. Any damage observed should be repaired immediately to avoid further damage and the eventual collapse.	• Ensure periodic monitoring of erosion control structures • Continuous maintenance of erosion control structures including concrete channels and check dams, and bio-remediated areas for continued effectiveness.	• Sustained gully healing process	Community Leaders; Site Committee CBOs/CDOs

6.3 Institutional Responsibilities and Accountabilities

The key actors as well as the roles and responsibilities of the various institutions with associated costs in the ESMP implementation are as shown in Table 6.2.

Table 6.2: Institutional Responsibilities

Institutional Category	Project Implementation Phase	Roles & Responsibilities
Anambra State Ministry of Environment (SMENV)	All Phases (Preconstruction, Construction and Post Construction)	• Lead role to ensure adherence to this ESMP and applicable standards, environmental and social liability investigations, Monitoring and evaluation process and criteria • Executing agency with overall responsibility for NEWMAP implementation in the State. • Ensure that sufficient funds are made available to the SPMU • Ensure that SPMU, regardless of financing source, complies with the provisions of the ESMP and *WB* safeguard policy. • Ensure that SPMU complies with ANSG environmental policies and regulations. • Ensure that the SPMU retain dedicated Technical Support for the project duration including safeguard specialists to oversee ESMP implementation. • Ensure that SPMU monitor environmental protection and mitigation measures in the ESMP and those activities that are embodied in the detailed designs • Ensure that SPMU has secured environmental clearances certification from FMENV and WB prior to award and/or commencement of civil works contracts • Ensure that SPMU establishes and implements an environmental grievance redress mechanism, as described in this ESMP, to receive and facilitate resolution of affected peoples' concerns, complaints, and grievances about the Project's environmental performance • Ensure that the bidding and contract documents include the ESMP. • Ensure that SPMU submits semi-annual monitoring reports on ESMP implementation to WB and FPMU.
SPMU (Safeguard Officers, Project Engineer, Project Coordnator)	Pre-Construction Phase	• Ensure that bidding and contract documents include the ESMP and OHS to make them obligatory/mandatory. • Review and approve all required management plans necessary for the pre-construction, construction and post construction phases of the project; • Undertake monitoring of the implementation of the ESMP (mitigation and monitoring measures) with support from the appointed Focal NGO, the Site Committee, the Contractor and other stakeholders. • Report to WB and FPMU on all aspects of social and environmental management and monitoring at required frequency • Submit monthly and quarterly or semi-annual monitoring reports on ESMP implementation to FPMU and WB • Participate in grievance redress mechanism, as described in the this document, to receive and facilitate resolution of affected peoples' concerns, complaints, and grievances about the sub-project's environmental performance • Based on the results of ESMP monitoring, identify environmental corrective actions and prepare a corrective action plan • Maintain and manage all funds effectively and efficiently for the project; • Coordinate all policies, programmes and actions associated with the intervention construction works; • Ensure the smooth and efficient implementation of the preconstruction phase of project's various programmes; • Have custody of a copy of this ESMP and disseminate information contained therein accordingly.
	Construction Phase	• Cooperate with the Steering/Technical Committees to provide guidance to the technical aspects of all project activities; • Provide oversight of contractors work plan and E&S implementation schedule; • Conduct weekly or routine site inspection and monitor implementation of

Institutional Category	Project Implementation Phase	Roles & Responsibilities
		E&S safeguards; • Receive and review reports from the contractor; • Prepare and submit weekly/monthly and subsequent quarterly and annual reports to the SPMU Project Coordinator, FPMU and the WB.
	Post Construction Phase	• Ensure proper closures of all contractor's temporary facilities; • Ensure that the terms of Agreement between the Contractor and the community and land owners are fulfilled.
FPMU	All Phases (Pre-construction, Construction and Post Construction)	• Project assessment and monitoring of this ESMP implementation and the construction activities. •
World Bank	All Phases (Pre-Construction, Construction and Post Construction)	The World Bank shall perform the following roles: • Ensure that the Safeguard Policies of the World Bank are complied with in the implementation of the ESMP; • Recommend additional measures for strengthening the ESMP and implementation performance; • Carry out the final review, clearance and approval of the ESMP • Ensure that environmental safeguards are complied with during World Bank supervision mission
State Ministry of Works	Pre-Construction and Construction Phases	• Provide necessary preconstruction and construction support to the SPMU • Site assessment and monitoring of construction works and engineering activities;
State Ministry of Lands & Survey (SMLS)	Pre-Construction Phase	• Compliance overseer at State Level, on matters of land acquisition, compensation and other resettlement issues
Other MDAs	Pre-Construction and Construction Phases	• Intervene in areas under their jurisdiction as and when project demands
Contractor (Site Manager, Site Engineers/ Supervisors)	Pre-Construction Phase	• Recruit qualified environmental safeguard specialist to ensure compliance with environmental statutory and contractual obligations and proper implementation of the ESMP • Implement all the provisions of the ESMP in coordination with the SPMU and other relevant authorities • Develop and submit for SPMU and FPMU approvals specific management plans as provided in the ESMP. • Provide sufficient funding and human resources for proper and timely implementation of required mitigation measures in the ESMP • Implement additional environmental mitigation measures for unexpected impacts, as necessary • Develop a work plan which incorporates schedule for E&S safeguards implementation; • Submit the work plan and schedule of E&S safeguard implementation to the SPMU; • Train/create awareness of all personnel/workers on relevant E&S safeguard measures and their obligations; • Ensure land disturbance activities are conducted in accordance with relevant legislation and the ESMP; • Communicate content of ESMP to all employees and contractor agents; • Provide oversight function during mobilization to ensure adherence to good practice and the ESMP
	Construction Phase	• Implement all E&S safeguards and other mitigation measures as planned; • Submit monthly and quarterly implementation reports on E&S safeguards to SPMU; • Comply with BEME specification in procurement of material and construction, and adherence to the ESMP and good construction practices; • Ensure land disturbance activities are conducted in accordance with relevant legislation and the ESMP; • Provide adequate onsite waste collection bins, ensure proper disposal, not to litter and not to create environmental nuisance; • Provide oversight function during construction to ensure adherence to good practice and the ESMP

Institutional Category	Project Implementation Phase	Roles & Responsibilities
	Post Construction Phase	• Provide oversight function during decommissioning to ensure adherence to good practice and the ESMP
Site Committee	All Phases (Preconstruction, Construction and Post Construction)	• Monitor and ensure compliance to ESMP provisions as well as contractor implementation quality
Local government	All Phases (Preconstruction, Construction and Post Construction)	• Provide support in monitoring project execution within their domains to ensure compliance with this ESMP and other relevant requirements
Local Community	All Phases (Preconstruction, Construction and Post Construction)	• 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.
CDOs	All Phases (Preconstruction, Construction and Post Construction)	• Ensure community participation by mobilizing, sensitizing community members;
Focal NGO	All Phases (Preconstruction, Construction and Post Construction)	• Assist to ensure effective response actions, to evolve and devise sustainable environmental strategies and rehabilitation techniques, organize, coordinate and ensure safe use of volunteers in a response action, & provide wide support in management planning, institutional/governance issues and other livelihood related matter, awareness campaigns
General Public	All Phases (Preconstruction, Construction and Post Construction)	• Identify issues that could derail the project • Support project impacts mitigation measures as well as awareness campaigns

6.4 E&S Obligations of the Construction Contractor

It is the responsibility of the construction contractor to ensure compliance with all the Engineering Design provisions associated with this project. The SPMU shall not be responsible for any property (whether community, corporate or individual) damaged as a result of actions or activities undertaken or being undertaken by the contractor in the course of executing its contract. In the event of such damage, the contractor shall be fully liable for the cost of such damage.

As part of the construction approval process for the project, a set of environmental and social management plans is needed to address the specific issues identified in this ESMP which may arise in the course of the project. The management plans will need to be developed by the Contractor to address the specific impacts as identified in this ESMP. These management plans are briefly described in the following sections and shall be implemented as part of the overall environmental and social management and monitoring plan for the gully project.

6.5 Required Environmental and Social Management Plans

The construction Contractor for the project shall be required to meet the specific E&S safeguard obligations as provided in this ESMP which shall be incorporated into the contract specifications for the project as provided in Annexure IV. The contractor shall also be required to develop Contractor E&S Management Plans for field work to guide and explain how the mitigation measures recommended in this ESMP will be implemented during the project execution. This is in addition to other contractual provisions for the project. The required specific E&S management plans include the following:

6.5.1 Public/Stakeholder Consultation Plan

A key element of sustaining stakeholders' support in the project is to sustain the consultations and communication process that has already been effectively established in the course of the preparation of this ESMP. Stakeholders' engagement needs to be enhanced and managed through a well-defined strategy. Table 6.4 provides a summary of the stakeholder consultation activities to be considered in the engagement plan. Public sensitization and consultation will continue throughout the project execution.

The Contractor shall be required to prepare and submit for approval of SPMU and FPMU, a comprehensive Stakeholder Engagement Plan. The Plan will provide the Contractor's specific engagement plan to ensure that all segments of the community and other stakeholders are fully and effectively involved in the project decision process.

Table 6.4: Summary of Stakeholder Consultation Plan

Activity	Stakeholders / Community	Timeline
Pre-Construction / Prior to Project Commencement		
Project briefings, site tours, personal meetings, community sessions, consultation meetings	State Government , Local Government, Site committee, Residents of affected areas/ Community and interest groups	As required, subject to project updates and feedback from the community
Development/dissemination of feedback and complaints mechanism and communications procedures	State Government , Local Government, Site committee, Residents of affected areas/ Community and interest groups	As required, subject to any updates on the project
Briefings, Site Tours and Community Sessions for flood control and intervention works	Government authorities, Local communities, Key/ relevant stakeholders	Prior to Work Plan approval
Construction and Operations		
Responding to issues and inquiries as per feedback and complaints mechanism	All stakeholders	Ongoing / as required
Monthly/Quarterly reporting on status of project	All stakeholders	Monthly/quarterly/as required.
Briefings, site tours and community sessions for flood control and intervention works closure plan	Government authorities, Local communities, Key/ relevant stakeholders	Prior to project completion
Prior to Project Closeout/Post-Construction		
Project briefings, site tours, personal meetings, community sessions, consultation meetings with stakeholders	All stakeholders, State Govt , Local Govt, Site committee, Affected residents/ Community/ interest groups	As required, subject to approvals and feedback from the community

6.5.3 Occupational/Public Health, Safety and Security Management Plan

The Contractor shall be required to develop and implement an occupational and community health and safety plan that contributes to a healthy workforce and local community. The health and safety plan shall be submitted to the SPMU and FPMU for necessary approvals prior to implementation. In developing the Plan, the Contractor shall evaluate possible hazards that may be associated with the project activities such as: (a) imported backfill material; (b) Hazards to the aquatic environment arising from toxic effects of imported material (pH, COD, salinity, dispersed material); (c) Flood hazards due to heavy downpour during the construction period; (d) Physical/mechanical hazards due to the movement of solid material in the event of an accident; (e) Hazards resulting from soil contamination.

The Contractor shall also be required to identify who and what can be affected assuming possible scenarios (such as construction failures). Consideration should be given to issues relating to the environment (water, soil, and biota), humans (life, health and living conditions), and economic losses of the population (damage to infrastructure, property) in

the event of the possible scenarios. Cooperation between the Contractor, the SPMU and the local community is recommended for emergency planning.

The Contractor shall fully comply with ESHS standards and bear the cost of implementation. Community Health, Safety and Security assessment will identify potential negative risks related to the different phases of the project. Some of the significant risks to be considered include:

- Possible pressure and/or additional demand on community health services associated with the influx of workers from outside the project area;
- Possible pressure and/or additional demand on utility services including water and wastewater system associated with the influx of workers from outside the project area;
- Possible pressure and/or additional demand for social services as a result of an increased family stress and violence;
- Possible sexual harassment and gender based violence/Sexual Exploitation and Abuse (GBV-SEA);
- Possible illicit drug use and alcohol;
- Possible crime and criminal activities;
- Possible change in community wellness as a result of alcohol, and substance abuse associated with the influx of workers from outside the project area;
- Possible change in Community Health as a result of sudden spread of communicable and non-communicable diseases including sexually transmitted diseases (STDs) associated with the influx of workers from outside the project area;
- Possible pressure on traffic and transportation network associated with construction and operations activities; and
- Possible change in water and air quality associated with construction and operations activities.
- In addition to the potential negative impacts which would require mitigation, the rehabilitation of the erosion gully also has the potential to improve community health safety and security through the following means:.
    - Improved access to medical facilities for communities due to the gully rehabilitation and the restoration of connecting roadways;
    - Improved healthcare infrastructure;
    - Improved workforce health awareness;
    - Improved standards of living of direct and indirect employees due to better income in the employees households; and
    - Improved standards of living of vulnerable groups and their households, including support to the elderly within the respective households.

6.5.4 Gender Based Violence Management Plan

The Gender Based Violence/Sexual Exploitation & Abuse Management Plan (GBV-SEA MP) is required to identify and assess key risks, develop mitigation measures to prevent and respond to sexual exploitation & abuse and other forms of Gender Based Violence (GBV). The Contractor shall prepare and submit for approval of SPMU and FPMU, the necessary GBV-SEA MP to be implemented for the project. The GBV-SEA MP will set out a formal system by which the Contractor will carry out mitigation measures that will reduce any impacts relating to Gender Based Violence matters.

Specifically, the GBV-SEA MP will provide details regarding the implementation of avoidance mitigation and management measures for impacts related to the possibility of or any existing risks which may lead to GBV issues. The scope of the GBV-SEA MP will cover pre-construction, construction and post construction/closure phases of the Project.

