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LAGOS STATE GOVERNMENT

Environmental & Social Impact Assessment (ESIA)

- Final Report -

Lagos Metropolitan Development Project (LMDP)

environQuest
integrated environmental solutions

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List of Acronyms

AU	-	African Union
EA	-	Environmental Assessment
ECOWAS	-	Economic Community of West African States
ESIA	-	Environmental and Social Impact Assessment
FEPA	-	Federal Environmental Protection Agency
FGN	-	Federal Government of Nigeria
FMEnv	-	Federal Ministry of Environment
GIS	-	Geographic Information System
IDA	-	International Development Association
LASG	-	Lagos State Government
LASEPA	-	Lagos State Environmental Protection Agency
LAWMA	-	Lagos State Waste Management Authority
LCC	-	Lagos City Council
LG	-	Local Government
LGA	-	Local Government Area
LMDP	-	Lagos Metropolitan Development Project
MSDS	-	Material Safety Data Sheet
OD	-	Operational Directives
OHS	-	Occupational Health and Safety
O&M	-	Operation and Maintenance
PMU	-	Project Monitoring Unit
PU	-	Project Unit
ROW	-	Right-of-Way
RPF	-	Resettlement Policy Framework
SWM	-	Solid Waste Management
OR	-	Terms of Reference
TSP	-	Total Suspended Particles
UNEP	-	United Nations Environment Programme
USEPA	-	United State Environmental Protection Agency
WB	-	World Bank
WHO	-	World Health Organization

Executive Summary

Lagos State, a wetland area, lies in the South Western coastland of Nigeria, approximately on longitude 20° 42E and 3° 22E and between Latitude 60° 22N and 60° 42N. The State is bounded both in the North and East by Ogun State of Nigeria; in the West, by the Republic of Benin; in the South, it stretches for 180 kilometres along the Gulf of Guinea of the Atlantic Ocean. The State is home to about 12 million people with diverse ethnic background. Of this population, it is estimated that about two-thirds currently live in slums.

Living conditions in these slums are extremely crowded and dismal: more than 75% of the people live in one room, with a room density of 4.6 persons per room; eight to ten families live in one house, sharing common cooking and sanitation facilities, with about 40 people competing for the use of one toilet in the mornings before school or work; diarrhoea, hepatitis, typhoid and cholera are the most common diseases; sixty six percent of the diseases affecting children under the age of five are related to poor water quality and a lack of access to sanitation; more than half the households experience flooding outside their homes, while about one fifth suffer from floods inside the homes, with refuse and raw sewage being swept in; floods in these slums are on an average knee deep both inside and outside the house, are said to last over five hours, cause immense economic hardship, and are a severe health hazard. Given the high incidence of flooding, drainage was the community's top priority, especially in the slums along coastal areas, followed by roads. Reducing flooding in such slums would require that the primary drains and channels to which on-site connect, be functional.

The Lagos State Government (LASG) has approached the World Bank to support the Lagos Metropolitan Development Project (LMDP). The project's principal development objectives are (i) improved living conditions in nine slums through upgrading; (ii) reduced the incidence and severity of routine flooding in Lagos through better drainage and solid waste management; and (iii) enhanced capacity for urban management through institutionalizing the use of data for urban management.

The Lagos Metropolitan Development Project (LMDP) is a major investment in improving the quality of life of Lagos State inhabitants, especially those in the slums. The project's development objectives are (i) to improve living conditions in Lagos through investments in critical basic infrastructure; and (ii) enhanced capacity for urban management through institutionalizing the availability and use of data for urban management.

Under the LMDP, there are four major components:

- Urban upgrading in 9 slum areas,
- Drainage network rehabilitation,
- Solid waste management, and
- Capacity building and institutional development.

The activities under the infrastructure investments for upgrading 9 slum areas will entail civil works in upgrading subprojects in Agege, Ajegunle, Amukoko, Badia, Bariga, Ijeshatedo/Itire, Ilaje, Iwaya and Makoko. The rehabilitation works in these slum areas will be in the following sectors: water supply, roads, footpaths, drainage, power reticulation, private and public sanitation facilities, solid waste management, markets, street lighting, recreational facilities, schools, clinics, community facilities, etc. The final agreement with the communities on the investment packages for the nine upgrading areas and their designs would be completed within the first 9 months of the project implementation, with construction to begin in month 15 of the project. All of the slum upgrading civil works will have an Environmental and Social Impact Assessment (ESIA) integrated into the engineering design scope of work.

As for solid waste, detailed engineering designs for 6 transfer stations and upgrading of the dumpsite will be contracted out to consultants, and, as a part of the consultants' scope of work, a thorough ESIA would be undertaken for these civil works.

Concerning drainage, a comprehensive hydraulic model (sitting on top of the drainage GIS layer) will be developed before any serious rehabilitation works are designed for the overall network improvements. For the first year's program, an initial 26.6 kilometres of cleaning and drainage channel reshaping (to original design cross sections and vertical slopes) of drains associated with the

nine slum upgrading areas will be contracted out as civil works. These are the primary focus of this specific ESIA.

Thus, in recognition of the fact that environmental and social concerns may arise as a result of the proposed project, the Lagos State Government commissioned an Environmental and Social Impact Assessment (ESIA) study and a Resettlement Policy Framework (RPF) in fulfilment of the World Bank requirements for project appraisal.

This ESIA has been prepared to satisfy national and state regulatory requirements as well as World Bank's mandate for project of such magnitude and it addresses the environmental and socioeconomic consequences of the proposed project. The existing environment is described only for those aspects of the physical, biological, social and economic environment within the study area that are relevant to the project. The assessment also identifies the project-environment interactions during operational phase.

The impacts and prevention/mitigation measures associated with the projects are discussed. The project will have both beneficial and negative impact on the physical, biological and social environment. Rehabilitation of drainage and reconstruction of roads will reduce incidence of flooding and make the area readily accessible during the rainy season. Facilities and infrastructure upgrade will result in better living conditions for residents.

An environmental management plan (EMP) has been developed to ensure that impacts which cannot be mitigated are minimized to the maximum extent possible. The plan deals with how mitigation measures proposed are implemented and assigned the responsibility and costs, if appropriate, in its implementation. The EMP has the following objectives:

- Protection of the environment from potentially harmful activities, and vice versa;
- Government institutional strengthening in conducting environmental protection and monitoring of the drains

The monitoring plan defines roles and responsibilities distinguishing between the routine monitoring of the project. Routine monitoring focuses mainly on construction supervision and raising awareness in the context of human health and safety and environmental protection. Routine monitoring requirements are defined according to potential impacts and recommended mitigation measures. Where applicable monitoring costs are estimated and roles and responsibilities for monitoring are also defined.

Finally, a consultation plan was developed to provide a framework for achieving effective stakeholder involvement and promoting greater awareness and understanding of issues among all the stakeholders so that the project is carried out effectively within budget and on-time to the satisfaction of all stakeholders.

1. INTRODUCTION

1.1 Background

Nigeria, estimated to have a population of 133 million growing at 3% per annum. With one of the highest urbanization rates in the world, Nigeria will cross the 50% urbanization mark by 2007. Major cities are growing at rates between 10-15%, and medium size cities are growing at 7%-10% per annum.

Lagos is home to almost 18% of Nigeria's urban population today. Its population has been growing at around 6% annually since the 1980s, and growth rates are projected to be between 4% to 5% till 2015. With a current estimated population of 11.14 million, and is expected to be home to over 17 million by 2015.

It is the premier manufacturing city in W Africa, most important sea port, node for telecommunications with the largest concentration of multinationals, and home to 250 of Nigeria's financial institutions. More than 60% of Nigeria's non-oil economy is located in Lagos. Despite its dominant position in Nigeria's non-oil economy, Lagos remains a "poor city" with an annual budget of about US$650 million[1].

However, Lagos' urban productivity is severely compromised by nearly three decades of neglect - every sector in Lagos demands urgent and immediate attention. In a complex institutional environment that includes inter-governmental and fiscal decentralization issues (whose impacts are exacerbated since the move of Nigeria's capital from Lagos to Abuja), the city faces overwhelming challenges. Inadequate resources, inadequate knowledge, the lack of reliable data for decision-making, the lack of urban management tools necessary for planning, and unprecedented population growth – together these factors have overwhelmed the capacity of the public sector to manage growth and deliver services to its large and growing population. It is estimated that about two-thirds of the city's population currently lives in slums.

With refuse and raw sewage being swept in; floods in these slums are on an average knee deep both inside and outside the house, are said to last over five hours, cause immense economic hardship, and are a severe health hazard. Given the high incidence of flooding, drainage was the community's top priority, especially in the slums along coastal areas, followed by roads. Reducing flooding in such slums would requires that the primary drains and channels to which on-site connect, be functional.

Indiscriminate dumping of solid waste in open channels and drainages over the years is another factor that affects the network. Of the 10,000 tons of waste generated per day, only about half is ultimately discharged to the three official dumpsites. There is a well conceived and staffed, public authority for solid waste management – the Lagos Waste Management Authority (LAWMA). LAWMA has the statutory mandate for metropolitan area wide collection, transfer, treatment and disposal of solid waste, as well as cost recovery for services. It has the technical capacity, organizational arrangement, accountability, and transparency suitable for managing solid waste in the metropolitan area. However, over the last fifteen years, LAWMA has neither been adequately supported financially, nor has been allowed to become financially autonomous. Regular political interference, unfunded mandates, and policy changes have impeded LAWMA's efforts to provide services and develop cost recovery mechanisms.

For scaling-up slum upgrading to all its slums, Lagos needs a coherent, feasible and sustainable strategy, as well as a time-bound program owned by LGs and the communities. Successful implementation will require considerable planning and managerial capacity to be established at both State and local government levels, significant commitment of funds for more than fifteen years, and most importantly, embedding a culture of maintenance, without which no program gains will be sustained. Given the high willingness to pay for services in these slums, establishing transparent and credible cost recovery mechanisms to contribute towards maintenance will be essential. LASG is committed to a long term program dealing with existing slums and prevention of slums in the future.

However, before on-site investments in slums deliver sustainable benefits, the drainage system needs to work. Recognizing that limited resources will be the reality for years to come, LASG has agreed to establish a Drainage Board to enhance efficiency in providing services and utilization of limited funds. LASG has made a commitment to ensure that funds will be allocated to the Board on a priority basis from LASG funds, commensurate with agreements between LASG and LGs, with respect to property taxation.

With regards to solid waste management, LASG has agreed to create a safe and conducive climate for private sector investment, give LAWMA the necessary autonomy and a clear mandate for strategic and long-term institutional development, and elevate it to a position reporting directly to the Governor.

Since the democratically elected government assumed office 1999, LASG has made impressive progress on several fronts. It has focused on critical fundamentals that are necessary for urban management and service delivery. Despite these efforts, substantial challenges remain. Given the rapid growth of population and urban poverty, there is an urgent need to strengthen the State's capacity to plan, manage, and coordinate metropolitan functions and services, in order to give substance to the Government's vision for the management and transformation of Lagos.

The Lagos State Government has approached the World Bank to support the Lagos Metropolitan Development Project (LMPD). The principal development objectives of the project are to: improve the living conditions in nine (9) slums within Lagos by upgrading facilities and infrastructure; reduce the incident and severity of routine flooding in Lagos through improved drainage and solid waste management; and to enhance the capacity for urban management through the institutionalization of data use for urban management.

The Lagos Metropolitan Development Project is a major investment in improving the quality of life of Lagos State inhabitants, especially those in the slums. The project's development objectives are (i) to improve living conditions in Lagos through investments in critical basic infrastructure; and (ii) enhanced capacity for urban management through institutionalizing the availability and use of data for urban management. In addition, LMDP will improve transparency and accountability for better governance, through institutional reform in key infrastructure sectors; through support for the application of data driven urban management tools, LMDP will facilitate results based budgeting, targeting, expenditure and impact monitoring, and feedback mechanisms to the public

Furthermore, the LMDP will improve basic services for one million direct beneficiaries in nine slums, and contribute to human development through a reduction in the threat of disease by reducing the incidence and severity of flooding in the metropolitan area. This will also contribute to more effective functioning of the road network, thereby contributing to productivity enhancement of the firms and households in Lagos.

Under the LMDP, there are four major components:

- Urban upgrading in 9 slum areas,
- Drainage network rehabilitation,
- Solid waste management, and
- Capacity building and institutional development.

The activities under the infrastructure investments for upgrading 9 slum areas will entail civil works in upgrading subprojects in Agege, Ajegunle, Amukoko, Badia, Bariga, Ijeshatedo/Itire, Ilaje, Iwaya and Makoko. The rehabilitation works in these slum areas will be in the following sectors: water supply, roads, footpaths, drainage, power reticulation, private and public sanitation facilities, solid waste management, markets, street lighting, recreational facilities, schools, clinics, community facilities, etc. The final agreement with the communities on the investment packages for the nine upgrading areas and their designs would be completed within the first 9 months of the project implementation, with construction to begin in month 15 of the project. All of the slum upgrading civil works will have an Environmental and Social Impact Assessment (ESIA) integrated into the engineering design scope of work.

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Thus, in recognition of the fact that environmental and social concerns may arise as a result of the proposed project, the Lagos State Government commissioned an Environmental and Social Impact Assessment (ESIA) study and a Resettlement Policy Framework (RPF) in fulfilment of the World Bank requirements for project appraisal.

The World Bank's Operational Policy (OP) 4.01 requires that the ESIA report be disclosed as a separate and stand alone document by the Lagos State Government and the World Bank, as a condition for Appraisal of the LMDP. The disclosure should be both in Lagos where it can be accessible by the general public (including at the local government areas) as well as the Infoshop at the World Bank.

1.2 Objectives of the Environmental and Social Assessment (ESIA)

The objectives of the ESIA study for the LMDP are to:

- identify the possible negative environmental and social impacts of the project as presently planned for implementation in the first year's program of the project; and
- propose measures required to mitigate these potential negative impacts.

For the first year's program, the negative impacts could be coming from the drainage network rehabilitation and improvements of existing 26.6 kilometers of drainage.

Specific objective of the EIA Study focus on the following issues:

- the effects of desilting these 26.6 kilometers of drains and the potential to worsen the flooding of neighborhoods downstream.
- assessment of soils disposal management scheme for the materials to be extracted from the drains.
- propose mitigative measures including traffic management plan.

2. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

2.1 General

In Nigeria, environmental issues were of concern to the Government in the late 1980s. The Federal Military Government of Nigeria created Federal Environmental Protection Agency (FEPA) by Decree No 58 of 1988, and then formalised its functions by Decree No 59 in 1992. The two documents became known as the FEPA Act. The Agency was created as an integral part of the Presidency with responsibility for the "protection and development of the environment and biodiversity conservation and sustainable development of Nigeria's natural resources". It became the Agency's duty to establish such environmental criteria, guidelines, specifications and standards for the protection of the nation's air and inter-state waters as may be necessary to protect the health and welfare of the population from environmental degradation.

The FEPA Act encouraged States and Local Government Councils to set up their own Environmental Protection Bodies for the purposes of maintaining good environmental quality in their respective areas.

In 1991, FEPA released its Regulations with respect to pollution abatement in industries and facilities generating wastes and effluent limitation. The text of the Regulations rules that "no industry of facility shall release hazardous or toxic substances into the air, water or land of Nigeria's ecosystems beyond limits approved by the Agency". Equally, every industry is required to install anti-pollution equipment for detoxification of effluent and chemical discharges emanating from the industry. Moreover, an industry or facility shall:

- Have a pollution monitoring units within its premises;
- Have on site a pollution control; or
- Assign responsibility for pollution control to a person or body accredited by the Agency.

Schedule 1 of the Regulations establishes a list of industries required to control their effluent emissions and waste water parameters applicable to this industry. Schedule 2 and 3 impose effluent and gaseous emissions limits.

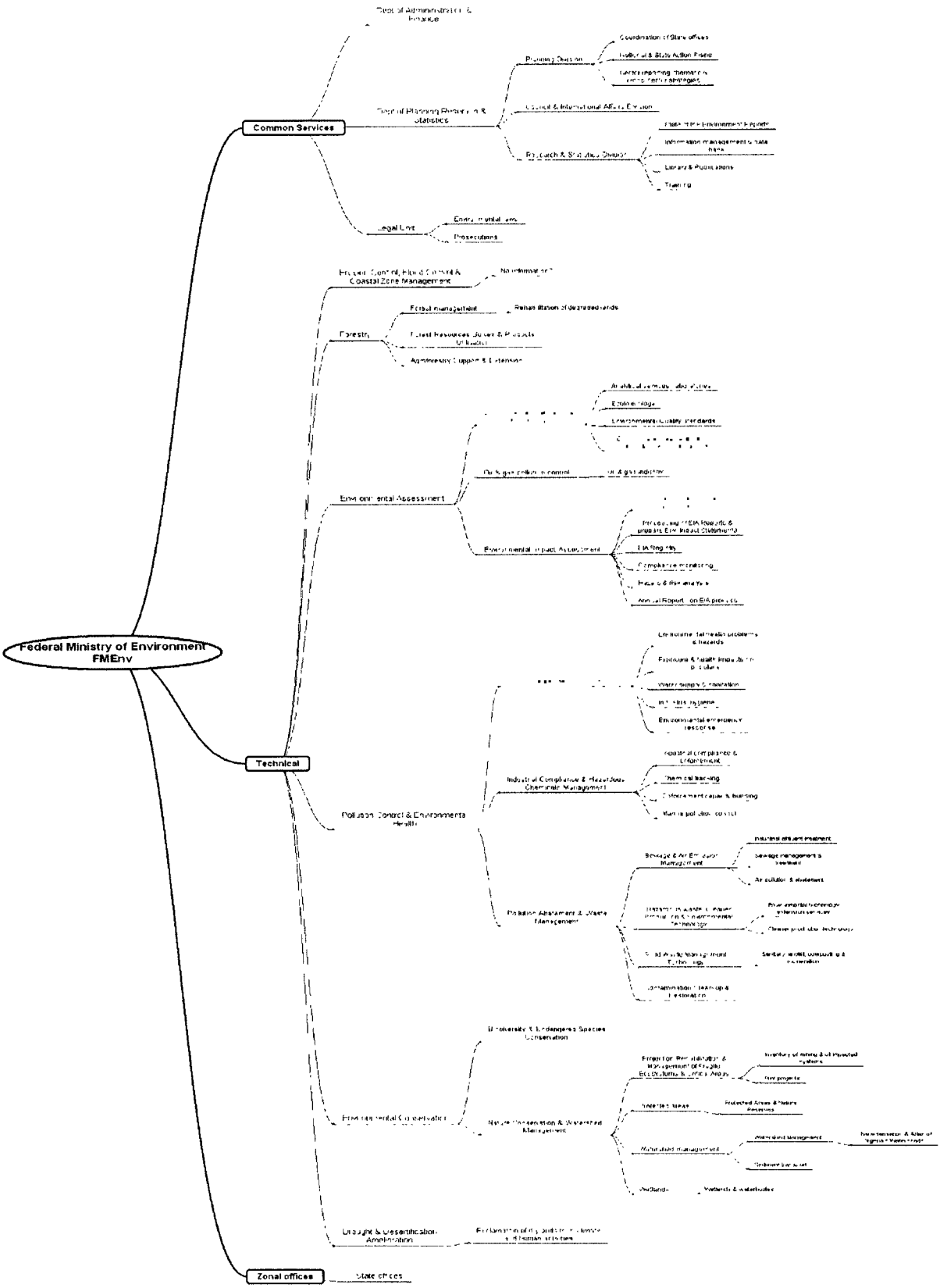
In 1992, the Government issued Environmental Impact Assessment Decree No 86, which specified in its article 2-(1) that "the public or private sector of the economy shall not undertake or embark or authorise projects or activities without prior consideration, at an early stages, of their environmental effects".

The Decree set out the procedures and methods to enable the prior consideration of environmental impact assessment on certain private and public projects and gave specific powers to the FEPA to facilitate environmental assessment process. In 1999, the Government abolished FEPA and created a Federal Ministry of Environment. At the time it also incorporated nine departments from other Ministries. The mandate of the new Ministry is to co-ordinate environmental protection and natural resources conservation for sustainable development and specifically to:

- Secure a quality of environment adequate for good health and well being;
- Promote the sustainable use of natural resources;
- Restore and maintain the ecosystem and ecological processes and preserve biodiversity;
- Raise public awareness and promote understanding of linkages of environment; and
- Co-operate with government bodies and other countries and international organisations on environmental matters.

The organisational structure of FMEnv is shown in Figure 2-1 next page

Figure 2-1: FMEnv organisational structure



2.2 National and Local Regulations

2.2.1 Federal Government of Nigeria (FGN)

The specific mandate for environmental assessment in Nigeria is the *Environmental Impact Assessment* Decree No. 86 of 1992. This Decree gives specific powers to the Federal Ministry of Environmental (FMEnv) to facilitate environmental impact assessments (EIAs) on all new projects in Nigeria and to make an EIA mandatory for new major public or private sector projects, i.e. any proposed physical work or activity that is likely to significantly affect the environment. In effect, the decree deals with all EIA-related issues including: (a) timing and processing of EIA; (b) content of an EIA report including the factors to be considered in the EIA; (c) public involvement in the EIA process and public information disclosure; (d) transboundary impact of projects, whether state or international; (e) definition and requirement of environmental management plans for polluting development projects; (f) review of EIA and conflict resolution mechanisms; (g) powers of the Federal Environmental Protection Agency to further regulate the EIA process; and, (h) lists of activities subject to mandatory EIA.

FMEnv, from inception, has put in place statutory documents to aid the monitoring, control and abatement of industrial waste including the indiscriminate pollution of the environment. The statutory documents currently in place include:

- FEPA Guidelines and Standards for Environmental Pollution Control in Nigeria, 1991;
- The FEPA Harmful Wastes (Criminal Provisions) Decree No. 42, 1988;
- The FEPA National Policy on the Environment, 1989;
- FEPA National Effluent Limitation Regulations, 1991;
- FEPA Pollution Abatement in Industries and Facilities Generating Waste Regulations; 1991.
- Solid and Hazardous Wastes Management Regulations of 1991;
- National Guidelines and Standards of Waste Management in the Oil Industry;

These guidelines issued by FEPA stipulate standards for industrial effluent, gaseous emissions and hazardous wastes with which managers and operators must comply to improve the environment by limiting pollution and other environmental hazards.

In addition, Nigeria is a signatory to the following relevant international conventions:

- The African Convention on the Conservation of Nature and Natural Resources, The African Convention, 1968;
- The Convention Concerning the Protection of the World Cultural and Natural Heritage, The World Heritage Convention, 1972;
- The Convention on International Trade in Endangered Species of Wild Fauna and Flora, CITES, 1973;
- Convention on Conservation of Migratory Species of Wild Animals, Bonn, 1979.
- The Basel Convention on the Control of Transboundary Movement of Hazardous Waste and Disposal, 1989;
- The Framework Convention on Climate Change, Kyoto Protocol, 1995;
- The Convention on Biological Diversity, 1992;
- The Convention on the Prevention of Marine Pollution by Dumping of Waste, MARPOL, 1972.

Nigeria also has obligations to protect the environment through various commitments to the African Union (AU), the Economic Community of West African States (ECOWAS) and the Commonwealth. It is also committed through relations with the European Community under the Lome IV Convention.

2.2.1.1 Land Use Act

The legal basis for land acquisition and resettlement in Nigeria is the Land Use Act 1978 and modified in 1990. The following are selected relevant sections:

Section 1. Subject to the provision of this Act, all land comprised in the territory of each state in the Federation are hereby vested in the Governor of each state and such land shall be held in trust and

administered for the use and common benefit of all Nigerians in accordance with the provisions of this Act.

Section 2. (a) All land in urban areas shall be under the control and management of the Governor of each State; and (d) all other land shall be under the control and management of the local government within the area of jurisdiction in which the land is situated.

Therefore, according to the Land Use Act, all land in Nigeria is vested in the Governor of each State, and shall be held in trust for the use and common benefit of all people. The administration of land area is divided into urban land which will be directly under the control and management of the Governor of each State; and non-urban land, which will be under the control and management of the Local Government. The Governor of each State will have the right to grant statutory rights of occupancy to any person or any purpose; and the Local Government will have the right to grant customary rights of occupancy to any person or organization for agricultural, residential and other purposes.

The Acts gives the government the right to acquire land by revoking both statutory and customary rights of occupancy for the overriding public interest. In doing so, the Act specifies that the State or Local Government should pay compensation to the current holder or occupier with equal value.

2.2.1.2 *Nigerian Environmental Management Act:* This act was drafted following the amalgamation of the Federal Environmental Protection Agency in to the Ministry of Environment (see section 2.1.2) but was never ratified. It repeals the 1988 Federal Environmental Protection Agency Decree #58 (amended #59 and #14) and establishes the FEPA as part of the Ministry with the Minister of Environment having primary responsibility for its implementation. It does not repeal any other environmentally related legislation. As well as the general environmental provisions, which include environmental sanitation and occupational health, it specifies the powers of authorised officers and penalties and fines. The Act gives the Minister the authority to grant environmental permits for prescribed activities which includes sand mining but not any other mining activities.

2.2.1.3 *National Policy on the Environment:* The stated goal of the National Policy on the Environment is to achieve sustainable development in Nigeria, and in particular to:

- Secure a quality of environment adequate for good health and well being;
- Conserve and use the environment and natural resources for the benefit of present and future generations;
- Restore, maintain and enhance the ecosystems and ecological processes essential for the functioning of the biosphere to preserve biological diversity and the principle of optimum sustainable yield in the use of living natural resources and ecosystems;
- Raise public awareness and promote understanding of the essential linkages between the environment, resources and development, and encourage individual and community participation in environmental improvement efforts; and
- Co-operate in good faith with other countries, international organisations and agencies to achieve optimal use of trans-boundary natural resources and effective prevention or abatement of trans-boundary environmental degradation.

2.2.2 Lagos State Government

2.2.2.1 Lagos State Environmental Protection Agency Edict

Lagos State established the State Environmental Protection Agency (LASEPA) in 1996. The edict spells out clearly the functions and authority of the agency, and also imposed restrictions on the release of toxic materials into the environment as well as responsibilities of industries whose operation are likely to negatively impact the environment.

Specific functions of the agency include:

- monitoring and controlling of disposal of wastes generated within the State;
- monitoring and controlling of all forms of environmental degradation from agricultural, industrial and government operations;

- monitoring of surface, underground and potable water, air, land and soils within the State to determine the pollution level as well as collect baseline data;
- Co-operating with federal, state and local governments on matter and facilities relating to environmental protection

The agency is empowered to apply enforcement measures to make regulations to control water, air, soil and noise pollution; effluent discharge standard and waste management. The edict also empowers the agency to combat environmental degradations in manufacturing premises and government operations; analyse samples of any substance found in any premises searched, etc.

2.2.2.2 Lagos Waste Disposal Board Edict

The Waste Disposal Board was established in 1977 by vide Edict No.9 of April, 1977 to coordinate refuse disposal activities in Lagos State. Initially it was mandated to take charge of general environmental sanitation and the collection, disposal, and management of domestic refuse. Subsequently, it was assigned the responsibility of cleaning primary and secondary drains, collection and disposal of industrial wastes, flood relief activities, and the collection and disposal of scrap and derelict vehicles.

2.2.2.3 Lagos Urban & Regional Board and Town Planning Authority Edict

To control and regulate indiscriminate development in the state, the LASG established the Urban & Regional Board and town Planning Authority in 1997. Specific functions of the board include;

- Formulate state policies for urban and regional planning and development, including spatial location of infrastructural facilities.
- Advise state government, initiation of and prepare regional and sub-regional plans for the state; outline development plans and other physical development plans and schemes embracing spatial distribution of major roads, location of industrial, commercial, residential as well as recreational facilities.
- The establishment and operation of an effective development control organ on state lands
- The provision of technical assistance to the local government;

The edict also emphasize that each Local Government Area are to establish planning authorities which shall be responsible for preparing town, rural and local plans and control development activities within its area of jurisdiction.

