ASSESSING THE EFFECTIVENESS OF SEWAGE DISPOSAL MANAGEMENT IN ABUJA, NIGERIA.

BY

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FEBUARY 2009.

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FEBUARY 2009.

DEDICATION

For every reason, I give God the glory for making this research work a reality.

DECLARATION

I Okpara, Onyekachi Anthony declare that this project title, Assessing the Effectiveness of Sewage Disposal Management in Abuja, Nigeria is a record of my own research. It has not been presented analysis for a higher degree or any other purpose. All sources of information used have been duly acknowledged.

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04/06/09
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CERTIFICATION

This thesis titled: Assessing the Effectiveness of Sewage Disposal Management in Abuja, Nigeria, by Okpara Onyekachi Anthony (M.Tech/SSSE/2005/1459) meets the regulations governing the award of the degree of M.Tech of the Federal University of Technology, Minna and is approved for its contribution to scientific knowledge and literary presentation.

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ABSTRACT

The beauty of an environment is incomplete without adequate provision of a befitting sewage disposal system to augment the provision of other essential amenities like electricity, water supply, road network and so many others. The project was aimed at assessing the effectiveness of the management of sewage in a modern city with Abuja municipality as a case study. The essence of good sewage disposal system is very important especially in Abuja. The analysis shows that if adequate provision is not made to up grade and complete the existing sewage facilities in the Federal Capital Territory, the might be a collapse of the sewage system due to pressure which might result in outbreak of diseases. Most data collected for the research were obtained through interviews and personal discussion with staff of Abuja Environmental Protection Board (AEPB), structured of questionnaire administered on residents of the Federal Capital Territory and physical observation by the researcher. The result shows that the sewage disposal system has been neglected for a long time which has resulted to a lot of problems within the Federal Capital Territory. The research also recognized the inability of the A.E.P.B to handle the sewage disposal system as a result of lack of adequate manpower and finance. The Federal Capital Development Authority should revisit the initial plan of the sewage disposal plan of the Abuja Municipal in other to up-grade the facilities. The need to employ professionals to run the A.E.P.B is also very important.

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ABBREVIATION

A E P B	-	Abuja Environmental Protection Board
F C C	-	Federal Capital City
F C D A	-	Federal Capital Development Authority
F C T	-	Federal Capital Territory

CHAPTER ONE

INTRODUCTION

Abuja, the Federal Capital of Nigeria was created, due to the inability of Lagos, the former capital city, to efficiently and effectively perform its role as a Federal Capital, because of its multiple roles or station as a state and a Federal Capital which brought about amongst other things problems of housing, overpopulation, poor drainage, poor sewage disposal and overburdened infrastructural facilities and service like electricity, wholesome water, road, telecommunication and so many others.

To ease above problems, the government established a new Federal Capital Territory in Abuja and embarked on the construction of houses and infrastructural facilities for the people moving into the Territory with the plan to avert the problems encountered in Lagos.

The Abuja Municipality comprises the Central Area, Garki I, Garki II, Wuse I, Wuse II, Asokoro, Maitama, Gudu, Utako and Jabi district and the waste water collection system for the city is the integrated trunk sewer collection system with a treatment plant. The system is a gravity collection system with no lift stations, force mains or other powered devices which is made possible by the good terrain the city has. In order to reduce the load on the waste water treatment plant, the separate system is adopted, that is storm run-off is not allowed to enter the stationery sewage (The Abuja Master Plan, 1979).

The construction of the interceptor sewage schedule I and III which take the sewage from the city to the sewerage treatment plant has attained 90% and 97% completion respectively. The construction of schedule II has attained 65% completion level.

The construction of the pilot starter sewerage treatment plant, which is to cater for the city's initial population of about 200,000 people has been awarded since 1981, and has attained 65% completion. As a temporary measure, most of the built up areas of city were provided with septic tanks which are considered adequate for the present population. (The making of a new capital, 1995).

Public utilities are fraught with management problems. Up-till date the treatment plant for Abuja municipality is yet to be completed.

Considering the huge amount of money spent so far by the Federal Government for effective sewage disposal, construction works are still going on especially on the treatment plant. Also sewer lines in use are channeled to streams with the attendant danger on the inhabitants of the city and environment in general. Also there is the problem of blocked lines causing surges in most parts of the city.

1.2 STATEMENT OF THE PROBLEM

In the study area, it is discovered that most parts of the municipality experience offensive odour and streets messed up as result of sewerage from manholes. It is observed that with effective sewage disposal management these problems should not to be experienced.

The above problem if allowed to continue will have effect on the environment because sewage disposal is as important to the city or environment just as there is need for adequate position of complementary facilities like road network, drainage system, electricity, and telecommunication and so on.

1.3 AIM AND OBJECTIVES

The aim of this research work is to appraise the effectiveness of sewage disposal management in Abuja municipality of the Federal Capital Territory.

To achieve this aim, the following objective shall be pursued:

(i) To asses the functionality and adequacy of facilities provided by the government in Abuja Municipal area.

(ii) To identify the problem encountered by Abuja Environmental Protection Board in the management of sewage in Abuja municipal area.

(iii) To identify the problems encountered by the general populace using the sewage disposal facilities and proffer solutions to them.

1.4 DESCRIPTION OF STUDY AREA

The thought of a new capital was conceived when Lagos became congested because of its multiple role as a state and federal capital. Thus, the need for a new capital for the nation. The study will be beneficial to both the policy formulators in the public sector and investors in the private sector.

As contained in Murtala and others (New Nigerian Newspaper 1998). The search for a new federal capital for Nigerian began in earnest on 9th of August 1975 when the then military government set up the Justice Aguda Panel to examine the dual of Lagos as both federal and state capital and advice on the desirability or otherwise of Lagos retaining that role.

The problem of Lagos as a national and state capital, chief seaport and main industrial and commercial center became too complex and intractable, and arose the corner of most patriotic Nigerians.

The Aguda Panel was amongst other things to recommend which of the two governments-federal or state should move to new location in the event of their finding Lagos unsuitable for its dual status. Were they are to decide that the federal and not state capital should move, they should recommend a suitable alternative site for new Federal Capital Territory. The panel submitted its report

in December 1975 and recommended that the Federal Capital of Nigeria be sited in a vast, virgin territory in the country's heartland.

The factor responsible for the choice of Abuja were central location and easy accessibility from all parts of the country, healthy climatic conditions, low population density, available of land for future expansion, physical planning, convenient and ethnic record.

1.4.1 STUDY AREA LOCATION

As contained in the making of a New Capital City (1986) the Federal Capital Territory is located in the geographical centre of the nation. It lies between latitude $8^0 5^I$ to $9^0 20^{'}$ North of the equator and longitude $64^0 S^I \sim 7^0 39^I$, east of the Greenwich meridian. This geographically places it at the north of Kaduna State. Being centrally located, Abuja is easily accessible from all parts of Nigeria and indeed, the principal cities of Africa.

Placed in the North-Eastern quadrant of the territory and in a position easily identified as Aso hill is the crescent shaped city, Abuja, the new Federal capital a mere 3% of the Territory.

