

**LOCATION ANALYSIS OF FILLING STATIONS IN KANO METROPOLIS,
NIGERIA**

By

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DECLARATION

I hereby declare that the work in this thesis titled Location Analysis of Filling Stations in Kano Metropolis was performed by me in the Department of Geography Ahmadu Bello University, Zaria. The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this work has been presented for another degree or diploma at any institution.

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CERTIFICATION

This dissertation titled Location Analysis of Filling Stations in Kano Metropolis meets the regulations governing the award of the degree of M.Sc. Remote Sensing and GIS in Department of Geography of the Ahmadu Bello University, and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

To my father Alh Uba Muhammad Dantima and my mother Hajiya Hauwa Ado Ya'u for whom owe everything I have in this life. Also to my elder brother Mal Hamza Umar Zango from whom I learnt the true meaning of a brother.

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Even though I appreciate peoples’ contribution, I remain responsible for any mistake, omission or misjudgment found therein.

TABLE OF CONTENTS

| | |
|--|------|
| DECLARATION..... | ii |
| CERTIFICATION..... | iii |
| DEDICATION..... | iv |
| ACKNOWLEDGEMENTS..... | v |
| TABLE OF CONTENTS..... | vii |
| LISTOFFIGURES..... | xi |
| APPENDICES..... | xii |
| ABSTRACT..... | xiii |
| CHAPTER ONE..... | 1 |
| INTRODUCTION..... | 1 |
| 1.1 Background to the Study..... | 1 |
| 1.2 Statement of the Research Problem..... | 4 |
| 1.3 Aim and Objectives..... | 7 |
| 1.4 Scope of the Study..... | 7 |
| 1.5 Justification for the Study..... | 8 |
| CHAPTER TWO..... | 10 |
| LITERATURE REVIEW..... | 10 |
| 2.1 Introduction..... | 10 |
| 2.2 Conceptual Framework..... | 10 |
| 2.2.1 Location Analysis in Geography..... | 10 |
| 2.2.2 History of Filling stations..... | 11 |
| 2.2.3 Filling Stations in Nigeria..... | 12 |
| 2.2.4 Filling Station Regulation in Nigeria..... | 18 |
| 2.2.5 Department of Petroleum Resources (DPR)..... | 19 |
| 2.2.6 Kano Urban Planning Development Agency (KNUPDA)..... | 21 |
| 2.3 Literature Review..... | 23 |
| 2.3.1 GIS for Location Analysis..... | 23 |
| 2.3.2 Filling Stations Distance to Public Building..... | 24 |
| 2.3.3 Compliance of Filling Stations to Planning Standard..... | 25 |
| 2.3.4 Gaps Filled By the Study..... | 26 |
| CHAPTER THREE..... | 28 |
| STUDY AREA AND METHODOLOGY..... | 28 |

| | |
|---|----|
| 3.1 Introduction..... | 28 |
| 3.2 The Study Area | 28 |
| 3.2.1 Location..... | 28 |
| 3.2.2 Historical Background | 29 |
| 3.2 Methodology..... | 31 |
| 3.2.1 Reconnaissance..... | 31 |
| 3.2.2 Types of Data | 31 |
| 3.2.3 Data Sources..... | 31 |
| 3.2.4 Scanning, Georeferencing and Digitizing the Maps..... | 32 |
| 3.2.5 Detail Field Work | 33 |
| 3.2.6 Software and Hardware..... | 33 |
| 3.2.7 Data Integration | 33 |
| 3.2.8 Data Analysis..... | 34 |
| CHAPTER FOUR | 37 |
| DATA ANALYSIS, PRESENTATION AND DISCUSSION..... | 37 |
| 4. 1 Introduction..... | 37 |
| 4.2 Inventory and Mapping of the Filling Station | 37 |
| 4.2.1 Inventory of Filling Stations by Road..... | 37 |
| 4.2.2 Filling Stations by Ownership | 43 |
| 4.2.3 Petroleum Products Sold by Filling Stations in Kano Metropolis | 47 |
| 4.3 Pattern of Distribution of Filling Stations in Kano Metropolis | 47 |
| 4.4 Factors Influencing the Distribution of Filling Stations in Kano Metroplis..... | 50 |
| 4.5 Filling Station and Physical Planning Standards | 51 |
| 4.5.1 Distance from Road | 52 |
| 4.5.2 Distance between the Location of Filling Stations | 54 |
| 4.5.3 Distance of Filling Stations to Health Facilities..... | 57 |
| CHAPTER FIVE..... | 59 |
| SUMARY, CONCLUSION AND RECOMMENDATIONS | 59 |
| 5.1 Summary of Findings | 59 |
| 5.2 Conclusion | 60 |
| 5.3 Recommendations | 61 |
| 5.3.1 General Policy Recommendation | 61 |
| 5.3.2 Future Study Recommendations..... | 62 |

| | |
|-----------------|----|
| REFERENCES..... | 63 |
| APPENDICES..... | 68 |

LIST OF TABLES

| | |
|--|----|
| Table 4.1: Location of Filling Stations by Road in Kano Metropolis | 39 |
| Table 4.2: Density of Filling Stations per Road in Kano Metropolis..... | 42 |
| Table 4.3Major Petroleum Marketers and their Stations in Kano Metropolis..... | 44 |
| Table 4.4: Petroleum Products Capacity (in Litres) for Filling Station in Kano Metropolis | 47 |

LISTOFFIGURES

| | |
|--|----|
| Figure 3.1: Kano Metropolis | 30 |
| Figure 4.1: Spatial Distribution of Filling Stations in Kano Metropolis | 40 |
| Figure 4.2: Filling Station Distribution by Road Type in Kano Metropolis..... | 41 |
| Figure 4.3: Filling Station Ownership in Kano Metropolis | 43 |
| Figure 4.5: Nearest Neighbour Analysis of Filling Stations in Kano Metropolis | 49 |
| Figure 4.6: Filling Station and 15 metre Standard Distance from Road | 52 |
| Figure 4.7: Location of Filling Station in Kano Metropolis against the 15m Standard Distance from Road | 53 |
| Figure 4.8: Filling Stations in Relation to 400 metre Distance to Nearest Filling Station in Kano Metropolis | 55 |
| Figure 4.9: Location of Filling Stations in Relation 400m Distance from Other Filling Stations in Kano Metropolis | 56 |
| Figure 4.10: Filling Station Distribution in Relation to 100m Distance to HCF | 57 |
| Figure 4.11: Location of Filling Stations in Relation to Health Care Facilities in Kano Metropolis | 58 |

APPENDICES

| | |
|--|----|
| Appendix I: Major Marketers Filling Station in Kano Metropolis | 68 |
| Appendix II: Independent Marketers Filling Stations in Kano Metropolis | 70 |
| Appendix III: NNPC Filling Stations in Kano Metropoli | 73 |
| Appendix IV: Filling Stations Not Meet 15 Meter Distance From Road..... | 74 |
| Appendix V: Filling Stations Not Meet 100m Distance from Hospital | 74 |
| Appendix VI: Filling Station And Their Addresses in Kano Metropolis | 74 |

ABSTRACT

This study analysed the location of filling stations in Kano Metropolis against the physical planning standards set by Department of Petroleum Resource (DPR) and Kano Urban Planning and Development Agency (KNUPDA). Names and street addresses of the filling stations were obtained from the Department Petroleum Resource (DPR) Kano. Global positioning System Garmin 76X GPS was used to capture the locations of the filling stations. The Quickbird imagery, street map, and boundary map were obtained from the Kano State Ministry of Land and Physical planning and then imported to Arcmap environment of ArcGIS 10, integrated and georeferenced to the same coordinate system. The findings revealed that there are 214 filling stations located along the 43 roads in the study area, of which 69% are owned by independent marketers, 26% owned by Major Marketers and 5% owned by the NNPC. There is significant correlation between the number of filling stations and the road hierarchy. While Zaria, Maiduguri and Katsina roads (all major roads) have the highest number of filling stations, the access roads like Sabo Bakin Zuwo and Zungeru roads have highest density of filling station per km. Petroleum Motor Sprit (PMS) is major products trade by the stations, the overall pattern of the location of the filling stations in the area is clustered, and there is significant difference between the pattern and random pattern at both 95 and 99% level of significance. The major factors governing the location of filling stations are the traffic flow, exit site from the city and closeness to motorpark. Most of the filling stations satisfied the minimum requirement of 15 metres distance from the road (96%). Equally 98% of the filling stations met the minimum distance of 100 meter from the health care facilities. However many stations had not meet the criteria of 400 meter minimum distance to other stations where located on same road side and when not separated by any road or street. The research recommends that the regulatory agencies should take appropriate which ensure that filling stations operators comply with the standards.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Maps are scales for measuring the property of location. Although maps may show objects with respect to attributes other than location, their principal purpose is to depict object in term of their location property. Location is seen as that property of objects which geographers consider central to their study and problems of understanding objects or phenomena which interest them (Lewis, 1977).

In geography the term location is used to identify a point or an area on the earth or elsewhere and this may be through the use of absolute or relative terms. Location is said to be relative when it is described in relation to other point or area. An absolute location uses a specific pairing of latitude and longitude in a Cartesian coordinate grid (Abler, Adam and Gould (1971).

The increase of urban population and the growth of the number of cars and other vehicle generate various kinds of demands, one of which is fuel. Harrison (1999) noted that a considerable amount of cars fuel is wasted due to the long urban paths and unnecessary trips. Increase vehicles triggered increasing demands for fuel and by extension fuel station, since engines are made to use petroleum products and filling station are the places were fuel are sold.

Filling Station, Petrol station, gas station or petroleum outlet is defined as any land, building or equipment used for the sale or dispensing of petrol or oil for motor vehicles or incidental thereto and includes the whole of the land, building or equipment whether or not the use as a petrol station is the predominant use or is only a part thereof. The American heritage dictionary of English Language (2011) defined filling station as a place where gasoline and oil are sold and facilities are available

for repairing or maintaining automobiles. Most filling stations sell petrol or diesel, some carry specialty fuels such as liquefied petroleum gas (LPG), natural gas, hydrogen, biodiesel, kerosene, or butane while the rest add shops to their primary business (Ayodele, 2011).

Petroleum is no doubt a predominant source of Nigeria's revenue and foreign exchange. It has occupied strategic importance in the Nigerian economy, accounting for as high as 78 percent of gross domestic product and up to 90 percent of the country's total annual revenue and foreign exchange earnings (National Bureau of Statistics, 2008). The petroleum industry in Nigeria is divided into two main segments, the upstream and the downstream sectors. The upstream refers to activities such as exploration, production and delivery to an export terminal of crude oil or gas. The downstream on the other hand encompasses activities like loading of crude oil at the terminal and its use especially transportation, supply trading, refining distribution and marketing of petroleum (Asada, n.d.). Activities of filling stations or petroleum outlets are part of the downstream sector.

According to Ehinomen and Adeleke (2012) the petroleum industry can be classified by type of actors or by sector. The actors in the Nigerian industry consist of both private and public organizations. The public actors are the government agents and functionaries such as the Nigerian National Petroleum Corporation (NNPC) and its subsidiaries, the Department of Petroleum Resources (DPR), the Petroleum Products Pricing Regulatory Authority (PPPRA), among others. The private segment consists of both indigenous and foreign actors. The indigenous actors consist of independent marketers which numbered about 1000 in 1979, a year after formulating the act which established them but increased to 7948 in 2010 and they are competing with the foreign or multinational marketers (referred to as major marketers) like

Mobil Oil Nigeria Plc., MRS Nigeria Plc., Total Nigeria Plc., Conoil Plc., Oando Nigeria Plc. and African Petroleum Plc.

Selecting a better site for business enterprise is at mind of every government and entrepreneurs who invests their capital to earn profit. Some of the variables considered when selecting location for utility are proximity to population centers, distance from neighboring stations, the easements of using existing utility, and the magnitudes of environmental pollution parameters (Alesheikh and Golestani, 2011). Other factors to take into account when making a decision about the location of business, including customers, transport, the neighborhood, finances and the longer term future (Oetomo and Sesulihatien, 2012).

Bolen (1988) stated that every location in the earth has its analyzable advantages and disadvantages. According to him the factors can be classified into two physical conditions. These are the real physical and analysis physical. Real physical is a visible condition in relation to area such as land condition, the width, and the distance from the highway. Analysis physical, on the other hand, is physical condition obtained from physical analysis such as population analysis, neighborhood factor, and competitor analysis. Both factors are important while locating business; this is because while the physical condition can affect the nature and type of business to be conducted, analysis physical can affect the business performance. For example, if the distance between one station and the other is too close, then it will lead to decreased turnover on each station (Oetomo and Sesulihatien, 2012).

This work focused on the location analysis of filling stations in Kano Metropolis, the second largest city in Nigeria and the commercial hub of northern part of the country. The study is triggered by the fact that a lot of filling stations in the area, and it seems there are problems as regard location and distributions of filling

stations in the city. Some of the implications of improper location of the filling station are traffic congestion, fire risk, inconveniences, and so on. In the word of Christeller (1933) in Abler, Adams and Gould (1973), there is some ordering principles unrecognized that governs the distribution of things and phenomena. Only when proper investigation is made that one can explain what is where and why, a question that geography holds since the epoch of Eratosthenes, since the beginning of geography.

1.2 Statement of the Research Problem

In all parts of the world cities are exposed to hazards such as traffic congestions, pollution, accidents, fire explosion and environmental problems. These problems are most common in developing nations like Nigeria where there is lack of coordinated planning for development and non-adherence to planning laws. These generally results to illegal conversion, leading to haphazard development and the deliberate location of land uses in unsuitable areas. As observed by Ayodele (2011), in highly urbanized areas filling station is a significant contributor to traffic problems such as traffic congestion, pollution, fire and explosion. The extent of these problems depends on the criteria or variable such as location, size and set back from road e.t.c.some hazards, such as traffic congestion, pollution and many more problems result from un-coordinated development. Apart from these hazards, cities are also confronted with other problems like accidents, explosionand fire. Studies have been done on filling stations in urban areas.

One of the common features of Kano City, which is the second largest industrial centre and largest commercial state in Nigeria, is traffic hold up, which sometimes may be attributed to the long queues in the nearby filling station especially in the period of fuel scarcity. Also filling stations result to reduction in width

of carriageway meant for the efficient movement of automobile and pedestrians; results to noise and air pollution and unpleasant odours in the neighbourhood. Filling stations are located anywhere along the city's road to the stage that one wonders whether there exist in place any planning standards to guide their establishment. It has been discovered in many instances when accident happened in the stations the neighborhoods are affected and these led to loss of life and properties.

Sule, Shebe, Bichi and Atiyon (2006) studied the spatial distribution of filling station in Kaduna Metropolis using ArcView GIS software. The results of the study showed that there are 193 filling stations in the area, and that independent marketers dominate the business with 68% of the stations. Although the study aimed at inventory and showing the location of the filling stations, it did not show which stations is where or why, and did not examine the spatial pattern of the stations.

Ayodele (2011) examined the spatial distribution of filling stations in Kaduna North. The study identified the pattern and distribution problem in the area. The study found that there 22 filling stations in the area and the distribution is uneven as the stations are mostly concentrated along major roads. In addition the study looked at the set backs and locational situation of the stations and concluded that 69.5% did not conform to the standard. Though GIS was applied for mapping, it was not employed for measuring the standards compliances. Similarly a study was carried out in Agege Local government Area of Lagos State by Abdullahi (2012). The study observed that filling stations are randomly distributed in the area. The study observed due to land shortage people build station wherever the land is available and this creates a pseudo development pattern.