The risk indicators to be considered shall include but not limited to:

- Possible pressure and/or additional demand for social services as a result of an increased family stress and violence;
- Possible sexual harassment (including rape, sexual assault and harassment in all public and private spheres of life);
- Norms, attitudes and stereotypes around gender in general and violence against women in particular;
- Various forms of structural inequality or institutional discrimination on any particular gender.

6.5.5 Labour Management Plan

The Labour Management Plan (LMP) is required to identify and assess key risks, develop mitigation measures to prevent and respond to labour influx issues, alcohol and drug use, fair compensation of labor, child labour etc. The Contractor shall prepare and submit for approval of SPMU and FPMU, the necessary LMP to be implemented for the project. The LMP will set out a formal system by which the Contractor will carry out mitigation measures that will reduce any impacts relating to Labour management matters.

Specifically, the LMP will provide details regarding the implementation of avoidance mitigation and management measures for impacts related to the possibility of or any existing risks which may lead to labour crisis. The scope of the LMP will cover pre-construction, construction and post construction/closure phases of the Project.

The risk indicators to be considered shall include but not limited to:

- Possible occurrence of social conflicts;
- Increase in crime and illicit behaviors;
- Increased burden on and competition for public service provision;
- Child labor issues; and,
- Inflation of prices in the project area.

6.5.6 Vegetation Clearing and Biomass Management Plan

The Contractor shall be required to prepare and submit for approval of SPMU and FPMU, a comprehensive Vegetation Clearing and Biomass Management Plan (VCBMP). Together with this ESMP, the VCBMP will provide the specific activities to be carried out to protect the natural biodiversity of the project area as well as maintain appropriate public access.

The specific objectives of the Plan are to:

- Identify appropriate, ecologically sustainable, and spatially-explicit management actions, such as re-vegetation with native plant species, based on biological and hydrological factors, as well as the reasonableness of costs, local community expectations, and other key considerations.
- Develop monitoring methods to evaluate progress toward Plan objectives, to apply adaptive management to enhance the likelihood of achieving those objectives, and to increase understanding of water and ecosystem interactions.
- Prepare for anticipated changes to the system, such as climate change and land-use changes.
- Prepare for implementation of rapid, active ecological restoration and other management strategies for threatened, endangered, and other native wildlife species potentially displaced by construction activities, and to enhance pollinator habitat.
- Provide consideration of proper implementation techniques, implementation costs, short- and long-term maintenance needs, water use/savings, and wildfire control.

The approved Plan shall form part of the construction documents and requirements for Contractor implementation through the project.

6.5.7 Air Quality Management Plan

Air quality plans identify potential control measures and strategies, including rules and regulations that could be implemented to reduce air pollutant emissions from construction equipment, on and off road motor vehicles, and other sources. The Contractor shall be required to prepare and submit for approval of SPMU and FPMU, a comprehensive Air Quality Management Plan (AQMP). The Contractor shall implement these strategies through rules and regulations, public education and outreach, and partnerships with other agencies and stakeholders.

6.5.8 Emergency Response and Incident Plan

The Contractor shall be required to prepare and submit for approval of SPMU and FPMU, a comprehensive Emergency Response and Incident Plan (ERIP). The Plan will describe the set of necessary actions to be taken in response to defined circumstances, across all hazards, and through the phases of mitigation, preparedness, response, and recovery during this project.

The Plan will provide necessary guidance for how to organize assets to respond to an incident (system description) and processes to manage the response through its successive stages (concept of operations). The Plan will document the combination of facilities, equipment, personnel, procedures, and communications existing within the Contractor's organizational structure and designed to help in the management of resources during incident response.

The activities contained in the Plan will address the phases of mitigation, preparedness, response, and recovery and will identify potential hazards, assess their likelihood of occurrence, their potential impact and the organization's vulnerabilities to the impact, and also provide a basis for understanding how the hazard likelihood and organizational vulnerabilities can be addressed.

For the Plan to be effective, the emergency incident must be formally defined so that there is clarity and consistency as to what is being managed. This may be best accomplished by defining the incident response through delineation of response goals and objectives, and by explaining response parameters through the Emergency Response and Incident Plan (ERIP).

6.5.9 Water Management Plan

The Contractor shall be required to prepare and submit for approval of SPMU and FPMU, a Water Management Plan. The Plan will provide information about current water uses and charts a course for water efficiency improvements, conservation activities, and water-reduction goals.

An important step in creating a water management plan is to establish a water balance for the project. It is necessary to ensure that water supply, wastewater, storm water issues, and water efficiency Best Management Practices (BMPs) are taken into account prior to commencement of the construction works. Water emergency and other contingency plans should describe how the construction facility will meet minimum water needs during emergency or other water shortages.

6.5.10 Erosion and Sedimentation Management Plan

The Contractor shall prepare and submit for approval of SPMU and FPMU, a comprehensive Erosion and Sedimentation Management Plan. Together with this ESMP, the Plan will provide the specific activities to be carried out to protect the environment from erosion and sedimentation within the project area. It is important that an erosion and sediment control plan is effective in preventing illicit discharge. Appropriate consideration should be given to identify potential problems posed by the project area slopes, drainage patterns, and soil types in preparing an effective erosion and sediment control plan.

The erosion and sediment control plan shall be overlaid on the project grading plan(s) or site plan if there is no grading plan.

- The plan shall show what Best Management Practices (BMPs) will be used, when, and where, specific to the project scope, along with the total disturbance area and installation details and notes for the proposed BMPs. Measures will include those necessary to delineate areas of work, prevent erosion of unstable or denuded areas, plan for construction staging and storage logistics, construction of stabilized access points, and proper containment measures for construction materials and waste.
- The name and contact information for the person responsible for maintaining erosion and sediment control measures throughout the construction work shall be included as Erosion Control Point of Contact.
- Location, width, direction of flow and approximate location of top and toes of banks of any watercourses.
- Location and types of existing vegetation on the site. Within 10 meter of any cut or fill, the plan shall identify the location, diameter, species and appropriate elevation at the base of all trees over 0.3 m in diameter measured at 1.5m above average ground level.
- Existing drainage patterns and direction of flow.
- Limits of disturbed areas.
- Areas not to be disturbed and off-limits to construction activity.
- Location of proposed vegetative erosion control measures (e.g., seeding, landscaping), including type, quantity, planting schedule, and irrigation.
- Location and details of all proposed drainage systems, walls, cribbing or other erosion protection devices to be constructed in connection with, or as a part of, the project.

6.5.11 Traffic and Vehicle Management Plan

Managing traffic at a construction workplace is an important part of ensuring the workplace is without risks to health and safety. Vehicles including powered mobile plant moving in and around a workplace, reversing, loading and unloading are often linked with death and injuries to workers and members of the public. Traffic includes cars, trucks and powered mobile plant like excavators or graders, and pedestrians like workers and visitors. The most effective way to protect pedestrians is to eliminate traffic hazards.

The Contractor shall be required to prepare and submit for approval of SPMU and FPMU, a comprehensive Traffic and Vehicle Management Plan (TVMP). Together with this ESMP, the TVMP will provide the specific and general guide to vehicular movements throughout the project area in order to protect the community and workforce from accident and safety hazards during construction.

Key issues to consider for managing traffic at the construction workplace include:

- Keeping pedestrians and vehicles apart including on site and when vehicles enter and exit the workplace;
- Minimizing vehicle movements;
- Eliminating reversing vehicles or minimizing the related risks;
- Ensuring vehicles and pedestrians are visible to each other;
- Using traffic signs, and,
- Developing and implementing a traffic management plan.

The Contractor shall be required to provide appropriate information, training, instruction or supervision necessary to protect all persons from risks to their health and safety. The Contractor must also ensure construction induction training is provided to workers who carry out construction work.

- The Anambra State NEWMAP will place speed limits and appropriate road signage along all Project roads;
- The Anambra State NEWMAP will enforce speed limits for safety, air quality, and noise purposes both on the Project site and beyond;
- All Anambra State NEWMAP drivers should be trained by a road safety specialist; and,
- All vehicles should be properly maintained and undergo periodic safety inspections.
- Observance of speed limits by contractor's vehicles / drivers should be part of the contractual agreements

6.5.12 Waste Management Plan

A waste management plan (WMP) is required to achieve the goals set for managing construction waste. The construction Contractor shall prepare and submit for approval of SPMU and FPMU, a comprehensive Waste Management Plan (WMP). The WMP will provide the specific and general guide to the management of solid and liquid wastes throughout the project area and for the duration of the project. The Contractor shall have responsibility for the implementation of the Plan which will include procedures for salvage, reuse and recycling of materials. The implementation of the WMP will protect the community and workforce from the health hazards of indiscriminate waste disposal during construction.

The waste management plan should cover the following:

i. Specify who is responsible for managing waste on site.
ii. Establish goals and objectives.
iii. Estimate the waste types and amounts involved.
iv. Set targets for reducing the amount of each waste sent to the waste disposal site;
v. Describe recycling/reuse methods for each material.
vi. Identify the waste destinations and transport modes, including what materials are being segregated on site for reuse or recycling.
vii. Track progress.
viii. Describe special measures for material use and handling.
ix. Describe communication and training to support and encourage participation from everyone on site.

6.6 ESMP Monitoring and Evaluation

For effective implementation of the ESMP, it is essential that an effective monitoring programme be designed and carried out. The objectives of the monitoring and evaluation program are:

- To ensure that the measures suggested herein are being carried out during construction;
- To evaluate the efficiency of the proposed mitigation and enhancement measures;
- To investigate the adequacy of the ESMP as well as suggest improvements to it;
- To generate data that could be incorporated in future ESMPs;
- To evaluate what additional enforcement is required for the effective implementation.

6.6.1 Monitoring and Reporting

Project performance monitoring has the overall objective of achieving the desired outcomes through reporting of as measurable events or parameters or aspects that can be monitored and verified. The following monitoring and reporting sequence is proposed for the ESMP implementation

- The Contractor shall submit to SPMU a monthly monitoring report and the ESMP accomplishments during project implementation,

- The SPMU shall prepare monthly ESMP monitoring and accomplishment reports to be submitted to FPMU and the WB.

This reporting cycle should be repeated as the feedback mechanism scheme to all key players consisting of the affected stakeholders, Site Committee, Focal NGO, CBOs/CDOs, Contractors, SPMU, etc.

6.6.2 Post Construction Monitoring

In the post-construction phase of the project, the Site Committee shall be required to maintain continuous monitoring of the project beyond the decommissioning phase. This will ensure that the Federal High Court gully rehabilitation/healing process and the associated livelihood programmes are sustained beyond the project closeout. Since the Site Committee will have a big role in sustaining the post construction (operations and maintenance) phase of the project, necessary capacity building trainings will be required to provide its officers/leaders the needed capabilities for formulating necessary policies, systems and procedures. The SPMU and the SMEnv will be required to ensure that the Site Committee and other CBOs/CDOs are institutionally strengthened. A summary of the impacts mitigation and monitoring plan for the preconstruction, construction, and post-construction phases of the project with the associated monitoring frequencies, responsible parties and projected costs are presented in Table 6-6.

6.7 Grievance Mechanism and Procedures

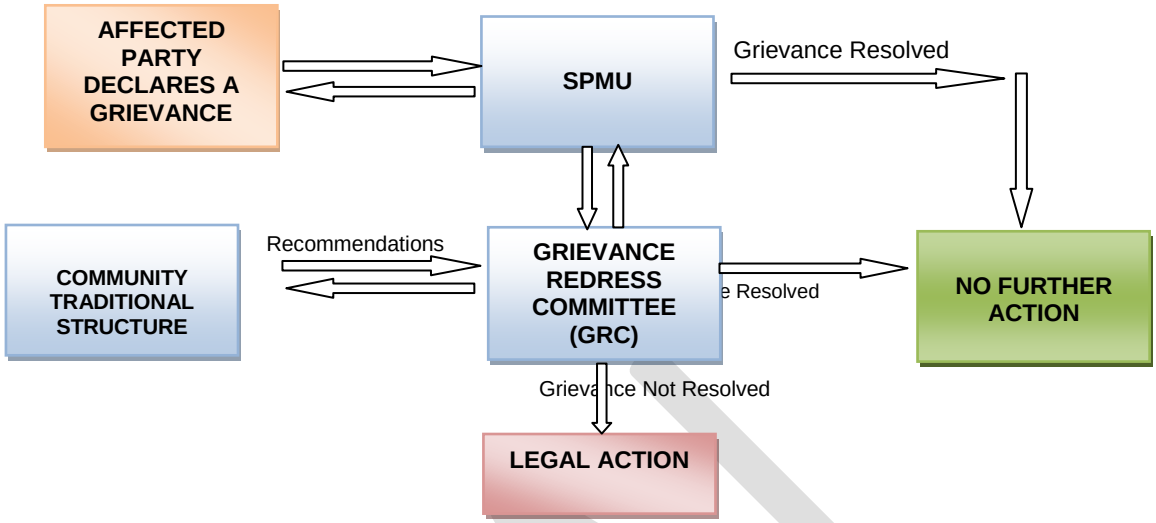
It is for the benefit of the MOE/ANSG, NEWMAP, FHC Communities and the PAPs to devise a mechanism through which complaints and disagreements arising from the implementation of the Federal High Court gully erosion control project can be resolved. A Grievance Redress Mechanism (GRM) is necessary in order to prevent and address community issues, reduce exposure to risks and also provide the platform for the optimization of environmental and social benefits of the project. The grievance procedures consist of the steps that ensure proper documentation of all grievances, a discussion mechanism for hearing and resolving the grievances, and provisions for appeals in the event of dissatisfaction by any affected persons.