1.4.2 PHYSIOGRAPHY OF REGION

As contained in Berger-Soge-Unecon (1981) "Much of the Federal Capital is underlain by crystalline igneous and metamorphic rocks of Precambrian age. Sandstone and clay-stone of cretaceous age overlies Precambrian rocks in much of the southern parts of the territory. Latrite of probable tertiary age caps many hills of cretaceous rock and some hills of Precambrian rock farther north, and crops out near banks of streams in the eastern and northern plain. Alluvial sediment is found in the beds of all streams, but is of marble size only along a few of the largest rivers" soil within the territory comprises two major groups. The first is composed of poorly to well-drained sand and still-stand soil, which covers a major part of the territory, provided good drainage and excellent foundations materials. The second consists of clayed sand and sand-clay mixture, which overlies both cretaceous rocks in the southeast and metamorphic mica-rich schist in the southeast having lower permeability and poor drainage, and is less desirable as foundation material.

Topographic features of the erosional plain include insulters, whalebacks and rounded hills, and are mainly granite in composition. The area crossed by high tectonic ridges and principally shared meta-sedimentary rocks cross the areas.

Principally the northeast trade and southwest monsoon winds determine climate within the Federal Capital Territory. The northeast trade winds occur between

October and April bringing long cloudless days, high temperatures and the harmattan (a dry wind blowing a fire dust from the Sahara region).

The southwest monsoon winds occur between April and October, bringing approximately 1,600mm of rainfall to this area. Rainfall over the capital is not evenly distributed, the south receive more than the north.

The unique topographic features of the Gwagwalada plain and the Bwari Aso Hills give rise to many small microclimate conditions over the territory (berger-soge unecon, 1981).

1.4.3 THE PEOPLE AND THE POPULATION

Abuja is inhabited by people from across Nigeria, it is a city owned by not individual ethnic groups or states, but all citizens of Nigeria.

For the fact that Abuja was carved out of three states in the Federal, it is obvious that apart from English, the official language, are Hausa, Igbo and Yoruba Nigerian major languages, several other district dialects are being spoken in various communities of the territory. The international planning Association (IPA), the designers of the master plan, projected the population of the territory to hit ideally a 3.1 million mark a: completion of the 4^{th} and 5^{th} (final) development phase of the territory.

Since the movement from Lagos began in 1982, the population of Abuja has been growing. The population of the territory as recorded in 1991 national census was 378,571. However, with the final movement of the Federal Government Ministries and parastatals as well as other multinational corporations, the population today is put at over 4 Million. (2007 National Census).

1.4.4 PLANNING AND DESIGN OF ABUJA.

The Federal Capital Territory is divided into six (6) area councils namely:
Abuja Area Council, Abuja Municipal Area Council, Gwagwalada Area Council, Kuje Area Council, Bwari Area Council and Kwali Area Council, Abuja Municipal Area Council (AMAC) comprises Asokoro, Maitama, Wuse, Garki, Gudu, Jabi, Utako and Central Area. Popular towns and village in AMAC often referred to as satellite town are Karshi, Nyanya, Gwagwa, Karmo, Karu, Jiwa, Kubwa, Ushafa, Sarki Share etc.

The site of the capital city and seat of government occupies an area of about 250sq kilometers. The Abuja master plan is projected to carter for 3.1 million people in the land of about 800,00sq kilometers when fully developed. The physical development of the territory is planned into four phases. Phase one is expected to accommodate 230,000 people while phase 2,3, and 4 are expected

to provide for 585,000; 640,000 and 1.7 million people respectively. (The making of a Capital City, 1995).

The first phase which has been developed, involved the development of the Federal Capital city (FCC) Abuja, a crescent shape city that covers approximately 250sq kilometer (3% of the total land ~ of the territory, is divided into;

(i) Central Area

(ii) Garki I & II

(iii) Wuse I & II

(iv) Asokoro

(v) Maitama

(vi) Utako

(vii) Jabi

(viii) Gudu

Table 1.1: **A Table Showing The FCC District Land Allocation And Population.**

	Land Budget in Hectares	Planned Population	Present Population
Central Area	1,685	30,000	120,000
Garki	865	50,000	210,326
Wuse	1,530	69,000	89,007
Asokoro	897	30,000	73,568
Maitama	1,050	35,000	106,712
Total	**6,000**	**214,000**	**599,613**

Source: Development control FCT Abuja (2007).

With the exception of the central area, the other districts are of mixed residential, and office accommodation for both public offices and private individuals structures for numerous government and private organizations as well as individual families.

The population which is high in the study area underscores the need for efficient and adequate sewage disposal in Abuja municipality and the need for effective and efficient management. It is observed that the sewage disposal management is not adequate.

In the next chapter emphasis will be paid on literatures on the subject mater of the research work..

1.5 SCOPE OF STUDY

This study is limited to the facility provided for in the disposal and treatment of the sewage in Abuja municipality, the agency saddled with the responsibility of managing these facilities and finally identifying and assessing problems encountered by the agency and the general populace making use of this facility in Abuja.

The research therefore covers the management of sanitary or domestic sewage in Abuja municipality, which include areas such as Asokoro, Garki, wuse, Maitama Central Area, Jabi, Utako and Gudu.

1.6 LIMITATION OF STUDY

There were a number of difficulties encountered by the researcher in the course of this study; among the problems were that of data availability and collection.

1.7 SIGNIFICANCE OF STUDY

The study is undertaken in view of the fact that effective sewage disposal is as important to the environment as other facilities like hospitals, roads, water, electricity are to the society, hence, the need for efficient and use of resources to achieve this.

CHAPTER TWO

LITERATURE REVIEW

Sewage is not first made up of human excreta and water; it can also contain hundreds of toxic chemical and metals which enter the system from households, business and industrial operations. This toxic come from solvent detergent inks, pesticides, paints, and is multiple of other ingredients or modern house hold and business. Sewage also includes debris such as gravel, grit, tampours ranks etc. Tons of food wastes from sink grinders add to the leads. (Steel and McGhee [1979]). According to Wikipedia encyclopedia sewage is mainly liquid waste containing some solids produced by humans who typically consist of washing water feces, urine, country waste and other materials which go down drains and toilets from households and industries It is one type of waste water and is a major central or potential source of pollution especially in urban areas. It is estimated that pollution of drinking water due to feces is by far the biggest cause of death worldwide [UNDP (2006 REPORT)].

2.1 HISTORICAL PERSPECTIVE

The first sewage system has been found at the prehistoric Middle East and the surrounding area. The first time an inverted siphon system was used, along with glass covered clay pipes was in palace gate of Greece. It is still in working condition after about 3000years. The system then remained without much

progress until the 19th Century where in England; Sir John Harington invented a device for Queen Elizabeth that released waste into ceespool (Wikipodia encyclopedia).