Blamah, Vivan, Tagwi and Ezemokwe (2012) looked at the locational impact assessment of gasoline service stations along Abuja-Keffi road and environs in Karu,

Abuja, Nigeria. The study examine the location of petroleum filling station using Site Analysis Report (SAR) of the seventeen sampled (out fifty) station in the area, a questionnaire was also administered to solicit people's perception on the effects of the location of filling stations. The findings of the study revealed partiality and disregards of planning criteria in locating filling station, that about 82% of the stations have fallen short in meeting the standards of 450m distance in-between.

Kano is the most populated state in Nigeria (NPC, 2006), it has over 10million people out of which about 2-3million own different kind of vehicle which about 6-7million use vehicle to their work place (NIAF, 2011). The movement of this vehicle is powered by gasoline. To be able to maintain this number and movement of vehicles a number of gasoline selling points are established. Some have met the guide lines or planning while others have not. The points established for seeling gasoline and other petroleum products whether officially or unofficially are called filling stations. It was found out and as confirmed by other studies that traditional patterns are clustered, random or scatter (Ahmad, Mohammed, Mohammed and Idris, 2013). To the best knowledge of the researcher none has analysed the location pattern of filling stations in Kano Metropolis nor compare their present locations to the physical planning standards, which is the gap this study intend to address. Moreso there is lack of spatial data for the filling station in the area, and no study has been done see the extent of compliance.

From the foregoing discussion this study setout to address the following questions:

1. What is the number of filling stations in Kano Metropolis?
2. What is nature and pattern of the location of the filling stations in Kano Metropolis?

3. What are the factors governing the location of filling stations in Kano Metropolis?
4. To what extent does the distribution of filling stations in the area comply with the physical planning standards set by DPR (2007) and Kano Urban Planning Development Agency, KNUPDA (2013)?

1.4 Research Hypothesis

The study would test the following hypothesis:

H₀: there is no significant relationship between the distribution of filling station in Kano Metropolis and the physical planning standards set out by DPR (2007) and KNUPDA (2013).

1.3 Aim and Objectives

The aim of this study is to analyse the location of filling stations in Metropolitan Kano against the physical planning standards set by DPR and KNUPDA.

The specific objectives are to:

- i. take an inventory and map out the filling stations in the area
- ii. determine the location pattern(s) of the filling stations in the area
- iii. examine factors influencing the location of filling stations
- iv. compare location of the filling stations with the physical planning standards set by DPR (2007) and KNUPDA (2013)

1.4 Scope of the Study

This research focuses on the location analysis of filling stations in Kano Metropolis, which consist of eight local governments (Dala, Fagge, Gwale, Kano

Municipal, Kumbotso, Nasarawa, Tarauni and Ungogo). Location, distributions and patterns of the filling stations were determined by the study; and products sold by the filling stations have been examined. In addition the ownership of the filling stations was also identified by the study. The study also examined the factors influencing the location of filling stations in the area. Also the distance of the stations from the road, hospitals, and distance between station and its neighbors had been examined and compare with the standards of DPR and KNUPDA. The data were collected during the month of May 2014, thus the analysis were restricted to the stations existing at the time of study. However not all the physical planning standards were examine due to resource and other constraints.

1.5 Justification for the Study

Petroleum has found a central place among the energy resource. There is little or no exaggeration when one suggests that the name petroleum has become synonymous with Nigerian economy, but its supply and distribution has always been an acid test for successive government in the country. Due to urbanization, increase in population and vehicles for carrying goods and services there is general increase in petroleum demand. Filling stations are built to meet these demands.

The report submitted by the Petroleum Revenue Special Task Force (PRSTF) in 2012 outlined lack of adequate data record keeping, over reliance on manual method and inadequate data and IT infrastructure among industry players are the shortcomings of Nigeria's key agencies under the Ministry of Petroleum Resources/ Department of Petroleum Resources that are vested with the mandate to produce Oil and Gas licence, keep and update records, supervise petroleum industry operations and ensure payment of rent and royalties. As reported by Ehinomen and Adeleke (2012), Eromosele (1997) observed that after almost half a century of oil exploration

in Nigeria, the oil industry is earning a mature status in comparison to other industries in the country such that significant progress has been made in terms of oil exploration and sale of crude oil abroad. Unfortunately, the domestic management of petroleum resources is fraught with a number of problems. There are occasional product shortages, inefficient product distribution and contending pump price of petrol.

Kano Metropolis is the second commercial and most populous city in Nigeria and the largest city North Niger. The city has high vehicular movement and many filling stations and that one may wonder whether planning standards are considered when siting such station. In some instance traffic hold-on and accidents are associated with the filling station location. Hence the need to investigate the location of the filling station against the planning standard set by the regulation agencies.

This study may therefore play a role in creating database of the filling stations, identifying pattern and proposing some solution to problem associated with location problems such as long queues and reducing the damages that may result from poor locations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The literature review was broken into sections, that included the location analysis in geography; filling stations; physical planning; and GIS and spatial analysis. Each of the sections was further subdivided into subheadings and review was done under subheadings.

2.2 Conceptual Framework

2.2.1 Location Analysis in Geography

Location analysis has been in practice long before now, for centuries before, people may have wondered in which cave to live, where to build houses, villages, churches, and other facilities and they solved these problems using some sort of heuristic methods. However, location science formally begins with Pierre de Fermat (1601–1665), who used to tease his contemporary mathematicians with tricky problems (Eisalt and Marianov, 2012). Among the pioneers in location analysis are Evangelista Torricelli (1608-1647) and Battista Cavalieri (1526-1597) whose studies on basic Euclidean spatial median problem in early seventeenth century, however Weber's name struck most in the field of location science with formulation of the model in his book's appendix written by Pick (Eisalt and Marianov, 2012; Şen, Önden, Gökgöza and Şen, 2013).

The 1930s saw contributions by Christaller, who founded central place theory and Weiszfeld (1916-2003) who developed his famed algorithm that solved Weber problems with an arbitrary number of customers. Later important contributions included those by Lösch (1906-1945) and the regional scientists Isard (1956) and Alonso (1964). The birth of modern quantitative location theory occurred in the mid-

1960s, when Hakimi wrote his path-breaking analysis of a location model on networks, which, in today's parlance, is a p -median problem (Eisalt and Marianov, 2012).

2.2.2 History of Filling stations

Filling stations are roadside facilities specially design to sell gasoline and other products that automobiles use. In addition many also offer other minor repair services such as motor tuning and tire alignment (Jackle, 1978).

Energy adequacy is universally recognized as a crucial parameter for the sustainable development of a nation. The constant increase in oil and gas demand requires the exploration, development and distribution of new energy sources (Tavana *et al.*, 2012). Ambituuni, Amezaga and Emeseh (2014) argued that petroleum consumption has been on the increase in Nigeria since the early 1980s. This upward trend is evidenced in the energy consumption data of 2006, 2007 and 2011 where petroleum products represents 53%, 67.3%, and 68.5% respectively of the total energy consumed in the country (Energy Information Administration, 2012).

Since principal function of the filling station is to supply the need for the automobile and truck owner, its history is related to that of the automobile. While the first passenger cars were sold in 1895, filling station begin operation in 1905 (Beckman, 1957). However Beckman maintained that then specialized outlet for selling gasoline and lubricant were unknown. Rather motorist then purchase their product from number of kind retailing stores and service establishments that sell petroleum product together with other business activities. James 1953 argues that the first fuel dispensing stores with underground tank appeared in 1910 and even then most pumps were adjacent to other stores. These specialized stores specialized in selling motor fuel and lubricant and form large portion of their revenues, and often

have physical space for motorist to derive in and receive service off the street. Beckman (1957) and Pees (2004) noted that the first derive in station was opened in Chicago by Standard Oil Company of Indiana in 1913.

According to Pees (2004) Standard of Indiana was the first specialized filling station. They argue that the company (Standard of Indiana) opened a pump station for automobiles in Minneapolis in 1911, however then the gasoline was pumped into cans and then poured into the vehicle's tank. Imperial Oil had a service station in Vancouver, Canada, in 1908. Standard also opened a curbside station having a rotary pump in Rockford, Illinois, in 1914.

2.2.3 Filling Stations in Nigeria

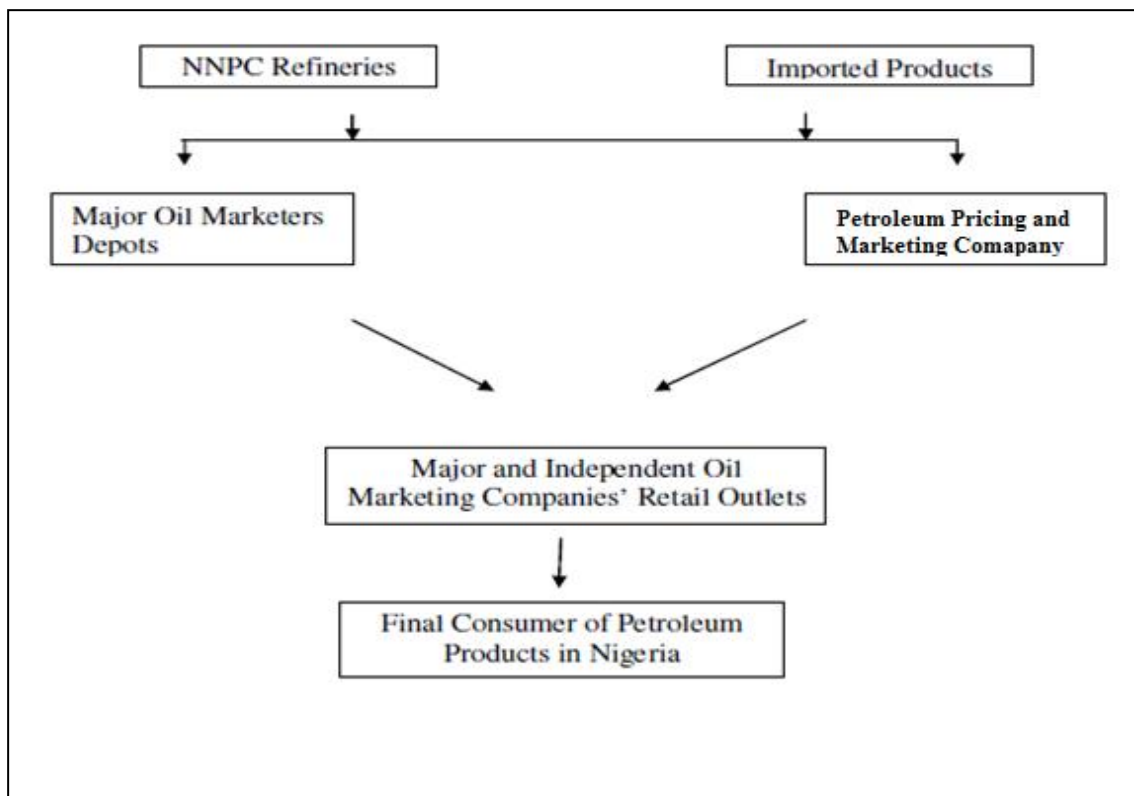
The history of filling station in Nigeria dated back to 1907 when the Socony Vacuum first brought the first cargo of sunflower kerosene to this country and since then upto the Nigeria independence in 1960, Oil companies had been in full control of arrangement for supplying petroleum products (Udoh, 2013).

Even though the filling stations operations began prior to independence, the business is nothing to write home about till 1960s. This is because till close to independence the mileage of motor able roads hardly increased and the vehicles plying these roads were quite few. However with the independence (1960), Construction of more roads, schools, and factories started and consumption of Petroleum Products sky rocketed. Demands for all grades of Petroleum Products started to overtake the supply and this became more manifested after the civil war (Udoh, 2013), hence leading to opening of many filling stations across the country. The filling stations operators are often referred to as oil marketing companies.

According to NNPC bulletin (2006) the responsibilities of the oil marketing companies are:

1. To contract for petroleum products supply from refineries in line with prescribed regulations.
2. To import, supply and market petroleum products throughout the country.
3. To contract for capacities from logistics companies (jetties pipelines, depots) in line with regulations and pay prescribed tariffs
4. Ensure that marine tanker parcel size, quantity of products and conditions of vessel meet prescribed regulations
5. Ensure that onward delivery of petroleum products from regional depots to retail stations using road tankers comply with stipulated regulations.
6. Ensuring holding of strategic petroleum stocks in regional depots, refinery tank farms or company owned depots in line with regulations.

Petroleum distribution has been described as a complex task that involves transporting and storing across the country (Ehinomen and Adeleke, 2012). This process is done by a variety of players including the major marketers that transport products from the refineries to their branded station, independent distributors that transport products from the depots to the service stations. Indeed the process has been explained diagrammatically below.



Source: Ehinomen and Adeleke (2012) Adapted from NNPC/PPMC Bulletin (2010)

Nigeria has over 26,000 petroleum retail stations often called filling stations (PPPRA, 2006), owned by three operators that dominate the industries. These are the major marketers, the independent marketers and the NNPC. Six major marketers (Oando Nig. Plc, Mobil Oil Nig. Plc, Total Nig. Plc, Forte Oil Nig. Plc, MRS Nig. Plc, and Conoil Plc) controls 25.47% share of the fuels retail market; over 3800 Independent Marketers control 51% of the fuels retail market; while the NNPC controls only 23.43% of the retail market (Ambituuni, Amezaga and Emeseh, 2014).

Total marketing company began operation in June 1956 (with its first outlet in Yaba, Lagos), to market petroleum products in Nigeria. It became Total Nigeria Limited in 1967, and Total Nigeria Plc in 1978 after it went public in accordance with the Nigeria Enterprises Promotion Decree of 1977. The company has over 500 retail outlets.

Oando started business as a petroleum marketing company in Nigeria under the name Esso West Africa incorporated, subsidiary of Exxon Corporation of USA. In 1976 the company was re-branded Unipetrol Nigeria Limited, having bought by the state. In 1991, Unipetrol became a public Limited Company. In 1999, Unipetrol acquired 40% in the equity of Gaslink Nigeria to facilitate Gas sale and purchase agreement with Nigeria Gas Company. By 2002, Unipetrol acquired 60% in the equity of Agip Nigeria Plc from Agip Petrol International and in 2003; Unipetrol Nigeria, through a merger deal with Agip Nigeria Plc and was rebranded Oando.

African Petroleum plc (Forte Oil since 2010), started business in Nigeria in 1954 with the name British Petroleum, changed to African Petroleum Nigeria Limited in 1979. Conoil began oil marketing operations in 1927 under the name Shell Company of Nigeria and later Shell Company of West Africa. It was incorporated as a private Limited liability Company in 1960 and registered with the Nigerian Stock Exchange (NSE) as a Public Liability Company in 1989. In April 1975, the federal Government of Nigeria acquired 60 percent shares of the company through the Nigerian National Petroleum Corporation and the company became known as National Oil and Chemical Marketing Company. In the year 2000, the Federal Government through the Bureau of Public Enterprises (BPE), bought 40% of the company held by Shell company of Nigeria (UK) Limited. Following the privatization of the company, Conpetro Limited acquired 60 percent issued shares while the Nigerian public held the remaining 25.6 percent.

Texaco, which gave birth to MRS Oil Nigeria plc, started marketing of petroleum products in Nigeria in 1913 under the Texaco brand name of CFAO a French multinational retail company. In 1964, MRS began direct marketing of petroleum products through service stations under the name Texaco Africa Limited.