The issues considered include: the project's benefit(s) to the stakeholders; potential changes to the routine activities of the stakeholders that might occur due to the project; and the project activities that might cause damage or conflict for the stakeholders. Any issues that may lead to grievances will be addressed through documented grievance mechanism that takes into consideration the cultural and traditional rights of people avoiding as much as possible potential for legal redress mechanism. The specific objective of the mechanism is to facilitate the process and ensure effective and timely grievance resolution thereby reducing the risk of escalation of conflicts and avoiding unnecessary delays. The grievances and remedial actions shall be carefully documented to enhance accountability and reduce liability.

The community traditional land dispute resolution structure currently constitutes the nucleus of traditional resolution of disputes among community members on matters of land. It is therefore wise and advisable that this structure be necessarily retained in the event of any grievance or dispute relating to the ESMP implementation. Inputs from the leadership may also be limited to providing recommendations as to how a specific dispute is to be addressed. Aside from the traditional structure, Figure 6-1 provides a secondary mechanism for grievance resolution using the Grievance Redress Committee (GRC). The proposed GRM will also help to achieve the following:

- To serve as the open channel for effective communication together with the identification of emerging environmental and social concerns due to the project;
- To prevent and mitigate any adverse environmental and social impacts as a result of any phase of the project;
- Promote harmonious relationship and respect among stakeholders; and,
- Ensure community acceptance of the project.

Figure 6-1: Grievance Redress Procedure



6.7.1 Levels of Grievance Redress Mechanism

The levels of grievance redress mechanism as approved by the World Bank are as follows:

First Level: Community Grievance Redress Committee (C-GRC)

1. Members of Community Grievance Committee as elected
2. Representative of Focal NGO (Coordinator)
3. The Local Government Liaison Officer
4. PAP (Complainant)

The timeline for addressing/resolving issues raised by a complainant by this C-GRC shall be at most 15 days from the last day allowable for grievance and complaints submission.

Second Level: PMU Grievance Redress Committee (PMU-GRC)

1. PMU Grievance Committee
2. Representative of Focal NGO
3. Chairman of Community Grievance Committee
4. Secretary of Community Grievance Committee
5. Project Coordinator (Coordinator)
6. PAP (Complainant)

The timeline for addressing/resolving issues raised by a complainant by this PMU-GRC shall be at most 15 days from the last day allowable for grievance and complaints submission following the inability of the C-GRC to resolve the matter.

Third Level: NEWMAP Steering/Technical Committee (State-GRC)

1. Commissioner or PS (Coordinator)
2. Project Coordinator
3. Chairman of Community Grievance Committee
4. Secretary of Community Grievance Committee
5. Representative of Focal NGO
6. State Safeguards Officers (Social & Environment)
7. PMU Communication Officer
8. PAP (Complainant)

The timeline for addressing/resolving issues raised by a complainant by this STATE-GRC shall be at most 15 days from the last day allowable for grievance and complaints submission following the inability of the PMU- GRC to resolve the matter.

Fourth Level: The Courts

Where the Complainant is not satisfied with the decisions of the STATE-GRC, he/she may seek redress in the law Courts.

All grievances will first of all be address at the First Level. It will only move on to Second Level if the first level agreement was not accepted by the party involved and then to third and forth under similar situations. If negotiated settlement of grievances cannot be achieved through the normal procedural steps outlined in the grievance mechanism, the complainant has the right to approach the courts. The GRM procedure will be included in the community engagement plan to ensure that all PAPs know and understand the process and are able to access it whenever they feel the need. The effectiveness of the GRM will be one of the crucial monitoring indicators.

6.8 Capacity of Anambra NEWMAP in Implementing the ESMP

6.8.1 Capacity and Training Needs

In order to achieve effective ESMP implementation, there is a need for the strengthening of relevant competencies on environmental and social management at particularly the State level and secondarily, the LGA and community levels including contractors. This will stimulate the required collaboration among the key actors. Experience shows that strengthening capacity involves more than improving technical skills, developing new systems or establishing quality assurance and improvement standards. While these are important, strengthening capacity is however, essentially about changing behavior.

The capacity building should include equipping individuals with the understanding, skills and access to information and training that enables them to perform effectively. Personnel of the erosion control intervention project need to understand the purpose of the ESMP and their expected roles during its implementation.

The target groups for the training will include:

- SPMU E&S Safeguard Officers and Project Engineers;
- Contractor's personnel;
- Construction workers and site personnel; and,
- Select members from the project communities.

The SPMU E&S safeguard officers and contractors will require capacity building in the implementation of the projects' environmental and social safeguards and general project planning and management interfaced with E&S components. Capacity requirements are also in the areas of E&S monitoring and reporting, adherence to the required E&S principles, standards and commitments. The construction workers and select members of the project communities will undergo training on public awareness creation/educational techniques (on environmental, social and health issues) and first aid procedures.

6.8.2 Capacity Building Cost

The capacity building plan for the ESMP with the associated cost implications is shown in Table 6.5 below. To enhance the respective roles and collaboration of the relevant stakeholders, the broad areas for capacity building and effective ESMP implementation are identified and shown in Table 6.5.

Table 6.5: Summary of Institutional Capacity and Training Needs with Costs

Programme Description	Participants	Form of Training	Duration	Training Agency	Estimated Cost In (N) and Project Phase
Understanding the Environment: • Concepts, Regulations & Statutory Requirements; • Environmental Management; • Flood and Erosion Prevention & Control; • Stakeholder & Community Participation	Officials of SMEnv, ASWAMA, SMOW, SMLS, SPMU, Contractor, Community Leaders, Focal NGO, CBOs & Other Relevant Groups	Workshop	One Day	External Agency for capacity building or Environmental & Social Specialist	300,000.00 (Pre-Construction Phase)
Scope of Federal High Court Intervention Project: • Environmental & Social Impacts; • Engineering Design and Associated ESMP; • Coordination with Other MDAs and the Community	Contractor, SPMU Safeguard Officers and Project Engineers, SMENV, ASWAMA & relevant MDAs, Community Leaders, CDOs, & NGOs	Workshop	One Day	External Agency for capacity building or Environmental & Social Specialist	300,000.00 (Pre-Construction Phase)
Project Implementation: • Civil Works with Bio-remediation in the project; • Roles and Responsibilities of Key Actors; • Environmental Monitoring	SPMU Project Engineers and Safeguard Officers, Contractors, SMEnv, ASWAMA	Lecture and Site Visit	One Day	External Agency for capacity building or Environmental & Social Specialist	300,000.00 (Construction Phase)
Monitoring and Evaluation: • ESMP Monitoring and Reporting Strategy; • Stakeholder and Community Participation	Contractor, SPMU Safeguard Officers, Engineers, SMEnv, ASWAMA & relevant MDAs, Community Leaders, CDOs, & Focal NGO	Workshop	Half Day	Environmental & Social Specialists; External Agency engaged for capacity building	150,000.00 (Pre-Construction Phase)
Watershed Protection and Management: • Alternative income generation programme for stakeholders and skills requirements; • Promotion of Agricultural Methods and Technologies for Improving Farm Production and Erosion Prevention;	Watershed Committee, Community Leaders, LGA Staff, Support Professionals	Workshop	One Day	World Bank/External Agency Engaged for Capacity Building/ Environmental & Social Specialists	200,000.00 (Pre-Construction Phase)
TOTALS					**N1,500,000.00**

The capacity building and trainings costs shown in Table 6-5 shall be included as part of the overall project budget to be implemented by the SPMU. The trainings are to be conducted preparatory to the contractor's mobilization to site. All trainings shall therefore be completed prior to mobilization or latest two weeks after the contractor has mobilized to site.

6.9 ESMP Implementation Schedule

The implementation and management of the ESMP schedule is designed to facilitate any necessary resettlement issues associated with the RAP. The ESMP activities also need to be implemented within an agreed timeframe and budget. Appropriate timing should be adhered to in order to avoid project delays especially if the situation arises where site clearing is to begin before the resettlement end date.

Execution of the ESMP activities is recommended in accordance with the schedule shown in Table 6-6. The period of the first week will be used to develop and set up all structures necessary to support all aspects of the programmes.

Table 6-6: Proposed ESMP Implementation Schedule

DESCRIPTION OF ACTIVITY	DURATION IN MONTHS			
	1st Month	2nd Month	3rd Month	4th Month & Up
Disclosure of ESMP Report				
Formation of Project Complaint Committee (PCC)				
Review and Approval of Contractor's ESMP and Health, & Safety Plan				
Hold Stakeholders Meetings and Consultations				
Execute Capacity Building Programmes				
Implementation of Mitigation Measures				
Supervision of ESMP Implementation				
Monitoring & Reporting on ESMP Implementation				
Conduct Monitoring and Evaluation				
Programme Administration				

Table 6-7 E&S Impact Mitigation and Monitoring Plan

E&S Impact Category	Source of Impact	Objective	Impact Mitigation			Performance & Impact Monitoring			
			Proposed Mitigation Measures	Responsible to Implement	Mitigation Cost (N)	Monitoring Indicator	Monitoring Frequency	Responsible to Monitor	Monitoring Cost (N)
PRE-CONSTRUCTION PHASE									
Safeguard Instrument (ESMP)		Ensure that identified E&S impacts are addressed and mitigation measures are executed properly	Environmental and social management measures as spelled out in this document (details are as enumerated below)	SMEnv & SPMU	To be included in the overall project construction cost	Approval of ESMP Report by FMEnv & WB; Commencement of construction activities; Availability of completed & approved plans	Monitoring parameters as indicated in this ESMP	FPMU & WB	N/A
Impacts on Community and PAP Management (Loss of physical assets; Loss of means of livelihood	All those impact sources that are indicated in Table 6.1, Item 1, Column 3	To restore persons affected by the project to a condition equivalent to or better than the pre-project situation	A Resettlement Action Plan (RAP) has been prepared as a stand-alone document; All those impact mitigation measures that are indicated in Table 6.1, Item 1, Column 4	SMEnv & SPMU	To be included in the total RAP cost	• No. of public complaints recorded; • Level of awareness and understanding of community members; • No of community members that attend trainings; • Level of satisfaction among PAPs; • No of women gainfully employed by project; • No of other businesses induced by project • Questionnaires, direct observations and interviews.	Continuous Quarterly Continuous Quarterly Quarterly; Six months intervals Every two years	SPMU-ESO; Focal NGO SMEnv.; SMLS.; Community Leaders; Site Committee	Included in total cost provided in the RAP 200,000.00

E&S Impact Category	Source of Impact	Objective	Impact Mitigation			Performance & Impact Monitoring			
			Proposed Mitigation Measures	Responsible to Implement	Mitigation Cost (N)	Monitoring Indicator	Monitoring Frequency	Responsible to Monitor	Monitoring Cost (N)
Public/Stakeholders Participation	All those impact sources that are indicated in Table 6.1, Item 2, Column 3	Ensure effective community and stakeholder involvement in the project decision process	Develop and submit for SPMU approval a Stakeholders Engagement Plan; All those impact mitigation measures that are indicated in Table 6.1, Item 2, Column 4	Contractor Contractor	To be included in the overall project construction cost	• No of active participants from the community and other stakeholders	Continuously	Focal NGO; SPMU; SMEnv; Community Leaders; Site Committee	200,000.00
Vegetation and Biomass Removal Management	All those impact sources that are indicated in Table 6.1, Item 3, Column 3	Prevent damage to critical ecosystems and habitats and destruction of flora and fauna	Develop and submit for SPMU approval a Vegetation and Biomass Removal Management Plan; All those impact mitigation measures that are indicated in Table 6.1, Item 3, Column 4	Contractor Contractor	To be included in the overall project construction cost	Areas of stressed vegetation; Size of cleared vegetation areas	Monthly Monthly	SPMU-ESO; Focal NGO; SMOW; SMEnv; SMOH; Community Leaders; Site Committee	150,000.00
CONSTRUCTION PHASE									
Dust and Air Quality Management	All those impact sources that are indicated in Table 6.1, Item 4, Column 3	To minimize emission of hydrocarbons and generation of dust at the work site and access roads	Develop and submit for SPMU approval an Air Quality Management Plan; All those impact mitigation measures that are indicated in Table 6.1, Item 4, Column 4	Contractor Contractor	To be included in the overall project construction cost	• No. of public complaints; • Level of particulates • Level of air pollutants • Vegetation surfaces free of dusts • Ambient air monitoring using standard methods	Twice daily Continuous as necessary Continuous as necessary Two month intervals or as required	SPMU-ESO; Focal NGO SMOH.; Community Leaders; Site Committee	300,000.00