The History of sewage system in Nigeria is interwoven with the growth and expansion of early settlement especially Lagos Island. As early as 1862, the colonial government had observed that the street of Lagos needs straightening, widening, draining and clearing of waste from households

In 1873 a gazette by the Acting colonial Surveyor specified that:- "Household and owners of unoccupied lands throughout the town are required to keep the streets clean around their premises by sweeping them at least once a week as well as cutting and clearing away bush and grass and removing other sources of nuisance. "In 1877, an inspector of Nuisance was appointed (the first Sanitary Inspector), to ensure among others that garbage was collected and street swept.

Introduction of night soil collection around 1899 to reduce ground water pollution was based on the discovery that 202 wells were polluted. The Lagos ladies' league was thus founded to administer quinine to children and combat infant mortality and spread the knowledge or elements of hygiene in the community. Between 1899 and 1904 a sanitary Board of Health was established

to give advice on many township improvement schemes. Later on, Local Boards of Health were established for European Reservation Areas in Northern Nigeria.

In 1917, Township Ordinance (No. 17 of 1917) established a structure of cities with Lagos as a First class city with a Town Council having a wide range of functions including sanitation. However, the provisions of the ordinance did not extend to the native towns; hence there were no improvements in these areas until the bubonic plague of the late 1920s.

In 1927, the Town planning Committees established in 1924 to consider planning schemes, were dissolved and replaced by Health Boards.

Over the years, sewage system in Nigeria has developed due largely to individual efforts of households and several non-governmental agencies. The Federal, state and Local Governments, ESAs have in the past intervened in sanitation matters in one way or the other. The Agencies of Government that have been involved in sanitation include: Federal Ministry of Health, defunct Directorate for Food, Roads and Rural Infrastructure (DFFRI), Federal Ministry of water Resources, Federal Ministry of Works, Federal Agriculture, state Water Agencies and the Local Governments. The efforts of the various Agencies were not guided by a clear-cut sanitation policy for Nigeria

WHO, UNDP, UNICEF, World Bank, other External Support Agencies and civil societies have also made impact in the provision of sewerage in Nigeria, but these efforts were limited by several factors including absence of National Sanitation Policy, lack of Health and Hygiene Education and the very strong notion that sanitation in Nigeria is a household affair and inadequate political will.

Even with small efforts, laws and research in sewage management Nigeria still lacks behind in sewerage infrastructure development. Efforts made by past governments to remedy the situation have yielded no meaningful result. It is believed that a child dies every 3 minutes especially in the rural and semi urban area as a result of disease emanating from poor sewage disposal.

Sewerage by steel and McGhee (1979) defend it as the art of collecting, treating and disposing of sewage it further divided sewage as mostly liquid and behaves as water when flowing along channels and pipes and that there are three major sources.

a) Domestic Sewage

b) Surface Water

c) Trade/Industrial water

a) This is the produce of water closet, kitchen, sinks, baths and other sanity fittings.

b) This is water, which accumulates due to rainfall on development area. (The original, natural drainage is disturbed or rendered inadequate, when development takes place, and must be augmented or replaced by a system of sewage)

c) These result from manufacturing processes, many of which involves the creation of large quantities of liquid waste, often highly polluted.

The character of the domestic wastes and the surface does not vary appreciably from time to time or from place to place, but the nature of the trade wastes depends entirely upon the industries of the district.

In Abuja the Federal Capital Territory the major sewage service are mostly from domestic sewage and surface water. While domestic sewage constituting about 80% of the total sewage (Source Abuja Environment Protection Board 2007).

2.2 SEWERAGE/SEWAGE WORKS

These are comprehensive terms covering all the structures and procedures for collecting, treating and disposing of sewage.

System of Sewerage.

Lawal (2000) identified two obvious systems for the conveyance of sewage, the combined system and the separate system. Additionally, he states that there is a compromise, the partially-separate system. There are explained below:-

Combined Sewage System:-

In this system, the whole of the waste matters and surface water is conveyed by a single sewer, and this system is suited to the needs of very large cities and towns. It has the merit of simplicity, possible lower first cost, and the provision of large sewers which are easy to inspect and keep clean.

Separate Sewage System.

In this system of sewerage, the whole of the soil sewage, that is the waste matter from W.C.S; urinals, sinks, lavatory basins, and baths are conveyed by one sewer (the "soil" sewer or foul water) and the rain water from streets, roofs of houses and yards by another (the surface-water sewer).

Partially-Separate Sewage System

It is found in practices that it is difficult if not impossible to keep out the whole of the storm-water from the soil sewers, and for this reason, the partially Separate system is used. In this method, the rainwater from backyards and the rear slopes of roots is admitted to the soil sewers, and the remainders flow off

via the street surface channels and sewers. With this system there is only one set of house drains to each house.

2.3 SEWAGE DISPOSAL

As defined by steel and McGhee (1979), it applies to the act of disposing of sewage by any method. It may be done with or without previous treatment of the sewage.

Sewerage-General Considerations

Providing adequate sewerage for an urban area required careful engineering, the sewers must be adequate in size or they will overthrow and cause property damage, danger to health and nuisance. Adequacy in size calls for estimation of the amount of sewage and use of hydraulic to determine proper size and grade of the service. Another important consideration is the velocity of flow in the sewers. If not great enough, deposit of solid will occur with accompanying odor and stoppages. After the sewage is collected, it becomes a liability to the city because of its potential danger to health and possible production of nuisance in streams.

The degrees of treatment required depend upon the quality standards applicable to the receiving stream and flow and quality of both the stream and waste. In no

case is treatment that produces an affluence containing more than 30mg/1BODs and 30 mg/1 suspended solid considered as adequate for new construction.

2.4 IMPORTANCE OF SEWAGE DISPOSAL

The importance of treating sewage before its ultimate disposal cannot be over emphasized.

Sewage should be treated before its ultimate disposal in a receiving water course in order to:

a) Reduce the speed of communicable disease caused by the pathogenic organisms in the sewage; and

b) Prevent the pollution of surface and grain waters.

These two reasons are interdependent to the extent that a polluted body of water is a potentially and frequently source of infection, particularly in hot contamination of the environment is most undesirable in itself and that therefore measures to abate pollution should be judged from an ecological standpoint rather than merely by this improvement they make to human condition.

Nevertheless, in most tropical developing countries, the relative scarcity of funds and the desperate need for sanitary facilities will insure that for many years to come money will be spent primarily on measures directly designed to improve the well being of the people (water supply, sewage disposal, mosquito

control and so on), rather than improving the environment for its on sake (Mara, 1976).

Methods of Sewage Disposal

There are basically two (2) methods of sewage disposal namely,

1. **Conservancy Methods**

   This is a method of disposal of sewage for isolated building or communities that cannot be served by main sewer system.

   Conservancy sanitation has been defined as "sanitation by keeping refuse matter in privies, pails, earth. Closets and cesspools for its periodic removal.

   Other types of disposal system under the conservancy method include soak-away, pit latrine, VIP latrine, and septic tank and so on.

2. **Water-Borne System**

   This is a method of sewage disposal in which sewage is conveyed in pipes known as sewers from its place of production to its place of treatment and disposal.