The edict further stipulates that developers shall submit an environmental impact assessment report in respect of applications for residential land in excess of half an hectare and/or development in excess of 4 floors; factory building ; commercial buildings; places of worship and petrol service stations

2.3 World Bank Safeguard Policies

The World Bank has operational safeguard policies, which apply to various development projects which the bank is either implementing or funding. The objective of these policies is to prevent or at least minimize social environmental risks while increasing socio-economic benefits of approved projects. The effectiveness and positive impact on development of projects and programmes supported by the Bank has substantially increased as a result of these policies. The Bank's safeguards policies include:

OP 4.01 Environmental Assessment
OP 4.04 Natural Habitats
OP 4.09 Pest Management
OP 11.03 Cultural Property
OP 4.12 Involuntary Resettlement
OD 4.20 Indigenous Peoples
OP 4.36 Forests
OP 4.37 Safety of Dams
OP 7.50 Projects in International Waterways
OP 7.60 Projects in Disputed Areas

The World Bank shares responsibility with local communities and state governments for ensuring that safeguards aren't violated. Applicable World Bank's operational policies that are triggered by the LMDP are summarized in Table 2-1.

Table 2-1: World Bank Operational Policies

Operational Policy	Brief Description
Environmental assessment (EA)	World Bank financed projects must be environmentally sound and sustainable. The type and detail of the EA is dependent on the nature, scale and potential environmental risks. The safeguard instrument used here is the ESIA
Involuntary resettlement	People who have to be removed or who lose their livelihood as a result of the project must be resettled, compensated for all of their losses and they must be provided with a situation that is at least as good as the one from which they came. The safeguard instrument applicable here is the RPF.

3. DESCRIPTION OF THE PROPOSED PROJECT

3.1 General Description

The Lagos State Government (LASG) has requested World Bank support for the Lagos Metropolitan Development Project (LMDP). The LMDP will improve basic services for one million direct beneficiaries in nine slums, and contribute to human development through a reduction in the threat of disease by reducing the incidence and severity of flooding in the metropolitan area. This will also contribute to more effective functioning of the road network, thereby contributing to productivity enhancement of households and firms in Lagos.

In operational term, the key development objective of the project is to improve the living conditions in the nine blighted areas by;

- upgrading facilities and infrastructure;
- reducing the incident and severity of routine flooding in Lagos through improved drainage and solid waste management; and
- enhancing the capacity for urban management through the institutionalization of data use for urban management.

3.2 Project Components

The Lagos Metropolitan Development Project is organized into six components to achieve the objectives, which are:

Component 1. Urban Upgrading – (US$ 37.75 million)

This component will finance upgrading in the following slums: *Agege, Ajegunle, Amukoko, Badia , Iwaya, Makoko, Ilaje, Bariga, Ijeshatedo/Itire*. These slums were selected because, they were the largest slums identified in last comprehensive study – they cover an area of 760 hectares and have a current population estimated to be over 1 million people. Tertiary infrastructure and services will be developed and delivered to appropriate standards, to allow greater coverage with limited resources, while at the same time, using high quality materials to off-set poor maintenance. Multisectoral investment packages developed in response to the expressed demand of the beneficiaries, include: streets, footpaths, foot bridges and walkways; water supply; drainage; schools; health centers; public sanitation facilities; market stalls; electricity transformers; street lighting; community centers; postal stations; fish smoking facilities; floating jetty with petrol station; and box culverts.

Component 2. Drainage – (US$ 61.1 million)

The project will support the design and engineering of a comprehensive program which would provide for a rehabilitation, reconstruction, new construction, and routine maintenance program for the city-wide drainage network. It will also support development of a long-term technical solution to flooding, and the highest priority civil works investments to mitigate flooding; will be financed under the project. During the first year of the project, while the engineering designs are being developed, the cleaning of 25 km to 50 km of drainage channels directly impacting (downstream) the nine slum areas slated for upgrading will be contracted out. As a part of the institutional reforms needed to sustain the investments in drainage infrastructure, a Drainage Board is in the process of being formed. Through the project, the shaping of the Drainage Board can be positively influenced such that adequate financing for routine maintenance of the drainage network is formalized.

Component 3. Solid Waste Management (SWM) - (US$ 23.20 million)

This component will: i) Support to LAWMA to develop concession contracts for 3 sanitary landfill facilities to competent operators, ii) Establish a performance based management contract for LAWMA for improved waste collection and revenue mobilization, iii) Support to other institutions namely, MOE, LASEPA, to enable them carry out their statutory mandated responsibilities regarding policy formulation, regulation, monitoring and enforcement mechanisms, iv) Solid waste coverage in

unserved areas and increased participation of the private sector, v) construction of 6 SW transfer stations on existing SWM services sites; rehabilitation and upgrading of the existing dumpsite, rehabilitation of equipment vi) procurement of monitoring and communication equipment to support the establishment of a sustainable waste management system.

Flooding is a persistent and costly problem in Lagos, but cannot be addressed in the absence of a well managed and functioning solid waste sector, because uncollected garbage finds its way into open channels and drains. The expected outcome is that there will be an increase in the amount and regularity of refuse collected and disposed of in an environmentally sustainable manner. The target group is the residents of Lagos, and coverage will particularly be extended to unserved and low-income areas. The population residing or working near the present refuse dumps will benefit from better environmental conditions. Through the Global Carbon Fund, support will be given to capture methane gases and explore the opportunity to sell reductions to the global carbon market.

Component 4. Capacity Building, & Institutional Development – (US$ 4.50 million)

This component will finance consulting services and goods/equipment for training, analysis, as well as knowledge acquisition and dissemination. Initially the project will finance project-related training to build capacity through the acquisition of skills to enable project staff to competently perform his/her duties in support of the project development objectives.

Thereafter the project will support capacity building for a broader group of competitively selected staff from relevant ministries and LGs. It will also support a consortium of a consultant local urban design firm, and an urban planning department of a local university; as well as a consortium of a consultant firm and a civil engineering department from one of the pre-eminent universities in Nigeria. These two elements of support will contribute respectively to long term sector policy development and urban planning, and the development of long-term technical and engineering solutions to drainage problems in Lagos.

Support will include, but not be limited the following areas: basic computer applications, project management, procurement, financial management, civil works contract management, monitoring and quality control of civil works, infrastructure planning for sustainability, O&M planning, revenue improvement, environmental management and planning, participatory and community-based planning techniques, auditing, data collection, statistical analysis and the use of shared statistics for investment planning; management practices and effective leadership; staff exchange programs; comprehensive hydraulic modeling and GIS; results based budgeting; development of performance indicators; performance monitoring; establishment of feedback mechanisms to the public; and metropolitan communications for strategic metropolitan policy making and implementation.

Component 5. Project Management – (US$ 6.75 million)

The project will finance 90% of the costs of the purchase of office equipment and vehicles, to assist in the establishment of the PMU and PUs, and 90% of the operating costs of the units at State and LG levels (refer to detailed cost tables in Annex 3: Estimated Project Costs).

Component 6. HIV/AIDS awareness campaign – (US$ 0.6 million)

The project will support the development and execution of an appropriate AIDS Education, Information and Communication Campaign in the project areas. The campaign will be conducted within the framework of activities determined by the National Action Committee on AIDS (NACA) and the State Action Committee on AIDS (SACA). The campaign will be implemented on upgrading construction sites, and along the drainage, and solid waste collection, transport, and disposal networks.

3.3 Institutional Arrangements for Implementing the LMDP

State Level Project Management Unit (PMU): The project will be implemented by the PMU established under the Office of the Executive Governor. The PMU will be headed by a civil servant of Director level rank or above, with demonstrated broad management experience in different LASG ministries. LASG will staff the PMU with qualified and experienced staff, acceptable to IDA, including a procurement specialist, and four sectoral specialists, one each for urban upgrading, drainage, solid waste management, environment and safeguards.

The PMU will be responsible for: (i) overall technical management of the project, (ii) preparation of engineering designs and environmental impact assessments and mitigation plans, (iii) procurement; (iv) monitoring of implementation process and progress; (v) effective coordination with relevant State and LG agencies; and (vi) reporting on the progress of the project.

LG Level Project Unit (PU): at inception the project areas for the first year program covers six LGs. However, four additional LGs have been created within the area originally under the jurisdiction of six LGs. Therefore, the participating ten LGs will establish *six* project units (PUs) to support the effective planning, implementation, and monitoring of the nine urban upgrading areas, including mainstreaming of beneficiary participation.

PUs will be headed by an Engineer and supported by the LG Community Development Officer (CDO), appointed by their respective LGs and acceptable to IDA. This Unit will co-opt other officers as necessary. The head of the PU will participate in the procurement processes in the PMU for the selection of consultants, and evaluation of bids that impact their jurisdiction, to ensure transparency and ownership of the procurement process. A community representative from the Community Development Association (CDA) in each upgrading area will be selected by the respective communities to work closely with the PU through the CDO. His/her role will be to inform residents of the project objectives, project progress, criteria and technical standards and mobilize and organize their community's participation. He/she will liaise with PU on a routine basis to get regular updates on project progress through the CDO and ensure that the information is shared with the community.

State Level Project Steering Committee: To ensure policy level coordination across sectors and levels of Government and to provide a forum for discussing implementation progress and sharing experience, an inter-ministerial Steering Committee will be established. Chaired by the State Governor's designate, the Committee will include representatives from the State Ministries of Finance, Economic Planning and Budget, Environment, Chairman of the 10 LGs, LAWMA, Drainage Board, Lagos State Water Corporation, and six Community Development Associations representatives, one for each upgrading area, to strengthen links with the beneficiary community, as well as the local university or research institution selected competitively, to contribute to long term sector policy development and urban planning.

The Committee will provide overall policy guidance for urban development and oversee progress to ensure it is being made as planned, resolve any sectoral issues as they arise, and remove any impediments that may cause implementation delays. It will also support the execution of the HIV/AIDS awareness campaign on relevant project sites. It will initially meet monthly and then at least once every quarter when implementation is under way.

4. STUDY METHODOLOGY

4.1 Introduction

The ESIA study was undertaken in accordance with World Bank and Nigerian standards. The distinct phases of the study include:

- Field Sampling/Data collection,
- Characterization of the baseline conditions,
- Identification and characterization of potential impacts,
- Identification of impact mitigation measures and enhancement of benefits,
- Preparation of an Environmental Management Plan

4.2 Study Approach

4.2.1 Literature review

Review of LMDP literature including the Project Concept Document (PCD), Project Appraisal Document (PAD), the constitution of the Federal Republic of Nigeria, numerous federal, state and local environmental laws regulations, decrees, acts, policies and guidelines, world bank safeguard policies and other relevant documents.

4.2.3 Data Review

EnvironQuest team assembled and evaluated relevant baseline data related to the physical environment, biological environment and socio-cultural environment. The baseline data reviewed included:

- topography;
- local geological structure, classification, composition and distribution of superficial deposits;
- groundwater;
- hydro-geological data;
- physical, chemical and geotechnical properties of the surficial soil;
- background contamination of the surficial soil, surface water and/or groundwater;
- the risk of natural hazards (e.g. flooding) and subsidence;
- local meteorological data; and
- biological data.

4.2.4 Field Surveys

Field surveys were undertaken to confirm the data reviewed and to acquire additional baseline data to eliminate gaps in the environmental and socioeconomic baseline data for the nine communities and other areas likely to be impacted by the project.

Surface water samples were collected from water bodies in close proximity to the project areas and from both upstream and downstream of the existing drainage Groundwater samples were taken from locations adjacent to where surface water samples were recovered. All water samples were analyzed to determine the presence and concentration of chemical substances.

4.2.5 Characterization of Baseline Condition

Socio-Economic Environment

During the consultation respondents were educated about the project and its likely impacts on the social environment. A socio-economic baseline was prepared for each slum. The baseline data include population distribution, household size, income level, existing economic activities, educational facilities,, industries in the area and the skills used by those industries, social inequalities currently

existing in the project area, adequacy and costs of transportation, and current & projected labor supply and wage levels.

Biological Environment

A field sampling program was designed, and all pertinent biological features were inventoried. An inventory of animal, plant, and aquatic life were prepared for selected sub-areas of the total area. The field data acquisition phase includes determination of the type and density of commercial species present in the area. The distribution and density of flora and fauna, habitats and the ecological interaction of species were studied.

4.2.6 Consultations

EnvironQuest consulted and met with the PMU, World Bank, LASEPA and other government officials as well as the residents of the project area. The meetings and the consultations enabled the study team to discuss the outcome of the field survey.

5. BASELINE DATA

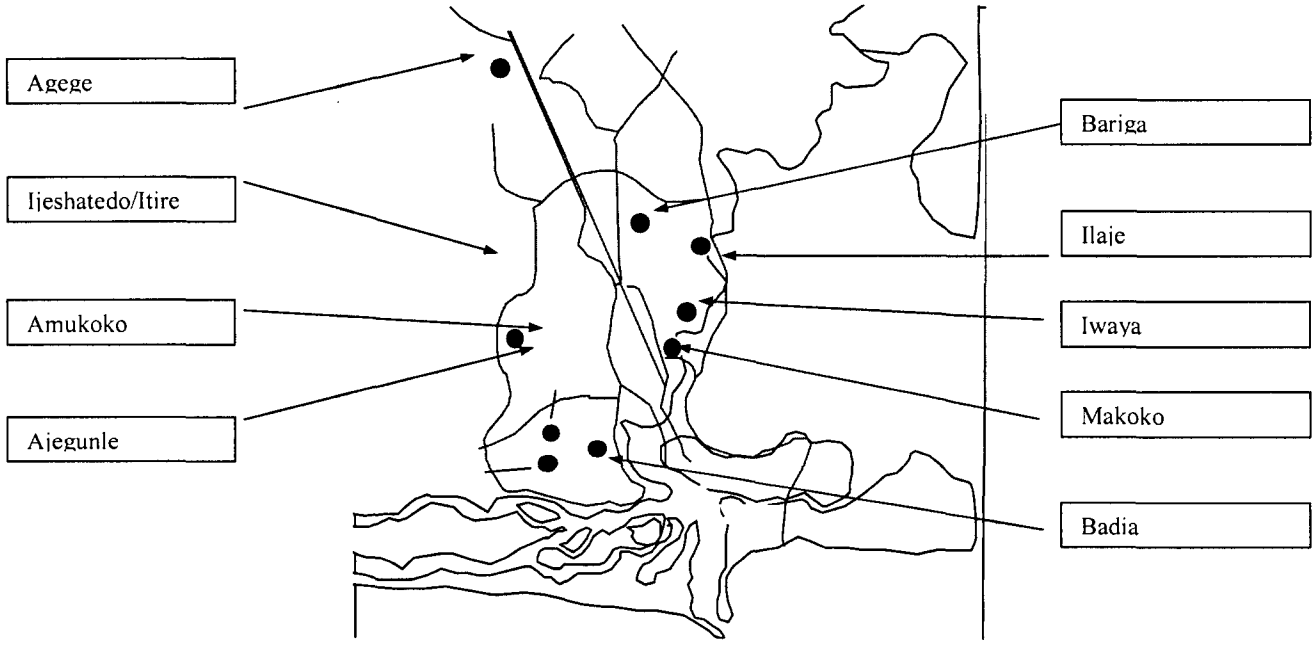
5.1 General Description and Location

Lagos state was created on May 27, 1967 by virtue of Decree No. 14 of 1967, which restructured Nigeria's Federation into 12 States. Prior to this, Lagos Municipality had been administered by the Federal Government through the Federal Ministry of Lagos Affairs as the regional authority, while the Lagos City Council (LCC) governed the City of Lagos. Equally, the metropolitan areas of Ikeja, Agege, Mushin, Ikorodu, Epe and Badagry were administered by the Western Region. The State took off as an administrative entity on April 11, 1968 with Lagos Island serving the dual role of being the State and Federal Capital.