E&S Impact Category	Source of Impact	Objective	Impact Mitigation			Performance & Impact Monitoring			
			Proposed Mitigation Measures	Responsible to Implement	Mitigation Cost (N)	Monitoring Indicator	Monitoring Frequency	Responsible to Monitor	Monitoring Cost (N)
Water Resources, Erosion & Sedimentation Control Management	All those impact sources that are indicated in Table 6.1, Item 5, Column 3	Ensure that project area is adequately protected from development of erosion and sedimentation hazards	Develop and submit for SPMU approval a Water Management Plan and an Erosion and Sedimentation Management Plan; All those impact mitigation measures that are indicated in Table 6.1, Item 5, Column 4	Contractor Contractor	To be included in the overall project construction cost	•No of complaints from community members; •Absence of sediment build up; •Absence of flooding in construction areas; •No of spills & repairs made; •Use of standard monitoring methods	Daily Daily Daily Daily Three month intervals	SPMU-ESO; Focal NGO; SMOW; Community Leaders; Site Committee;	300,000.00
Noise and Vibration Exposure Management	All those impact sources that are indicated in Table 6.1, Item 6, Column 3	Ensure adequate protection of the workforce and community members from effects of noise and vibrations	• All those impact mitigation measures that are indicated in Table 6.1, Item 6, Column 4	Contractor – Site Engineer	To be included in the overall project construction cost	•No of complaints from community members; •Absence of structural failures; •Absence of debris accumulation; •No of debris removals & repairs made; •Sensor measurements around workplace	Daily Daily Daily Daily Daily	SPMU-ESO; Local NGO; SMOW; SMOH; Community Leaders; Site Committee	150,000.00
Occupational & Public Health and Safety Management	All those impact sources that are indicated in Table 6.1, Item 7, Column 3	Ensure that identified occupational & public health, safety and security impacts are addressed and mitigation measures are executed properly	Develop and submit for SPMU approval an Occupational and Public Health, Safety and Security Management Plan; All those impact mitigation measures that are indicated in Table 6.1, Item 7, Column 4	Contractor Contractor	To be included in the overall project construction cost	•No. of sanitary facilities provided at start of project; •Adherence to stipulated speed limit •Record of incidents; •Use of PPEs by workers; •Records of appropriate workers' training;	At start of project; Twice weekly; Weekly; Daily; Monthly;	SPMU-ESO; Focal NGO; SMOH; Community Leaders; Site Committee;	400,000.00

E&S Impact Category	Source of Impact	Objective	Impact Mitigation			Performance & Impact Monitoring			
			Proposed Mitigation Measures	Responsible to Implement	Mitigation Cost (N)	Monitoring Indicator	Monitoring Frequency	Responsible to Monitor	Monitoring Cost (N)
						•Record of reinstatement plan for burrow pits; •Record of health and safety meetings •Record of first aid exercises •Hazards assessment	At beginning of project Weekly; Monthly At start of project		
HIV/AIDS and STIs Management	All those impact sources that are indicated in Table 6.1, Item 8, Column 3	Ensure effective HIV/AIDS and STI awareness among community members	•All those impact mitigation measures that are indicated in Table 6.1, Item 8, Column 4	SPMU Safeguard Officers; MOH; NGO; Contractor-Health & Safety Personnel	To be included in the overall project construction cost	• No. of HIV/AIDS workshops held; • Level of awareness of workers & others; • Records of peer educators' training; • Records of condoms distributed	Quarterly Continuous Bi-monthly Monthly	Focal NGO; SPMU-ESO; SMEnv; SMOH; Community Leaders; Site Committee;	300,000.00
Construction Operations & Slope Stabilization	All those impact sources that are indicated in Table 6.1, Item 9, Column 3	To ensure that construction activities are carried out without risks to health and safety of the workforce and the community	Develop and submit for SPMU approval an Emergency Response and Incident Plan; All those impact mitigation measures that are indicated in Table 6.1, Item 9, Column 4	Contractor Contractor	To be included in the overall project construction cost	•No. of accidents/incidents; •No. of visible warning signs; •Level of public awareness; •Record of safety meetings held;	Daily; Daily; Continuous; Weekly.	SPMU-ESO; Focal NGO; SMOW; SMEnv; Community Leaders; Site Committee	240,000.00
Traffic and Transportation Hazards	All those impact sources that are indicated in Table 6.1, Item 10, Column 3	To ensure that traffic within the project area is managed so as to assure the workplace and community are	Develop and submit for SPMU approval a Traffic and Vehicle Management Plan; All those impact mitigation measures that are indicated in	Contractor Contractor	To be included in the overall project construction cost	•Effective traffic flow with vehicular & worker safety; •Appropriate positioning of road signs, reflectors, speed	Daily; Daily;	SPMU-ESO; Focal NGO; SMOW; SMEnv; Community Leaders; Site	240,000.00

E&S Impact Category	Source of Impact	Objective	Impact Mitigation			Performance & Impact Monitoring			
			Proposed Mitigation Measures	Responsible to Implement	Mitigation Cost (N)	Monitoring Indicator	Monitoring Frequency	Responsible to Monitor	Monitoring Cost (N)
		without risks to health and safety	Table 6.1, Item 10, Column 4			ramps, control limits, traffic wardens; •Records of accidents and near misses	Daily.	Committee	
Waste Management (Solid and Liquid Wastes)	All those impact sources that are indicated in Table 6.1, Item 11, Column 3	To protect the community and the workforce from health hazards of indiscriminate waste disposal by proper collection and disposal of liquid and solid wastes generated on-site during the project.	Develop and submit for SPMU approval a Waste Management Plan; All those impact mitigation measures that are indicated in Table 6.1, Item 11, Column 4,	Contractor Contractor	To be included in the overall project construction cost	•Waste segregation and littering; •Emptying of bins at waste dump sites; •Waste composting; •Indiscriminate defecation; •Toilets decommissioning	Daily; Weekly; Weekly; Daily; At end of project	SPMU-ESO; Focal NGO; SMOW; SMEnv; Community Leaders; Site Committee	300,000.00
OPERATION AND MAINTENANCE (POST CONSTRUCTION) PHASE									
Land Use Restriction	All those impact sources that are indicated in Table 6.1, Item 12, Column 3	To ensure that required project areas under restricted use remains as designated	All those impact mitigation measures that are indicated in Table 6.1, Item 12, Column 4	SPMU; SMEnv; Community Leaders; Site Committee		Sustained treated gully healing process	Routine monitoring of project corridor (6mos – 12mos)	SPMU-ESO; SMEnv; Focal NGO; Community Leaders; Site Committee	400,000.00
Closure of Temporary Office, Staging Areas and Decommissioning of Project	All those impact sources that are indicated in Table 6.1, Item 13, Column 3	Ensure that agreements with the community and landowners on post construction hand-over are	•All those impact mitigation measures that are indicated in Table 6.1, Item 13, Column 4	Contractor Contractor	To be included in the overall project construction cost	Agreements entered with community and landowners for use of land; Terms of Agreement fulfilled with	Prior to start of project; Quarterly; At completion of project	SPMU-ESO; Focal NGO; Community Leaders; Site Committee	300,000.00

E&S Impact Category	Source of Impact	Objective	Impact Mitigation			Performance & Impact Monitoring			
			Proposed Mitigation Measures	Responsible to Implement	Mitigation Cost (N)	Monitoring Indicator	Monitoring Frequency	Responsible to Monitor	Monitoring Cost (N)
		kept.				community and landowners; Handover of office site as agreed			
System Control Failures Management	All those impact sources that are indicated in Table 6.1, Item 14, Column 3	Ensure sustainable maintenance of erosion prevention and control structures	All those impact mitigation measures that are indicated in Table 6.1, Item 14, Column 4	SPMU; Community Leaders; Site Committee		Sustained gully healing process	Routine monitoring of project corridor (6mos – 12mos)	Community Leaders; Site Committee CBOs/CDOs	300,000.00

6.10 ESMP Management Costs

A summary of the projected ESMP management costs through the preconstruction, construction and post-construction phases of the project are presented in Table 6-7.

Table 6-7: ESMP Management Costs

Institutional Category	Roles & Responsibilities	Associated Management Costs (N)		
		Pre-Construction	Construction	Post Construction
Anambra State Ministry of Environment (SMEnv)	• Overall oversight, assessment and monitoring of specific and general project implementation ;	200,000.00	700,000.00	300,000.00
SPMU (Safeguard Officers, Project. Engineer)	• Oversight of all specific activities associated with the ESMP implementation	300,000.00	1,200,000.00	500,000.00
FPMU	• Project assessment and monitoring of this ESMP implementation and the construction activities.	300,000.00	700,000.00	N/A
World Bank	• Overall assessment and monitoring of specific and general project implementation ;	N/A	N/A	N/A
State Ministry of Works	• Provide necessary preconstruction and construction support to the SPMU;	N/A	500,000.00	N/A
State Ministry of Lands & Survey (SMLS)	• Provide necessary support to the SPMU on matters of land acquisition, compensation and other resettlement issues	N/A	N/A	N/A
Other MDAs	• Intervene in areas under their jurisdiction as and when project demands	200,000.00	300,000.00	N/A
Contractor (Site Engineers/ Supervisors)	• Provide oversight function during decommissioning to ensure adherence to good practice and the ESMP	N/A	N/A	N/A
Site Committee	• Monitor and ensure compliance with ESMP, BEME and implementation quality	200,000.00	500,000.00	200,000.00
Grievance Redress Committee (GRC)	• Provide necessary support to the SPMU on resolution of all grievances through the duration of the project	500,000.00	200,000.00	200,000.00
Local government	• Provide support in monitoring project execution within their domains to ensure compliance with this ESMP and other relevant requirements	N/A	N/A	N/A
Local Community	• Support and promote environmental awareness	200,000.00	N/A	500,000.00
CDOs/CBOs	• Ensure community participation by mobilizing, sensitizing community members;	N/A	200,000.00	300,000.00
NGOs	• Assist to ensure effective response actions, to evolve and devise sustainable environmental strategies and rehabilitation techniques, organize, coordinate and ensure safe use of volunteers in a response action, & provide wide support in management planning, institutional/governance issues and other livelihood related matter, awareness campaigns	N/A	300,000.00	500,000.00
General Public	• Identify issues that could derail the project • Support project impacts and mitigation measures as well as awareness campaigns	N/A	N/A	N/A
TOTALs		**N1,900,000.00**	**N4,600,000.00**	**N2,500,000.00**

6.11 Budget to Implement ESMP

Cost projections for implementation of the various measures, monitoring plan and capacity building are given in Table 8.8. The projected implementation budget will enable the ESMP to be an integral part of financing for the rehabilitation/maintenance works in the project.

An indicative budget of **N15,433,000.00** (Fifteen Million Four Hundred and Thirty Three Thousand Naira) only, is shown for the implementation of the ESMP bearing in mind the elements that make up the implementation process. The budget covers:

1. Routine E & S duties of the SPMU;
2. Capacity Building for the SPMU and other stakeholders;
3. Environmental and Social Due Diligence investigations and/or Audits;
4. Monitoring and evaluation activities of the SPMU

Table 6-8: Breakdown of Cost Estimates

S/No	ITEM	RESPONSIBILITY	COST BREAKDOWN IN (N)			COST ESTIMATE IN NAIRA (N)	COST ESTIMATE IN (US$)
			Pre-Construction Phase	Construction Phase	Post-Construction Phase		
1	MITIGATION	Contractor	To be built into Contractor costs (This cost is provided for bidding guidance purposes only and is not part of the grand total below)			N19,000,000.00	$62,091.50
2	MANAGEMENT	SPMU/ SMEnv	1,900,000.00	4,600,000.00	2,500,000.00	N9,000,000.00	$29,411.76
3	MONITORING	SPMU/ FPMU/ FMEnv/ SMEnv/ Environmental Consultants/ NGOs	550,000.00	2,230,000.00	1,000,000.00	3,780,000.00	12,352.94
4	CAPACITY BUILDING & TRAININGS	SPMU/ MOH/ Consultants/ Contractor	950,000.00	300,000.00	N/A	1,500,000.00	4,084.96
Sub-total						N14,030,000.00	$45,849.46
5	CONTINGENCY (10%)					1,403,000.00	4,584.95
GRAND TOTAL						**N15,433,000.00**	**$50,434.41**

Assumed exchange rate: US$1.00 = N306.00 (Nigerian Naira)

6.12 ESMP Disclosures

After a review and clearance by the World Bank, the ESMP will be disclosed at the Federal Ministry of Environment, the State Ministry of Environment and the host LGA offices as well as at the World Bank website. The purpose will be to inform stakeholders about the project activities, impacts anticipated and proposed environmental management actions as well as to obtain the certificate of conformity from the Federal Ministry of Environment.

6.13 Mandatory Technical Review

The ESMP will be subjected to mandatory Technical Review as scheduled by Federal Ministry of Environment followed by the Impact Mitigation Monitoring (IMM) exercise for the purpose of EIA Certification

CHAPTER 7: SUMMARY CONCLUSION AND RECOMMENDATIONS

7.1 Summary

Overall, this project is aimed at halting or minimizing the environmental and social damages being caused by the incidence of gully erosion in Nodu and Umuzocha villages of Okpuno and Awka towns, respectively. There is an overwhelming emotional relief for community members over fears of a continued loss of their properties and ancestral lands to gully erosion. The project will provide long term emotional and economic benefits to the people of Nodu and Umuzocha villages. These residents will no longer live in fear of losing their assets, properties, ancestral lands and cash crops to perennial floods and erosion. Expectedly, this will in turn increase the mental health of the community leading to improved efficiency and productivity. This is, in the overall a positive impact that will bring about emotional relief and comfort to all the community members particularly those along the gully corridor.

Additionally, there will be multiplier effects such as employment opportunities, poverty reduction, enhanced national reputation and cultural promotion, among others. Educational establishments, hospitals and agriculture will also benefit from the boost of the reduced community health and safety concerns. There are however, some social and environmental impacts associated with the project that require mitigation to acceptable levels. The social impacts include loss of means of livelihood, loss of physical assets, and land use restriction. The environmental impacts include dust and air quality issues, surface and ground water quality, noise and vibration effects, vegetation loss, public/occupational health and safety, traffic and transport issues, earth movement risks, solid and liquid wastes hazards, and climate change effects.

The set of mitigation measures to be implemented in order to reduce or eliminate the identified environmental and social impacts to acceptable levels have been identified and documented in this ESMP. The monitoring and institutional actions to be taken before, during and after the remedial construction and development works have also been provided.