Water borne sewerage system is undoubtedly the best. But it is highly capital intensive and many communities in need of sewerage cannot afford to install full network of reticulation and trunk sewer (Mara, 1976; pg7)

2.5 TREATMENT OF SEWAGE

Sewage cannot be discharged into natural watercourse without treatment because decomposition of its organic content depletes the natural water of oxygen and thus fish life is destroyed. Moreover, once the oxygen has been absorbed, anaerobic fermentation setting, due to the action of bacteria which thrive in the absence of oxygen, producing offensive gases.

Sewage treatment can be divided into ancient and modern method. Modern method depends ultimately upon oxidation of the organic mater in the sewage by means of oxygen from the air and action bacteria. No mater what method is adopted for the treatment of and disposal of sewage it should always be borne in mind that the primary objective is purification. Many different system have been employed with varying degrees of success, the following is a list of the principle modes of treatment still in use;

i. Discharge without preliminary treatment into sea or tidal estuary

ii. Land treatment-Board irrigation-Filtration

iii. Separation or suspended in-organic mater by the use of detritus tanks or grit chambers.

iv. Separation of organic matters by the use of sedimentation tanks-septic tanks.

v. Oxidation of dissolved impurities by the use of contact beds-percolating filter-activated sludge tanks

Some of these systems are of course, complete in themselves but in most cases are simply one stage in the series of processes which together go to produce satisfactory final effluent.

2.6 WASTE WATER MANAGEMENT

There are three constituent and interrelated aspects of wastewater management:

1) Collection

2) Treatment

3) Re-Use

1) Collection

Collection of domestic wastewater is best achieved by a full sewerage (water-carriage) system. Unfortunately, this method is the most expensive and there are relatively few communities in hot climates which are able to afford it.

The collection work can be done either by the combined or separate sewage system.

2) **Treatment**

Conventional treatment is the term used to described the standard method of sewage treatment in temperate climate. It comprises of four (4) stage of treatment:

1) Preliminary treatment
2) Primary treatment
3) Secondary or biological treatment (bio-filtration or activate sludge).
4) Sludge treatment (anaerobic digestion of the sludge produces in stages 2 and 3 (Mara, 1976) Pg; 53).

3) **Effluent Re-Use**

The general scarcity of water is the tropics and the high cost of developing new water supplies and the two (2) major factors responsible for the increasing recognition of the need to conserve water resources by effluent re-use.

Also, human wastes are valuable natural resources and should be re-used whenever practicable. These are essentially different systems for re-use.

- Agriculture
- Aquaculture

- Biogas Production
- Municipal Re-use

a) **Agricultural Re-use**

Both night soil and sludge may be used to enrich the soil. The direct application of night soil as an agriculture fertilizer has been practiced for centuries in many parts of the world, but this practice involve very substantial health hazards to agriculture workers and to the consumers of the crop grown, and is not recommended. However, sludge could be digested or composed with organic refuse and vegetable matter before application to the land (Caricross and Feachem, 1983).

b) **Aquaculture**

Aquaculture means water farming, just as agriculture means field farming. It is the growing of plants and animals in water for their eventual harvesting as foods, either for man or for animals (Mara, 1976).

c) **Biogas Production**

Night soil, mixed with animal waste can be used to generate methane or biogas. This technique has been applied in India, Korea and China where nearly one million biogas plants are in use. In a warm climate, a biogas plant can meet the fuel needs for cooking and lighting of a family of five people (Cairncross and Feachem, 1983).

d) **Municipal Re-Use**

Effluent, which has received tertiary treatment, which includes chlorination, is suitable for watering municipal park, golf course and street flushing; it is often cheaper to use affluent for this purpose than fully drinking water. Mara, 1976).

2.7 ESTABLISHMENT AND FUNCTION OF ABUJA ENVIRONMENTAL PROTECTION BOARD

The Abuja Environmental Protection Board (AEPB) was established in July 1989 under the ministerial leadership of Major General Gado Nasko (Rtd). It is backed by AEPB decree No. 10 of 12th August 1997, which takes introactive effect from July, 1989, when the board came into being.

For effective management of the organization, the organizational structure of the board was in 1996 reorganized into the following functional department and units:

i. The board secretariat and administration
ii. Personnel management
iii. Finance
iv. Engineering and landscaping service\public health
v. Public health
vi. Solid waste management and sanitation

vii. Orchard plant nursery and conservation

viii. Legal unit

ix. Planning, research and statistics

x. Liquid waste

xi. Workshop, purchasing and supply

xii. Public relations unit

xiii. Internal audit

xiv. Inspectorate and audit

The board headed by a Director, who is the chief Executive (The Capital Environment, 1997).

Objectives of Abuja Environmental Protection Board

The Abuja Environmental Protection Board (AEPB) has following objectives:

(i) To secure a quality environment adequate for the health and well being of residents of Federal Capital Territory.

(ii) To conserve and use the environment and the natural resources for the benefit of the Federal Capital Territory generations.

(iii) To minimize the impact of physical development on the ecosystem of the country's new Federal Capital Territory

(iv) To raise public awareness and promote understanding of essential linkages between environment and development.

Functions of Abuja Environmental Protection Board

To achieve the set objectives of the board, it performs the following functions:

a) Removal of liquid and solid waste in Federal Capital Territory

b) Control of:

   (i) Industries waste, burrow pits and quarry sites and particularly to direct construction companies/individuals to refill burrow pits excavated and ensure that such places are replanted to avoid soil erosion.

   (ii) Vectors, pests, rodents and reptiles

   (iii) The quality of potable water, waste water and effluent discharge.

   (iv) Bush burning, poaching and indiscriminate felling trees.

   (v) Septic-tank and sewage maintenance

   (vi) Stray and wandering animals

   (vii) Public convenience and cemeteries

c) To generally do any other thing that will enhance a healthy environment in this Federal Capital Territory.

To sustain the relatively unpolluted environment of Abuja and ensure hygienic environment as well as guarantee the good health of the inhabitants, the Master Plan for the development of Abuja, the New Federal Capital City envisaged the provision of portable water by pipe borne water system. The portable water supply scheme is to be realized through the impoundment f raw water in dams, treatment by conventional water treatment plants, conveyance by rising mains and the associated distribution lines run under gravitational flow with ranging from 5 to 10 bar pressure. To avert damage to the water line, they have been carefully routed through vacant parcels of land along the road corridors as indicated in the land use plan.

The Master plan also envisaged the handling of the raw sewage generate in the city via Central Sewage Schemes. The sewage so collected is designed to flow by gravity through collector and trunk sewer lines located at lowest parts of the Districts unto the various sewage treatment plants, which are located at separate sewage drainage basins.

The water and sewage schemes for the city of Abuja have been so carefully conceived, planned and designed that they have already been acclaimed as one of the best designed in the world.

The beauty of the design of water or sewage schemes is that flow of water from the dam to the various end user houses is by gravity flow so also the sewage is collected from the various houses and conveyed to the sewage treatment Plant by gravity. Despite the careful Planning of Abuja the new Federal Capital City of Nigeria, the implementation has been interfered with by ill-conceived alterations and carved out plots in green areas reserved for Parks, service etc, resulting in serious distortions and abuse of the Land use Plan.