Lagos State is highly urbanised with 70 percent of its population living in urban centres. The population of Lagos State grows at 8 percent per year (compared with the national rate of less than 4 percent). Population density is 3,746/km2 and the state accounts for nearly 37 percent of Nigeria's urban population, most of them living in the metropolis. It is the premier manufacturing city in West Africa, most important sea port, node for telecommunications with the largest concentration of multinationals, and home to over 95% of Nigeria's financial institutions. Despite its dominant position in Nigeria's non-oil economy, Lagos remains a "poor city" with an annual budget of about US$650 million

Lagos State lies in the south-western part of the Federal Republic of Nigeria on the West Coast of Africa. It has boundaries with Ogun State both in the North and East; in the West by the Republic of Benin and in South it stretches for 180 kilometers along the Guinea Coast of the Atlantic Ocean. The state occupies an area of 3,577 sq. km. 22% of which consists of lagoons and creeks. Prominent among these is the Lagos and Elk Lagoons, Kuramo Waters, Ologe and Ogun River. Others are Badagry, Port Novo and the Five Cowrie Creeks.

Figure 5-1: Priority Areas (within Agege, Ajeromi/Ifelodun; Apapa; Lagos Mainland; Mushin; and Somolu LGAs).



The scope of this ESIA covers improving drainage through rehabilitation of existing drains and/or construction of new drains in Agege, Ajegunle, Amukoko, Badia, Bariga, Ijeshatedo/Itire, Ilaje, Iwaya and Makoko (see Figure 5-1 above).

5.2 Description of the Environment

The main characteristics of the biological, physical and socio-economic environment of the project area are summarized below.

5.2.1 Physical Environment

Climate

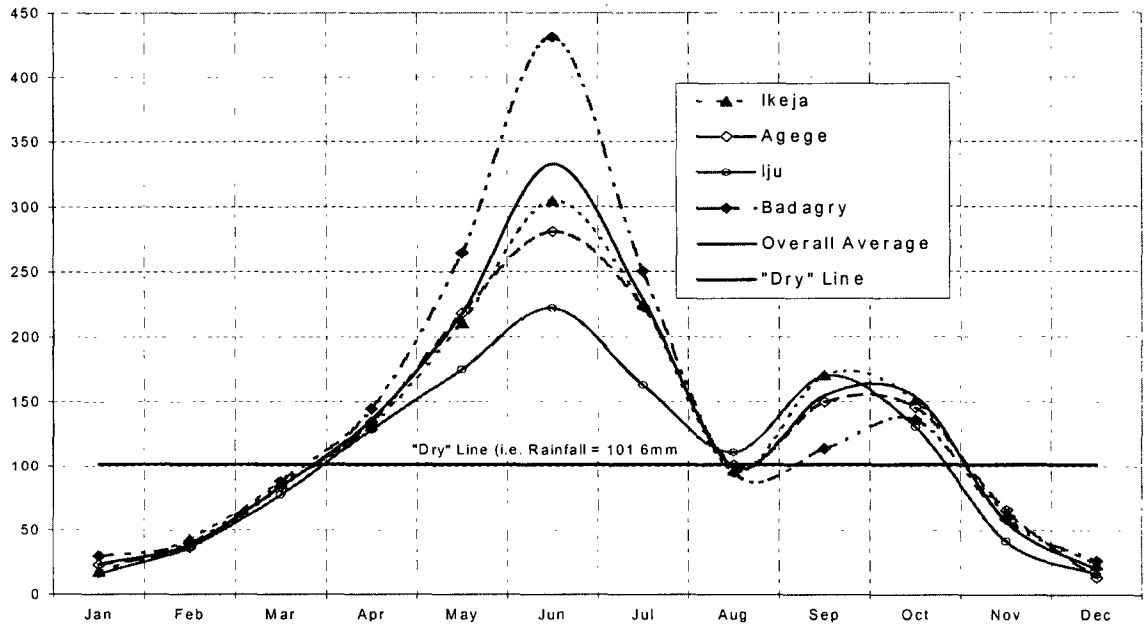
The climate of the project area is that of the humid tropics and it is largely controlled by prevailing winds and nearness to the Atlantic Ocean. The two dominant air masses are the dry wind from the Sahara and the wet from the Atlantic Ocean. Marginal alterations have being recorded due to landform characteristics, especially the dominant ocean currents, configuration of surrounding shoreline and the generally flat topography of the region.

Rainfall

Rainfall is the single most important element for defining the climatic seasons in the tropics. Hence, Lagos has two dominant seasons; the wet and the dry seasons. Around the coastal areas like Bariga, Ilaje, Makoko, Apapa, etc. however, temperature exerts considerable impact on the micro-climatic regimes. As shown in Figure 5-2, the lowest mean is recorded in January, and the highest is recorded in June. Other significant climatic elements in the area are sunshine (hours), atmospheric pressure, wind (direction, speed and intensity), radiation, relative humidity and evapo-transpiration.

The short "August Break" in-between the double maxima peaks depicted is associated with the brief southward retreat of the ITD during the period.

Figure 5-2: Mean Monthly Rainfall in selected LGAs (in mm)



Temperature

Temperature values are high throughout the year over the project area. Variation in mean air temperature values ranges between 25°C (June to October) and 27°C - 29°C (November to July). A more detailed analysis shows that the highest value is recorded in March while the lowest is between July and August. The lower coincides with the peaks of the dry season. The slight decline around December is due to the chilling effect of the in-coming northeast trade (harmattan) wind.

Wind

South-westerlies dominate the wetter period of the year in the areas while north-easterlies dominate the drier season. Depending on the shifts in the pressure belts in the neighbouring Gulf of Guinea, they are interspersed respectively by south-easterlies and north-westerlies in different parts of the year. In view of the fairly strong influence of sea breezes from the adjoining maritime environment, the wetter winds prevail for more than 70% of the time as reflected by the wind rose for the area. Directions are found to vary more in the mornings than in the afternoons.

Mean annual wind speed varies between 2 to 6 m/s. Speeds in the months of "dry" period (November - March) are lower. In the wet period of April–October, daily average speed could rise to 15 m/s. Values of up to 25 m/s are sometimes experienced due to inducement by convective rainfall activities and relative diffusion.

Air Quality

Generally, air quality in the area complies with regulatory standards; however, the results are indicative of anthropogenic impacts. Based on the air quality screening, the air quality around the Badia (Apapa LGA) axis of the study area appears to be the most impacted, while Makoko (Mainland LGA) appears to be the least affected. For example, TSP values ranged between 75mg/m^3 at Makoko and 108mg/m^3 at Badia. The relatively elevated values in Apapa area is attributed to the heavy industrial activities in the area. Whereas, in Makoko the most important industrial activity in the area is fish smoking.

The FMEnv adopted the WHO standards (Tables 5-1) as the national standards for gaseous emissions against which air quality parameters monitored are compared in order to ascertain its "cleanliness".

Table 5-1: Nigerian Ambient Air Quality Standard

Air Pollutants	Emission Limits
Particulates	250 (ug/m3)
SO2	0.1 (ppm)
Non-methane Hydrocarbon	160 (ug/m3)
CO	11-4 (ug/m3) or 10 (ppm)
NOX	0.04-0.06 (ppm)
Photochemical Oxidant	0.06 (ppm)

Source: FME, 1991

Table 5-2: Air Quality Classification Based on TSP Values

Range of TSP Values (µg/m3)	Class of Air Quality
0 – 75	High Quality
76 – 230	Moderate Quality
231 – 600	Poor Quality

Source: Jain, et. al (1976)

For the purpose of this study, air quality screening was carried out around the project locations, using portable handheld air monitors. The results of this monitoring are summarized in Table 5-8.

Table 5-3: Results of Air Quality Screening

Location	LGA	Pollutant Gases (ppm)						
		TSP mg/m3	CO	NO_2	SO_2	CH_4	H_2S	NH_3
Agege	Agege	94	2	0.1	0	n.d	n.d	n.d
Ajegunle	Ajeromi-Ifelodun	89	3	0.1	0.1	n.d	n.d	n.d
Amukoko	Ajeromi-Ifelodun	86	3	0.1	0.1	n.d	0.2	n.d
Badia	Apapa	108	5	0.3	0.3	n.d	0.2	n.d
Bariga	Somolu	91	1	0.1	0.1	n.d	n.d	n.d
Ijeshatedo/Itire	Mushin	88	3	0.2	0.1	n.d	n.d	n.d
Ilaje	Somolu	76	1	0.1	0.1	n.d	0.3	n.d
Iwaya	Lagos Mainland	79	1	0.1	0.1	n.d	0.2	n.d
Makoko	Lagos Mainland	75	1	0.1	0.1	n.d	0.2	n.d
Mean Values		87.33	2.22	0.13	0.11	n.d	0.12	n.d

Pollutant gases such as CO, NO_2 SO_2, CH_4, H_2S and NH_3 were documented at levels ranging from not detected, to 5ppm. Apart from CO, no other gas was detected at levels above 0.3ppm. Consistently, all the gases associated with combustion of fossil fuels were recorded at higher levels in Apapa LGA than any of the other locations. On the contrary, H_2S, a gas typically associated with decomposition of sulfidic materials and very common in swampy terrains was recorded only at 5 of the 9 locations sampled.

Geology

The project area falls within the Dahomey sedimentary basin, a basin known to have resulted from events associated with the break-up of Gondwana and subsequent opening of the southern Atlantic. Deposition was in a fault-controlled depression, bounded by faults and other tectonic structures of the Romanche Fault Zone on the west, and by the Benin Hinge line, also a major fault structure, on the east. Sediment thickness in the basin, which extends from Accra/Ghana to the Okitipupa Ridge, where it is separated from the Niger Delta, increases from north to south and from east to west within Nigeria.

Geomorphology

Landforms in the study area are closely related to the soil types. The floodplains or seasonally flooded/swampy areas are characterized by morphological features like incised meanders, ox-bow lakes, marshes and back – swamps. The flat inter fluvial surface is underlain mainly by brownish red and yellow mottled clayey sands and sandy clay (an indication of fairly well drained soils).

Soils Characteristics

The soils are generally sandy on top with varying increasing clay content within the profile. the clayey subsoil is the result of breakaway retreat processes by which colluvial clay has been mixed with sandstone.

The soils are slightly acidic in the top horizons (pH range, 4.3 – 6.0) and this acidity increases with soil depth (subsoil pH ranges from 3.5 – 4.8). The exchangeable bases and cation exchange capacity are generally low varying from 0.34 to 14.82 and 1.14 to 21.06 cmol (+) Kg-1 soil respectively, suggesting low inherent fertility status of the soils. The percent aluminum saturation of the soils is high especially

in the subsoil and this suggests possible mobilization of heavy metals in the subsoil, due mainly to poor drainage, poor aeration and acidic solum.

Water Quality

The Lagos Lagoon is the most prominent water body in the area and is common to several of the selected slums. Specifically, the Lagoon is quite proximal to Badia, Amukoko, Iwaya, Makoko, Ilaje and Bariga. Effectively, about two-thirds of the project area are either fronted by the lagoon or are located very close to it.

Generally, the waters of the area are within the alkaline range, with pH ranging from 7.2 to 7.9. The conductivity of the samples ranges between 27.65mS/cm and 40mS/cm while TDS ranges commensurately between 13.82mg/l and 20.00mg/l. Dissolved oxygen is relatively high, ranging between 5.3 and 6.4. This is indicative of constant aeration of the water, probably due to wave action created by vessels moving to and fro on the water.

5.2.2 Biological Environment

Fauna

The main amphibians documented in the area are the West African Toads (Bufo sp) and various species of frogs. Because of the general wetness of the area and swampy tendency, many of the gutters, filled to overflowing, form suitable breeding grounds for the frogs and toads.

The macro benthic fauna are composed primarily of molluscs (primarily bivalves and gastropods), crustaceans (most of which are important shellfish), and polychaete annelids. The fish fauna comprise about 30 species, dominated by catfishes, clupeids and cichlids. The family Cichlidae seemed to dominate both qualitatively and quantitatively. Shrimps were also found in abundance.

A number of reptilian species are known to occur in the project area. These include smaller animals such as lizards and skinks, as well as the larger ones like the mentor lizards. The habitat type largely influences the distribution of these species. For instance, the monitor lizards (Varanus niloticus) occur within the swamps around Makoko and Ilaje.

Avian species occur in large numbers around the project area; their distribution is greatly influenced by habitat type. As such, diving birds like the pied kingfisher (Ceryl rudis) and white egrets (Egretta gazetta and E. alba) occur along the coastline and the marshes of Makoko, Ilaje, etc. Species such as Streptopelia vinacea and S. semitorquata (doves) and the village weaver (Ploceus cuculatus) occur inland in the Agege/Ajegunle area. Generally, their populations are quite high and even though both predatory animals and human beings regularly prey on them, their high fecundity rates enable them to maintain population levels.