And by 1978, 40% of Texaco Nigeria Limited was sold to Nigerian individuals and organisations by Texaco Petroleum Company following the indigenization decree. In 2001, Chevron Corporation and former Texaco Nigeria plc merged and in 2006, the company's name changed from Texaco Nigeria plc to Chevron Oil Nigeria plc; and in 2009, Chevron Oil Nigeria plc changed to MRS Oil Nigeria plc (Udoh, 2013).

Kupolokun (2006) observed that in the past years, the downstream sector of the petroleum products started under a market structure in which price were determined by the interplay of the forces of supply and demand. Then, the product market was dominated by the multinational oil companies until 1973 when the Government introduced uniform pricing of petroleum products in order to ensure even distribution of products nationwide. In 1975, the Petroleum Equalisation Fund (PEF) was established to deal with the problem of cost differentials arising from the transportation of petroleum products to various parts of the country, based on the uniform pricing policy. As observed by Kupolokun (2006), the introduction of the Independent marketer's scheme in 1978 as earlier mentioned broke the dominance of the multinationals and subsequent establishment of independents marketing companies

At its presentation before the Nigeria national assembly (2009), Independent Petroleum Marketers of Nigeria (IPMAN) claimed to have over ten thousand (10,000) memberships and about twelve thousand retail outlets (filling stations) operating all over the country. In addition the presentation gave the IPMAN total investment in filling station and haulage business in Nigeria at over N1,098 trillion apart from the employment generations.

Eventhough petroleum indepent marketing was seen as a breakthrough in the process of retail and distribution of petroleum product, it not pre from any limitations.

Shikenan.com (2011) outlined the advantages and disadvantage of both independent and major marketing of Petroleum Company. The advantage of independent marketing is that one should get to choose any name for your filling station and brand it the way you like; not have worry about anything else in particular except the authorities; to choose a representative and an assistant representative to represent his company at the NNPC's Petroleum Products Marketing Company (PPMC) Depot nearest him; can get high profit as per as nine naira profit per liter on each petrol product lift. The disadvantage of Independent marketing is one need lift a full tank any time you need to load up which most marketers cannot afford; to own tanker for transporting the product; a depot Representative that has to physically take his bank draft which is issued in the name of NNPC to the Depot and has to be physically present when are picking the product up; to advertise his own brand; have insurance on these tankers, and this makes them incur heavy debts when accident happens; be a member of Independent Petroleum Marketers Association of Nigeria or IPMAN, you will have to pay a sum of 5,000 Naira each time he load petroleum product; and have to employ a company's personnel (Shikenan, 2011).

On the other hand major marketer has the advantages of which one will get to open up a filling station using the name of a major marketer; will use the brand name of an already established oil company; get to enjoy the support and the customers of his chosen marketer; will not have to worry about advertising campaign as his chosen established company will take care that; don't need to appoint a marketer as well, as the oil company already has a marketer representing them at the Depot; and Payment for petroleum products is trouble-free, as one will pay into the account of the company and they will bring the product to the station in time. The major

disadvantage however is that the profit is lower than for independent marketers (Shikenan, 2011)

In a feasibility study conducted by the one stop shop for the oil and gas industry in Nigeria in 2012, the Nigeria's demand of three petroleum products (PMS, DPK and AGO) on daily basis stood at an average of 60 million litres daily usage and has been attributed to increasing level of standard of living, more Nigerians are increasing the number of cars on the road, the need for constant power supply to aid uninterrupted production of goods and services and also for domestic use more Nigerians are increasing the demand for fuel in order to enjoy the usage of their generating sets and industrial plants. In essence this led to the establishment of a lot of petroleum products selling points, and to ensure that operators comply to standards regulators were created.

Ambituuni, Amezaga and Emeseh (2014) observed scarcity of petroleum products leading to long queues at service stations all over the country. As noted above, this has fuelled poor safety practices and high level of environmental pollution. Doublegist (2013) observed that despite the efforts aimed at efficient distribution of petroleum products in Nigeria, there are problem of inadequate and uneven distribution that threaten the markets.

2.2.4 Filling Station Regulation in Nigeria

The upstream petroleum sector involves the search for and production of crude oil and gas. It comprises such activities as; exploration, evaluation and appraisals, development, production and decommissioning (API, 1983; Charles, 1999). On the other hand, the downstream sector involves refining, product storage, transportation, distribution, and retailing. Filling station concerned with distribution and retailing of

petroleum products with or without other businesses attach to it. The location and the sitting of filling stations however need careful examination in regard to the control that requires to be exercised, the legal tools that may be required to enforce such control and the optimum conditions that should be created from the point of view of service to the general public. Filling station has been identified as one the major generator of traffic hazards, aestheticism reducing and potential fire causal agents (Ujjwal and Sokhi, 2006). It is on this basis that states and nations make laws and regulations on sitting and location of filling station so as to minimize and reduce the risk associated. In Nigeria the DPR is responsible for registering and regulating the downstream petroleum sector including the filling station business. Other agencies involve are the state ministries for town planning. Indeed one time the DPR blame the town planning ministries for foul play and lamented that Indiscriminate citing of filling stations in odd places across Nigerian cities would continue unless the town planning authorities are called to order (BusinessDay, November 2013).

2.2.5 Department of Petroleum Resources (DPR)

In the bid to strengthen its control over the industry, the Nigerian National Oil Corporation (NNOC) was established and given responsibility for both up-stream and downstream activities in the sector. The NNOC also looked after Government's participation in the activities of the oil companies. In 1977, the Ministry of Petroleum Resources (which also had regulatory functions) and operates side-by-side with the NNOC, were merged to form the Nigerian National Petroleum Corporation (NNPC). The NNPC combined the commercial functions of the defunct NNOC (that is, exploration, production, transportation, processing of oil, refining and marketing of crude oil and its refined products) with the regulatory functions formerly exercised by the Ministry of Petroleum Resources. In the Ministry of Petroleum Resources, there is

a Department of Petroleum Resources (DPR) which has four divisions: Resources Management Division, Inspections Division, Technical Control Division, and Service Division, which has three branches including Economics, Planning and Statistics. The DPR issues the certificates and regulates the activities of filling station (Proshare, 2013).

According to the DPR procedure guide for grant of approvals to construct and operate of a petrol products retail outlet (2007), before one begin petroleum retail outlet or filling station business one has to submit:

1. Three (3) copies of approved plan showing the building existing or proposed on the site and the relation to the roadways and adjoining properties.
2. A certificate signed by signed by the Chief Federal/ State Fire Officer, or by an officer authorized in that behalf, that the arrangements proposed for the prevention of fire at the site are satisfactory.
3. A certification by the Area/Town Planning Authority for the construction of a Petrol Filling Station on the proposed site.
4. A certificate signed by the divisional police Officer or a superior police officer in-charge of the police motor traffic that he is satisfied that the site and layout of the proposed filling station do not constitute an unnecessary traffic hazard.
5. Evidence that company applying is duly registered as a limited liability company by the appropriate Federal Ministry/Corporate Affairs Commission to deal in petroleum products.
6. Tax receipt and/or tax clearance certificate for the preceding three years.

According to the DPR manual before operating filling station one has to certify some physical planning standards. These standards are:

1. Land should be zoned for commercial/industrial use or be designated specifically for the purpose in a subdivision.
2. The parcel of land should not be less than 33 x 33 square meters or equivalent of two plots of land allow for the free flow of traffic
3. A petrol filling station should be sited 400 meters away from the next petrol station.
4. A petrol station should be sited 50 meters away in all angles of the build-up areas to create a buffer zone for the residential house-the buffer zone can be devoted to any non-residential land use.
5. That the distance from the edge of the road to the nearest pump will not be less than 15meters.
6. The total number of stations within 2 km radius of the site should not be more than four (4) including the one under construction
7. Filling station should not be located less than 100 meters from school, hospital, theaters, clinics and other public and semi-public buildings.
8. The site (for filling station) should not lie within NNPC/PPMC pipeline right of way or PHCN transmission or railroad lines (Procedure guide for grant of approvals to construct and operate of a petrol products retail outlet by DPR, 2007).

2.2.6 Kano Urban Planning Development Agency (KNUPDA)

According to Dankani (2013) Physical planning in Kano started as far back as 1095 and 1134, when the first city wall was build. He stated further affirmed that Kano has been witnessing urban planning and development control legislation based as the general legislation (Township ordinance of 1917, the Building regulations of 1940 and Town and country planning laws 1946).

In order to ensure a healthy urban development and expansion Kano Urban Development Agency (KNUPDA) is established and given mandate to approved, monitors and ensure planning compliance for all land projects in the urban Kano. The KNUPDA dates back to 1962 when the Greater Kano Planning and Development Board was established to primarily ensure the orderly physical development of Kano Township. It was then renamed Metropolitan Kano Planning and Development Board in 1969. In 1976, the defunct Kano State Urban Development Board was created to plan and provide infrastructural facilities necessary for healthy and orderly physical development of all the designated urban centers in the State. Following the establishment of Federal Environmental Protection Agency (FEPA) by the Federal Government in 1989 and the subsequent directives to all State Governments to establish similar bodies that would be responsible for environmental protection and pollution control activities, Kano State decided to restructure and enlarge the function and jurisdiction of the former Urban Development Board. It was against this background that the Kano State Environmental Planning and Protection Agency (KASEPPA) was established based on Edict No.15 of 1990. KASSEPA was given duties to ensure urban planning and additional duties of Environmental Protection which included Refuse Disposal. Again, following the creation of the Ministry of Environment in 1999, the Environmental Protection and Pollution Control activities were transferred to the Ministry, returning the Agency to its former status quo of planning and provision of infrastructures in the designated Urban Centres of the State. However, the name was retained until its transformation into KNUPDA (Tsakuwa 2013; KNUPDA, 2013; and Dankani, 2013).

According to the KNUPDA home page (2013) the present functions of the agency are provision of planning scheme for the state urban centres (Master Plans

etc); providing planning permission/advice to the state ministry of land and physical planning; development control (control use of land, granting building/development permits and monitoring); provision of amenities and convenience including recreational facilities; Construction and Maintenance of roads and drainages; designing of layouts for various purposes; and Coordinating the efforts of other major providers of urban infrastructure and services, utilities, refuse Management, etc.

2.3 Literature Review

2.3.1 GIS for Location Analysis

Geographic Information System (GIS) is define as a set of tools for collecting, storing, retrieving, at will, transforming, and displaying spatial data from the real world for a particular set of purposes (Burrough, 1986). It is used to design service areas to meet specified criteria by integrating layers of information. The methods of analysis have been implemented in GIS to support the search for optimum locations for such central services as retail stores, hospitals, or fire stations.

Understanding the spatial distribution of phenomena that occur in space today constitute a great challenge to the elucidation of central questions in many areas of knowledge. Studies are becoming more and more common, due to the availability of low cost Geographic Information System (GIS) with user-friendly interfaces. To achieve that it is enough to have a database and a geographic base (like a map of the municipalities), and the GIS is capable of presenting a colored map that allows the visualization of the spatial pattern of the phenomenon (Ahmed *et al*, 2013).

Example of these studies includes Camelli (2010) on location of petrol station in Abidjan whose aim is to enable motorist find nearest station using GPS. The finding of the study indicate that GIS can allow consumer locate the station within the

Central Business District and outskirts of the Abidjan without encountering any difficulty. A similar study was conducted by Ayodele (2010) in Kaduna Metropolis that aimed at exploring the capability of GIS based technology for locating filling station. Emwandongo (2013) worked on the use of GIS in the management of information about services offered in petrol station in Mumbasa Road, Kenya; the project is based on the integration of GPS and GIS technology for comprehensive database linked to digital map for efficient and effective management of information.

Adsavakulchai and Huntula (2010) in Bangkok analysed the optimum site selection of natural gas vehicles (NGV) station using geographic information system. Layers of information system were integrated in a GIS environment for selecting best sites. These layers were population, road networks, vehicular population and data for existing natural gas station. The result of the study revealed that there are 76 filling station in the area and the optimal district site location for NGV station in Bangkok is Nongjok district about 50m from urban. The study concluded that GIS plays a vital role in decision making such as gas station selection.

2.3.2 Filling Stations Distance to Public Building

Even though filling stations are very important and petroleum products were compared to food, stations have to maintain some distance from the public places. This is due to their vulnerability, bad odours and air pollution. Scientists from the University of Murcia in Spain studied the effects of contamination at petrol stations and found dangerous airborne pollutants from garages contaminated buildings as far as 100m away. The study concluded that a minimum distance of 50 metres should be maintained between petrol stations and housing, and 100 metres facilities such as hospitals, health centres, schools and old people's homes (Daily Mail reporter, 2011).

Morales *et al.*, (2010) evaluated the extent to which petrol stations affect their surroundings in Murcia, located in the south-east of the Iberian Peninsula in Spain. The method is based on the fact that the ratio of the concentrations of aliphatic and aromatic hydrocarbon pollutants in the air of the petrol stations and their surroundings (basically determined by vapor emissions from unburned gasoline) differs from the ratio found in urban air, which is mainly influenced by traffic emissions. The study involves multipoint measuring campaigns of the air at the studied petrol station and built-up area in general and processing the data with software capable of providing isoconcentration contours. The procedure should help local authorities in terms of land management, so that a “belt” can be established around petrol stations where housing or vulnerable populations and activities such as those in schools, hospitals and community centers should be restricted. The finding revealed a very good linear correlation ($R^2 > 0.9$) between the different pairs of pollutants in the city

2.3.3 Compliance of Filling Stations to Planning Standard

Ioş and Tudor (2011) examined the temporal changes in proximity of residential land use to filling stations in Bucharest suburban, Romania. Coordinates of the stations were obtained using GPS, aerial photographs and google earth imageries were used to digitize the residential areas. Buffer zones were created in map to see the encroachments of the residential areas. The results of the study revealed that 21 gas stations are located in residential areas and 39 gas stations are located in non-residential area. There are 10 gas stations (half of the total of 21) located in residential areas. However the study limited itself mainly to buffer analysis and only one land use (residential), distance of filling stations to other conflicting land use like public buildings, hospitals and the likes were not analysed by the study.

Ujjwal and Sokhi (2006) applied GIS for petrol station vulnerability assessment in New Delhi, India. In their study land uses within the 200m radius from each filling station were identified using high resolution Ikonos image and coordinate of the station were obtained using GPS. Stations were categorized into vulnerability classes on the bases of the use, density and population with 200 meter buffers.

Nwanjo and Ojiako (2007) investigate the potential health hazards of petrol stations on attendants in Owerri, Nigeria. Attendants from twenty filling stations were assessed in the area and another twenty that were not exposed to its vapour were used as control. The result show a significant increase in the activities of alkaline phosphatase, alanine and aspartate aminotransferases for those exposed to petrol vapour from 6-10 years. Also the concentrations of serum urea, creatinine and urinary protein for those exposed to petrol vapour were significant based on the study. The study concluded that these effects are directly related to the duration of the exposure. However the study did not look at the role of distance in determining the concentration of those chemicals which may give another interesting picture, since not only attendants are exposed to petrol vapour, but also the stations' neighbors.

2.3.4 Gaps Filled By the Study

In Nigeria, many studies were carried out on the analysis of location of filling station in relation to physical planning standards. Examples of these studies include Blamah, et al. (2012) which looked at the locational impact of gasoline service stations along Abuja-Keffi road and environs in Karu. Even though GIS was not involved in the study, site reports submitted were used in assessing the location of the filling stations. The study found out that many stations in the area did not comply with the standards set by the regulator. Abdullahi (2012) found out that most filling

stations Agege Local government Area of Lagos State did not consider standards in citing their station. The study did not apply GIS, focused mainly on the use charts and frequency tables to show the distribution of filling stations.