7.2 Recommendations

The savannah species observed is indicative of the fact that project area falls within the derived savannah zone. Conservation programme which should include the elimination/control of bush burning in the area should be initiated in order to check the advancing savannah. The area should be re-vegetated after the engineering works in order to stabilize the soil. Species such as *Bambusa spp* and *Gmelina aborea* which have proved to be resilient in the area due to their silvical properties should be given priority considerations. Other species particularly those of economic value should be incorporated based mainly on the peoples' preference. The species already being cultivated in the home-gardens will make a useful guide.

Empowerment programmes should be developed and provided for the community members to reduce their dependence on crop farming and other activities that may impact negatively on the environment thereby pre-disposing the area to soil erosion.

The proposed gully erosion intervention project is designed to improve erosion and flood management which will result in:

- Reduced loss of infrastructure including roads, houses, etc.
- Reduced loss of land and productivity from soil loss caused by surface erosion and floods.
- Progressively restore vegetative cover, improve environmental conditions and more humid local microclimates expected to result in increased vegetation cover for wildlife and carbon sequestration.
- Environmental improvements due to land stabilization measures which preserve the landscape and biodiversity.

The construction of the gully erosion control infrastructure and the site rehabilitation activities, as designed, will require the use of existing access roadways to reach project locations. These access roadways and associated drainages will need to be rehabilitated. The need for the rehabilitation of the access roads is heightened by the level of destruction that will arise from movement of heavy duty vehicles and equipment for project construction activities.

Generally, the study has indicated that the establishment of the proposed project will immensely impact positively on the existing environmental, social, health and safety conditions of Nodu and Umuzocha villages. This inference is further made strong, owing to the fact that the community has thrown her full weight behind the project and is anxiously awaiting its implementation.

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ANNEXURES

ANNEXURE I: List of Contacted Stakeholders

The following groups/persons were contacted or met for the stakeholders'/community meetings:

CONTACTED STAKEHOLDERS	MODE OF CONTACT
Individuals or group of persons within Okpuno and Umuzocha whose daily activities (including farming) bring them in close proximity to the project area OR whose day-to-day lives/livelihoods may be directly affected by project activities.	General meetings, phones and personal contacts using a facilitator.
Women groups of Okpuno and Umuzocha communities	General meetings, phone and personal contacts
Youth groups of Okpuno and Umuzocha communities	General meetings, phone and personal contacts
Vulnerable persons within the project sphere of influence	General meetings, phone and personal contacts
Traditional rulers of Okpuno and Umuzocha Communities	General meetings, phone and personal contacts
Anambra NEWMAP	Worked with them on a day to day basis on the overall project.
Office of the President General, Okpuno and Umuzocha Development Union	Phone and personal contacts

ANNEXURE II: Template of Socioeconomic/Census Data Forms

ONE PASSPORT-SIZE PHOTO OF RESPONDENT REQUIRED

QUESTIONNAIRE NUMBER	

ANAMBRA STATE NIGERIA EROSION &WATERSHEDMANAGEMENT PROGRAMME (ANS-NEWMAP)
NEW JUDICIARY/FEDERAL HIGH COURT DOWNSTREAM EXTENSION GULLY EROSION PROJECT
[Rehabilitation and Redevelopment of GullyCorridor]

NAME OF COMMUNITY: _____

DATA COLLECTION CONSENT & SURVEY FORM

CONSENT:

We are conducting/preparing a Resettlement Action Plan (RAP) for the above gully erosion project under the Anambra State Nigeria Erosion and Watershed Management Programme (ANS-NEWMAP). The data collected will help to assess and identify the persons and assets that may be affected by the gully rehabilitation and redevelopment project. To enable us achieve this objective, this socioeconomic survey and your voluntary consent for the survey are required.

Respondent Name:_____Signature:_____

Gender		**Phone Number(s)**					
Your Village/ Community			**No of years lived in area?:**		**Do you desire to see this project happen?**		
					YES		**NO**
No. of Persons in Your Household:	**MALE**		**FEMALE**		**Highest Education**		**NS/F/S/UG/G/PG**
What is your age range?		**0-21 yrs**	**22-45 yrs**	**46-60 yrs**	**61-70 yrs**		**Above 70 yrs**
Are you married?	**YES**	**NO**	**Your Occupation**				
Household Age Distribution		**0-21 yrs**	**22-45 yrs**	**46-60 yrs**	**61-70 yrs**		**Above 70 yrs**
Household Educational Distribution	**No School (NS)**	**FSLC (F)**	**SSCE (S)**	**Undergrad (UG)**	**Graduate (G)**		**Post Grad (PG)**
Household Marital Status:	**Child**	**Single**	**Married**	**Widowed**	**Separated**		**Divorced**
Household Occupational Distribution:	**Student**	**Farmers**	**Daily Labor**	**Civil Servant**	**Trader/ Business**	**Industrial Worker**	**Unemployed**
Monthly Household Income:	**Below N21,000**	**N21,000-30,000**	**N31,000-45,000**	**N46,000-60,000**	**N60,000-120,000**		**Above N120,000**
How will this project		**Improve**	**Increase**	**Improve**	**Improve**		**Others**

affect you, your household or your community?	**Movement**	**Land Value**	**Trading**	**Communication**	
What was the frequent illness(es) in your family in the past one year?					
Where does your family seek medical treatment from?	**Hospital**	**Pharmacy/ Chemist**	**Native Drugs**	**Self-Medication**	
How far is this facility from your place?	**Walking Distance**	**Upto2.0km**	**Over2.0km**	**Outside Community**	
INTERVIEWER: (Full Names)		**PHONE NO.**			
SIGNATURE		**DATE:**	**D:**	**M:**	**2019**

Household Composition and Personal Information

Household Members	Surname	Other Names	Relationship With H.H	Gender	Age	Disability	Educational Level	Occupation
Head of Household								
Spouse								
Member 1								
Member 2								
Member 3								
Member 4								
Member 5								
Member 6								
Member 7								

Disability = Blind-1; Crippled-2; Mentally Disabled-3; Physically Challenged-4, Other-5
Relationship = Self -1; Wife-2; Son/Daughter-3, Nephew/Niece-4, Son-in-law/Daughter-in-law-5, Grand Child-6, Parent-7, House Help-8, Others-9
Marital Status = Single-1, Married-2, Widow-3, Widower-4, Divorcee-5, Separated-6, Single Parent-7.
Literacy Level = Illiterate-1, Primary School-2, Secondary School-3, Undergraduate-4, Graduate-5, Post Graduate-6, Others-7.
Occupation = Crop Farming-1, Animal Husbandry-2, Service Provider-3, Civil Servant-4, Craftsmanship/Artisanship-5, Trade/Business-6, Industrial Worker-7, Daily Wage Labour-8, Other-9.

WHAT IS LIKELY TO BE AFFECTED BY THE PROJECT?

Structure-1; Land-2; Structure and Land-3; Cash Crop-4; Others-5 (specify)……..

Years of Occupation of Affected Property (if applicable):……Years

STATUS OF PROPERTY USER: A) Title holder; B) Tenant; C) Non-Title Holder; D) Govt; E) Squatter

Affected Structure Details:

Type of Use	Monthly Rent	Utility Connections	Distance to Gully Edge (m)	No of Rooms	Floor Level	Total Area (m2)	Type of Construction		
							Roof	Wall	Floor

Type of Use = Residence-1; Commercial-2; Residential-cum-Commercial-3; Animal Shed/Poultry-4; Other (specify)-5…….

Type of Construction: Wall = Mud-1, Thatched-2, Brick-3, Plank-4, Zinc-5; **Roof** = Zinc/Asbestos-1; RCC-2; Thatched-3; Tiles-4

Floor = Cement-1; Mud-2; Tiles-3; **Floor Level** = Bungalow-1, Storey Building-2; **Utility Connection** = Electricity-1; Water-2; Phone-3

AFFECTED LAND DETAILS

SIZE OF AFFECTED LAND……..

TYPE OF LAND……. (Agriculture-1; Residential-2; Commercial-3; Barren-4; Grazing Land-5)

If Agriculture, is land …….. Wet-1; Dry-2; Other-3

Crops grown on land& How long?…….....

…….....

Immovable assets likely to be affected: Trees……..; Orange……; Mango…..……; Apple……;

Others…….……

In your view, what is the yearly monetary benefit you gain from the land? .N.....

ANNEXURE III: Summary of World Bank Safeguard Policies

The World Bank safeguard policies are designed to help ensure that projects proposed for Bank financing are environmentally and socially sustainable, and thus improve decision-making. The Bank has ten safeguards policies as listed below:

- OP 4.01 Environmental Assessment;
- OP 4.04 Natural Habitats;
- OP 4.09 Pest Management;
- OP 4.11 Physical Cultural Heritage;
- OP 4.12 Involuntary Resettlement;
- OP 4.10 Indigenous People;
- OP 4.36 Forests;
- OP 4.37 Safety of Dams;
- OP 7.50 Projects on International Waterways;
- OP 7.60 Projects in Disputed Areas

The environmental and social safeguard policies of World Bank triggered and applicable in this FHC subproject include OP 4.01 and OP 4.12. These policies are summarized as follows:

Environmental Assessment (EA) (OP 4.01):

An EA is conducted to ensure that Bank-financed projects are environmentally sound and sustainable, and that decision- making is improved through appropriate analysis of actions and of their likely environmental impacts. Any World Bank project that is likely to have potential adverse environmental risks and impacts in its area of influence requires an EA indicating the potential risks, mitigation measures and environmental management framework or plan.

Physical Cultural Resources (OP 4.11):

The Bank seeks to assist countries to manage their physical cultural resources and avoid or mitigate adverse impact of development projects on these resources. Although this policy is not triggered for this subproject, there are possibilities for the existence of shrines and other cultural relics within the project area. The requirements for chance finds of such relics shall apply during the construction works.

Involuntary Resettlement (OP 4.12):

Key objectives of the World Bank's policy on involuntary land acquisition are to avoid or minimize involuntary resettlement where feasible, exploring all viable alternative project designs; assist displaced persons in improving their former living standards, income earning capacity and production level, or at least in restoring them; encourage community participation in planning and implementing resettlement; and provide assistance to affected people regardless of the legality of land tenure. The policy covers not only physical relocation, but any loss of land or other assets resulting in relocation, or loss of shelter; loss of assets or access to assets; loss of income sources or means of livelihood whether or not the affected people must move to ANOther location. When the policy is triggered, a Resettlement Action Plan (RAP) must be prepared. An abbreviated plan may be developed when less than 200 people are affected by the project. In situations, where all the precise impacts cannot be assessed during project preparation, provisions are made for preparing a Resettlement Policy Framework (RPF). The RAP/RPF must ensure that all Bank's policy provisions detailed in OP 4.12 are addressed particularly the payment of compensation for affected assets at their replacement cost.

Disclosure Policy (OP 17.50).

This policy supports decision making by the Borrower and Bank by allowing the public access to information on environmental and social aspects of projects. Mandated by six safeguard policies that has specific requirements for disclosure in country (Before project appraisal in local language and in English) and World Bank INFO-Shop (Before project appraisal in English). Documents can be in draft but must meet WB standards

ANNEXURE IV: General Environmental Management Conditions For Construction Contracts/Civil Works

Contract Specifications for Contractor

1.0 General

a. All Environmental and Social (E&S) safeguards associated with the contract shall be complied with by the contractor. The Contractor shall also update himself about such issue in the ESMP, and prepare his work strategy and plan to fully take into account relevant provisions of the ESMP.

b. The Contractor shall develop a plan of work indicating all Environmental and Social safeguards at the various stages and indicate the period within which site will be maintained to it's original state after completion of works to ensure that significant E&S safeguards have been addressed appropriately.

c. The Contractor shall adhere to the proposed plan implementation schedule and the monitoring plan to ensure effective feedback of monitoring information to the SPMU Project Engineer (PE).

d. The Contractor shall implement all measures to avoid undesirable adverse environmental and social impacts wherever possible, restore site offices to acceptable standards, and abide by all environmental performance requirements specified in the ESMP

2.0 Dust Mitigation Measures

a. The contractor shall minimize the effect of dust on the surrounding environment resulting from site clearing, vibrating equipment and temporary access roads.
b. During the rehabilitation project, the contractor shall carry out proper and efficient measures, such as water dousing, whenever necessary to reduce the dust nuisance, and to prevent dust originating from the operations.

3.0 Noise Due to Construction Activities

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

4.0 Waste Management

a) Construction waste shall not be left in stockpiles along the road, but removed and disposed of/or reused where needed.
b) All waste shall be segregated into organic waste and plastic and glass. The organic waste will be composted near the site office to enrich the soil while plastics and glass will be taken to the district dump sites
c) All sanitary facilities (e.g. garbage collection and disposal, drinking water facilities, etc.) shall be provided by the contractor in site offices or project sites.

5.0 Water Resource Management

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

b) The contractor shall take all possible steps to prevent pollution of streams and other water supplies.

c) Entry of runoff water to the site shall be restricted by constructing diversion channels or culverts to reduce the potential of soil erosion and water pollution.

d) Waste water from washing out of equipment shall not be discharged into water courses.

6.0 Material Excavation and Deposit

Vegetation clearing shall be restricted to the area required for safe operation of the rehabilitation work. Vegetation clearing shall not be done more than two weeks in advance of rehabilitation.

7.0 Contractor's Environment and Social Management Plan (ESMP)

a) Within 6 weeks of signing the Contract, the Contractor shall prepare a work plan to ensure the adequate management of E&S aspects of the works, including implementation of the requirements of these general conditions and any specific requirements of an E&S safeguards for the works. The Contractor's work plan will serve two main purposes:

i. For the Contractor, for internal purposes, to ensure that all measures are in place for adequate E&S management, and as an operational manual for his staff.

ii. For the Client, supported where necessary by SE, to ensure that the Contractor is fully prepared for the adequate management of all E&S safeguards issues.

b) The Contractor's E&S document shall provide at least:

- A description of procedures and methods for complying with these general environmental and social conditions, and any specific conditions specified in the ESMP;
- A description of specific mitigation measures that will be implemented in order to minimize adverse impacts;
- A description of all planned monitoring activities and the reporting thereof; and
- The internal organizational, management and reporting mechanisms put in place.