The most ubiquitous mammalian group throughout the project area is rodents. They are highly fecund and adaptable and have therefore successfully colonized all the areas. Smaller species like the multimammate rat (Rattus natalensis), larger species such as the Giant rat (Cricetomys gambianus), all occur in the project area. Other mammals that have been documented in the area include bats (Eidolon helvum), and various monkeys, such as the colobus monkey (Colobus polykomos).

Flora

Being a wetland environment characterized by rich alluvial and ferralitic red-yellow soils, mangrove and fresh water swamps, dense luxuriant under-growth, climbers, epiphytes and tropical hard woods for which there is a 1,500 hectare forest reserve.

The dominant vegetation of the State is the swamp forest consisting of the fresh water and mangrove swamp forests both of which are influenced by the rainfall pattern of the State, which makes the environment a wetland region.

Vegetation in the project area is very scanty, particularly in the residential areas. Along the coastline and in undeveloped areas of the slums, there are vestiges of the original vegetation, which are largely

aquatic, given the generally swampy terrain of most of the project area. During the field study, vegetation distribution was observed and species composition and diversity noted. Generally, apart from ornamental trees and shade trees planted in front of residences, in the fairly dry sections of the study site, vegetation in the area consisted mostly of grasses such as Paspalum vaginatum, Cyperus spp., Kyllinga spp., etc.

Water hyacinth and other floating/rooted macrophytes occur in the project area. Most of them belong to the plant families of Azollaceae, Lemnaceae, Araceae, Lentibulariaceae, Convolvulaceae, and Euphobia.

In the dryer areas, forbs such as Chromolaena odorata were more abundant. Other dry land species included Newbouldia laevis, Carica papaya, Tridax procumbens, Spigellia anthelmia, Gomphrena celosoides, Euphorbia heterophyla, E. hysopifolia, Fluerya aestuans, and Luffa aegyptiaca. The coastline section of the project area is primarily lagoon-barrier complex. Coastal vegetation covering the barrier system is very sparse with scattered mangroves, marshes and freshwater swamps.

5.2.3 Socio-economics

Demographics

Being a city-state, Lagos is a melting pot of cultures in which its unique endowments have created an attraction for domestic and international immigration producing a megacity of immense dynamism. Whereas the population of Lagos in 1963 was 1,443,568, the UN World Population Monitor puts the population of Lagos State at 5.8 million in 1985 and 10.28 million in 1995. At this point, Lagos entered the league of global *megacities*. Recent UN studies estimated the population of the State at 13.42 million in 2000, which, if projected, will be over 15 million with a population density of over 4,193.46/sq. km.

The City-State is estimated to be growing at between 6% and 8% per annum making it one of the fastest growing cities in the World. Indeed, studies have shown that the Lagos-Lekki corridor (Lagos South-East) is growing at about 16.6% per annum as against the Nigeria's average of 2.9%. More instructively, *Lagos, which currently is the 6th largest global urban agglomeration, is projected to become the 3rd global mega city in 2015 with an estimated population of 24.6 million.* Whilst the above presents the State with substantial potentials, it equally poses the problem of urban crisis, which presents enormous challenges for governance.

Table 5-4: Population figures for LGAs in 1991 (Source 1991 Census)

LGA	Population
Agege[a]	650,274
Badagry	118,704
Epe	99,567
Eti-Osa[a]	170,948
Ibeju-Lekki	24,825
Ikeja[a,b]	639,762
Ikorodu	181,914
Lagos Island[a]	164,352
Lagos Mainland[a,c]	869,601
Mushin[a,c]	986,847
Ojo[a]	1,011,808
Shomolu[a]	767,179
Total	5,685,781

a. These local government areas comprise metropolitan Lagos, they account for 5,260,771 or 93 per cent of the total 1991 population of Lagos State. The provisional figure for metropolitan Lagos has been challenged by the state government, which considers it to be an under-enumeration.
b. Including Alimosho Local Government Area.
c. Including Surulere Local Government Area.
d. Including Oshodi-Isolo Local Government Area.

Ethnic Groups and Religion

Lagos State consists of three Yoruba sub-ethnic groups:

- The Awori in Lagos (Eko), Ikeja and parts of Badagry Division
- The Ogu in Badagry
- The Ijebu in Ikorodu and Epe Divisions respectively, with pockets of Lagos Awori population in the coastal areas.

English is the official language while the vast majority of the population conducts commercial activities in the Yoruba language. Predominantly the people are Muslims and Christians with few animists.

Land Use Pattern

Predominant land uses in the area are residential, industrial, recreational and fisheries and aquaculture. Due to the high demand for the rapidly expanding population requiring additional land, pressure on land is fast increasing. The expansion of demand for land for housing, industry and even the anticipated recreational demands, together with demand from other traditional sectors and environmental conservation can no longer be ignored. The value of land is fast increasing and with it the frequency of disputes about ownership titles and boundary definitions.

Land Tenure

Customary rights of occupancy still exist in some part of the project area. The Land Use Decree 1978 vests all land in the state through the office of the governor. Land is to be held in trust and administered for the use and common benefit of all Nigerians according to the provisions of the Act. By this legal instrument, the state replaced the traditional institutions of obaship and chieftaincy in their roles as keepers of communal land.

Control and management of land in urban areas is the responsibility of the state governor, while all other land (rural, public, etc.) is the responsibility of the local government of the area. The governor is empowered to designate certain areas as urban land and to grant statutory rights of occupancy of fixed periods and rights of access to any person, subject to rental arrangements fixed by and payable to the state. The local government can grant a customary right of occupancy to land in the local government area (LGA) to any person or organization for agriculture, grazing, residential or other purposes. Land so granted should not exceed 200 ha for agricultural purposes, or 2 000 ha for grazing purposes, for any single customary grant. Certificates of occupancy are to be issued in respect of both types of grant.

Economics

Within the project area, Apapa is primarily an industrial area. As such most of the economic activities there revolve around industries. However, the clusters of residential areas, such as Badia are densely populated and so a large proportion of the population is confined to the slums and other small portions of residential area, which are typically small lands and/or islands surrounded by the creeks, creeklets, rivers and other water bodies that dot the terrain of Lagos generally. The main activities around Apapa include manufacturing, food and confectionaries production, trading (buying and selling), compared with mostly artisan fisheries, and mechanic activities such as panel beating, spray painting, mechanical repairs in other areas.

Facilities

The main transportation means in the areas are road and water. Water transportation is fairly developed in the areas. Mostly dug-out canoes and few motorized boat. The areas are powered through the national grid. The power supply is epileptic; being an industrial area Apapa enjoys better supply than the other areas.

With regard to educational facilities, the project areas are poorly served. Existing schools are in dilapidated state and some with no tables and chair and broken windows and doors. A total of 13 schools will be rehabilitated while 5 new ones will be constructed.

Presently there are few government health care facilities in the project area but private ones abound. The LMDP will rehabilitate 4 existing facilities and construct six new primary health care centres; one in each of the original LGs.

Cultural Resources

Diverse shrines and groves were observed in the areas with Apapa having the least. The shrines belong to the Egungun and Igunnukos.

6. POTENTIAL ENVIRONMENTAL & SOCIAL IMPACTS AND THEIR MITIGATING MEASURES

6.1 Introduction

The rehabilitation and/or construction of the drains under the drainage component of the LMDP (the focus of this ESIA) will have both positive and negative impacts on the environment. The negative impacts will emanate from construction and operation phases of the project.

6.2 Environmental Impacts

6.2.1 Construction Phase

i Flora and Fauna

Preparation of the secondary drains and its lining would result in the clearing of the vegetation and shrubs which have inhabited the drains. There are no endangered species of flora and fauna along these drains and based on this the clearance will not have any significant impact.

ii Soil and Land Degradation

Earth-moving equipment such as excavators will be used in digging and excavating. This earth moving equipment or machinery at the site during construction will not only expose the soil, but will also compact the soil and break down the soil structure though this would potentially decrease the drainage of the areas.

iii Visual Intrusion

The LMDP will change the natural landscape setting or characters of the area. The clearing of vegetation, construction of drains will impact the visual amenity of nearby houses and communities around the project area.

iv Vehicular Traffic

The construction work at the site will result in traffic volume on the roads in the area. Wastes generated from project activities such as cement bags, paint drums, debris from blocked drains will constitute obstructions to road transport. The transport of raw materials will introduce a number of heavy trucks on the main road and this could increase the risk of motor accidents and also result in vehicular-pedestrian conflicts. These impacts are localised and regarded as short term.

v Noise Level and Ground Vibration

Minimal and intermittent noise would e generated during the construction phase of the drainages. The background noise levels and ground vibrations at the site will increase as a result of the movement of a number of tipper trucks delivering materials, heavy earthmoving equipment and use of machinery such as concrete mixers, vibrators and block molders. The anticipated noise and ground vibrations will however, not have devastating effects on the work force and immediate environment.

vi Construction Wastes

Activities at the site will produce construction wastes such as excavated soils and debris. These collections of wastes could obstruct the movement of the workers, the general public and trucks as well as affect the beauty of the environment. This waste will therefore have to be managed at various times during the construction phase.

vii Slope, erosion and drainage

If the topography of the project area is hilly (as observed in Ilaje), erosion problems during construction are likely to be more severe, as compared to a flat area. However, if the area is flat,

water will not drain away easily, and there will be the tendency for pools of water to be created. These pools, if not drained regularly will provide favourable grounds for mosquito and other disease vector breeding.

viii Spoil Disposal

Spoil will contain household refuse, as well as pieces of concrete, human excreta, stones and silt which have to be removed during construction. The removal of the household refuse and human excreta will pose a health risk to the workers hired to remove them. The transport of these materials to final disposal site can also expose the public to health risks in the event of spills. Soil disposal will also lead to increased traffic between the excavation and disposal sites.

ix Occupational Safety and Health

Safety of the local population may be at risk during the construction phase. The movement of trucks to and fro the site, the operation of various equipment and machinery and the actual construction will expose the workers to work-related accidents and injuries. Pollutants such as dust and noise in the workplace could also have negative implications for the health of workers.

x Probable Flooding Downstream

There is a risk that the lining of more secondary drains may cause flooding downstream. With the clearing/dredging of drains, there will be enhanced flow of water through the drains. This may lead to flooding in downstream areas; especially in places were there are constricted drainages or where two secondary drains merge into one. During the fieldwork for this project, a number of such sites were seen (See plate 5.1 and 5.2). Also, the fact that the waters are able to move faster means that they will carry more sediment and suspended solids out into the primary drains and/or the lagoon. This could lead to siltation in downstream areas and may cause flooding in downstream areas.

xi Air Quality

Removing existing road surfaces will release particulate matters. Air Quality will also be impacted by emissions from vehicles and from heavy earthmoving equipment. At the peak of construction various equipment rated between 200- 600 horsepower and burning diesel fuel would be operated. The USEPA AP-42 Emission Factors for diesel industrial engines was used to estimate emission from construction equipment. The estimated emissions from equipments are shown in Table 6.1.

Table 6-1: Estimated Emissions from Construction Equipment

Constituents	Quantity Emitted (kg/day)
Nitrates	160
Carbon monoxide	6400
Sulphates	10
Particulates less than 10μm	10
Caron dioxide	15300
Aldehydes	10

xii Water Quality

The clearance of existing drainage will involve de-silting, removing debris and spoil from the existing drains. Wastewater will also be produced by other construction activities. Water quality will be impacted by wastewater discharge from the drain clearance and construction activities. These will include discharges from onsite sewerage system, domestic wastewater or by rainwater run-off from the developed areas such as workshops etc. discharge of this wastewater into surface waters will impact water quality by causing changes to its physical, chemical and biological properties.

Given the anticipated volume of waste/spoil that will be generated, they will typically be stockpiled on either sides of the drain or channels. If they are not properly contained, rains could wash them back into the drains or carry them along with runoff into other surface waters, leading to increased turbidity

and siltation problems there. This would affect aquatic resources such as fisheries and aquatic invertebrates.

Social Impacts

i Disruption of Utilities Service

The excavation for the drainage will cause temporary disruption of utility services such as electricity and water. Such disruption may incur the wrath of the communities in the area.

ii Displacement of people

The construction and/or rehabilitation of drains may require the demolition of rooms of dwelling, compound walls, kiosk, toilets, foot bridges etc. this could be caused by the realignment and widening of drains in some sections and by the need for access during construction. Some of these structures will be rebuilt in the same location or nearby. Compensation for loss of assets or livelihood may be required. It is unlikely that any voluntary relocation of families will be involved. Resettlement issues and compensation are addressed in the Resettlement Policy Framework - - which is also been prepared as a stand alone document.

iii Education

Children and youth attending school will experience difficulty reaching their schools daily as a result of obstruction of their normal route.

iv Livelihood

Adults will face disruptions in their work especially those that sell items by the road side. Among the kinds of disruptions to occur are:

- Separation from their kiosk, and need to travel longer distance to reach work and potential unavailability of transportation
- If a business is moved, separation from established customers
- Separation from usual source of goods and materials to trade

v Demolition and partial destruction of properties

There will be moving or destruction of compound walls, partial demolition of shops and rooms, toilets and other structures that have encroached on the drains but this will be minimised as possible. Partial demolition of houses will lead to congestion and possible voluntary termination of tenancy. These negative impacts of partial demolition will deprive landlords of important rent income.

Secondly, shops, barbershops, carpenters' shops, food joints etc are likely to be affected by the construction of the drain.

vi Contractors' (Workers) Camp

The civil work contractor will have to establish and operate a camp which will house offices, workshops etc. the selection of the camp location should be based on approval of the project supervisor from the PMU.

Problems that may be encountered include temporary resettlement of some residents, erosion and disposal of liquid and solid wastes. The impact will be minimal as the camp will be small and the workforce will live outside the camp. Other social impacts associated with the contractors' camp are theft, alcoholism and sexually transmitted diseases (especially HIV/AIDS). HIV/AIDS will be addressed as part of the institutional capacity building component. On completion fo the project the camp will be dismantled and the areas fully reclaimed. However, where possible camp and/or some of their facilities may be handed over to the original land owners or local organisation for their use. This would trade off inconveniences with long term gain.

vii Traffic

All the communities that will be selected for the provision of storm drains are built up communities where there are commercial and brisk socio-economic activities going on daily coupled with both human and heavy vehicular traffic. Construction related activities will create nuisance to the users of the road e.g. storage of construction stones and chips close to the road. The impacts from construction traffics are regarded as short-term.