Ayodele through the use of GIS concluded 69.5% of the filling station in Kaduna did not conform to the planning standards; however the study did not explained the actual method employed for and which of the standards were not achieve. Although ArcGIS software was used for the analysis, the study did used the tool available for spatial pattern analysis such nearest neighbor analysis and kernal density analysis. In addition there were no attempt to identify the factors consider in sitting filling staions in the area.

This study focuse on location analysis of filing stations in Kano Metropolis using GIS tools. Comparison of location to physical planning standards set by the regulators is employed to see the extent of compliances. Studies in other Nigeria cities like Kaduna (Ayodele, 2011), part of Lagos (Abdullahi, 2012) and Karu in Abuja (Blamah, et al., 2012) already found that some filling stations did not comply with planning standards. Among the three, only Ayodele used GIS to show the spatial distribution and nothing on location pattern. Also this study would use GIS to identify the spatial pattern of the location of filling stations in Kano metropolis.

CHAPTER THREE

STUDY AREA AND METHODOLOGY

3.1 Introduction

This chapter discussed the study area and the methods used to source and analyse the data for the study. The chapter is divided into sections: these are the study area, reconnaissance survey, types and sources of data, scanning, georeferencing and digitizing of the maps, detailed field work, data integration and data analysis.

3.2 The Study Area

3.2.1 Location

The study area, Kano metropolis lies between latitude $11^{\circ}50'$ to $12^{\circ}07'$ N and longitude $8^{\circ}22'$ to $8^{\circ}47'$ E and altitude 472 meters above sea level. The climate of the area is Tropical wet and dry climate, coded Aw by the Koppen's Climatic Classification System (Olofin, 1987). Kano Metropolis bordered by Minjibir LGA to the Northeast and Gezawa LGA to the East, Dawakin Kudu LGA to the South East and Madobi and Tofa LGAs to the South West.

According historical sources Kano city was founded around Dala Hill in the 9th century (Olofin 1987; and Dankani, 2013). Dankani is of the view that the spatial planning and development of the area started with the building of the first city wall between 1095 and 1134, which started east of the Kurmi market near the Jakara stream. After independence, Kano witnessed an unprecedented urbanisation and rapid population growth due to socio-economic transformation in the state. According to Marafa (1999) as cited in Na'aba (2002), by the time colonial masters came in early 20th century, what constitute Kano and virtually encompassed by the wall was contained within 17.5 km^2 . Today metropolitan Kano (made up of the declared urban area in accordance with the Land Use and Allocation Committee) is contained within

60 km², while the built-up metropolitan Kano is contained within 40 km² (Dankani, 2013).

3.2.2 Historical Background

The Kano Metropolis is regarded as urban Kano, as the sprawling and the expansion of the city is swallowing the peripheral area vis-à-vis the surrounding lands is gradually taking over by urban structure and site acquire an urban character. Urban Kano is located at the central part of Kano closed settled zone, and therefore having the highest density, as a result of industrialization and other economic development, it has also through time become a cosmopolitan city with all the ethnic groups.

The study area includes the eight metropolitan local government of Kano State namely Dala Local Government, Fagge Local Government, Gwale Local Government, Kano Municipal Local Government, Kumbotso Local Government, Nassarawa Local Government, Ungogo Local Government, and Tarauni Local Government. The population of the Kano Metropolis based on 2006 is 2,826,307 (National Population Commission, 2006).

3.2 Methodology

3.2.1 Reconnaissance

A preliminary survey was carried out to identify and document filling stations in the area. This acquainted the researcher with the knowledge of the area and provide guide on how to source the data, types of data needed and preparation for the field work.

3.2.2 Types of Data

Types of data obtained for the study are:

1. Name of the area and street where the filling stations are located
2. Quickbird satellite imagery of 0.5m resolution and dated 24th April, 2013
3. List of the filling stations
4. Geographic location and name of the filling stations

3.2.3 Data Sources

Data for the study were obtained from both primary and secondary sources. They included:

1. Street maps of Kano State at a scale 1:2000 were sourced from Kano State Ministry of Land and Physical Planning. Quickbird imagery of 2013 was also sourced from Kano State ministry of Land and physical planning and integrated with street map in order to produce the update street map of the study area.
2. List of filling stations were obtained from the Department of Petroleum Resources (DPR), a department under the Ministry of Petroleum Resources responsible for registering and regulating the filling stations. From the data filling station name, type

and area (street) of location were identified. This served as a guide for verification and collection of the coordinate data using Global Positioning System (GPS).

3. Interview was conducted with the officials of Independent Petroleum Marketers Association of Nigeria (IPMAN), Kano chapter at their head office at Maiduguri Road and with Director Planning Kano Urban Planning Development Agency (KNUPDA), to find out firsthand information about filling station operation and factors considered in choice for locating filling station in the area.

3.2.4 Scanning, Georeferencing and Digitizing the Maps

Street map sourced was scanned, imported into ArcMap environment of ArcGIS 10.1 and then geo-referenced using map to image georeferencing method. Quickbird 2013 image of the area was used as a slave image for the georeferencing. Major land marks in the area like Silver Jubilee Round About, Katsina Road/Airport Round-about, Dawanau Junction and Aminu Kano Airport were used as reference points for the georeferencing.. The georeferenced maps were auto rectified and then given the same coordinate with image, Universal Transverse Mercator (UTM) Global Coordinate System (GCS) projection and Minna Zone 32N datum. UTM system was choosing because it is metric and has the capacity to enable the researcher calculate the length, distance and other measurement that may not be possible with geographic coordinate system. Two shape files were created in ArcCatalog environment and given same coordinate system with the maps and image. The shape files were later imported into the ArcMap environment and used to digitize the street map and land use map separately. Fields were created for name and the type of the road, and to calculate the length of the road in metre.

3.2.5 Detail Field Work

A simple checklist were drafted and used to source the detailed information on the filling station. Field visit were made to all the filling stations, and coordinate of the filling stations were obtain using GPS (Garmin 76X Model). The filling station were categorized into three (independent marketers, major marketers and NNPC stations) for comparison. In order to examine factor influencing the distribution of filling stations interview was conducted with officials of the Independent Petroleum Marketers Association Nigeria (IPMAN) at their head office in Hotoro along Maiduguri road, Kano. This is because they (the marketers) know reasons for choosing their business locations more than the managers who just employee at the filling stations.

3.2.6 Software and Hardware

The software and hardware used for the work include

1. Excel Microsoft Office Application of Microsoft office software (2007)
2. ArcGIS 10 Version
3. Computer hardware and related accessories like mouse, printer and scanner.

3.2.7 Data Integration

To achieve the goal of the study, different sets of data were used. These include the filling station data sourced from DPR and field survey, landuse map and road map. This data were imported, georeferenced to the same coordinate and datum, and integrated in the ArcGIS 10.1 environment for the analysis.

3.2.8 Data Analysis

Data obtained from the DPR were first entered in Excel Microsoft (2007) applications to create a simple database. Columns were used as field to store information on filling station. These fields are the company name, detailed address; Road location; LGA; capacity in term of Petroleum Motor Spirit (PMS), Automated Gas Oil (AGO), Dual Purpose Kerosene (DPK), Lubricated Oil (Lub oil) and Liquefied Petroleum Gas (LPG); type of station (whether major or independent marketer); latitude and longitude coordinates. The data were saved in the project folder (created in C drive) and exported to ArcMap environment of ArcGIS 10. The data was converted to shape file and used to perform all the analysis. Different symbolization was used to map out the filling stations. The numbers of filling station in each road were determined and the densities of the filling stations per roads were computed as ratio of the number of stations along the road to the length of the road in km. In addition tables and charts created in Microsoft Excel were used to present the inventoried data. These helped in achieving the first objective of the work i.e. to take an inventory and map out the filling stations.

In order to achieve the second objective of describing the location pattern(s) of the filling stations in the area, pattern analysis were done using spatial statistics tools in ArcMap environment to identify the location pattern of filling stations in the area, a nearest neighbour analysis was used to compute the nearest neighbor index (NNI), the Z-Score and probability (p) value in order to determine the pattern of the distributions.

The nearest neighbour analysis was initially developed by Clark and Evans in 1954 to analyze the spatial distribution of plant species. The method compares the observed average distance between points and their nearest neighbours with the distance

that would be expected between nearest neighbours in a random pattern. The nearest neighbor statistics/index, R_n , is defined as the ratio between the observed and expected values. R_n varies from 0 (when all points are in one location and distance between each point and its neighbour is equal to zero) and 2.14 (for a perfect uniform or symmetrical point pattern spread out on an indefinite large area). A value of $R_n=1$ indicates a random pattern since the observed distance between neighbours is equal to the one expected for random distribution. The nearest neighbour formula is

$$R_n = 2 \bar{d} \sqrt{n} / A$$

Where R_n = the description of the distribution; \bar{d} = the mean distance between the nearest neighbours (km); n = the number of the points in the study area; A = the area under study (km^2) (Wough, 2007).

To achieve the third objective (ie examining the factors influencing the location of filling stations) an interview was conducted with the Chairman and Secretary of the Independent Petroleum Marketers Association of Nigeria to find out the major reasons marketers consider in building their filling stations and the reason(s) on why they (marketers) prepare one road over the other.

In order to achieve the fourth objective which is to compare location of the filling stations with standards buffer and proximity analysis were done in ArcMap. Buffers of 15 meters were created on the roads to identify stations that meet the criteria of fifteen (15) metre distance from the road. Query by location was performed using the selection menu in ArcMap environment. In addition the data were queried to give all locations that are within 15m buffer. The selected stations were highlighted, right-clicked was done on

the shape file (containing the station) and the software was commanded to create layer from the selected features. The stations selected were identified as those not meet the distance criterion of 15m from road. Chart was created to see the proportions of the stations not meet this criterion.

Another query operation was done using selection menu, the query is to give stations that are within distance of 400 metre from other station. The selected stations are identified as those not meet the criterion of 400 meter between stations. Shape file for these stations was also created, saved and used to compute the proportion not meet 400m criterion.

A hospital (being a public building) database was also imported into the ArcMap environment and a query by location was performed. The software was asked to find and highlight all stations that are within 100 meter from the hospitals. The selected stations were identified as those not meet the criterion of 100 meter from public place (hospitals). A similar operation was done using schools shape file to identify those not meet the distance of 100 meter from school.

Worshiping places (even though public and semi public) were not included in this work because their of lack of spatial data for them, also the fact that anyone familiar with the study area (Kano Metropolis) mosque are built everywhere in the city and that comparison with them will prove difficult and nearly impossible

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND DISCUSSION

4.1 Introduction

This chapter presents the analysis and discusses the major findings of the research, to achieve the objective stated at the first chapter. The result is presented and discussed under five sub-headings that include: inventory and mapping the filling station, distribution pattern of the filling station, factors governing the distribution of filling stations and comparison of the distribution of filling stations with physical planning standards set by DPR (2007) and adapted by KNUPDA (2013).

4.2 Inventory and Mapping of the Filling Station

4.2.1 Inventory of Filling Stations by Road

The findings revealed that there existed two hundred and fourteen (214) filling stations at the time of study. These filling stations are located along the forty three (43) roads in the area (Table4.1). However the filling stations are not equally distributed between the roads as can be observed from the table 4.1, Zaria road has the highest number of station (28) followed by Maiduguri and Katsina road with (27) and (25) each respectively, these three roads account for more than one-third of the filling stations in the area (representing36%). This result is not surprising because the three roads are the major roads in the metropolis, they are the longest and linked Kano with major cities of Nigeria. Equally Gwarzo road, Eastern bye-pass and Hadejia Road have significant number of filling stations as can be observed from the table. On the other hand short and access roads have least number of filling stations. This can be seen in roads like

IBB Way, Jakara Road, Kofar Wambai and many others with one filling station each. Indeed this finding has corroborate with that of Baichie and Wallimsi (2000) where they reported that filling stations are not built in town centres but rather on exit roads.

Another feature of the location off filling station is that they tend to be dominant on the exit side of the town. One major reason for that is most drivers fuel their vehicle when moving out of the city. For example out of twenty-eight filling stations along the Zaria road, eighteen (65%) are situated on the exit side along Kano to Zaria Way. Equally fourteen (52%) in Maiduguri road and sixteen (64%) in Katsina road are located on exit side from Kano (figure 4.1).

It was discovered that 78% of the filling stations are located on the major road, about 13% on the secondary or minor roads and only 9% on the access road (figure 4.1.2). Attempt was made to see if there exist any relationship between the road rank and the number of filling station using Pearson product moment correlation and it was discovered that there is significant relationship even at $\alpha=0.01$ because the p-value for the relationship is 0.00110. In other words the higher rank of the road the more the number of filling stations located along it.

Table 4.1: Location of Filling Stations by Road in Kano Metropolis

| S/N | Road | Type | No. of Stations | |
|--------------|---------------------------------|--------|-----------------|-------|
| | | | F | % |
| 1 | Abdullahi Bayero Way | Major | 1 | 0.5 |
| 2 | Bompai Road | Minor | 1 | 0.5 |
| 3 | Enugu Road | Access | 1 | 0.5 |
| 4 | Ibb Way | Minor | 1 | 0.5 |
| 5 | Jakara Qtrs | Minor | 1 | 0.5 |
| 6 | Kofar Mazugal Road | Major | 1 | 0.5 |
| 7 | Kofar Wambai | Access | 1 | 0.5 |
| 8 | Kumbotso Secreteriate Road | Access | 1 | 0.5 |
| 9 | Lagos Street | Access | 1 | 0.5 |
| 10 | Lawan Danbazu Link/Off Buk Road | Access | 1 | 0.5 |
| 11 | Middle/Court Road | Access | 1 | 0.5 |
| 12 | New Road | Access | 1 | 0.5 |
| 13 | Old Katsina Road | Minor | 1 | 0.5 |
| 14 | Sabo Bakin Zuwo Road | Access | 1 | 0.5 |
| 15 | Tafawa Balewa Road | Minor | 1 | 0.5 |
| 16 | Tudun Yola Road | Access | 1 | 0.5 |
| 17 | Waika-Dawanau Road | Minor | 1 | 0.5 |
| 18 | Zango Road (Dakata) | Minor | 1 | 0.5 |
| 19 | Court/Middle Road | Access | 2 | 0.9 |
| 20 | Link Road | Access | 2 | 0.9 |
| 21 | Yahaya Gusau Road | Minor | 2 | 0.9 |
| 22 | Zungero Road | Minor | 2 | 0.9 |
| 23 | Bello Road | Major | 3 | 1.4 |
| 24 | Club Road | Major | 3 | 1.4 |
| 25 | Dala Hospital Road | Major | 3 | 1.4 |
| 26 | Dambatta/Daura Road | Major | 3 | 1.4 |
| 27 | Independence Road | Minor | 3 | 1.4 |
| 28 | Zoo Road | Minor | 3 | 1.4 |
| 29 | Aminu Kano Way | Major | 4 | 1.8 |
| 30 | Murtala Moh'd Way | Major | 4 | 1.8 |
| 31 | Sharada Ind. Estate | Major | 4 | 1.8 |
| 32 | Buk Road | Major | 5 | 2.3 |
| 33 | Ibrahim Taiwo Road | Minor | 5 | 2.3 |
| 34 | Kofar Ruwa Road | Access | 6 | 2.8 |
| 35 | Madobi Road | Major | 7 | 3.2 |
| 36 | Panshekara Road | Minor | 7 | 3.2 |
| 37 | Sani Abacha Way (Airport Road) | Major | 8 | 3.7 |
| 38 | Hadejia Road | Major | 9 | 4.1 |
| 39 | Eastern Bypass | Major | 14 | 6.5 |
| 40 | Gwarzo Road | Major | 17 | 7.8 |
| 41 | Katsina Road | Major | 25 | 11.5 |
| 42 | Maidaguri Road | Major | 27 | 12.4 |
| 43 | Zaria Road | Major | 28 | 12.9 |
| Total | | | 214 | 100.0 |