8.0 Health and Safety

a) 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 HIV/AIDS.
b) Adequate road signs to warn pedestrians and motorists of rehabilitation activities, diversions, etc. shall be provided at appropriate points.

9.0 Reporting

The Contractor shall prepare monthly progress reports to the SPMU on E&S monitoring with these general conditions and the project E&S safeguards. It is expected that the Contractor's reports will include information on:

- E&S management actions/measures taken, including approvals sought from SMENV, PE and FME

- Problems encountered in relation to E&S 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 E&S aspects; and
- Observations, concerns raised and/or decisions taken with regard to E&S management during site meetings.

10.0 Cost of Compliance

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

ANNEXURE V: Summaries of Minutes for Community Meetings

MINUTES OF MEETING WITH UMUZOCHA AND NODU COMMUNITIES

ITEM	DESCRIPTION
1. Project:	Anambra State NEWMAP ESMP AND RAP
2. Communities:	Umuzocha and Nodu, Awka South L.G.A.
3. Date:	March 18, 2019.
4. Language of Communication:	Igbo and English
5. Introductions and Protocols:	The meeting started at about 10:47am at Nodu community hall.
6. Remarks of Principal Consultant, Dr. Odili Ojukwu	Dr. Odili Ojukwu, the principal consultant introduced himself and members of his project consultant team. • He explained that the purpose of the meeting was to inform the communities formally of the commencement of the Resettlement Action Plan (RAP) and Environmental and Social Management Plan (ESMP) in their communities under the Anambra state NEWMAP with the assistance of FGN and World Bank. • Specifically, the study will identify and document those whose assets and means of livelihood would be impacted by the proposed works. Also an appropriate capacity building programme would be recommended to enable the beneficiaries use the projects in a responsible and sustainable manner. • He told them that his team would be in the Nodu community hall for 3 days to document all who would potentially be affected and he also told them while coming to fill out the forms they should come with a passport photograph for identification purposes and a photocopy of any form of government issued identification cards. After the documentation exercise, Verification will be done. • The communities were enjoined to take ownership of the project by proactive engagement and instituting community-based monitoring and evaluation activities in the course of implementation, and to maintain the projects when completed, to know and understand their roles in the project. • He kindly solicited the blessing of the communities towards the success of the study pleading that the work is a time based work as such they should accommodate him when he calls and turn out for the betterment of the community.
7.Questions/Concerns of the Community:	i. Can we visit the site before the documentation? ii. How will you know the project will affect you?
8.Response of the Consultants	• Yes, we can visit the site tomorrow March 19, 2019 by 10am. • If you know you have assets whether Economic Trees/Crops, Structure or Land within 20m from the gully edge then you can document.
9.Closing:	The consultants thanked the communities. The meeting closed at about 12:10pm. It was attended by 23 persons.

NIGERIA EROSION AND WATERSHED MANAGEMENT PROJECT (NEWMAP)
ESMP/RAP NEW JUDICIARY/FEDERAL HIGH COURT DOWNSTREAM EXTENSION GULLY PROJECT
CONSULTANT CONSULTATIVE MEETING WITH COMMUNITY
MARCH 18, 2019

ATTENDANCE SHEET

S/No	NAME	GENDER	COMMUNITY/VILLAGE/ ORGANIZATION	PHONE NUMBER	SIGNATURE
1	Onwuasiko P.C	M	Nodu Okpuno	07064424979	[signature]
2	Hon. Charles Anze	M	Umuzocha - Awka	~~08033038220~~ 08033732752	
3	Hon. Paulson Okeke	M	" "	08033038208	
4	Emma Kenechi Okeke	M	Nodu Okpuno	08109615946	
5	Cyriacus Egeoh	M	Omu	08033477012	CC.
6	Nwammadu B. Udochukwu	M	Nodu Okpuno	07034226149	
7	Anthony Okeke		Nodu Okpuno	08100060329	[signature]
8	Nkemdilim Ikechukwu	M	Nodu Okpuno	08097733293	[signature]
9	Vicent Obi	M	Nodu Okpuno	08068212498	[signature]
10	Igboka Tagbo	M	Nodu Okpuno	08035997539	[signature]
11	Udefuna Christopher	M	Nodu - Okpuno	08090833525	[signature]
12	Udefuna Chibuike	M	Nodu - Okpuno	07031493337	[signature]
13	Aluka Udefuna	M	Nodu - Okpuno	08094784887	[signature]
14	Chief Obiefuna Okonkwo	M	Nodu Okpuno	08034252338	T. O. Okonkwo
15	Nkemdilim Anayo	M	Nodu Okpuno	08032617771	[signature]
16	Benjamine Okonkwo	M	Nodu Okpun	07064251118	
17	Okonkwo Onyeka	M	Nodu Okpuno	08135097458	[signature]
18	Ilesanmi Clement O	M	OTG	08024206539	[signature]
19	Abaekih Charles	M	CONSULTANT	08037787562	[signature]
20	Oba Adaeze S.	F	Consultant	08067808207	[signature]
21	NWOKOLO CHIBUIKE	M	Consultant	08030957277	[signature]
22	Odili Ojukwu	M	Consultant	08033380090	
23	Umeokafor Chinelo	F	Consultant	08037739595	[signature]

MINUTES OF MEETING WITH TRADITIONAL RULER AND ADMINISTRATIVE LEADERSHIP

ITEM	DESCRIPTION
1. Project:	Anambra State NEWMAP RAP and ESMP
2. Community:	Nodu, Awka South L.G.A.
3. Date:	March 26, 2019
4. Language of Communication:	Igbo and English
5. Introductions and Protocols:	The meeting started at about 5:05pm in the palace of the traditional ruler HRM Igwe Engr S. I. Okafor. HRM welcomed the visiting consultant's team and all present with traditional kola-nuts ceremonies.
6. Remarks of Principal Consultant, Dr. Odili Ojukwu	Dr. Odili Ojukwu, the principal consultant introduced the members of his project consultant team and thanked HRM for his words of welcome. • He explained that the purpose of the meeting was to pay homage to HRM and inform him formally of the commencement of the Resettlement Action Plan (RAP) and Environmental and Social Management Plan (ESMP) for his community under the Anambra state NEWMAP with the assistance of FGN and World Bank. • Specifically, the study will identify and document those whose assets and means of livelihood would be impacted by the proposed works. Also an appropriate capacity building programme would be recommended to enable the beneficiaries use the projects in a responsible and sustainable manner. • The consultant team have meet with the larger segment of the benefiting communities and settlements to sensitize them on the study and solicit their supports and inputs. He also told HRM that his teams were in the community for 3 days to document all who would potentially be affected and while filling the form one passport photograph and a photocopy of government issued identification were collected. • The communities were enjoined to take ownership of the project by proactive engagement and instituting community-based monitoring and evaluation activities in the course of implementation, and to maintain the projects when completed. • He kindly solicited the blessing and support of HRM and his community towards the success of the study pleading that the work is a time based work as such they should accommodate him when he calls and turn out for the betterment of the community
7.Remarks of HRM:	HRM once again welcomed the consultants and expressed his happiness as well as that of his community with the study. He said that he wants development and progress for his community but the erosion issues pose great constraints. He promised the full support and offered his royal blessings for the success of the exercise.
8.Response of the Consultants	The consultants thanked HRM for his support and told him that his team is coming for verification on March 27, 2019 by 7:00am.
9.Closing:	The meeting closed at about 6:15pm. It was attended by 8 persons.

NIGERIA EROSION AND WATER SHED MANAGEMENT PROJECT (NEWMAP)
ESMP/RAP NEW JUDICIARY / FEDERAL HIGH COURT DOWN STREAM EXTENSION GULLY PROJECT
CONSULTANT CONSULTAATIVE MEETING WITH TRADITIONAL RULER
MARCH ....26th..... 2019

ATTENDANCE SHEET

S/N	NAME	GENDER	COMMUNITY/ VILLAGE/ORGANIZATION	PHONE NUMBER	SIGNATURE
1.	HRM IGWE ENGR S.I. OKAFOR	M	IGWE OKPUNO	08037421423	
2.	Igboka Tagbo	M	Nodu okpuno	08035997539	
3.	Abaeri Charles	M	OTG	08037781562	
4.	Alike Okwudili	M	OTG	08037772731	
5.	Ilesanmi Clement O	m	OTG	08024205539	
6.	Oba Adaeze S.	F		08067808207	
7.	Dr Odii Ojukwu	M	Consultant	08088380090	
8.	Umeokafor Chinelo	F	consultant	08037739595	
9.					
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MINUTES OF COMMUNITY AND STAKEHOLDER MEETINGS

MINUTES OF MEETING WITH TRADITIONAL RULER

ITEM	DESCRIPTION
1. Project:	Anambra State NEWMAP RAP
2. Community:	Awka Awka-South, L.G.A.
3. Date:	April 5, 2019.
4. Language of Communication:	Igbo and English
5. Introductions and Protocols:	The meeting started at about 11:15am in the palace of the traditional ruler HRH Obi Dr Gibson Nwosu. HRH welcomed the NEWMAP and the consultant's team. Mr Achebe Emeka (Communication Officer) introduced himself, Mrs Okafor Blessing (Social and Livelihood Officer) and the Principal Consultant Dr Odili Ojukwu.
6. Remarks of Principal Consultant, Dr. Odili Ojukwu	Dr. Odili Ojukwu, the principal consultant introduced the members of his project consultant team and thanked HRH for his words of welcome. • He explained that the purpose of the meeting was to pay homage to HRH and inform him formally of the commencement of the Resettlement Action Plan (RAP) and Environmental and Social Impact Assessment (ESIA) for his community under the Anambra state NEWMAP with the assistance of FGN and World Bank. • Specifically, the study will identify and document those whose assets and means of livelihood would be impacted by the proposed works. Also an appropriate capacity building programme would be recommended to enable the beneficiaries use the projects in a responsible and sustainable manner. • The consultant team have meet with the larger segment of the benefiting communities and settlements to sensitize them on the study and solicit their supports and inputs. He also told HRM that his teams were in the community for 2 days to document all who would potentially be affected and while filling the form one passport photograph and a photocopy of government issued identification were collected. • The communities were enjoined to take ownership of the project by proactive engagement and instituting community-based monitoring and evaluation activities in the course of implementation, and to maintain the projects when completed. • He kindly solicited the blessing and support of HRH and his community towards the success of the study pleading that the work is a time based work as such they should accommodate him when he calls and turn out for the betterment of the community.
7.Remarks of HRH:	HRH once again welcomed the consultants and expressed his happiness as well as that of his community with the study but was displeased that the consultants meet the community before coming to pay homage to him. HRH asked of his role to play in the project and he promised his full support and offered his royal blessings for the success of the exercise.
8.Response of the Consultants	The consultant thanked HRH for his support and apologized for meeting his community before him. He also told HRH that his role in the project is to assign someone to monitor the project.
9.Closing:	HRH assigned Mr Okeke Paulson to be his contact person in the project. The meeting closed at about 12:40pm. It was attended by 10 persons.

NIGERIA EROSION AND WATERSHED MANAGEMENT PROJECT (NEWMAP)
ESMP/RAP JUDICIARY/FEDERAL HIGH COURT DOWNSTREAM EXTENSION GULLY PROJECT
CONSULTANT CONSULTATIVE MEETING WITH ~~COMMUNITY~~ TRADITIONAL RULER
APRIL 05, 2019.

ATTENDANCE SHEET

S/No	NAME	GENDER	COMMUNITY/VILLAGE/ORGANIZATION	PHONE NUMBER	SIGNATURE
1	HRH OBI DR GIBSON NWOSU	Male	Obi of Aroka Aroka Community	08033541880	
2	Paulson OKEKE	Male	Umuzochi	08033035208	
3	Emeka Achuzie	Male	ANS - NEWMAP	08034700384	
4	Okafor, Blessing C.	Female	ANS - NEWMAP	08058385074	
5	Dr Odili Ogakwu	Male	Consultant	08033388890	
6	Chidi Chinyere Adaikwu	Female	Consultant	08145946757	
7	Oba Adaeze S.	Female	Consultant	08068750207	
8	D'Nwachukwu Nancy	female	Consultant	08066947894	
9	Umeokafor Chinelo	Female	Consultant	08037739595	
10					
11					
12					
13					
14					
15					
16					

ANNEXURE VI: Photos of Community Meeting

Consultation Meeting With Umuzocha and Nodu Community Leaders

Consultation Meeting With Igwe of Nodu Igwe Engr. S.I. Okafor

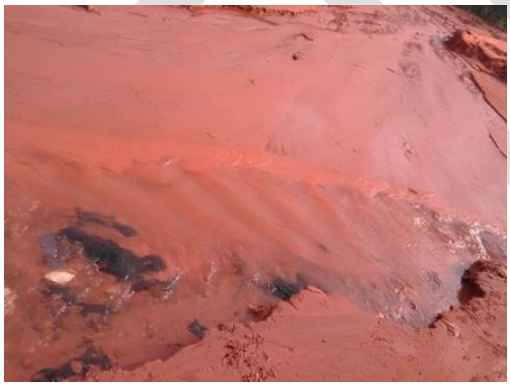
Consultation Meeting With Obi of Awka - Obi (Dr.) Gibson Nwosu








Cross – Section of Federal High Court Gully Erosion Site Visit Pictures.