Of particular concern is the action of developer who deliberately erect buildings on sewer lines that falls into the plots allocated to them after having full knowledge of the presence of the sewer lines. These engineering facilities are essential and in fact indispensable to the hygienic environment and healthy existence of the inhabitants of Abuja.

As contained in the marking of a capital 1995, the wastewater collection system for the Abuja city is via the "integrated trunk sewer" collection system. This is a gravity collection system with no lift stations, force mains powered devices. In order to reduce the load on the wastewater treatment plants, the separate system is located, that is storm run off is not allowed to enter the sanitary sewerage system.

The construction of the interceptor sewer schedule I and III which takes the sewerage form the city to the sewerage treatment plant has attained 90 percent and 97 percent completion respectively. While the construction of schedule II, has attained 58 percent completion level.

The construction of the pilot starter sewerage treatment plant which is to cater for the city's initial population 200,000 people has been awarded since 1981, and has attained only 65 percent completion. As a temporary measure therefore, the built up area of the city were provided with septic tanks and soakaway, which are considered adequate for the present population, before subsequent discharge of waste streams.

In Abuja, the Federal Territory, the agency responsible for the provision of sewage disposal facilities is the Federal Capital Development Authority (FCDA), while the Abuja Environment Protection Board is responsible for the management and maintenance of same.

CHAPTER THREE

MATERIALS AND METHODS

3.1 RESEARCH DESIGN

A research design is the method or procedures for collecting data and also the analysis of the needed information.

Considering the size of the population of study and type of data required for the exercise, the researcher had no option than to adopt the sampling method for the collection of all the data needed through the administration of questions. The category of data collected included data on linkage to public sewers, data on back flow of sewage and so on. The data collected from the analysis were from Abuja Environmental Protection Board, the occupiers of real estate in the study area and personal observation by the researcher.

3.2 RESEARCH INSTRUMENT

The researcher administered questionnaire as an instrument of data collection alongside with the oral interview conducted as well as the physical observation of study area. The data from this later source were used to corroborate the former and analyzed in the course of study.

3.3 SOURCE OF DATA

The source of data can be grouped as follows:

(1) Primary data (Sources)

(2) Secondary data (Sources)

3.3.1 PRIMARY DATA (SOURCES)

This refers to the data collected by the researcher through eyewitness account and includes the following:

- Questionnaires
- Oral Interview
- Direct Observation/Survey

Questionnaire:

The questionnaire designed includes both structure form and open form.

The administration of questionnaires spanned a period of three (3) weeks.

(2) Sets of questionnaire were administered, one on the occupiers of developed properties and the other on Abuja Environmental Protection Board.

Oral Interview:

The oral interview conducted was on the employees of Abuja Environmental Protection Board and residents in Abuja Municipality.

Direct Observation/Survey

Physical observation and survey were made to in order to assess the truthfulness of the data obtained through other sources.

3.3.2 SECONDARY DATA (SOURCES)

These include data gotten from written texts, journals, articles and report relevant to the research topic.

Secondary data were used mainly for background knowledge and in the analysis of issues in the problem under study.

3.4 LIMITATION IN DATA COLLECTION

In the process of carrying out the research study it was discovered that two (2) key issues hindered the collection of data namely;

(i) The perceived nature of Nigerians towards things that are of a general effect. People are only interested or concerned about issues that affect them as individuals. Hence, the extra-mile the researcher had to go to prove that the research would benefit the respondent as individuals.

(ii) Bureaucratic constraint in government establishment and department under the guise of official secret also play their part.

3.5 METHOD OF DATA ANALYSIS

The data collected in the course of this study would be presented and analyzed by the use of table and simple percentage methods. This would enable a clearer presentation and understanding of the result of the research.

3.6 POPULATION AND SAMPLING TECHNIQUES

A sample is a limited number of elements selected from a presented population. In other words, it is a small portion of a population or element taken in other to show the quality or opinion of the whole. Out of about 6000 developed plot in the study area (i.e Garki 1 & 2, Wuse 1 & 2, Maitama, Asokoro and Central Area) comprising of 33 neighbourhood, a total of 66 questionnaires were administered. And due to the size of population of study and the type of data required from the exercise, the researcher divided the entire population into strata's represented by two (2) questionnaires each to a neighbourhood via the convenience sampling method. The questionnaires were administered on owner-occupiers known and accessible to the researcher to avoid bias and guarantee the reliability of information given by the respondent. Consequently, the total numbers of questionnaire administered were 137.

CHAPTER FOUR

RESULTS

This chapter will be used to present and analyze the data obtained from the questionnaires administered, and the verbal interview conducted both to authenticate the information given on the questionnaires and to obtain further relevant information useful to this study.

The hypothesis formulated in chapter one will be presented here in order to properly interpret the analysed data colleted for the research work, and this will inevitably lead to the discussion and implication of the result which will be stated at the end of this chapter.

4.1 DATA PRESENTATION AND ANALYSIS

Under the presentation and analysis of data, the researcher reminds the reader that the use of table and simple percentage method was use in presenting and analyzing the data respectively for easy understanding.

Presentation of Questionnaire Administered

Table 4.1 Percentage of the Population Administered with Questionnaires.

Total Population	1,2m	100%
Number of Questionnaire issued	137	0.01%

Source: Field Survey

From the table above, only 0.01 % of the population of developed properties in the study area; was administered with questionnaires.

Presentation of Returned and Unreturned Questionnaires

Table 4.2 Analyses of Returned and Unreturned Questionnaires

Number of questionnaires issued 1	137	100%
Number of questionnaires received	102	65.7%
Number of questionnaires not received	35	34.3%

Source: Field Survey 2008

Only 65.7% of the administered questionnaires were returned, while 34.3% were unreturned.

Question 4

Table 4.3 Percentage of residents connected to the public sewer.

Variables	No. of Respondents	% Respondent
Yes	93	91.2%
No.	9	8.8%

Total	102	100%

Source: Field Survey 2008

Interpretation: The analyzed data proves that 91.2% of the samples are connected to the public sewer mains.

Question 5

Table 4.4: Presentation and Analyses of Supervision of Connection to public sewer

Variables	No. of Respondents	% Respondent
Yes	86	84.3%
No.	16	15.7%
Total	102	100%

Source: Field Survey 2008

Interpretation: The analysed data proves that 84.3% of the samples were connected to the public sewer under the supervision of **A.E.P.B.,** while 15.7% of the samples were connected under no supervision by the authority.

Finding: Connections to Public sewer not by the supervision of **A.E.P.B.**

Question 6: Test of Hypothesis

Are the Current sewage disposal methods suitable for the Federal Capital City?

Table 4.5: Response to Sewage Disposal in Abuja.

Variables	No. of Respondents	% Respondent
Satisfactory	32	31.4%
Unsatisfactory	70	68.6%
Total	102	100%

Source: Field Survey 2008

Interpretation: From the analysed data, 31.4% of the respondents are satisfied with sewage disposal system in Abuja, while 68.6% are not satisfied with the system.