Source: Field Survey (2014)

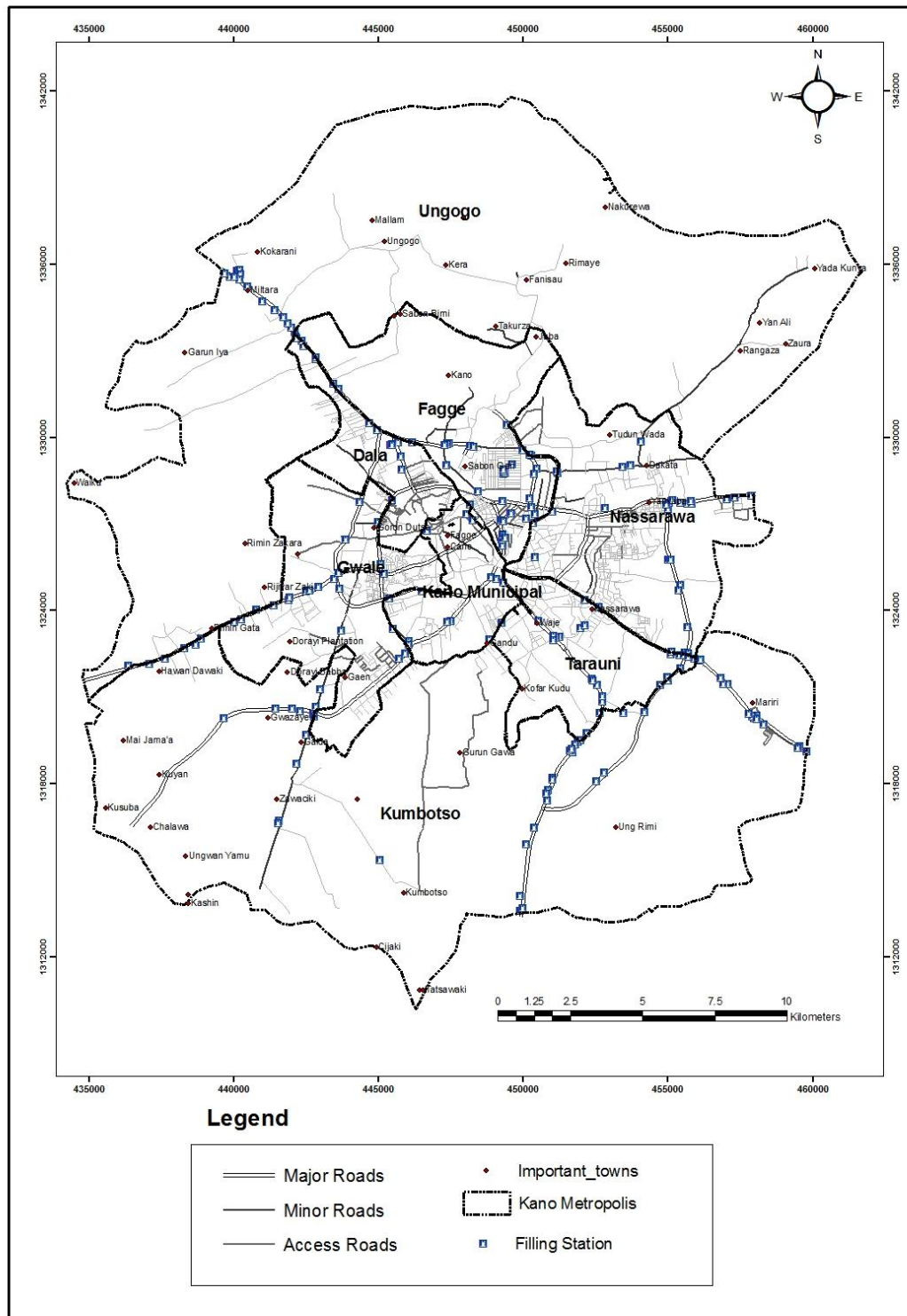


Figure 4.1: Spatial Distribution of Filling Stations in Kano Metropolis
 Source: Field Survey (2014)

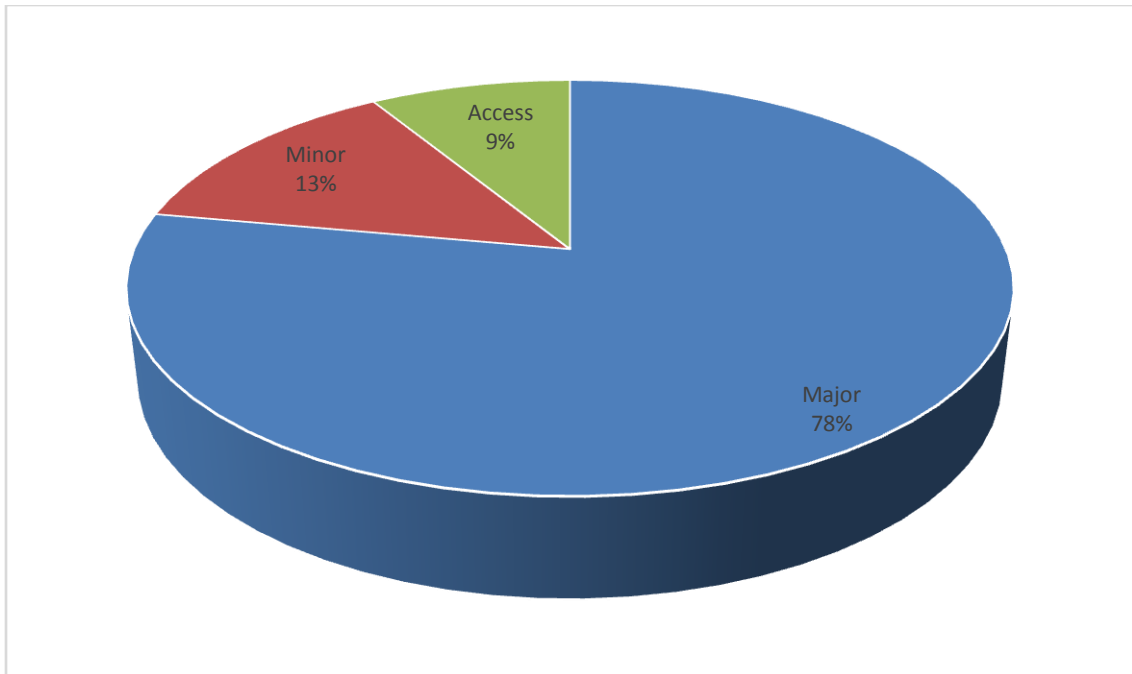


Figure 4.2: Filling Station Distribution by Road Type in Kano Metropolis

Source: Fieldwork (2014)

Furthermore the density of filling station per road length was calculated and the results revealed that there is wide variation in the density of filling station between roads. The length of each of the road in km was determined and the density of filling stations per km of each was computed. It was found out that although Zaria, Maiduguri and Katsina roads have the highest number of filling stations, minor roads like Sabo-Bakin Zuwo, Zungero and IBB way topped in relation to density per km (Table 4.2). Indeed the density of filling stations per km in roads like Sabo-Bakin Zuwo, Zungero, IBB, Bello, Dambatta/Daura among others exceed the minimum of Kano Urban Planning Development Agency, KNUPDA (2007) that says there must be at least 3 station in every two km.

Table 4.2: Density of Filling Stations per Road in Kano Metropolis

| S/N | Road | Length of Road (Km) | No. of Filling Stations | Density (per Km) |
|---------------------|---------------------------------|---------------------|-------------------------|------------------|
| 1 | Abdullahi Bayero Way | 4.52 | 1 | 0.22 |
| 2 | Aminu Kano Way | 2.66 | 4 | 1.50 |
| 3 | Bello Road | 0.90 | 3 | 3.33 |
| 4 | Bompai Road | 0.85 | 1 | 1.18 |
| 5 | Buk Road | 6.87 | 5 | 0.73 |
| 6 | Club Road | 2.67 | 3 | 1.12 |
| 7 | Court/Middle Road | 0.91 | 2 | 2.20 |
| 8 | Dala Hospital Road | 2.14 | 3 | 1.40 |
| 9 | Dambatta/Daura Road | 0.77 | 3 | 3.91 |
| 10 | Eastern Bypass | 13.22 | 14 | 1.06 |
| 11 | Enugu Road | 0.77 | 1 | 1.29 |
| 12 | Gwarzo Road | 9.18 | 17 | 1.85 |
| 13 | Hadejia Road | 15.79 | 9 | 1.52 |
| 14 | IBB Way | 0.26 | 1 | 3.86 |
| 15 | Ibrahim Taiwo Road | 1.53 | 5 | 3.27 |
| 16 | Independence Road | 5.66 | 3 | 0.53 |
| 17 | Jakara Qtrs | 1.12 | 1 | 0.89 |
| 18 | Katsina Road | 14.27 | 25 | 1.75 |
| 19 | Kofar Mazugal Road | 1.45 | 1 | 0.69 |
| 20 | Kofar Ruwa Road | - | 6 | - |
| 21 | Kofar Wambai | 0.47 | 1 | 2.14 |
| 22 | Kumbotso Secreteriate Road | 7.38 | 1 | 0.14 |
| 23 | Lagos Street | 1.09 | 1 | 0.91 |
| 24 | Lawan Danbazu Link/Off Buk Road | 0.51 | 1 | 1.95 |
| 25 | Link Road | 1.55 | 2 | 1.29 |
| 26 | Madobi Road | 8.33 | 7 | 0.84 |
| 27 | Maidaguri Road | 11.17 | 27 | 2.42 |
| 28 | Middle/Court Road | 0.78 | 1 | 1.28 |
| 29 | Murtala Moh'd Way | 3.37 | 4 | 1.19 |
| 30 | New Road | 1.26 | 1 | 0.80 |
| 31 | Old Katsina Road | 2.30 | 1 | 0.43 |
| 32 | Panshekara Road | 11.50 | 7 | 0.61 |
| 33 | Sabo Bakin Zuwo Road | 0.18 | 1 | 5.45 |
| 34 | Sani Abacha Way(Airpport Road) | 3.81 | 8 | 2.10 |
| 35 | Sharada Ind. Estate | 6.83 | 4 | 0.59 |
| 36 | Tafawa Balewa Road | 1.51 | 1 | 0.66 |
| 37 | Tudun Yola Road | 5.28 | 1 | 0.19 |
| 38 | Waika-Dawanau Road | 2.00 | 1 | 0.50 |
| 39 | Yahaya Gusau Road | 1.80 | 2 | 1.11 |
| 40 | Zango Road (Dakata) | 1.33 | 1 | 0.75 |
| 41 | Zaria Road | 14.07 | 28 | 1.99 |
| 42 | Zoo Road | 2.51 | 3 | 1.19 |
| 43 | Zungero Road | 0.34 | 2 | 5.93 |
| Mean Density | | | | 1.57 |

Source: Field Survey (2014)

The lowest density of filling stations per road is found in Kumbotso secretariat road, Murtala Muhammad way and Abdullahi Bayero way having the density of 0.14, 0.19 and 0.22 respectively (table 4.2).

4.2.2 Filling Stations by Ownership

In Nigeria filling station is owned either by entrepreneur(s) (individual or partner) that form a company known as independent marketers, or multi-national companies known as major marketers, or even a government own company named Nigeria National Petroleum Company (NNPC). The research findings shows that majority of the station in Kano Metropolis belongs to independent marketers followed by major marketers and then NNPC (figure 4.3 and 4.4).

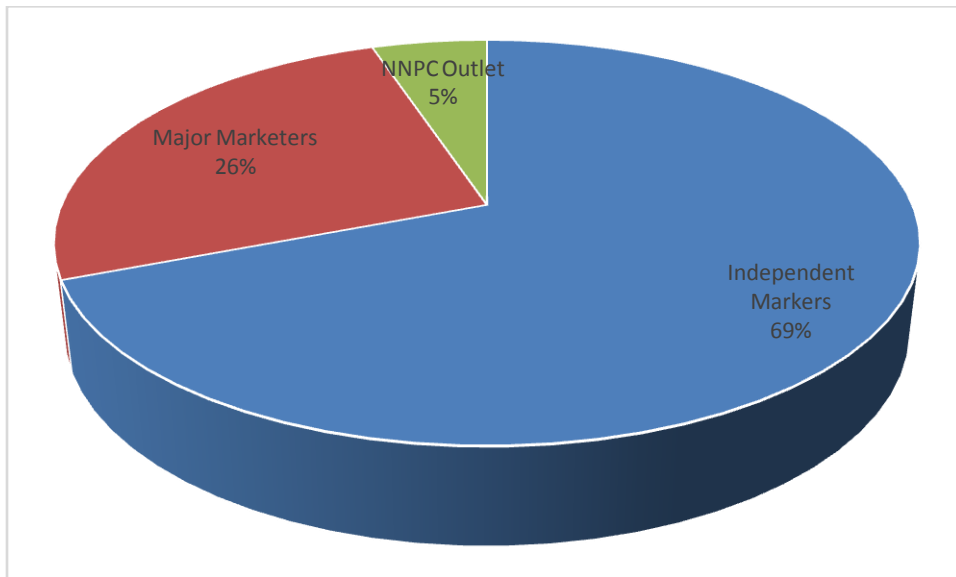


Figure 4.3: Filling Station Ownership in Kano Metropolis

Source: Field Survey (2014)

The results of the filling station ownership in Figure 4.3 corroborated with that of DPR (2014) that showed that independent marketers owned most of the filling station in

country between year 2008 and 2012. Equally the result agreed to some extent with the findings of Sule *et al* (2011) in Kaduna metropolis, where he discovered that more than 60% of the stations are owned by the independent marketers. However the result (in figure 4.3) contradicted the assertion made by Udoh (2013), that the petroleum products distribution/ marketing is dominated by six major marketers: Total Nigeria plc, Oando, AP (now Forte Oil), Mobil, Conoil, and Texaco now (MRS). According to Udoh these six majors form about 70% of the distributive trade while independent marketers take care of the rest.

In addition the number and percentage of filling station owned companies were determined. Table 4.3 shows the number of filling station owned by the Six Major Petroleum marketers in the study area.

Table 4.3 Major Petroleum Marketers and their Stations in Kano Metropolis

| Name | No. of Stations | Percent |
|--|------------------------|----------------|
| African Petroleum Plc/ Forte Oil Company Limited | 8 | 14.5 |
| Con Oil Nigeria Ltd | 9 | 16.4 |
| M.R.S Oil & Gas Company Limited | 9 | 16.4 |
| Mobile Oil Nigeria Ltd | 6 | 10.9 |
| Oando Nigeria Plc | 13 | 23.6 |
| Total Finaelf Nigeria Plc | 10 | 18.2 |
| Total | 55 | 100.0 |

Source: Field Survey (2014)

From the results in table 4.3 Oando Nigeria plc has the highest number of petroleum outlets among the six major marketers (23%) while Mobile has the lowest (account for 10%) of filling stations. M.R.S and Con Oil have 16% each.