6.2.2 Operation Phase

Air Quality and Noise Level

In the coastal areas of Bariga, Ilaje and Makoko, improved fish smoking facilities will lead to increased generation of smoke and the attendant degradation of ambient air quality. In addition, motorized boats plying the area and coming to fuel up at the floating fuel station will lead to an increase in ambient noise levels.

Water Quality and Hydrology

With the clearing/dredging of drains, there will be enhanced flow of water through the drains. This may lead to flooding in downstream areas; especially in places were there are constricted drainages or where two secondary drains merge into one (See Figures 6.1 and 6.2). The waters moving faster means that they will carry more sediment and suspended solids out into the primary drains and/or the lagoon. This could lead to siltation in downstream areas and may cause flooding.

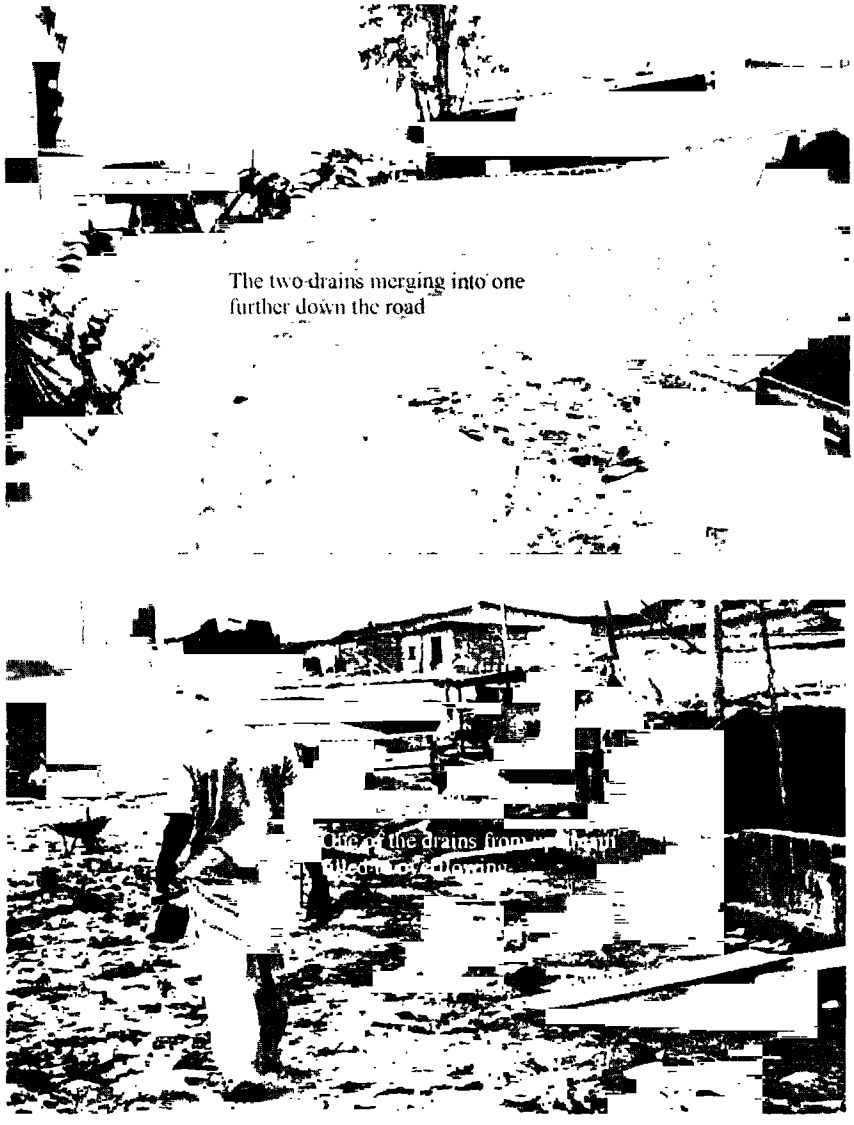


Figure 6-1/6-2: Clearing these drains may lead to flooding in downstream areas

Socio-economics

- *Traffic*

The main transportation impacts of the proposed project will be reflected in terms of heavier vehicular movement. With improved roads and other facilities, more visitors will frequent the area, and thus traffic density will increase. This could contribute significantly to the exacerbation of traffic jams and hold-ups in the area. Apart from emissions from exhausts, the traffic situation could impose physiological stress on neighbours of the residents of the area, in addition to significant man-hour loses in traffic.

- *Local Economy*

The impacts of the project on the local economy are largely positive.

- Vehicle Accident

With improved road quality, there is likelihood that they will increase speed around these areas. Given the fact that many of the inhabitants of the slum area are currently used to bad roads and are therefore in the habit of walking carelessly along roads and leaving little children to roam the streets, there is a chance that there will be increased occurrence of people being run over, especially little children. If injuries and fatalities occur, it could lead to revolts and social conflicts between residents and transporters.

- *Population Structure Effects*

The project potentially offers employment opportunities for both skilled and unskilled labour and may bring financial benefits to members of the communities in the project areas. It is anticipated that job seekers will migrate into the project area. There is already a preponderance of males over females in the project area therefore; the implementation of the slum upgrade project can further underscore this dominance of male population over females.

Other population impact sources include the fact that the upgraded slums will become more attractive for people to live in. As such, people who are currently hard-pressed for accommodation will relocate into the area and thus, in addition to population structure alteration, the proposed project could lead to an increase in population density in the area.

- *Local Economy*

The impacts of a project on the local economy will be both positive and negative. On the positive side, project activities typically stimulate the economy through cash injections, which come from the following sources:

i. Purchase/lease of landed property on which project is to be built

Typically, the land on which project activities are to be carried out belongs to either individuals, families or the community. Such land will have to be acquired and monetary injection into the system will generally buoys up the economy;

ii. Rental/Lease of landed Property

Improved infrastructure would result in increased demand for accommodation. This would improve the local economy as the prices of rent/lease of buildings, apartments and rooming structures would appreciate significantly e.g. significant increases in rent around Ibeshe area of Ikorodu has been reported in anticipation of the 4th Mainland Bridge. Therefore, upon the completion of the upgrade project, there is a high likelihood that rental of properties in the area may appreciate. While this may be a positive effect for property owners, it is a negative for potential migrants into the area.

iii. Patronage of Traders

For traders who deal in household items such as food, drugs, clothing, furniture, etc., there is a possibility of increased patronage from project workers.

iv. Employment Opportunities

The implementation of projects may offer some respite to unemployed youths. Even though most of the labour to be employed will be unskilled and semi-skilled, the fact that they have been removed from the labour market (albeit temporarily) would generally be welcomed.

The negative impacts that could result on the local economy include the following:

- *Inflation*

The most significant impact that may arise from project area is inflation. There is all likelihood that global prices of most items would increase. For instance, a dichotomy of prices is not likely; therefore

local as well as migrants will have to pay the same price. This will be obviously higher than what locals are used to paying and will thus generate resentments and ultimately, conflict between project workers and locals.

- *Occupational Shift*

Respondents who depend on fishing in the lagoon bound areas will change to salaried employment and this would result in reduced productivity and a commensurate increase in prices.

6.3 Mitigation Measures

Impacts on Peoples' Livelihood

The drainage rehabilitation may impact on peoples' livelihood due to the realignment needed, which may involve dredging, widening or narrowing of drains, and the provision of maintenance access reserve along the drains. Temporary access during construction may require the temporary demolition or displacement of structures. Kiosk operators may loose some land.

Mitigation measures that should be taken should involve the following:

- Compensation for damage to structures; and
- Payment for temporary loss of land use/utility

The mitigation measures should be guided by the provision of the Resettlement Policy Framework, which meets the requirements of the World Bank guidelines on involuntary resettlement. These include the preparation of a resettlement plan which addresses the following:

- Institutional responsibility
- Community participation
- Replacement cost, in cash or kind for loss of asset or income
- Assistance to tenants to find substitute accommodations
- Assistance to those whose livelihood are affected; and
- An implementation plan for resettlement

Slope, Erosion Drainage

Slope in the project area are gentle and are unlikely to give rise to major erosion hazard. Good construction practices should be followed to minimize localized erosion problems to avoid stagnant waters. Where stagnant water occurs it should be drained so as not to create mosquito breeding sites.

Spoil Disposal

The household refuse and human excreta removed from the drains prior to construction should be disposed off separately from other spoils. It should be carefully handled by the labour force wearing suitable protective clothing. Transportation of such materials should be made to proper disposal sites so as not to create unhygienic conditions and environmental hazards.

The large quantity of soil which may be disposed of should be used to reclaim low-lying land or to properly rehabilitate old refuse dumps. Any land reclamation opportunity should be analyzed against resettlement requirements for the project.

Noise and Dust Pollution

Construction of drains will generate some noise when heavy machinery is used. This will impact negatively on residents immediately adjacent to the work sites but will only be a temporary inconvenience. No special mitigation is proposed beyond ensuring that all heavy construction machines are equipped with appropriate and functional noise suppressor (mufflers).

Mitigation of dust includes spraying the affected section with water where dust generation becomes excessive for local receptors.

The temporary inconvenience of noise and dust are outweighed by the long term flood reduction benefits of the drainage improvements.

Contractors' Camp

The following aspects of the Contractors' Camps should form part of the contract document

- Entering into agreements with and payment of appropriate compensation to the rightful land owners;
- Supply of potable water in sufficient quantity;
- Efficient disposal of both solid and liquid wastes;
- Provision of medical services for the labour workforce including HIV awareness campaigns
- Rehabilitation or sites reclamation to the previous use or as per agreements.

Construction Traffic

Operators of vehicles and equipment must be qualified and experienced. They should undergo refresher courses and on-the-job training. They should observe strict maximum speed limits. The Project Contract Document should include a provision obliging the contractor to ensure responsible driving by his staff to enable Project Engineer to take appropriate measures in case of any complaints. Vehicles should also be regularly maintained.

Maintenance of the drains

No special mitigation measures are deemed necessary apart from regular maintenance involving removal of solid wastes, as well as desilting and repairing of both covered and uncovered drains. Refuse removed from the drains should be disposed off in proper and timely manner and it should not be left adjacent to the drains or roadways.

Encroachment on the mandatory access reserves must be prevented at all costs. Encroachment should be reported for immediate action to be taken.

7. ENVIRONMENTAL MANAGEMENT PLAN

7.1 General

The project's Environmental Management Plan (EMP) consists of the set of mitigation, monitoring and institutional measures to be taken during implementation and operation to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels. Essentially, the EMP preparation involves the following operations:

- Identify the set of responses to potentially adverse impacts;
- Determine requirements for ensuring that those responses are made effectively and in a timely manner; and
- Describe the means for meeting those requirements.
- In addition to mitigation and monitoring, the EMP involves capacity building and training, implementation schedules and cost estimates.

The critical point of the LMDP is the implementation phase where the environment could be degraded or improved upon. In order to be effective, environmental management must be integrated with the overall project management effort, which in itself should aim at providing a high level of quality control. Environmental management is carried out during all stages of the project planning, design and implementation.

This EMP has the following objectives:

- Protection of the environment from potentially harmful activities, and vice versa;
- Government institutional strengthening in conducting environmental protection and monitoring of the drains

These objectives can be achieved through having the PMU engaged in the following:

- Checking the progress of the civil contractors in implementing the mitigation measures outlined in the EMP
- Liaising with LASEPA and MOE regarding policies, procedures, and approaches for administering and monitoring environmental protection activities;
- Coordinating parties involved in the impact mitigation and enhancement process including : contractors, consultants, governmental officials as well as the public;
- Facilitating environmental monitoring and evaluation of the bio-physical and socio-economic isues concerning the drains;
- Conducting baseline studies.

Table 7-1 next page shows the EMP for the drainage component (which is the focus of this ESIA), while table 7.2 shows the EMP for the civil works of the some activities in the slum upgrading component.

Table 7-1: Environmental Management Plan for the Drainage Component

Impacts	Mitigation Required	Responsibilities for Implementation	Responsibilities for Monitoring	Cost
Eutrophication of water bodies, contamination of water from desiltation. Flooding downstream	. Spoils removed from the drains shall be promptly removed to avoid runoff. . Ensure drains downstream are cleared to avoid flooding downstream	Contractors, LAWMA, PMU	PMU, MOE, LASEPA, LAWMA	To be determined
physical and economic displacement, soil erosion	. affected property ownership/displaced persons should be adequately compensated per the provisions of the RPF accompanying this ESIA.	LASG, PMU,	PMU, MOE, Consultant	To be determined
Impairment of air quality by emissions from vehicles and combustion engines. Increase in noise level above hazard threshold limit. Dust generation from construction activities	. use noise attenuation measures, such as engine mufflers. . Combustion sources shall have high efficiency burners to minimize the emission of noxious gases. . Ear muff to be worn by construction workers. . Spray affected section with water	Contractors,	LASEPA, PMU, MOE	To be determined
Removal of spoils from drains will lead to increases flow of suspended materials and hazardous substances into the lagoon. Backwash into drains and run-off from rain	Increased turbidity impact is short-term. The drains shall be properly cleaned and wastes shall be contained as much as possible to reduce severity of impact. Evacuation trucks shall be permanently stationed at work sites to ensure all wastes are promptly removed.	Contractor, Communities PMU	LASEPA, MOE, PMU	To be determined

Positive impact through employment opportunity, and increase financial flow. Increase in traffic congestion from construction activities, water quality deterioration as a result of concentration of people and lack of public toilets	Project traffic should be timed not to complicate regular traffic flow. Basic amenities to be provided to cope with the influx.	Contractor, Government health officials	PMU	To be determined
Dredged materials will serve as breeding ground for diseases vectors. Improper solid waste management could constitute health hazards. Impaired health of handlers. Increase level of STDs as development will attract entrepreneurs, various traders and inevitably sex trade workers.	Prompt evacuation of dredged materials and other wastes to safe disposal sites. Training on handling of waste. Education of people on dangers of HIV/AIDS and other STDs	LAWMA, PMU, SACA, Government health officials	PMU, SACA,	To be determined
Attendant degeneration of air quality from exhaust emissions	The use of cleaner fuels.	Contractor	MOE, LASEPA	To be determined
Increased flow of water through the drains. Movement of suspended solids and other settleable solids through the drains may lead to flooding in downstream areas and enhance sedimentation	· drainages shall be cleared to the point of discharge into a larger and moving water body which has the capacity to absorb increased flows. · downstream drains should be expanded especially in areas where two or more secondary drains merge in	Contractor, Communities, PU, PMU	PMU, LASEPA, MOE, Communities	To be determined
There will be traffic congestion from increase in traffic density. Increased road accidents in the area	. traffic light should be installed in areas where bottlenecks are likely to occur. Road breakers should be installed. · traffic wardens should be deployed in areas where traffic lights are not functional.	LASG, Traffic Authority, Contractor in charge of rehabilitation,	PMU	To be determined