ANNEXURE VII: Complete Plant Listing from Vegetative Study

S/NO	SPECIES	COMMON NAMES	LOCAL NAMES	FAMILY	LIFE FORM
1	*Sida acuta*	Common wireweed/ broom weed	Udo/Eshioku	Malvaceae	Herb
2	*Senna hirsuta*	sicklepod	N/A	Cyperaceae	Herb
3	*Tridax procumbens*	Coat buttons	Igbalode	Asteraceae	Herb
4	*Eleusine indica*	Goose grass	Ichite	Poaceae	Herb
5	*Aspilia Africana*	Wild sun flower	Oramejina	Asteraceae	Herb
6	*Dialium guineense*	Velvet tamarind	Ichekwu	Fabaecae	Tree
7	*Carica papaya*	Paw paw	opopo	Caricaceae	Tree
8	*Polyalthia longifolia*,	False ashoka/masquerade tree	N/A	Annonaceae	Tree
9	*Mimosa pudica*	Touch and die	Uke	Fabaceae	Herb
10	*Ageratum conyzoides*	Billy goat weed/ white weed	Agadi isi Awo	Asteraceae	Herb
11	*Mimosa pigra*	Catclaws mimosa	Aluro	Fabaceae	Herb
12	*Milicia excelsa*	Iroko tree	Orji	moraceae	Tree
13	*Pentaclethra macrophylla*	Oil bean tree	Ukpaka	Fabaceae	tree
14	*Acacia ataxacantha*	Flame worm	Uhie	Fabaceae	Herb
15	*Bombax ceiba*	Silk cotton tree	Akpu ogwu	Malvaceae	Tree
16	*Tectonia grandis*	Teak	N/A	Lamiaceae	Tree
17	*Colocasia esculenta*	Cocoyam	Ede	Araceae	Herb
18	*Chromolaena odorata*	Siam seed/ Christmas bush	Awolowo	Asteraceae	Herb
19	Bambusa vulgaris	Bamboo	Otosi	Poaceae	Tree
20	Elaeis guineensis	African Palm Tree	Ukwu akwu	Areceae	Tree
21	*Newbouldea leavis*	Boundary tree	Ogrisi	Bignoniaceae	Shrub
22	*Manihot esculenta*	Cassava	Akpu	Euphorbiaceae	Shrub
23	Canarium schweinfurthii	African Elemi	Ube osa/ubengba	Burseraceae	Tree
24	*Azadirachta indica*	Neem tree	dogoyaro	Meliaceae	Tree
25	Mucuna pruriens	Devil bean/ velvet bean	Agbara	Fabaceae	Herb
26	*Trianthema portulacastrum*	Desert horsepurslane/Black pigweed/ giant	N/A	Ficoidaceae	Herb
27	*Paspalum conjugatum*	Buffalo grass/hilograss	Oji ikpere eje	Poaceae	Herb
28	*Paspalum scrobiculatum*	Rice grass	Ikute ala	Poaceae	Herb
29	*Eleusine indica*	Goose grass	Ichite	Poaceae	Herb
30	*Eragrostis tenella*	Japanese lovegrass	Ilulu nza	Poaceae	Herb
31	*Pennisetum polystachyon*	Mission grass	Achara ibeku/ Achara ngwa	Poaceae	Herb

31	*Pennisetum polystachyon*	mission grass	Achara ibeku/ Achara ngwa	Poaceae	Herb
32	*Morinda lucida*	Brimstone tree	Eze Ogu/ Njisi	Rubiaceae	Herb
33	*Gliricidia sepium*	Cocoa	Ujuju	Fabaceae	Tree
34	*Emilia sonchifolia*	Red tassel flower	Ogbunizu	Asteraceae	Herb
35	*Calopogonium mucunoides*	Wild groundnut	Abriba	Fabaceae	Herb
36	*Vitex doniana*	Black Plum	Ucha koro	Verbenaceae	Tree
37	*Ipomea vagans*	Moon flower	Ekimako	Convolvulaceae	Herb
38	*Pterocarpus rohrii*	N/A	N/A	Fabaceae	Tree
39	*Amaranthus* spp	Spinach	Inine	Amaranthaceae	Herb
40	Talinum fruticosum	Water leaf	Mgbolodi	Talinaceae	Herb
41	*Mangifera indica*	Mango	mangolo	Anacardiaceae	Tree
42	(*Treculia africana*)	Africa breadfruit	Ukwa	Moraceae	Tree

Source: Field Survey, March, 2019.

ANNEXURE VIII: Laboratory Analytical Results

MGG RESOURCES LTD (More Gain in God)

Public Analysis, Industrial/Environmental Consultants,
Water Treatment Specialist, Chemical Suppliers/Manufactures
General Merchandise RC: 768166

FMENV ACCREDITATION NO. 002637

21, Obollor Road, Nsukka Enugu State.
Tel:08060855490, 08167455647.
Email:lilyjohn2009@yahoo.com

3rd April, 2019.

Dear sir,

FEDERAL HIGH COURT AWKA (WATER (WS), SOIL (SS) AND AIR (AS) SAMPLES ANALYSES RESULT

Please find attached the result of the analyses of the samples brought to our laboratory on the 27th March, 2019.

Thank you for your patronage.

Yours faithfully,

Alum O. L (Mrs.)

FEDERAL HIGH COURT-SWS-001 N 06^0 14.435' E $7^0$04.682'Elevation 80m

S/N	PARAMETERS TESTED	UNITS	Average Value/Results	NESREA/FMENV LIMITS	METHOD
1	Temperature	0 C	20.90	40	In-situ
2	pH	-	5.2	6.5 - 8.5	In-situ
3	Taste	-	Slight taste	NS	OrgANOleptic
4	Appearance	-	Turbid	NS	OrgANOleptic
5	Odour	-	Has odour	NS	OrgANOleptic
6	Total Dissolved Solids	mg/l	53.00	2100	ASTM, 2005.
7	Conductivity	µS/Cm	116.60	1000µS/Cm	In-situ
8	Total hardness	mg/l	48.00	NS	ASTM, 2005.
9	Chloride	mg/l	25.56	350	ASTM, 2005.
10	Fluoride	mg/l	0.05	NS	ASTM, 2005.
11	Sodium	mg/l	0.99	120	ASTM, 2005.
12	Potassium	mg/l	1.16	50	ASTM, 2005.
	Sulphate	mg/l	14.35	250	ASTM, 2005.
14	Sulphide	mg/l	0.19	NS	ASTM, 2005.
15	Ammonia	mg/l	0.06	2.0	ASTM, 2005.
16	Nitrate	mg/l	24.20	40.0	ASTM, 2005.
17	Phosphate	mg/l	10.56	3.5	ASTM, 2005.
18	BOD	mg/l	8.40	6	ASTM, 2005.
19	COD	mg/l	12.00	30	ASTM, 2005.
20	Chromium	mg/l	1.28	0.5	AAS
21	Copper	mg/l	0.03	0.01	AAS
22	Iron	mg/l	0.61	0.5	AAS
23	Zinc	mg/l	0.03	0.2	AAS
24	Lead	mg/l	0.25	0.1	AAS
25	Nickel	mg/l	0.61	0.1	AAS
26	Manganese	mg/l	0.06	0.01	AAS
27	Silver (Ag+)	mg/l	0.14	< 1	AAS
28	Calcium	mg/l	32.00	180	ASTM, 2005.
29	Magnesium	mg/l	16.00	40.0	ASTM, 2005.
30	Total Alkalinity	mg/l	1.40	NS	ASTM, 2005.
31	Hydroxide	mg/l	Nil	NS	ASTM, 2005.
32	Bicarbonate	mg/l	0.60	NS	ASTM, 2005.
33	Carbonate	mg/l	Nil	NS	ASTM, 2005.
	Microbial Analysis				
34	Total Coliform	cfu/ml	2.6X103	NS	ASTM, 2005.
35	E-Coli	cfu/ml	4.3x102	Nil	ASTM, 2005.

µS/Cm = MicroSiemens per centimeter
NS = Not Specified
mg/l = milligram per litre
cfu = Coliform forming units.

FEDERAL HIGH COURT -SWS/002/ N $06^0$14.360'' E $007^0$04.587' Elevation 70 m

S/N	PARAMETERS TESTED	UNITS	Average Value/Results	NESREA/FMENV LIMITS	METHOD
1	Temperature	^{0} C	20.80	40	*In-situ*
2	pH	-	5.6	6.5 - 8.0	*In-situ*
3	Taste	-	Slight taste	NS	OrgANOleptic
4	Appearance	-	Turbid	NS	OrgANOleptic
5	Odour	-	Has odour	NS	OrgANOleptic
6	Total Dissolved Solids	mg/l	70.00	2100	ASTM, 2005.
7	Conductivity	µS/Cm	154.00	1000µS/Cm	*In-situ*
8	Total hardness	mg/l	54.00	NS	ASTM, 2005.
9	Chloride	mg/l	26.98	NS	ASTM, 2005.
10	Fluoride	mg/l	0.05	NS	ASTM, 2005.
11	Sodium	mg/l	6.07	10	ASTM, 2005.
12	Potassium	mg/l	7.81	NS	ASTM, 2005.
13	Sulphate	mg/l	8.16	250	ASTM, 2005.
14	Sulphide	mg/l	0.16	NS	ASTM, 2005.
15	Ammonia	mg/l	0.03	50	ASTM, 2005.
16	Nitrate	mg/l	12.32	NS	ASTM, 2005.
17	Phosphate	mg/l	4.16	NS	ASTM, 2005.
18	BOD	mg/l	8.10	6	ASTM, 2005.
19	COD	mg/l	14.20	30	ASTM, 2005.
20	Chromium	mg/l	0.05	0.1	AAS
21	Copper	mg/l	0.06	3	AAS
22	Iron	mg/l	3.91	1	AAS
23	Zinc	mg/l	0.05	< 1	AAS
24	Lead	mg/l	Bdl	0.1	AAS
25	Nickel	mg/l	0.41	0.1	AAS
26	Manganese	mg/l	0.12	0.01	AAS
27	Silver (Ag^+)	mg/l	0.08	< 1	AAS
28	Calcium	mg/l	32.00	NS	ASTM, 2005.
29	Magnesium	mg/l	22.00	NS	ASTM, 2005.
30	Total Alkalinity	mg/l	2.60	NS	ASTM, 2005.
31	Hydroxide	mg/l	Nil	NS	ASTM, 2005.
32	Bicarbonate	mg/l	2.20	NS	ASTM, 2005.
33	Carbonate	mg/l	Nil	NS	ASTM, 2005.
	Microbial Analysis				
34	E-Coli	cfu/ml	$2.2x10^2$	Nil	ASTM, 2005.
35	Total Coliform (cfu/ml) M.agar	cfu/ml	$1.4X10^3$	NS	ASTM, 2005.

FEDERAL HIGH COURT -SWS/003/ N 06^{0}14.453'' E 007^{0}04.498' Elevation 65 m

S/N	PARAMETERS TESTED	UNITS	Average Value/Results	NESREA/FMENV LIMITS	METHOD
1	Temperature	^{0} C	20.80	40	*In-situ*
2	pH	-	5.4	6.5 - 8.0	*In-situ*
3	Taste	-	Slight taste	NS	OrgANOleptic
4	Appearance	-	Turbid	NS	OrgANOleptic
5	Odour	-	Has odour	NS	OrgANOleptic
6	Total Dissolved Solids	mg/l	51.00	2100	ASTM, 2005.
7	Conductivity	µS/Cm	112.20	1000µS/Cm	*In-situ*
8	Total hardness	mg/l	46.00	NS	ASTM, 2005.
9	Chloride	mg/l	26.98	NS	ASTM, 2005.
10	Fluoride	mg/l	0.05	NS	ASTM, 2005.
11	Sodium	mg/l	5.09	120	ASTM, 2005.
12	Potassium	mg/l	5.10	NS	ASTM, 2005.
13	Sulphate	mg/l	8.91	250	ASTM, 2005.
14	Sulphide	mg/l	0.20	NS	ASTM, 2005.
15	Ammonia	mg/l	0.03	50	ASTM, 2005.
16	Nitrate	mg/l	16.13	NS	ASTM, 2005.
17	Phosphate	mg/l	4.14	NS	ASTM, 2005.
18	BOD	mg/l	9.40	6	ASTM, 2005.
19	COD	mg/l	10.00	30	ASTM, 2005.
20	Chromium	mg/l	0.17	0.1	AAS
21	Copper	mg/l	0.06	3	AAS
22	Iron	mg/l	0.12	1	AAS
23	Zinc	mg/l	0.07	< 1	AAS
24	Lead	mg/l	Bdl	0.1	AAS
25	Nickel	mg/l	1.02	0.1	AAS
26	Manganese	mg/l	0.16	0.01	AAS
27	Silver (Ag^+)	mg/l	0.02	< 1	AAS

28	Calcium	mg/l	30.00	NS	ASTM, 2005.
29	Magnesium	mg/l	16.00	NS	ASTM, 2005.
30	Total Alkalinity	mg/l	2.00	NS	ASTM, 2005.
31	Hydroxide	mg/l	Nil	NS	ASTM, 2005.
32	Bicarbonate	mg/l	1.20	NS	ASTM, 2005.
33	Carbonate	mg/l	Nil	NS	ASTM, 2005.
	Microbial Analysis				
34	E-Coli	cfu/ml	$1.1x10^2$	Nil	ASTM, 2005.
35	Total Coliform (cfu/ml) M.agar	cfu/ml	$1.0X10^3$	NS	ASTM, 2005.