In the case independent marketers there were about 108 companies doing business in Kano Metropolis. Most of the companies (comprising of 78%) have only one

petroleum outlet in the area. Only twelve percent (12%) owned multiple stations. A.A. Rano Nigeria ltd topped the list of independent marketers with eight filling stations, followed Azman Oil and Gas ltd with six stations, and Criss Cross Petroleum marketing, Biram Oil and Gas marketing ltd owned four stations each. Alfatashir Nigeria ltd and ABY petroleum have three stations each. A significant number of the companies owned two stations, but the great majority has only one station (Appendix I). Other filling stations (5%) are owned by NNPC (Appendix II). Almost all the NNPC stations were located on the major roads like Zaria, Maiduguri and Gwarzo roads (Figure 4.4).

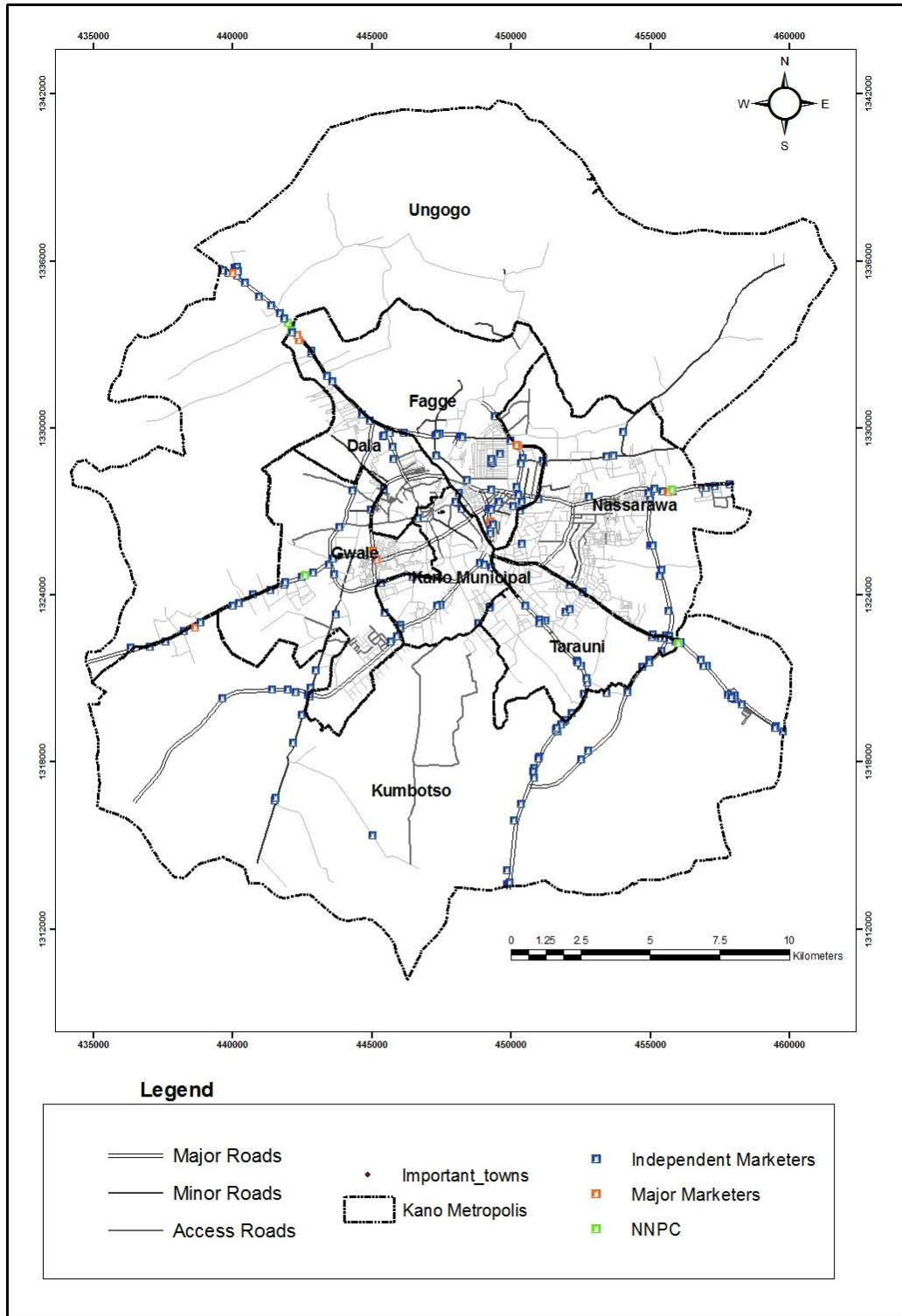


Figure 4.4: Distribution of Filling Stations in Kano Metropolis by Ownership

Source: Field Survey (2014)

4.2.3 Petroleum Products Sold by Filling Stations in Kano Metropolis

According to the DPR guidelines, before one gets a license to operate a filling station business, he must have at least three underground tanks for petroleum products: PMS, DPK, and AGO (DPR 2014). The summary of the capacity of filling stations (in litres) in the study area is presented in table 4.4.

Table 4.4: Petroleum Products Capacity (in Litres) for Filling Station in Kano Metropolis

| STATISTICS | PMS | AGO | DPK | LUB OIL | LPG | Total Capacity |
|--------------|------------|-----------|-----------|---------|---------|----------------|
| Total | 18,289,676 | 8,675,711 | 6,262,700 | 209,300 | 28,500 | 32,511,467 |
| Mean | 94765.16 | 45661.64 | 33490.37 | 2012.5 | 1583.33 | 166725.47 |
| STDV | 46532.52 | 45547.5 | 11252.84 | 127.48 | 549.06 | 66215.35 |
| CV | 0.49 | 1 | 0.34 | 0.06 | 0.35 | 0.4 |

Source: DPR 2013

Table 4.4 revealed that PMS is the most dominant product traded by the station. As observed from the table (in the study area), the stations have the highest total capacity for PMS, followed by AGO, DPK, LUB Oil, and LPG. Equally, the mean capacity, standard deviation, and Coefficient of Variation presented on the same table followed a similar trend as in total production.

4.3 Pattern of Distribution of Filling Stations in Kano Metropolis

Filling station business is governed by many factors among which are accessibility, market, government policy, and so on. This was supported by Wough (2007) when he asserted that activities and events in geographic space tend to exhibit certain patterns. This pattern can be clustered, random, or dispersed. There are many methods of pattern identification; nearest neighbor analysis is one of them. The results of the

analyses revealed that the pattern of distribution is perfectly clustered because the nearestneighbour index (R_n) value is less than 1 and Z-value is -15.87, less than -1.96. Also there is significant difference between the distribution of filling stations in the area and random distribution at both 95 and 99 percent because the p-value is less .001. However it is important to note that nearest neighbor analysis is just a technique that explained the distribution of phenomena but cannot explain the reason for the distribution (Wough 2007). The reason for clustered distribution of the filling stations in the area may be linked to the fact that filling stations are located mainly on the road side and researches had shown that they mostly tend to concentrate on the highways and major roads, typical of their distribution in Kano Metropolis.

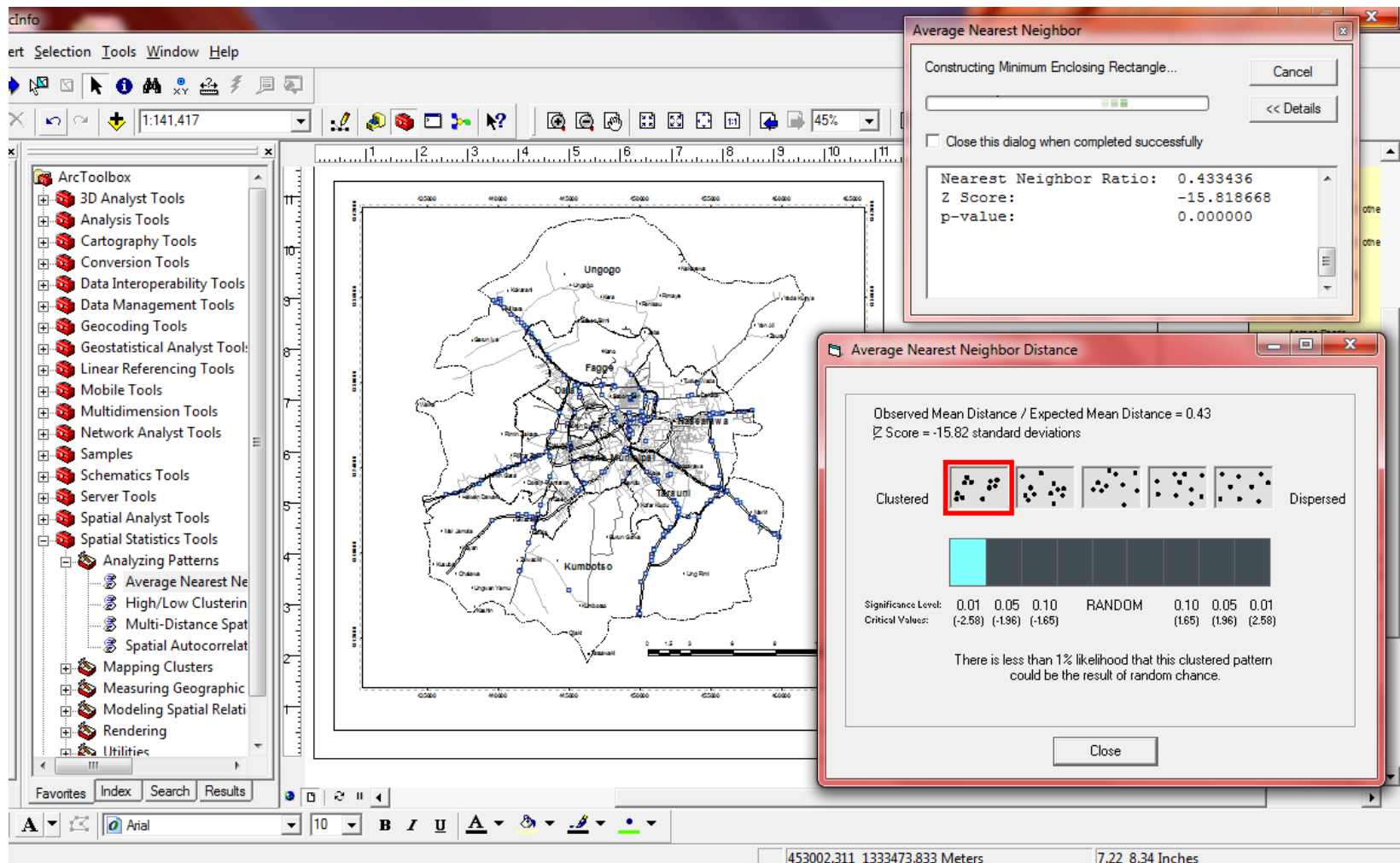


Figure 4.5: Nearest Neighbour Analysis of Filling Stations in Kano Metropolis

4.4 Factors Influencing the Distribution of Filling Stations in Kano Metropolis

Filling station business has spatial dimensions due to the fact that it is done in a geographic space and that a place to be used for doing the business has to fulfill certain criteria. While the DPR is responsible for clearing the site, issuing of license to operate and ensure standards are complied with, marketers consider some factors in the choice of business location. The result of the interview conducted by IPMAN official at Kano revealed the following as factors the operators consider in selecting site to build a filling station.

1. **Traffic Flow:** this is one of the most important factors considered in building station. Marketers built their station along major roads that have heavy and continues traffic flow because they are likely to attract more customers. In other words the more the traffic flow the more the fuel demand.
2. **Exit Roads:** Filling stations were mostly built along the exit roads which linked the City (Kano) with other important cities. Such roads like Zaria, Katsina, Maidugure, Hadejia and Gwarzo road have the highest number of station partly because they are the exit road from Kano to all parts of Nigeria. Petroleum had been compare to food as such anyone driving out of the town has to full his tank (with fuel). Indeed the finding has shown that most filling stations are built on the exit side where customers would find it easier to enter filling station and fuel their vehicle. In addition the marketers assumed that vehicle driving-in the town (Kano City) had already fuel their vehicle at their source/origin.
3. **Closeness to Motor Park:** Because the target of filling station business were drivers, especially public transport drivers, filling stations were built close to motor park

especially those for inter city or international transport. For example four stations were operating inside Kofar Motor Park (which is not only intra urban but international Motor Park in Kano). Also about four stations were built along and very close to Unguwa Uku Motor Park in Zaria road. Infact along motor parks such as Hedejia road motor park, Kofar Wambai Motor Park, Kabuga Motor Park and Mariri Motor Park along Maidugri road.

4. **Convenience:** This was another factor consider by the marketers when choosing their business location. Even though marketers are attracted by heavy traffic flow, they prepare to built-in their station in places away from traffic jam heart were the passengers may find it convenience to park and fuel their vehicle. Hence station are built where there is enough space for customers to maneuver the vehicle when entering or exiting after fueling.
5. **Near Nodal Towns/Junctions:** Filling stations are also built close to nodal towns or junction. Because nodal towns are potential markets for filling station, filling station were built along them. However this is more applicable to peri-urban stations. Vehicles are coming from different side of the junction and therefore likely to stop and gate fueled.

4.5 Filling Station and Physical Planning Standards

Filling station business is regulated by DPR, a department under the Ministry of Petroleum Resources saddled with responsibility to register and regulate the downstream petroleum sector. In addition there exists Kano Urban Planning Department Agency (KNUPDA) whose duty is to regulate all development within the metropolitan Kano. Filling stations has to meet the planning standard set by these agencies for their business

safety. This study correlate the planning standard (already discuss in chapter one) and current location of the filling station in the area. This was achieved using proximity analysis tools available in ArcGIS 10.

4.5.1 Distance from Road

According the physical planning Standards set by DPR (2007) Procedure guide for grant of approvals to construct and operate of a petrol products retail outlet, the distance from the road to filling station pump should not be less than 15meter. Since filling station were represented as point facilities and road as line feature, a buffer of 15m was created on the road and data query by location was made in ArcMap environment. The query assisted with “selecting all locations that are completely within 15meter road buffer. The result is presented in Figure 4.6 and 4.7.

The result revealed that only eight stations (4%) did not meet the criteria of 15m minimum distance from road (figure 4.7). These stations include those along the access road (e.g. Jakara and New road) and a few along the major roads (one station along Zaria, Katina, Daura/Dambatta road each.