Question 7: Test of Hypothesis

What is the effectiveness of the current sewage disposal method?

Table 4.6: Presentation and Analyses of Problems Encountered

Variables	No. of Respondents	% Respondent
Yes	62	60.8%
No	40	39.2%
Total	102	100%

Source: Field Survey 2008

Interpretation: From the analysed data, 60.8% of the samples encountered problems in the use of public sewer, while 39.2% admitted to not having problem from the use of the public sewer.

Question 8 'A"

Do you encounter problem(s) in respect of backflow of sewage into the household system?

Table 4.7: Presentation and Analyses of Nature of Problem

Variables	No. of Respondents	% Respondent
Yes	7	6.9%
No	95	93.1%
Total	102	100%

Source: Field Survey 2008

Interpretation: From the analysed data, 6.9% of the respondent encounters problems of backflow of sewage into the household system, while 93.1% do not experience same.

Question 8 'B"

If yes in question 7 above do you encounter problem(s) in respect of overflow of sewage from manholes in your neighourhood?

Table 4.8: Presentation and Analyses of Nature of Problem

Variables	No. of Respondents	% Respondent
Yes	89	87.3%
No	13	12.7%
Total	102	100%

Source: Field Survey 2008

Interpretation: From the analysed data 87.3% of the sample encounters problems of overflow of sewage from the manhole in their neighourhood, while 12.7% do not experience same.

Question 9

Have you noticed any damage, disrepairs or malfunction of the sewage facilities in Abuja and reported same to the A.E.P.B?

Table 4.9: Presentation and Analyses of Faults on Sewage

Variables	No. of Respondents	% Respondent
Yes	32	31.4%
No	70	68.6%
Total	102	100%

Source: Field Survey 2008

Interpretation: From the analysed data 31.4% of the same noticed one form of fault or the other on the sewage facilities and reported same to the A.E.P.B., while 68.6% of the sample did not.

Question 10

How effective was the response to repairs by the A.E.P.B?

Table 4.10: Analyses of Response to repairs work by the A.E.P.B

Variables	No. of Respondents	% Respondent
A	1	1%
B	8	8%
C	50	49%
D	43	42%
Total	102	100%

Source: Field Survey 2008

Interpretation: The analysed data proves that 42% of the samples are of the opinion that response to repairs works take about 2 weeks to effect. While 49% are of the opinion that repairs are being carried out within 1 week.

4.2 PRESENTATION OF ORAL INTERVIEW

The questions presented through oral interview conducted on the A.E.P.B include among other the following:

- Question 10: which department is responsible for the sewage disposal in particular?
- Question 11: which department is responsible for the provision of sewage infrastructure?

Question 13: Does the management of sewage cover collection, treatment and disposal?

Question 15: What are the problems being encountered by your agency in the discharge of its duties.

The information gathered from the AE.P.B revealed the following:

- That the department responsible for sewage disposal is the liquid waste department of the AE.P.B.
- That the AE.P.B is responsible for the management of sewage and sewage infrastructures, while the F.C.D.A is responsible for the provision of these infrastructures.
- It was also revealed that the management of sewage covers collection and disposal works only, without any form of preliminary treatment before disposal, neither does it cover the re-use of effluent. The use of soak-away and septic tanks is still in vogue in the municipally. Since the

treatment plant is yet to be completed. Consequently, the collected sewage is discharge into streams.

- **Test of Hypothesis III**

In the question as regards whether the agency encounter problems in the discharge of its duty or responsibility. The following were said to be the major problems the AE.P.B encounters.

1. Non availability of fund to run the agency as desired.

2. Lack of specialized and technical manpower in the area of sewage disposal e.g. sanitary engineers.

3. Non-availability of specialized machines to effect prompt repairs and maintenance.

From the foregoing therefore, it is crystal clear that the A.E.P.B encounters problems in the discharge of its duty and responsibilities.

4.3 DISCUSSION AND IMPLICATIONS OF THE RESULTS

From the results of the data analyzed the discussion and implication of results can be viewed under the following headings:

4.3.1 CONNECTION TO PUBLIC MAINS

Majority of the properties in the study area, that is the Abuja municipality are connected to the public sewer mains.

The implication of the above is that the agency responsible for the collection and disposal of sewage will find their job easy to mange due to the uniformity of the collection system.

4.3.2 SUPERVISION OF CONNECTION TO PUBLIC SEWERS

There are still cases where connections to public sewer mains are not done under the supervision of the relevant authority, which is the A.E.P.B.

The implication of the above is that the connection to the public sewer will be carried out without recourse to standards like gradient of pipes, size of pipes to be used e.t.c which will result into problem of sewage collection from households for example the problem of backflow of sewage into the household system.

4.3.3 ADEQUACY AND FUNCTIONALITY OF SEWAGE FACILITIES

The management of sewage (Le domestic sewage) in Abuja is grossly inadequate. From the oral interview conducted, it was discovered that the management of sewage for the federal capital territory (F.C.T) covers collection and disposal works only without provision for treatment works neither does it cover the re-use of effluent. The pilot starter sewage treatment plant is yet to be completed 23 years after the award of the contract in 1981, how much more of providing a comprehensive treatment plant to cater for the entire municipal area. Also the available facilities are non-functional, since there is constant pollution of the environment due to the surcharging of manholes, and backflow of sewage into the household systems, as a result of lack of periodic maintenance work on the sewers facilities by the A.E.P.B.

The implication of the above problems is that the environment is exposed to constant pollution as a result of foul odor emanating from the untreated sewage. The threat of epidemics like cholera is imminent since the untreated sewage are discharged into streams; all these will ultimately lead to urban decay.

Lack of periodic maintenance of the sewage facilities will also in the near future lead to total breakdown of the sewage disposal system.

4.3.4 PROBLEMS ENCOUNTERED BY THE GENERAL PUBLIC

The general public encounters problem ranging from the pollution of the environment due to constant surcharging of manholes and the infiltration of disease causing vectors like cockroaches and rat into houses through the system; backflow of sewage into the house hole system; to lack of immediate and prompt repairs of the faults by the A.E.P.B.

The implication of the above is that if the general public is dissatisfied with the sewage disposal system for a long time without improvement on it by the appropriate agency or authority, there is a tendency that the public will discontinue the use of the public sewer mains which will further compound the general sewage problem of Abuja.

4.3.5 PROBLEMS ENCOUNTERED BY THE A.E.P.B

The A.E.P.B is plagued with problems ranging from lack of adequate fund, lack of specialized and skilled manpower to lack of adequate number of machines like vacuum vans to effect repairs and maintenance.

The implication of the above is that the A.E.P.B is rendered handicapped and ineffective in the discharge of it's responsibility like the repairs and maintenance of sewage facility. This would ultimately lead to the total decay of the sewage system in Abuja.