Table 7.2: Environmental Management Plan for some of the activities destined in the slum upgrading component

Activities	Impacts	Mitigation Measures	Implementing Responsi.	Monitoring Responsibility	Cost
Construction/rehabilitation of schools, markets, clinics	Soils Contamination from waste materials, e.g., cement and paints, engine oil, etc. Erosion and flooding from new construction.	Control and daily cleaning at construction sites, provision of adequate waste disposal services Appropriate design and siting of building, away from slopes with adequate drainage.	Communities, Contractor, PMU,	PMU, LASEPA, MOE	To be determined during proj. Implementation.
	Water quality and flow Water contamination due to materials and chemical. Blockage of drains. Contamination from latrines.	Regular cleaning of drains. Proper siting of facility and latrines in relation to water sources, maintenance of latrines			
	Air Quality Dust, noise odor, and indoor pollution	Dust control by water, appropriate design and sitting, restrict construction to certain time			
	Social Increased refuse	Regular clean-up. Provision of first-aid facilities or materials			
Water supply	Soils Soil degradation during construction	Revegetation and physical stabilization	Communities, Contractor, PMU, PU	PMU, LASEPA, MOE	To be determined during proj. Implementation.
	Water quality and availability Water contamination	Adequate protection from livestock, minimum distance from settlements and farms, ensure water at source is not used for bathing, laundering, animal watering etc			
	Seepage of contaminated water back into well	Measures taken to minimize seepage, e.g., by lining the well and extending casting above ground level, covering the well, installing hand pump or permanently attached bucket to draw water			
	Puddles around wells, cistern or storage tanks being turned into breeding sites for disease vectors	Permanently attached bucket to draw water			
	Overexploitation of aquifers	Adequate drainage around wells; storage tank should be covered			
	Biodiversity and forest Disturbance of Wildlife.	Proper aquifer studies			
	Loss of vegetation	Proper site selection. Minimize vegetation loss during construction.			
Solid Waste Management	Water quality Point source pollution from dump sites	Proper siting and design	Community, PMU, PU	LASEPA, PMU	To be determined during proj.

	Seepage of pollutants into aquifers Air quality Smoke arising from garbage burning. Foul odours Biodiversity and forest Loss of vegetation and disturbance Social Disease transmission from animals and insects	Proper siting and design Control burning. Cover garbage properly. Proper siting Adequate waste collection and disposal			Implementation.
Roads/Feeder Roads	Roadway blocking drainage channel for water runoff Ponding on roadways providing breeding sites for water borne diseases & vector of water borne diseases Erosion caused by inadequate drainage along roadways	Install bridges or culverts across natural & man-made drainage channel & perform routine maintenance to keep them clear of debris etc Road profile construction design to ensure rapid drainage off the road surface. My also involve raising the road above ground level. Construction drainage ditches along either side of the road, & if required, install check drainage dams to control water flow velocity. Road surface runoff directed into natural or man-made drainage channel. Maximize the number of receiving channels to avoid erosion.	Contractor, communities, PMU	LASEPA, MOE	To be determined during proj. Implementation.
Footpaths	Footpath blocking drainage channels for water runoff Ponding of footpaths providing breeding sites for water borne diseases & vector of water borne diseases Footpath becoming water courses during heavy rains & causing erosion	Install bridges or culverts across natural & man-made drainage channels & perform routine maintenance to keep them clear of debris. Design path to facilitate drainage & if necessary, raise above ground level. Provide routine maintenance to fill depressions with granular material. Construct drainage ditches along either side of the road, & if required, install check drainage dams to control water flow velocity. Road surface runoff directed into natural or man-made drainage channel. Maximize the number of receiving channels to avoid erosion.	Contractor,	MOE, LASEPA	To be determined during proj. Implementation.
Sanitation (Latrines & Sewage)	Soak pits overflowing & contaminating surface water Seepage from soak pits contaminating wells, boreholes & spring	Ensure that pits are located in soils where seepage can percolate Ensure location is an adequate distance from wells, borehole & springs	, PMU, Contractor	PMU, PU	To be determined during proj. Implementation.

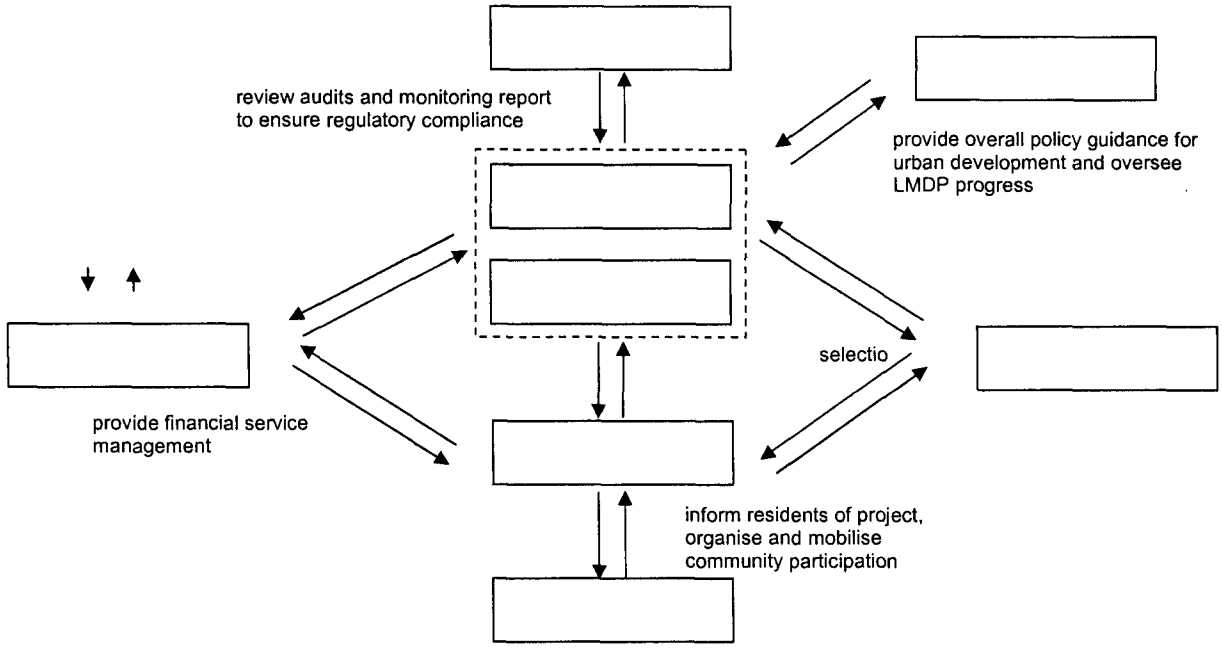
	Septic tank overflowing & contaminating surface water Disposal field overflowing	Through public health education campaigns, raise awareness about the dangers of exposed sewage. Establish and support affordable pump out services Establish and enforce guidelines for design and construction of disposal fields			
Socioeconomic	Increased incidence of water related disease Increased inequity Weaker community infrastructure Loss of assets and/or sources of livelihood in the list of likely impacts	Educate about the cause of disease. Improve health facilities Allocate time & money for public participation to ensure that plans are optimal, that all sections of affected society are considered & local institutions are in place to sustain irrigated agriculture Consider markets, financial services & agricultural extension in conjunction with proposed irrigation and drainage changes Ensure that agricultural intensification does not preclude economic or subsistence activities	Communities, PMU, PU	LASEPA, PMU	To be determined during proj. Implementation.
Street lighting and domestic supply	Accidents as a result of exposed electrical components	Routine maintenance of the Electrical systems	Contractor, PMU	PMU, Contractors	To be determined during proj. Implementation.

7.2 Resources for EMP implementation

The resources required for implementing the EMP are basically personnel and finance. The key stakeholders in the environmental management activities are the project engineer, the contractor, PMU, ministry of environment, LASEPA and to some extent the public. Resources for monitoring the compliance by the PMU will be provided under the project.

The PMU shall establish a system to implement a process to comply with all relevant policies and procedures. Figure 7.1 shows the system to be used for managing the LMDP, particularly relationships and reporting responsibilities.

Figure 7-1: EMP Implementation System



7.3 Institutional Requirements for Implementing the EMP

The overall objective of the project is to ensure that the LMDP integrate harmoniously into the communities, and that the operation will provide an opportunity for the selected project areas to play an active part in regional development. The PMU will provide staff to achieve the following objectives:

- propose management rules and specific measures that are compatible with sustainable development while implementing the project
- promote awareness by its personnel and the general public regarding environmental protection,
- propose concrete means of applying the EMP.

The environmental specialist attached to the PMU will be responsible for the implementation of the EMP in close collaboration with LASEPA and MOE.

Alternatively, EnvironQuest has identified several skills that are requisite to ensuring compliance to the EMP. The management plan will be executed by a group of professionals to be hired by the PMU or sourced from existing institutions (Ministry of Environment and LASEPA). These professionals will be qualified in the following disciplines:

- Environmental Assessment & Monitoring
- Soil & Water Conservation
- Civil Engineering
- Public Health
- Sociology and Socio-Economics

These individuals will form the core of the EMP implementation team that will be accountable directly to PMU Coordinator. Initiatives should be taken to ensure each person identified to implement specific aspects of the EMP fulfil their responsibilities as part of their daily activities. Each individual will be

required to develop a process to ensure implementation of the EMP occurs in a structured and formal manner and to ensure that personnel identified to assist in performing tasks defined in the EMP have the necessary skills to manage the environmental aspects of their work. The PMU will present all results of environmental monitoring to the LASEPA and will indicate which specific member of the EMP team should be contacted for clarification of issues outlined in the results presented.

The environmental specialist of the PMU will be responsible for the implementation of the environmental monitoring and the EMP. His/her responsibilities shall include:

- Coordinate, liaise with and monitor the contractors
- Compile and prepare periodic environmental reports for submission to the World Bank
- Review ESIA reports from consultants in collaboration with LASEPA and MOE
- Data Management
- Inspection of Drains

7.4 Capacity Strengthening

In order for PMU and Project Units to carry out the environmental assessment responsibilities required by the LMDP, institutional strengthening will be required at several levels. Capacity building will encompass PMU, PUs and the other state agencies involved in the implementation of the Project. LMDP should therefore ensure that the following concerns and needs are addressed:

- Institutional structuring within the relevant departments to ensure that required professional and other technical staff are available;
- Establishment of consultancy groups to ensure cross departmental discussions and information exchanges.

Table 7-3 shows the capacity strengthening measures.

Table 7-3: Institutional Capacity Strengthening Program

Target Audience	Description	Application	Duration
PMU staff	General environmental awareness seminar that will include ecological and social science principles, legal responsibilities, consequences of non-sustainable development, costs of poor environmental decisions, and introduction to the EIA process.	Personnel require appreciation of WB's, Federal/State environmental policies, as well as, an appreciation for the need to support environmentally sustainable development.	Three days seminar
PMU's Environmental specialist, LASEPA and MOE environmental and social specialists	An in-depth comprehensive course on environmental management including legal requirements, EIA methodology, Impact determination (methods) and mitigation analysis, public involvement methods, EMP preparation, monitoring techniques, preparation of EIAs, TORs, and other. Course will include field visits and classroom exercises.	The target audience will be responsible for EA review at the State level and for preparing TORs for EIA consultants as well as monitoring consultants' work and final approval of EIAs. Target audience will also be responsible for conducting environmental audits on selected sub-projects and for periodic monitoring of sub-project implementation to ensure compliance.	10 days workshop
PUs Staff	General environmental awareness seminar that will include ecological and social science principles, legal	Local Government level staff requires an appreciation for the WB's and Nigerian	One day

	responsibilities, consequences of non-sustainable development, costs of poor environmental decisions, and introduction to the EIA process.	environmental requirements, as well as, an appreciation for the need to support sustainable development.	

To successfully implement this ESIA, it is recommended that that a comprehensive training needs assessment and development of a training strategy plan be carried out as an initial implementation activity which will, inter alia, determine and conform whether the intense training programme proposed will suffice or is required. It is further recommended that technical assistance from more experienced environmental practitioners (from LASEPA for example) to "mentor" local government staff and support them in building experience to complement the training programme already mentioned earlier and thus build their capacity.

7.5 Cost estimates

The cost estimates are based on the assumption that resource persons are likely to come from other parts of the country and therefore require travel allowances; participants will come from local communities and attend during the day only but will receive a per diem. These estimates include an allowance for travel expenses. It is proposed that the training programme will be implemented two times a year, over first four years of the project cycle. The total cost is estimated at US $ 750,000.

7.7 Monitoring

This is elaborated in the next chapter—on monitoring plan

7.7 EMP Budget and Responsibilities

Based on available data, a sum of US$150 million will be allocated to the project. Of the total budget, it is recommended that at least 5% of the total budget will be allocated for environmental and social concerns.

Table 7-4: Budget and Responsibilities

Item	**Budget** (estimate)	**Responsibility**
Mitigation	$2,500,000	PMU/LASEPA/MOE
Management	$750,000	PMU
Capacity Strengthening	$750,000	PMU/World Bank
Monitoring	$1,500,000	PMU/LASEPA/MOE
Total	**$5,500,000**	

8. MONITORING PLAN

The PMU's environmental monitoring program for the implementation of the LMDP will serve as an integral part of the operational activities and is expected to generate the requisite information for environmental management and environmental information dissemination.

It is anticipated that monitoring will be conducted during all phases of the project: design, siting, construction and operation. This plan will play a pivotal role in ensuring that the trends for specific parameters are tracked and it will provide information on compliance with legislative norms, set guidelines or desirable operational limits; and form the basis for corrective actions and modification of activities if necessary. The intensity of sampling will depend on the time and location of the development activities and results derived from monitoring data.