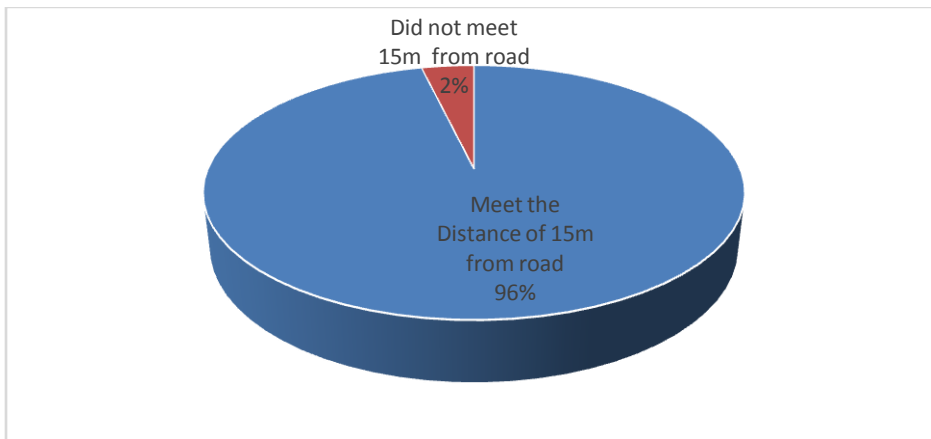


Figure 4.6: Filling Station and 15 metre Standard Distance from Road

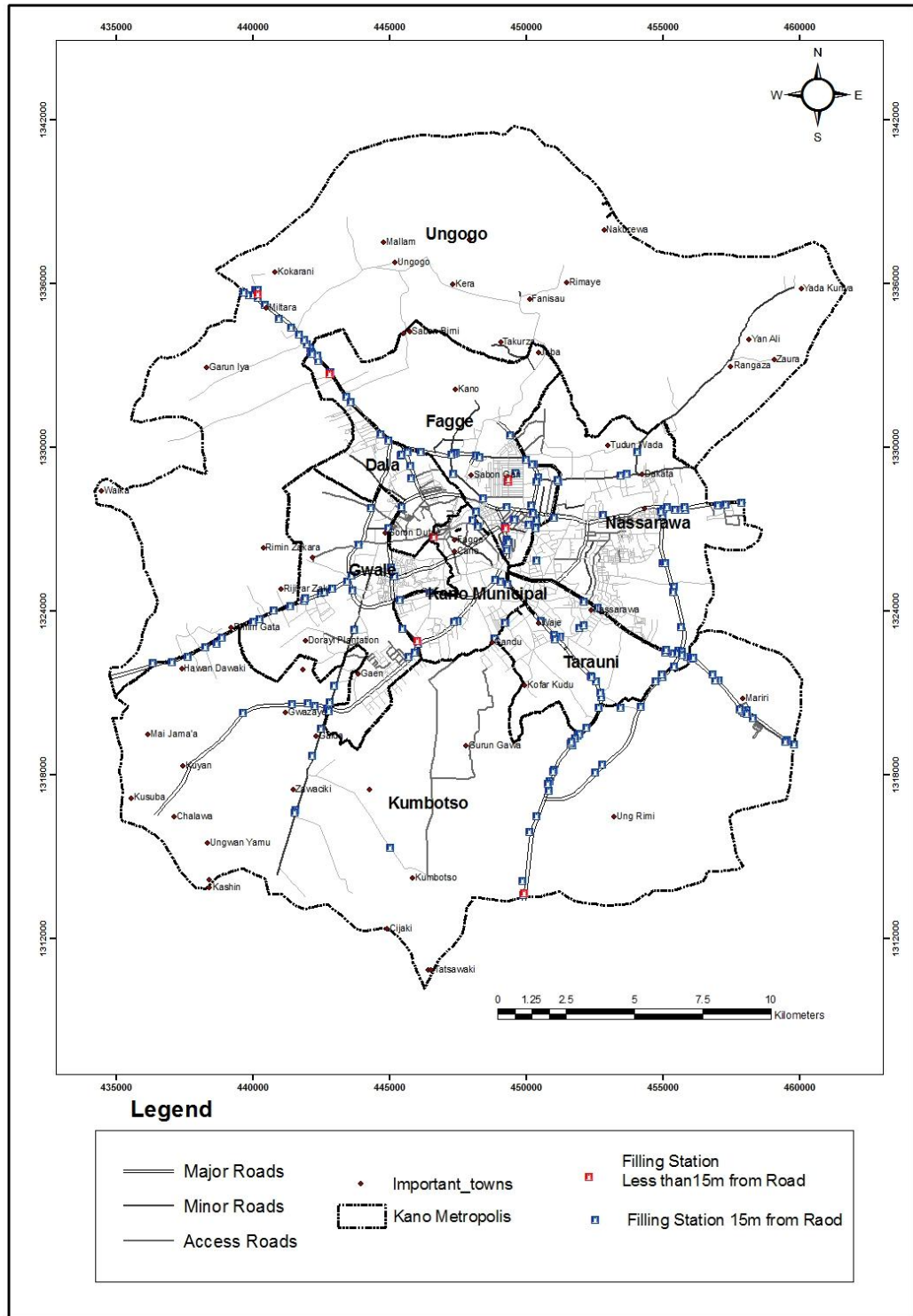


Figure 4.7: Location of Filling Station in Kano Metropolis against the 15m Standard Distance from Road

Source: Field Survey (2014)

This result confirms that majority of the filling stations meet the standard criteria of locating 15m distance from road. Among the filling stations that did not meet this criterion 62% are independent marketers, 38% are major markers and none is NNPC Appendix IV.

4.5.2 Distance between the Location of Filling Stations

Distances between stations in the area were determined in ArcMap environment using proximity operation of the analysis tool. The finding revealed that longest distance between neighbouring filling stations was about 3,700 metre. This was found between Gasau Petroleum along Kumbotso Secretariat and Misbahu Garba Nigeria ltd along Panshekara road. Apart from the two mentioned, the mean distance between neighboring filling stations was about 300 metres. The shortest distance of less than a metre and was observed were neighboring station lied back to back. The result also shows that more than half of the filling stations were less than 400 metres to their neighbours. However about only 24% of the station could not meet the minimum distance of 400 metres from their neighbours (with no road separation).

In a nut shell more one-quarter of the filling station did not to satisfy the standard of 400 metre distance from the nearest neighbour (figure 4.8). The filling station that had not satisfy this standard were found in most roads. The highest number of those not meet the minimum standard of 400m distance between the location of filling station was observed in Katsina and Gwarzo road, which are major road linking Kano to other major Nigeria's cities (figure 4.9). The likely reason for these playout may be due to the market along these areas and the fact that regulator bend to this rule and give waver to the filling stations (as regard the standards) in heavy traffic roads.

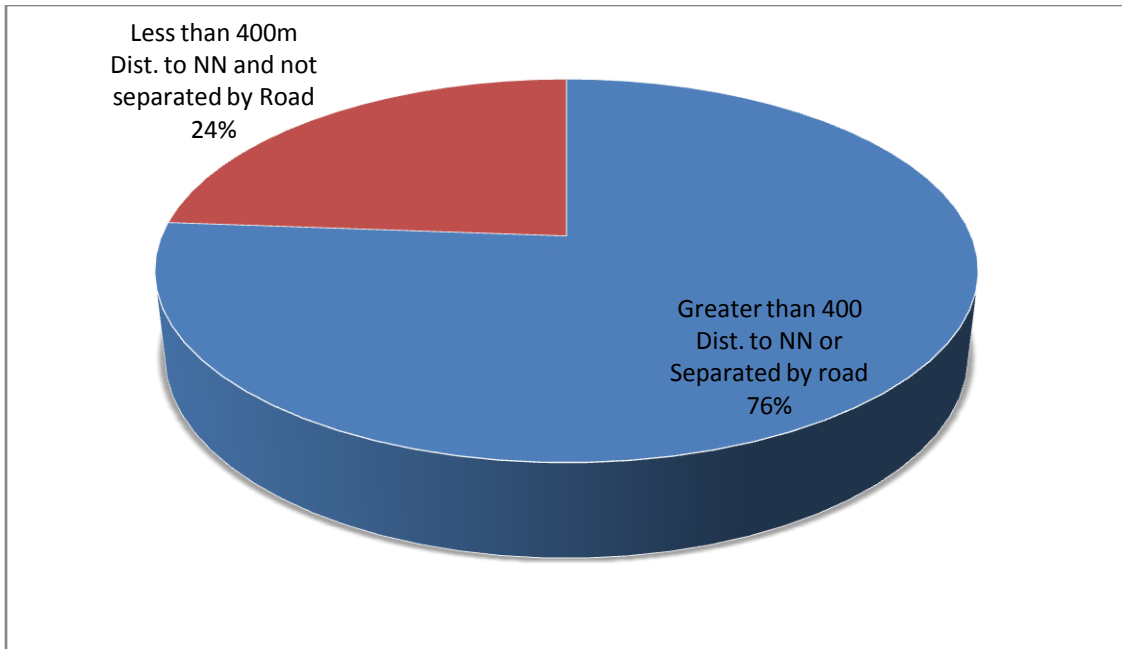


Figure 4.8: Filling Stations in Relation to 400 metre Distance to Nearest Filling Station in Kano Metropolis

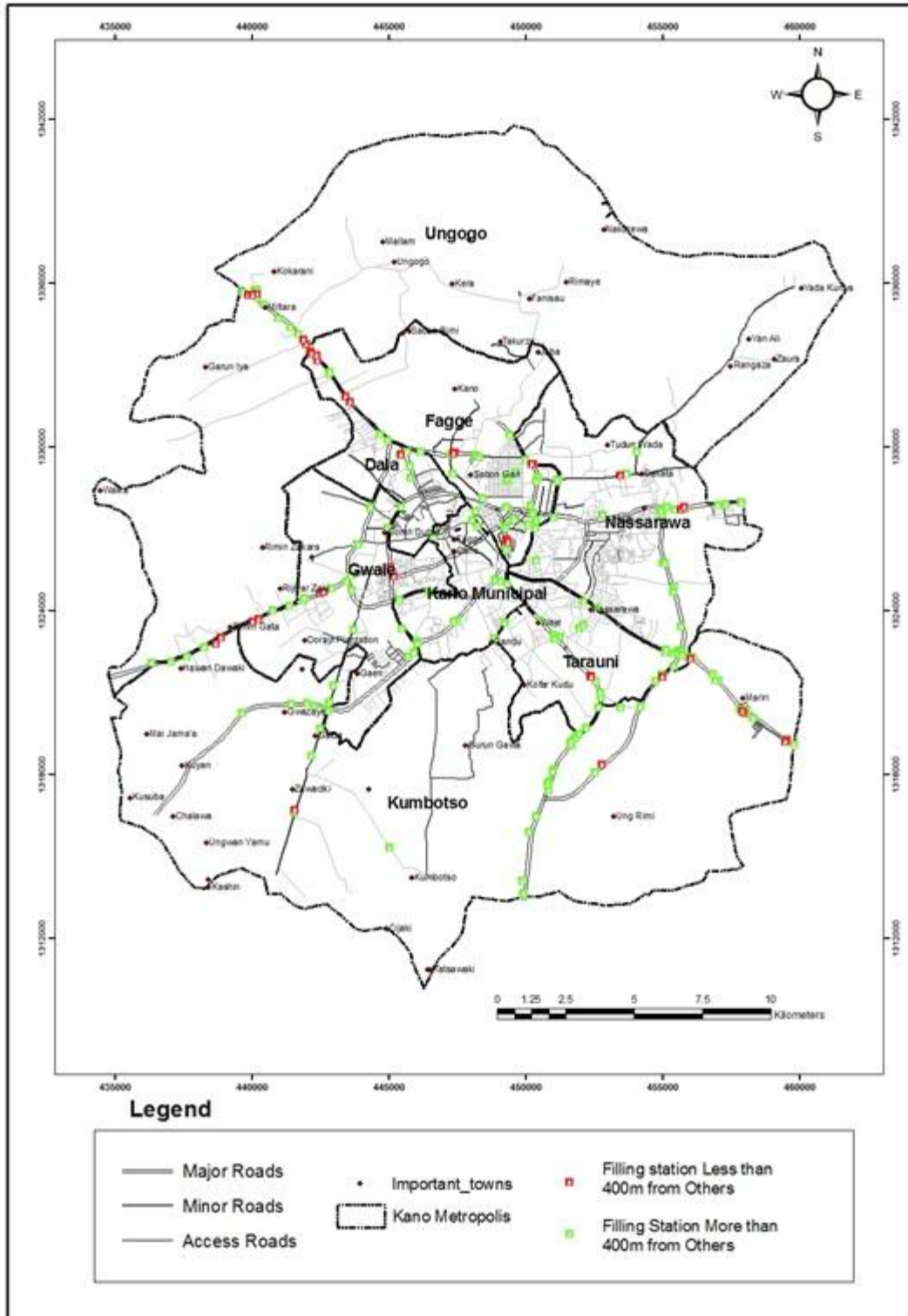


Figure 4.9: Location of Filling Stations in Relation 400m Distance from Other Filling Stations in Kano Metropolis

Source: Field Survey (2014)

4.5.3 Distance of Filling Stations to Health Facilities

According to the criteria set by the DPR, filling stations are not allowed to operate adjacent to public institutions like hospitals. In case they are to operate, the minimum distance of 100 meters has to be maintained. Thus, a comparison was made between the location of the filling station and its distance to the hospital. The findings revealed that the majority of the stations meet this standard (figure 4.10). Only a few of the stations (2%) could not meet the criteria. These stations are mainly major and independent marketers, and none among them is an NNPC outlet. In essence, the distance of the filling station to the hospital is one major criterion that regulators do not play with because only a few stations

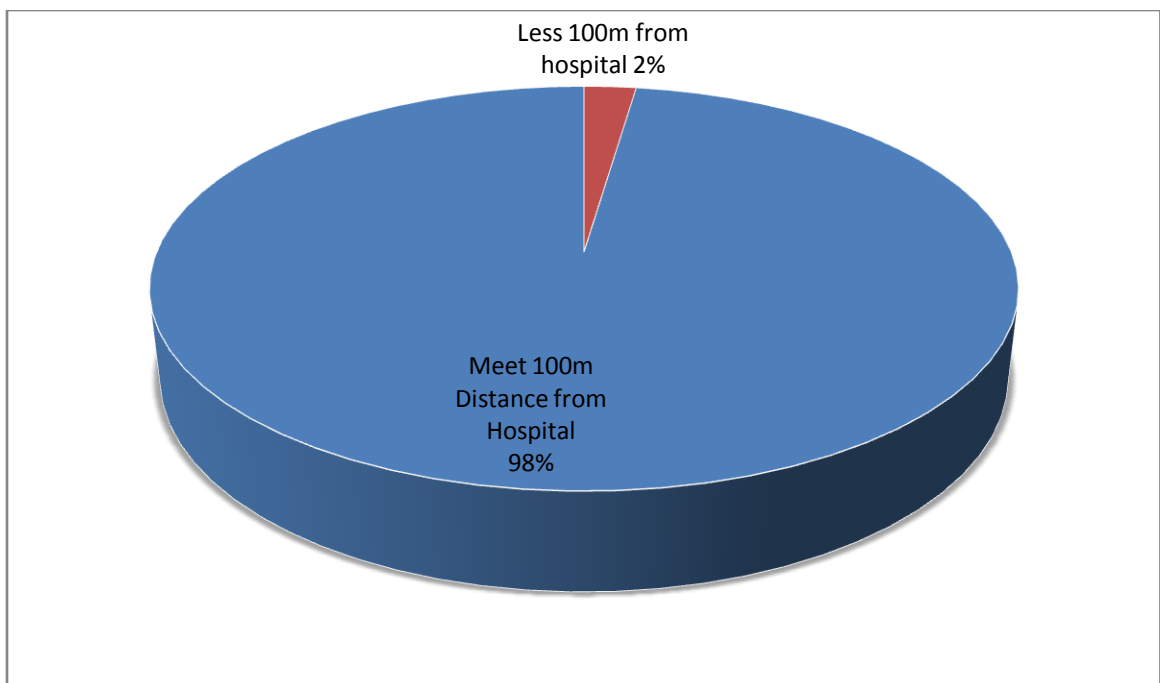


Figure 4.10: Filling Station Distribution in Relation to 100m Distance to HCF

Source: Field Survey (2014)