CHAPTER FIVE

DISCUSSION, SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 DISCUSSION AND SUMMARY

The findings of this research work can be summarized as follows:

1. The sewage (Le domestic waste) disposal system in the federal capital city Le the municipality is the integrated sewer system.
2. Majority of properties in the municipality are linked to the public sewers, except for the areas without full infrastructure.
3. Number of connection to public sewers is being carried out without the supervision of the A.E.P.B.
4. The federal capital city (F.C.C) has no sewage treatment plant.
5. The sewage disposal facilities in the Abuja municipality are inadequate and the available facilities are not functional. For instance the pre treatment facilities have broken down.
6. The general public encounters problems which includes backflow of sewage into the system and the surcharging of manholes.
7. An outbreak of water-borne disease is imminent unless something is done soon as regards treatment before disposal.
8. The A.E.P.B encounters problems like lack of fund, lack of adequate number of specialized skilled manpower.
9. The A.E.P.B does not carryout periodic maintenance of the sewage

disposal facilities or infrastructure; rather they carry-out unplanned maintenance.

10. Most people are not satisfied with A.E.P.B as regards to response to complaints.
11. The facilities provided are over stretched due to over population.
12. Interceptors serving different cadastral zones are now merged which is against the master plan.

5.2 CONCLUSION

Going by all the data analysed in this project, which is aimed at assessing the effectiveness of the sewage disposal management, in the Abuja municipality of the federal capital territory, one cannot but conclude that:

1. The facilities provided for the disposal and treatment of sewage in Abuja are grossly inadequate and the available facilities are non functional.
2. The general public encounter problems ranging from constant pollution of the environment due to the surcharging of manhole and the infiltration of disease causing vectors into the system to backflow of sewage into the household system.
3. The A.E.P.B encounters problems ranging from lack of adequate fund, specialized and skilled manpower, to non availability of specialized machines for periodic maintenance and repairs.

5.3 RECOMMENDATIONS

The following are the recommendations based on the summary of findings:

1. In view of the problem of treatment of sewage before disposal, the federal capital development authority should make the provision of treatment plant a priority project, which should be awarded to a reputable contractor as soon as possible.

2. The ministry of federal capital territory should increase the fund allocation to the A.E.P.B., also capital allocation to purchase the required specialized machines should be made available. Skilled and knowledgeable manpower should be made available through the training of personnel in the relevant fields to acquire these knowledge's.

3. A check on developers that build on sewage line should be discharged by directing the sewer line to avoid blockage. The structures should be at least 10metres away from the sewer line. Provision for access to right of way of the sewer line should be considered and provided.

4. The A.E.P.B should employ more professionals who are technically competent to handle the enormous task of sewage disposal.

5. The A.E.P.B should be partially commercialized and privatized so as to

improve its services.

6. Finally, the **A.E.P.B** should prepare a periodic maintenance schedule for the sewage disposal facilities, and adhere to it, and should adopt planned corrective maintenance policy, rather than the total breakdown maintenance that presently obtains.

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UESTIONNAIRE ON ASSESSMENT OF SEWAGE DISPOSAL ANAGEMENT IN AE JA TO BE FILLED BY OCCUPIERS OF DEVE OPED PROPERTIES

PARED BY: TONY OKPARA

MTECH ENVIRONMENT MANAGEMENT

FEDERAL UNIVERSITY OF

TECHNOLOGY MINNA – NIGER STATE

TE: (i) All information supplied will be treated with utmost secrecy.

(ii) Kindly (a) Tick ▱ as appropriate

(b) Fill the Dotted spaces

(c) Make comment where appropriate

1. Name of respondent .....
2. Address of respondent.....
3. How long have you been in occupation of the property?

   (A) Less than 1 year ▱

   (B) Within 2 – 4 years ▱

   (c) Above 5 years ▱

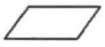
4. Is your building connected to the public Sewer mains?

   YES ▱

   NO ▱

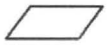
5. If yes in 5 above, were you connected under the supervision of A.E.P.B?

YES

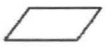
NO 

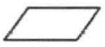
6. How would you describe the sewage disposal system in Abuja

Satisfactory 

Unsatisfactory 

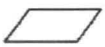
7. Do you encounter any problem in the use of the public sewer in Abuja?

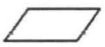
YES 

NO 

8. If yes in 7 above, do you encounter problem(s) in respect of the following:

(A) Backflow of sewage into the household system.

YES 

NO 

(B) Overflow of sewage from manholes in your neighourhood

.....

(c) Any other problem(s) (please

state)……..

……

9. Have you noticed any damage, disrepair or malfunction of the sewage facilities in Abuja?

YES ▱

NO ▱

10. If yes in '9' above, have you reported same to the appropriate authority/i.e A.E.P.B?

YES ▱

NO ▱

11. How effective was the response to repairs by the A.E.P.B?

(A) Within 1 day ▱

(B) Within 3 days ▱

(c) Within a week ▱

(d) With 2 weeks ▱

12. Does the reported fault re-occur soon after repairs?

YES ▱

NO ▱

ORAL INTERVIEW ON ASSESSMENT OF SEWAGE DISPOSAL MANAGEMENT IN ABUJA CONDUCTED ON THE A.E.P.B

PREPARED BY: TONY OKPARA

MTECH ENVIRONMENT MANAGEMENT

FEDERAL UNIVERSITY OF

TECHNOLOGY MINNA – NIGER STATE

1. Name of organization……..
2. Name of respondent……..
3. Status……
4. When was the A.E.P.B established?.....
5. By what statutory backing?.....
6. What are the aim and objective of your organization?.....

   .....

   .....
7. What are it's functions?.....

   ……

   ……
8. Would you say these facilities are adequate?.....