8.1 Monitoring Objectives

The aim of the monitoring is to establish appropriate monitoring criteria to verify the predicted impact of the LMDP, and to ensure that any unforeseen impacts are detected and the mitigation adjusted where needed at an early stage. The monitoring will keep relevant records to ensure compliance with sound environmental procedures recommended. The monitoring plan will ensure that mitigating measures and impacts of the project during construction and operation phases are implemented. Adequate funds will be provided for this purpose through the project.

The monitoring plan is to demonstrating whether an environmental change has occurred that is adducible to the upgrade activities and to forewarn proponents of unanticipated adverse impacts or changes in impact trends. Other specific objectives of the monitoring plan are to:

- check the effectiveness of suggested mitigative measures;
- demonstrate that the project activities (construction and operation) are carried out in accordance with the prescribed mitigation measures and existing compliance regulatory procedures; and
- provide early warning signals whenever an impact indicator approaches a critical level.

Impact indicators are defined in terms of carrying capacity, threshold levels, and regulation and enforcement standards. Implementation of the EMP will allow the PMU to potentially control and manage the timing, location and level of impacts and potentially provide the cause and effect data for the empirical verification or validation of various predictive models of action/impact relationships.

Construction Phase

The aim will be to assess the mitigation measures for noise, vibration, water quality, dust, air quality and public safety using visual assessment by the management and feedback from the other stakeholders. The nature and extent of pollution observed will be determined by laboratory analyses of samples taken from site. Appropriate measures should then be taken to rectify the problem.

Operation and Maintenance Phase

The monitoring plan at this phase will ensure that the negative impacts of the operation and maintenance of the drains are reduced to barest minimum. This will guarantee the safety and health of employees and the public at large. This would include:

- Occupational hazards and accidents
- De-silting and removal of solid wastes
- Repairs to damage drains
- Education of public on wastes dumping in drains

8.2 Monitoring Requirements

A monitoring program requires a number of components to ensure effective results. These include:

- Relevant baseline data against which to monitor project results;
- Verifiably objective indicators for each project and project component for which monitoring will be conducted;
- An independent body responsible for monitoring;
- Those responsible for monitoring must have the capacity for such;
- Monitoring on a regular basis;
- An effective monitoring reporting mechanism including feedback and commitment to action on monitoring results and recommendations.

Table 8-1: Monitoring Variables, Linkages, Indicators to be Considered, and Baseline Data to be Considered

Variable to be Monitored	Linkages	Indicators to be Considered	Baseline Data to be Considered
Natural Habitat:			
Habitat	Rare and endangered species needs	Area and quality of habitat	
Flora		Populations of important flora	Current species list and numbers
Fauna		Populations of important fauna	Current species list and numbers
Wetlands	Importance for flora and fauna and for flood control and provision of goods and services to local communities	Area of wetlands and numbers; integrity of wetlands re: providing goods and services	Inventory of wetlands – number and size; hydrological cylces and downstream effects
Fishery Resource:			
Populations	Community economic needs; water quality and quantity	Population size and offtake	Current population and offtake
Species composition	Ecosystem health; water quality and water quantity	Species mix	Current species mix
Cultural Resources:			
Cultural sites	Cultural and social systems and community needs	Sites remaining	Inventory of sites
Social systems	General community and individual member satisfaction	Community social structure	Current social structure and important aspects of structure
Water Resources:			
Groundwater quality	Health, crop production, desertification	Quality of water (chemical composition)	Current chemical composition
Groundwater quantity	Health, irrigation	Depth and yield	Current depth and yield
Surface water quality	Health, natural habitats, flora and fauna, irrigation	Quality of water (chemical analysis / indicator species of water quality)	Current chemical composition / fauna and flora inventory (e.g. macroinvertebrates, microinvertebrates, microflora)
Surface water quantity	Health, crop production	Yields and flows (seasonal)	Current yields and flows (in different seasons)
Soil Resources:			
Soil erosion	Crop productivity, cultivation techniques, watering points, livestock management	Sediment loading	Sediment loads
Soil quality – chemicals	Pesticide use	Chemical analysis soil	Chemical analysis of soil
Soil quality – waterlogging	Irrigation, drainage	Soil analysis, crop production	Soil analysis, crop production on controlled plots where possible
Air quality:			

Bush burning	Crop production, forest harvesting	Number of fires and area burned	Current level of frequency of fires and area burned
Health:			
HIV/AIDS	General increased activity through the project	Incidence of HIV/AIDS through clinic records	Existing levels of HIV/AIDS
Water borne diseases	Drainage, irrigation	Health statistics at local clinics	Status of health re: water borne diseases
Other social:			
Economic need from other natural resources (forestry, fishery)	Irrigation, drainage, conflicts	Harvest results, population size, area under forest cover, forest stand condition	Fishery population by species, forest stand volumes and areas
Conflicts	Land and resource use	Number and nature of conflicts	Current conflict levels and number and nature of conflicts from NFDP-I

Table 8-2: Cumulative Impacts – Monitoring Indicators and Possible External Factors

Impact	Indicator	Contributing External Activities
Loss of habitat	Total area and number of imporant habitats	Urbanization; road development; other development
Loss of wetlands	Area and number of important wetlands	Other irrigation and drainage projects
Groundwater quality	Chemical composition	Industrial pollution (effluent discharge); other agricultural activities
Groundwater quantity	Extraction rates and depth of water table	Industrial and other municipal extractions
Surface water quality	Chemical composition; biotic community	Effluent discharge from municipalities and industrial complexes
Surface water quantity	Flow rates	Extraction for power, industrial and domestic uses
Air quality	Chemical composition	Industrial air emissions; high volume and high concentration of vehicular traffic
Health: HIV/AIDS	Reported cases at clinics	Infrastructure activities attracting outside workers; other new development; expanding urban areas
Health: Water borne diseases	Reported cases at clinics	Other irrigation activities
Conflicts	Number of documented conflicts and nature and seriousness of conflicts	Any other development activity planned and implemented in absence of full participatory planning

8.3 Monitoring Plan Procedure

The Environmental Specialist of the PMU will prepare a long term monitoring strategy and this will encompass clear and definitive criteria and parameters to be monitored for each specific site and in each community. The monitoring plan and will take into consideration the scope of development, environmental and social sensitivity and the financial and technical means available for the monitoring plan. The plan will identify and describe the indicators to be used, the frequency of monitoring and the standard (baseline) against which the indicators will be measured for compliance with the EMP.

Monthly monitoring plans will be prepared by the PMU. These plans will define the specific issues to be monitored including, the natural habitat, land use, soil/water, and social impacts. Monthly monitoring will take place throughout the life of the project. Table 9-5 provides an indication of the variables that will be monitored (as these relate to the EMP, not to the overall project), possible indicators to consider, baseline data to consider, and linkages with other variables.

Under this component (II), monitoring should be carried out once a month for the rainy season months of April, May, June and September and October.

Quarterly and annual reports will be submitted to LASEPA and to other appropriate agencies. All monitoring components will be subject to audit, internally by the PMU and externally by LASEPA/MOE. Each monitoring programme will follow the established schedule; monitoring may be performed daily, weekly, quarterly, semi-annually, annually, biennially, or continuously, depending upon the resource, regulatory requirements for regulatory monitoring, and the project-specific requirements for other monitoring. Monitoring results will be compiled when due and communicated to the LASEPA/MOE as appropriate.

9. CONSULTATION PLAN

9.1 Introduction

The PMU has responsibilities to effectively engage stakeholders in achieving the LMDP objectives for the benefit of all.

The LMDP which is to be implemented depends on the meaningful participation of all stakeholders for success. During the preparation of the ESIA and RPF, the consultant met with communities, Project Units, relevant agencies and the PMU

9.2 Objectives

This plan provides a framework for achieving effective stakeholder involvement and promoting greater awareness and understanding of issues among all the stakeholders so that the project is carried out effectively within budget and on-time to the satisfaction of all stakeholders.

To ensure effective implementation of this plan, the PMU shall be committed to the following principles:

- promoting openness and two way communication with stakeholders
- clearly communicating objectives and values to stakeholders
- ensuring effective stakeholder involvement in the development of the project.
- increasing the stakeholder's knowledge and understanding of the project implementation process
- using all strategies and techniques which provide appropriate, timely and adequate opportunities for all concerned parties to participate.
- evaluating the effectiveness of the engagement plan in accordance with the expected outcomes.

9.3 Identifying Stakeholders

Stakeholders for the purpose of this project shall be defined as all those **people and institutions** that have an interest in the successful planning and execution of the project. This includes those positively and negatively affected by the project. To identify the key stakeholders, Table 9-1 was developed.

Table 9-1: The Stakeholder Identification Matrix

Those who may be affected by the project:	
These may include	**How to identify them**
People living in the vicinity of the proposed works.	• Identify the local government area(s) that falls within 1 km radius of the proposed sites. • Review available data to determine the stakeholder profile of the whole stakeholder or relevant group. • Use identified groups and individuals to tap into stakeholder networks to identify others.
Special interest groups.	• Identify key individuals or groups through organised groups, local clubs, community halls and religious places. • Organisations such as environmental groups would be aware of similar local groups or individuals.
Individual people who own properties that will be directly or indirectly affected.	• Advertise in local newspapers, telling people that they may be affected and asking them to register interest in attending meetings or receiving further information.
Business (owners and employees).	• Council lists or property registers.

9.4 Consultation Strategies

The consultation process shall ensure that all those identified as stakeholders are consulted. Subject to PMU's approval, the PUs should share information about the project with the public, to enable meaningfully contribution, enhance the success of the LMDP.

Public consultation should take place through workshops, seminars, meetings, radio programs, request for written proposals/comments, questionnaire administration, public reading and explanation of project ideas and requirements. The consultation plan would be monitored by LASEPA and MOE who will set their own verifiable indicators to assess the degree of participation of the key stakeholder during all the phases of LMDP implementation.

9.4.1 Level of Engagement

The level of stakeholder involvement would be based on the project phase, location and expected outcome. Small projects would require less complicated stakeholder involvement programs as the issues are likely to be less complex and their impact smaller. This section is a guide to determining the level of stakeholder involvement required.

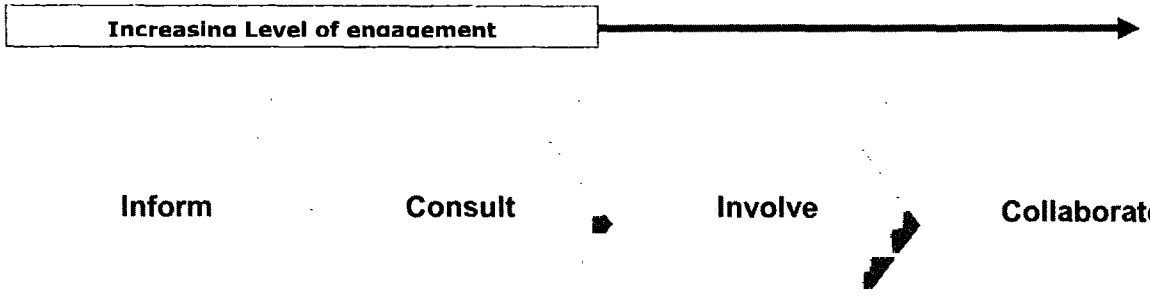
Specifically, the extent of stakeholders' involvement would be based on the following

- the project is likely to have significant impacts, that is, high impacts in one area/location, or relatively small impacts spread out over a large area.
- the project involves significant issues, that is, the wider stakeholder may be affected.

Table 9-2: Consultation Plan at Project Phases

Project Stage	Activities	Institutional Responsibilities
Implementation	Preparation of compensation packages, ESIA review	LASEPA/MOE, PMU
Monitoring	Review of verifiable indicators	LASEPA/MOE

Figure 9-1: Spectrum of Engagement



Objective	Objective	Objective	Objective
Provide public with objective information to assist them in understanding the issue.	Obtain public feedback on analysis, alternative, or decision.	Work with the public to ensure concerns are understood and considered.	Partner with the public in identification of preferred solution.
Tools	Tools	Tools	Tools
Meetings Public Notice Exhibition	Questionnaires Surveys Focus Group	Networking Questionnaires Notice Exhibition	Meetings Public Notice Exhibition

Through these engagement strategies; the PMU would be able to:

- clarify the project's objectives in terms of stakeholders' needs and concerns
- identify feasible alternatives (in particular alternative locations) and examine their relative merits in terms of environmental, social and economic factors
- identify and prioritise environmental issues, and establish the scope of future studies
- identify processes for continued stakeholders' involvement.

10. ANALYSES OF ALTERNATIVES

General

The Lagos State Government is totally committed to achieving the objectives, which is to improve the drainage in the selected areas. Drainage has a top priority in the government development agenda, mainly due to the cross-cutting impact of safe water on health, productivity, and quality of life, with serious implication for poor and vulnerable communities.

IDA support for the LMDP is based on her decision bias towards new construction rather than maintenance, it was important for the team to stress the need for a change in the behaviour and processes for decision making over public expenditures, both capital and recurrent, so that capital investments in any sector take into account realistic and affordable expenditure requirements over the design life of the capital investment in that sector. This would establish the institutional framework for sustainable operation and maintenance of the drainage system, before the network was further expanded. Drainage support is therefore limited to supporting maintenance, rehabilitation, and reconstruction of the existing network.

The LASG also realizes the acute and severe flooding problems facing the state. Three project alternatives are considered. These are:

The "Do-Nothing" or Null Alternative

The Null Alternative implies that the current state of drainage deterioration will continue to such a deplorable condition that it would become unsafe for the general public. It will also result in high mortality rates (leading to higher incidence of outbreak of diseases). Residents of these low income deprived areas will also be denied reliable facilities. Therefore the do nothing alternative will worsen the present situation and worsen poverty at the same time. This is not an option.

Delayed Project Option

This option implies postponing the proposed activities. This is not advisable considering the severity of the persistent flooding in Lagos and since the prevailing economics and the political environment is favourably disposed towards the project.

The implication, therefore of delaying the project will mean that all processes that have been put in place for the project implementation will have to be demobilised. Also, because of the inflationary trends in economy, such a delay may result in unanticipated increases in project costs. These, and other related problems make it unattractive to adopt the delayed project option

Alternative Site/Location Option

The existing drainage routes are considered optimal both in terms of design, needs and political consideration.