FEDERAL HIGH COURT -SS-001 N $06^0$14.357'' E $007^0$04.775'' Elevation 91m

S/N	Parameters	Units	Sample Results	FMENV/ NESREA	METHOD
1	pH (KCl)	-	4.6	-	pH meter
2	pH (10% solution @ 25^oC	-	5.5	6.5-9.0	pH meter
3	Nitrate	mg/kg	15.39	-	ASTM, 2005.
4	Moisture	%	17.61	-	ASTM, 2005.
5	Electrical conductivity	µS/Cm	8.80	-	Conductivity meter
6	Soil colour	-	Reddish	-	Visual Inspection
7	Potassium (K^+)	mg/kg	0.04	-	ASTM, 2005.
8	Magnesium (Mg^{2+})	mg/kg	2.00	-	ASTM, 2005.
9	Calcium (Ca^{2+})	mg/kg	0.80	-	ASTM, 2005.
10	Sodium (Na^+)	mg/kg	0.20	-	ASTM, 2005.
11	Available Phosphorus	mg/kg	7.66	5	ASTM, 2005.
12	Organic Matter	%	0.31	-	ASTM, 2005.
13	Nitrogen	%	0.05	-	ASTM, 2005.
14	Organic Carbon	%	0.18	-	ASTM, 2005.
15	Iron (Fe^{2+})	mg/kg	0.12	0.03	AAS
16	Lead (Pb^{2+})	mg/kg	Bdl	164	AAS
17	Copper (Cu^{2+})	mg/kg	0.29	100	AAS
18	Zinc (Zn^{2+})	mg/kg	0.07	-	AAS
19	Grain Size Distribution (Coarse Sand)	%	52	-	ASTM, 2005.
20	Grain Size Distribution (Clay)	%	17	-	ASTM, 2005.
21	Grain Size Distribution (Silt)	%	3	-	ASTM, 2005.
22	Grain Size Distribution (Fine Sand)	%	28	-	ASTM, 2005.
23	Textural Class	-	Sandy loam	-	Visual Inspection

FEDERAL HIGH COURT -SS-002 N 6^0''14.409 E$7^0$04.705'' Elevation 83m

S/N	Parameters	Units	Sample Results	FMENV/ NESREA	METHOD
1	pH (KCl)	-	4.6	-	pH meter
2	pH (10% solution @ 25^oC	-	5.5	6.5-9.0	pH meter
3	Nitrate	mg/kg	16.08	-	ASTM, 2005.
4	Moisture	%	15.21	-	ASTM, 2005.
5	Electrical conductivity	µS/Cm	12.00	-	Conductivity meter
6	Soil Colour	-	Whitish	-	Visual Inspection
7	Potassium (K^+)	mg/kg	0.03	-	ASTM, 2005.
8	Magnesium (Mg^{2+})	mg/kg	1.40	-	ASTM, 2005.
9	Calcium (Ca^{2+})	mg/kg	0.60	-	ASTM, 2005.
10	Sodium (Na^+)	mg/kg	0.02	-	ASTM, 2005.
11	Available Phosphorus	mg/kg	2.93	5	ASTM, 2005.
12	Organic Matter	%	0.310	-	ASTM, 2005.
13	Nitrogen	%	0.014	-	ASTM, 2005.
14	Organic Carbon	%	0.180	-	ASTM, 2005.
15	Iron (Fe^{2+})	mg/kg	0.61	0.03	AAS
16	Lead (Pb^{2+})	mg/kg	0.25	164	AAS
17	Copper (Cu^{2+})	mg/kg	0.48	100	AAS
18	Zinc (Zn^{2+})	mg/kg	0.04	-	AAS
19	Grain Size Distribution (Coarse Sand)	%	55.00	-	ASTM, 2005.
20	Grain Size Distribution (Clay)	%	9	-	ASTM, 2005.
21	Grain Size Distribution (Silt)	%	1	-	ASTM, 2005.
22	Grain Size Distribution (Fine Sand)	%	4	-	ASTM, 2005.
23	Textural Class	-	Sandy soil	-	Visual Inspection

FEDERAL HIGH COURT -SS-003/ N $06^{0}14.361''$ E 704.628'' Elevation 70m

S/N	Parameters	Units	Sample Results	FMENV/ NESREA	METHOD
1	pH (KCl)	-	6.4	-	pH meter
2	pH (10% solution @ $25^{o}C$	-	7.3	6.5-9.0	pH meter
3	Nitrate	mg/kg	10.49	-	ASTM, 2005.
4	Moisture	%	5.49	-	ASTM, 2005.
5	Electrical conductivity	µS/Cm	10.40	-	Conductivity meter
6	Soil Colour	-	Reddish	-	Visual Inspection
7	Potassium (K^{+})	mg/kg	0.04	-	ASTM, 2005.
8	Magnesium (Mg^{2+})	mg/kg	0.40	-	ASTM, 2005.
9	Calcium (Ca^{2+})	mg/kg	0.60	-	ASTM, 2005.
10	Sodium (Na^{+})	mg/kg	0.02	-	ASTM, 2005.
11	Available Phosphorus	mg/kg	5.79	5	ASTM, 2005.
12	Organic Matter	%	0.31	-	ASTM, 2005.
13	Nitrogen	%	0.02	-	ASTM, 2005.
14	Organic Carbon	%	0.18	-	ASTM, 2005.
15	Iron (Fe^{2+})	mg/kg	0.48	0.03	AAS
16	Lead (Pb^{2+})	mg/kg	0.00	164	AAS
17	Copper (Cu^{2+})	mg/kg	0.06	100	AAS
18	Zinc (Zn^{2+})	mg/kg	0.05	-	AAS
19	Grain Size Distribution (Coarse Sand)	%	58.00	-	ASTM, 2005.
20	Grain Size Distribution (Clay)	%	9	-	ASTM, 2005.
21	Grain Size Distribution (Silt)	%	1	-	ASTM, 2005.
22	Grain Size Distribution (Fine Sand)	%	12	-	ASTM, 2005.
23	Textural Class	-	Sandy soil	-	Visual Inspection

FEDERAL HIGH COURT/AS/001/ N 06^{0}14.357'' E 007^{0}04.775''

S/N	Parameters	Unit	NESREA	RESULT	METHOD	REMARK
1	Hydrogen Sulphide(H_2S)	Ppm	5	1	M40 Gas Analyser (direct reading method) (MGA)	BDL
2	Carbon monoxide (CO)	Ppm	500	0		BDL
3	Nitric Oxide (NO)	Ppm	300	6.24		BDL
4	Nitric dioxide (NO_2)	Ppm	300	1.377		BDL
5	Sulphur dioxide	Ppm	500	1.124		BDL
6	Hydrogen Cyanide (HCN)	Ppm	NS	3.74		BDL
7	Ammonia (NH_3)	Ppm	NS	3.124		BDL
8	Oxygen	Ppm	NS	20.8		BDL

BDL = Below detectable level.
MGA = M40 Gas Analyser
Ppm.= Parts per million.

FEDERAL HIGH COURT/AS/002 N 06^{0}14'388'' E 007^{0}04'743'' Elevation 88 m

S/N	Parameters	Unit	NESREA	RESULT	METHOD	REMARK
1	Hydrogen Sulphide(H_2S)	Ppm	5	1	M40 Gas Analyser (direct reading method) (MGA)	BDL
2	Carbon monoxide (CO)	Ppm	500	0		BDL
3	Nitric Oxide (NO)	Ppm	300	6.24		BDL
4	Nitric dioxide (NO_2)	Ppm	300	1.377		BDL
5	Sulphur dioxide	Ppm	500	1.124		BDL
6	Hydrogen Cyanide (HCN)	Ppm	NS	3.74		BDL
7	Ammonia (NH_3)	Ppm	NS	3.124		BDL
8	Oxygen	Ppm	NS	20.8		BDL

BDL = Below detectable limit.
MGA = M40 Gas Analyser
Ppm.= Parts per million.

FEDERAL HIGH COURT/AS/003 N 06^{0}14'409'' E 007^{0}04'705'' Elevation 83 m

S/N	Parameters	Unit	NESREA	RESULT	METHOD	REMARK
1	Hydrogen Sulphide(H_2S)	Ppm	5	0	M40 Gas Analyser (direct reading method) (MGA)	BDL
2	Carbon monoxide(CO)	Ppm	500	1		BDL
3	Nitric Oxide (NO)	Ppm	300	7.72		BDL
4	Nitric dioxide (NO_2)	Ppm	300	1.376		BDL
5	Sulphur dioxide	Ppm	500	1.51		BDL
6	Hydrogen Cyanide(HCN)	Ppm	NS	3.89		BDL
7	Ammonia (NH_3)	Ppm	NS	3.124		BDL
8	Oxygen	Ppm	NS	20.8		BDL

BDL = Below detectable level.
MGA = M40 Gas Analyser
Ppm.= Parts per million.

FEDERAL HIGH COURT/AS/004 N 06^{0}14'407'' E 007^{0}04'628'' Elevation 71 m

S/N	Parameters	Unit	NESREA	RESULT	METHOD	REMARK
1	Hydrogen Sulphide(H_2S)	Ppm	5	1	M40 Gas Analyser (direct reading method) (MGA)	BDL
2	Carbon monoxide (CO)	Ppm	500	1		BDL
3	Nitric Oxide (NO)	Ppm	300	7.70		BDL
4	Nitric dioxide (NO_2)	Ppm	300	1.373		BDL
5	Sulphur dioxide	Ppm	500	1.151		BDL
6	Hydrogen Cyanide (HCN)	Ppm	NS	1.25		BDL
7	Ammonia (NH_3)	Ppm	NS	3.125		BDL
8	Oxygen	Ppm	NS	20.8		BDL

BDL = Below detectable level.
MGA = M40 Gas Analyser
Ppm.= Parts per million.

FEDERAL HIGH COURT/AS/005 N 06^{0}14'414'' E 007^{0}04'534'' Elevation 66 m

S/N	Parameters	Unit	NESREA	RESULT	METHOD	REMARK
1	Hydrogen Sulphide(H_2S)	Ppm	5	1	M40 Gas Analyser (direct reading method) (MGA)	BDL
2	Carbon monoxide (CO)	Ppm	500	0		BDL
3	Nitric Oxide (NO)	Ppm	300	6.24		BDL
4	Nitric dioxide (NO_2)	Ppm	300	1.377		BDL
5	Sulphur dioxide	Ppm	500	1.122		BDL
6	Hydrogen Cyanide (HCN)	Ppm	NS	3.75		BDL
7	Ammonia (NH_3)	Ppm	NS	3.126		BDL
8	Oxygen	Ppm	NS	20.8		BDL

BDL = Below detectable level.
MGA = M40 Gas Analyzer
ppm.= Parts per million.

ANNEXURE IX: DISCUSSION OF METHODS/TECHNIQUES USED IN ASSESSING IMPACTS

Impact Rating Methodology

The assessment of the potential impacts of the project was based on specialists' expertise, Consultant's professional judgment, field observations and desk-top analysis. The significance of potential impacts that may result from the proposed project was determined to assist decision making.

Generally, the envisaged areas of potential impacts which could result from the activities of the project are evaluated for impact significance based on the comparative consequential effects of the potential impact on the social and biophysical environments. The significance of an impact may be defined as a combination of the consequence of the impact occurring and the probability that it will occur. The criteria used to determine impact consequence are shown in the Table 5-1.

Table 5.1: Criteria for Determining Impact Consequence

RATING	DESCRIPTION OF RATING	SCORE
A. Extent – the area over which the impact will be experienced		
Localized	Confined to specific project activity area or part thereof	1
Entire Watershed	The entire watershed	2
Regional	Beyond the watershed	3
B. Intensity – the magnitude of the impact in relation to the sensitivity of the receiving environment, taking into account the degree to which the impact may cause irreplaceable loss of resources		
Low	Site-specific and wider natural and/or social functions and processes are negligibly altered	1
Medium	Site-specific and wider natural and/or social functions and processes continue albeit in a modified way	2
High	Site-specific and wider natural and/or social functions and processes are severely altered	3
C. Duration – the timeframe over which the impact will be experienced and its reversibility		
Short-term	Up to 6 months	1
Medium-term	6 months to 1 year	2
Long-term	More than 1 year	3

The numerical scores in Table 5-1 are positive or negative depending on whether the impact is adverse or beneficial. If impact is adverse, the numerical score is positive and if the impact is beneficial, the numerical score is negative. The combined score of the three criteria (extent, intensity and duration) corresponds to a Consequence Rating, as shown in Table 5-2:

Table 5-2: Method used to determine Consequence Score

Combined Score (A+B+C)	3 – 4	5	6	7	8 – 9
Consequence Rating	Very low	Low	Medium	High	Very high

The probability of the impact occurring is determined using the probability classifications presented in the Table 5-3 below:

Table 5-3: Probability Classification

Probability – the likelihood of impact occurring	
Improbable	< 40% chance of occurring
Possible	40% – 70% chance of occurring
Probable	> 70% - 90% chance of occurring
Definite	> 90% chance of occurring

The overall significance of impacts was determined by considering consequence and probability using the rating system prescribed in the Table 5-4 below:

Table 5-4: Impact Significance Ratings

		Probability			
		Improbable	**Possible**	**Probable**	**Definite**
Consequence	**Very Low**	INSIGNIFICANT	INSIGNIFICANT	VERY LOW	VERY LOW
	Low	VERY LOW	VERY LOW	LOW	LOW
	Medium	LOW	LOW	MEDIUM	MEDIUM
	High	MEDIUM	MEDIUM	HIGH	HIGH
	Very High	HIGH	HIGH	VERY HIGH	VERY HIGH