9. Would you say these facilities are functional?.....

10. What department is responsible for sewage disposal particular?.....

11. Does the disposal of sewage cover collection, treatment, disposal and refuse?.....

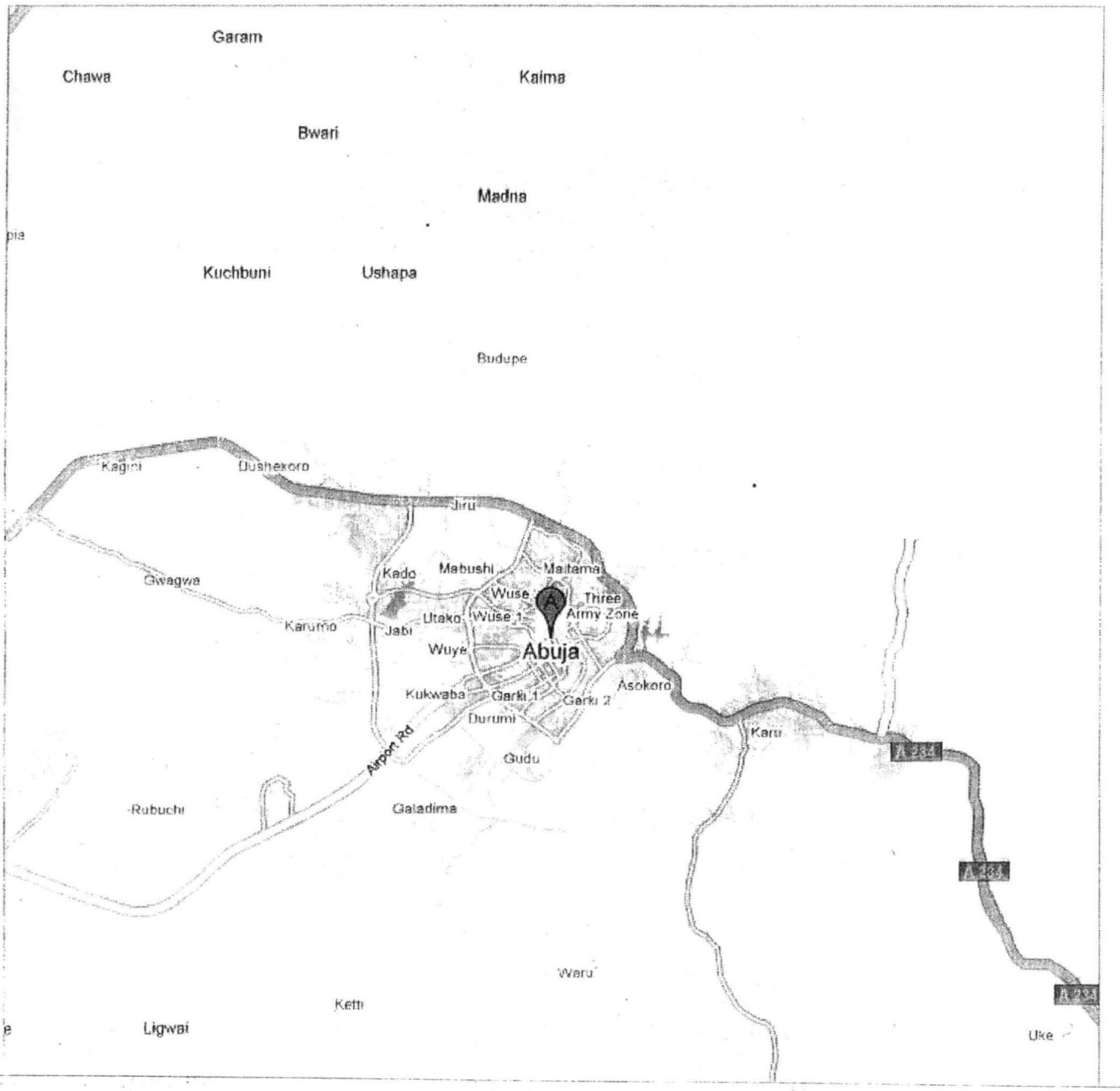
12. What are the problems being encountered by your agency in the discharge of it's duties?.....

.....

13. How are these problems being addressed?.....

.....

.....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Maitama
Wuse
Three
Army Zone
Karimo
Utako
Wuse 1
Jabi
Wuye
Abuja
Asokoro
Kukwaba
Garki 1
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Rubuchi
Galadima
A234
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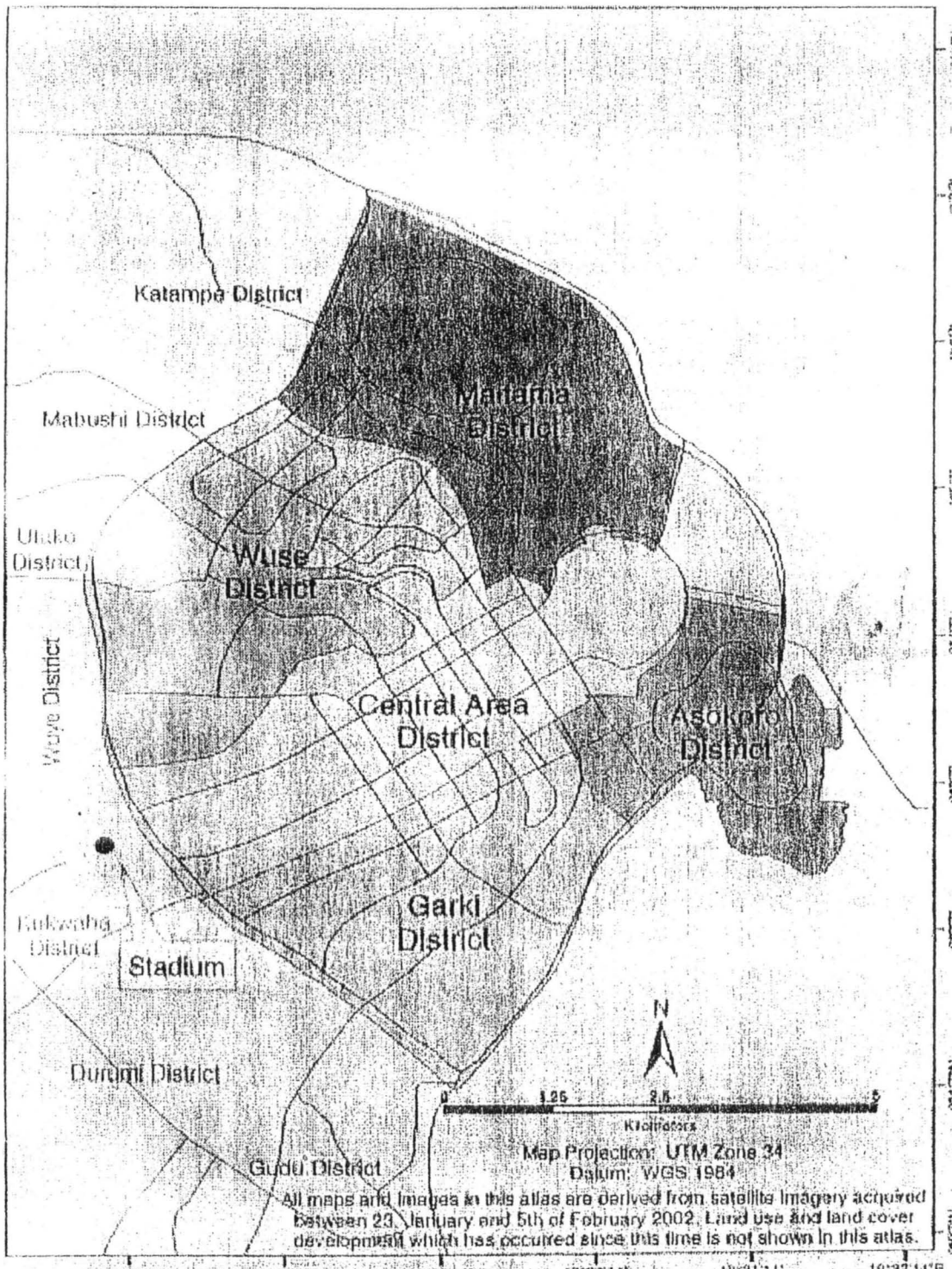
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All maps and images in this atlas are derived from satellite imagery acquired between 23 January and 5th of February 2002. Land use and land cover development which has occurred since this time is not shown in this atlas.
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