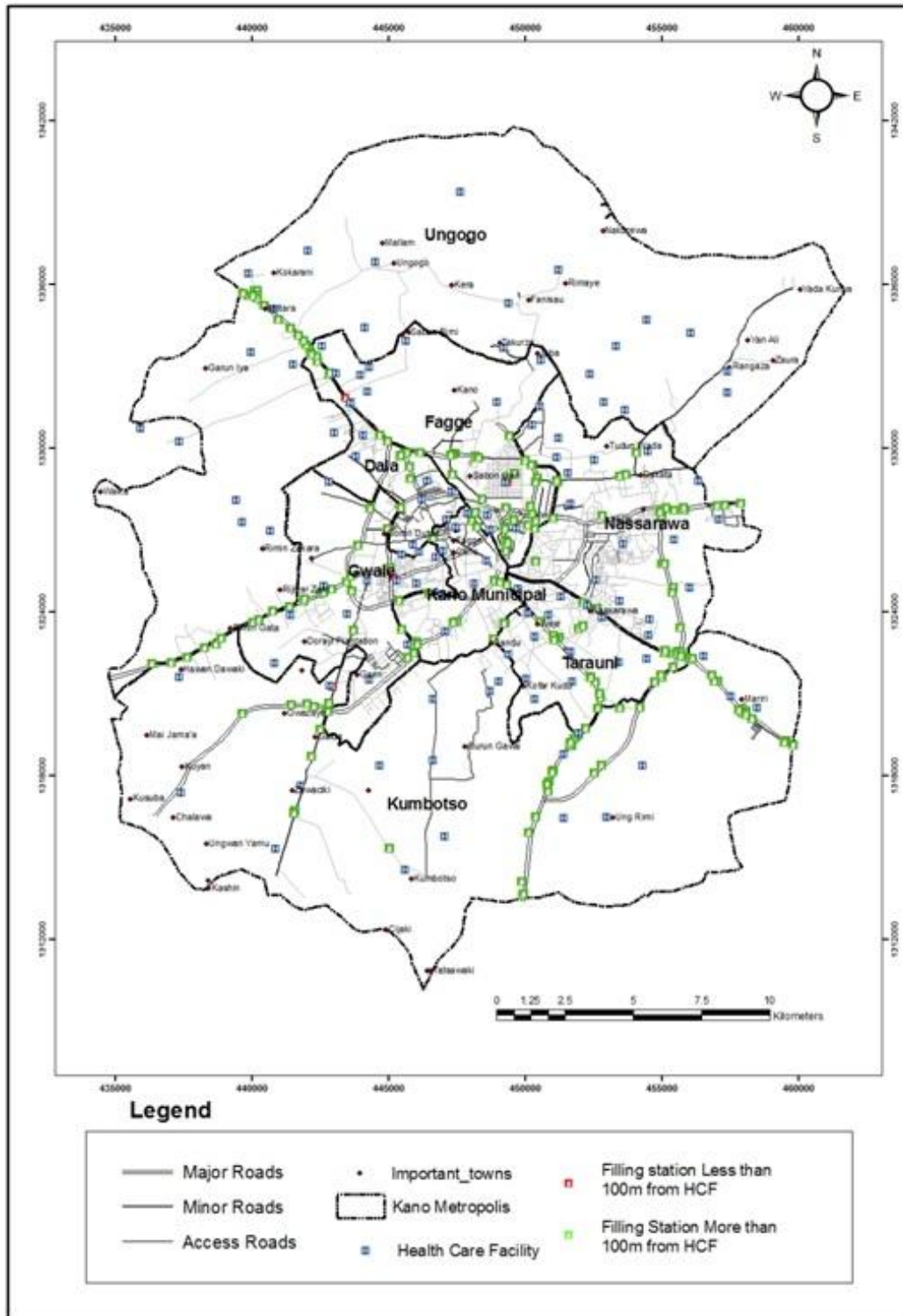


Figure 4.11: Location of Filling Stations in Relation to Health Care Facilities in Kano Metropolis

Source: Field Survey (2014)

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Findings

This research analysed the location of filling stations in Kano Metropolis and subjected the location to the physical planning standards put in place by the regulatory agency, DPR and KNUPDA. The research findings revealed that there are 214 filling stations currently operating in the area. Among the filling stations existing in the area, 69% are owned by about 108 independent marketing companies, 26% by six major marketers and 5% by NNPC. Oando Nigeria plc and A.A. Rano Nigeria ltd top the major and independent marketers with twelve and eight filling station respectively. Mobile Nigeria has the least number among the major marketers (account for 10% of station).

The number of stations correlated significantly with road hierarchy. Major roads like Zaria, Katsina and Maiduguri road have higher number of filling; however the density of station per distance (in km) is higher in minor and access roads. About 78% of the stations were located on the major roads, 14% on the secondary (minor) roads and 8% on the access roads.

The filling stations trade mostly in PMS than all other petroleum products. The mean capacity for the filling station storage capacity of petroleum products varies extensively because the coefficient of variance (CV) was high, greater than 100% in APG and 49% and 40% in PMS and LPG. The list variant was in observed in the storage capacity of LUB (6%).

Though the filling station exhibit linear pattern because they are cited mainly on road side where drivers can easily get the product, the overall pattern off distribution is clustered with nearest neighbour value (R_n) of 0.3 (less than 1) and z-value of -15. There was significant different between the observed pattern and the random pattern at both 95% and 99% level of significance and its 99% likely that the pattern is cause by chance. The major factors influencing the location of the filling stations are traffic flow, exit side of the town, nearness to inter urban Motor Park, convenience and existence of nodal towns or junction. Most of the station satisfied the minimum requirement of 15 metre distance from the road (96%). Equally 98% of the filling stations met the minimum distance of 100 meter from the hospital. However many station had not meet the criteria of 400 meter minimum distance to other stations where located on same road side and when not separated by any road or street.

5.2 Conclusion

The research made the following conclusions

1. That the filling stations in Kano metropolis are not evenly distributed, rather they are more concentrated along the major roads (high ways) especially Zaria road, Katsina road and Maiduguri road. These three account for more than one-third of the filling station in the area.
2. That there is significant correlation between the hierarchy of the road and number of filling station. Filling station retailers prepare highways linking the Kano City with major Nigerian cities like Zaria, Kaduna, FCT, Maiduguri, Katsina among others where the people mingle all the time.

3. PMS is most dominant petroleum product retailed by the filling stations, followed by AGO and DPK and there was high variation in the capacity of the stations in relation to these products.
4. Although major road have the highest number of filling stations, the density per km is higher in minor road. From the finding, major road exceed the KNUPDA minimum of at least three stations per 2 km.
5. The independent marketers dominated the petroleum retail business (filling Station) and this is good for the economy. Indeed the independent marketers were established with intention to diversify the economy, create opportunity for Nigerian to participate in downstream petroleum sector and reduce the monopoly of multinational companies that initially dominated the sector.
6. Even though filling station complies most to the standard regarding distance from the road and from public buildings specifically hospital, many filling stations did not meet the minimum distance of 400 metre from other stations. Indeed it is common in the area to see two stations lie back to back. This has been observed in almost all the major road.

5.3 Recommendations

The study made the following general policy and future research recommendations

5.3.1 General Policy Recommendation

1. This study was abled to create the database for filling stations in Kano Metropolis, the DPR and Kano State City Development Office-which iscurrently try to create spatial database for the city-can utilize this data. A similar study can be carried out in all states of the federation.

2. The DPR should make it compulsory for the filling station operators when submitting their EAI report to include the geographic location of the site. This can be helpful in updating the spatial database for the filling stations successfully.
3. Discrepancies were observed as regard the compliance with standards, as such regulatory agencies need to look into the issue, take appropriate measures and should (in future) ensure that only sites that meet the minimum standards are given permission to do the business.
4. Filling stations are mostly located on some roads as found by the study, hence the need to give priority for the roads with less number of filling stations when given license to operators.

5.3.2 Future Study Recommendations

1. That there is need for more studies on filling station especially issues related to site selection and optimization. Also issue like people's perception on the location of the filling station can be investigated.
2. The distance of filling station to other public institution like schools and mosques has not been considered by this study simply because the school and mosque are too many in Kano metropolis; this can be area for future research.
3. Filling stations perform many subsidiary businesses like servicing, car wash, mini mart and so on, this can be a potential area for investigation.
4. There is need to create comprehensive digital update database for filling stations that can enable one access the site (for filling station). In addition it could help the customers locate the filling station at ease.

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APPENDICES

Appendix I: Major Marketers Filling Station in Kano Metropolis

| S/ N | Company Name | Detailed Location Address |
|---------|---------------------------------|--|
| 1 | African Petroleum Plc | Bello Road, Kano Municipal Lga, Kano State |
| 2 | African Petroleum Plc | Eastern Bypass Kawaji Qtrs, Nassarawa Lga, Kano State |
| 3 | African Petroleum Plc | Maiduguri Roundabout, Hotoro, Tarauni Lga, Kano State, |
| 4 | African Petroleum Plc | Murtala Mohd Way (Leventis), Fagge Lga, Kano |
| 5 | African Petroleum Plc | Sharada Industry Estate, Dala Lga, Kano State |
| 6 | African Petroleum Plc | Zaria Road U/Uku, Opp Fgc, Tarauni Lga, Kano State |
| 7 | Con Oil Nigeria Ltd | Plot 7655, Bello Road, Fagge Lga, Kano State |
| 8 | Con Oil Nigeria Ltd | Gwarzo Rd, Rimin Gata Village, Dambare, Kumbotso Lga, Kano State |
| 9 | Con Oil Nigeria Ltd | Km 14, (Mile 9)Katsina Road, Ungogo Lga, Kano State |
| 10 | Con Oil Nigeria Ltd | 16 Lagos Street(Coronation), Fagge Lga, Kano State |
| 11 | Con Oil Nigeria Ltd | Sabo Bakin Zuwo, Tarauni, Kano State |
| 12 | Con Oil Nigeria Ltd | Sani Abacha Way, Nassarawa Kano State |
| 13 | Con Oil Nigeria Ltd | 852 Zaria Rd, Gyadi-Gyadi R/About, Tarauni Lga, Kano State |
| 14 | Con Oil Nigeria Ltd | Km 2, Zaria Road, Fiat Site, Kumbotso Lga, Kano State |
| 15 | Con Oil Nigeria Ltd | Km 2, Zaria Road, Na'ibawa, Kumbotso Lga, Kano State |
| 16 | Forte Oil Company Limited | New Road, Sabon Gari Kano |
| 17 | Forte Oil Company Limited | Hadejia Road |
| 18 | M.R.S Oil & Gas Company Limited | Along Aminu Kano Way |
| 19 | M.R.S Oil & Gas Company Limited | Km 12, Gwarzo Road, Dala Lga, Kano State |
| 20 | M.R.S Oil & Gas Company Limited | Maiduguri Road, Hotoro, Tarauni Lga, Kano State |
| 21 | M.R.S Oil & Gas Company Limited | 96a, Murtala Muhammed Way, Nassarawa Lga, Kano State |
| 22 | M.R.S Oil & Gas Company Limited | Km 7, Zaria Road, Na'ibawa, Tarauni Lga, Kano State |
| 23 | M.R.S Oil & Gas Company Limited | Along Zaria Road, Gyadi-Gyadi, Tarauni Lga, Kano State |
| 24 | M.R.S Oil & Gas Limited. | Zoo Road, Gandun Albasa, Nassarawa Lga, Kano State |
| 25 | M.R.S Oil & Gas Limited. | Madobi Road, Kunyan-Ta-Inna Village, Kumbotso Lga, Kano |
| 26 | M.R.S Oil & Gas Limited. | Maiduguri Road, Opp Tarauni Market Junct, Tarauni Lga |
| 27 | Mobile Oil Nigeria Ltd | 32a, Airport Road, Nassarawa Lga, Kano State |
| 28 | Mobile Oil Nigeria Ltd | Km 15 Gwarzo Road, Kofar Kabuga, Gwale Lga, Kano State |
| 29 | Mobile Oil Nigeria Ltd | Km 6, Gwarzo Road Kofar Kabuga, Gwale Lga, Kano State |
| 30 | Mobile Oil Nigeria Ltd | Km-9, Katsina/Daura Junction, Ungogo, Kano State |
| 31 | Mobile Oil Nigeria Ltd | 11, Tafawa Balewa Road, Nassarawa Lga, Kano State |
| 32 | Mobile Oil Nigeria Ltd | Along Zango Road, Dakata Nassarawa Lga, Kano State |
| 33 | Oando Nigeria Plc | Katsina Road Rijiyar Lemo |
| 34 | Oando Nigeria Plc | Katsina Road |
| 35 | Oando Nigeria Plc | Km-E3, Aminu Kano Way (Sani Mainagge), Gwale Lga, Kano |

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|----|---------------------------|--|
| 36 | Oando Nigeria Plc | Along Buk, Municipal, Kano State |
| 37 | Oando Nigeria Plc | 197, Club Road, Nassarawa Lga, Kano |
| 38 | Oando Nigeria Plc | No 1, Club Road, Nassarawa Lga, Kano |
| 39 | Oando Nigeria Plc | Eastern Bypass Road, Na'ibawa, Kumbotso, Kano |
| 40 | Oando Nigeria Plc | 44, Ibrahim Taiwo Road, Fagge Lga, Kano State |
| 41 | Oando Nigeria Plc | 16, Independence Road, Dakata, Nassarawa Lga, Kano State |
| 42 | Oando Nigeria Plc | Along Maiduguri Road |
| 43 | Oando Nigeria Plc | Along Maiduguri Road |
| 44 | Oando Nigeria Plc | 2 Middle/Court Road, S/Gari, Fagge Lga, Kano State |
| 45 | Oando Nigeria Plc | 85, Murtala Mohammed/Court Road, Nassarawa Lga Kano |
| 46 | Oando Nigeria Plc | No 1 Bello Road, Nassarawa Lga, Kano State |
| 47 | Total Finaelf Nigeria Plc | Katsina Road Rijiyar Lemo |
| 48 | Total Finaelf Nigeria Plc | 181a Airport Road, Nassarawa Lga, Kano State |
| 49 | Total Finaelf Nigeria Plc | 181b Airport Road, Nassarawa Lga, Kano State |
| 50 | Total Finaelf Nigeria Plc | Along Buk, Municipal, Kano State |
| 51 | Total Finaelf Nigeria Plc | Court Road, S/Gari, Fagge Lga, Kano State |
| 52 | Total Finaelf Nigeria Plc | Hadejia Road, Motor Park, Nassarawa Lga, Kano State |
| 53 | Total Finaelf Nigeria Plc | Km-2 Maiduguri Road, Hotoro Tarauni Lga, Kano State |
| 54 | Total Finaelf Nigeria Plc | Along Maiduguri Road |
| 55 | Total Finaelf Nigeria Plc | Along Maiduguri Road |
| 56 | Total Finaelf Nigeria Plc | Plot 10, Zoo Road, Kumbotso Lga, Kano State |

Appendix II: Independent Marketers Filling Stations in Kano Metropolis

| S/N | Company Name | Address |
|-----|---|---|
| 1 | A. A. Babura | Dala Hospital Road, Kofar Ruwa, Dala Lga, Kano State |
| 2 | A. A. Dangwaida | Kofar Ruwa M/Park, Dala Lga, Kano State |
| 3 | A.A Rano Nigeria Limited | Airport Road, Nassarawa Lga Kano |
| 4 | A.A Rano Nigeria Limited | Along Bompai Road, By Central Hotel, Nassarawa, Kano Maiduguri Road, Farawa Village, Kumbotso Lga, Kano State |
| 5 | A.A Rano Nigeria Limited | Kano-Challawa Road, Dukawuya |
| 6 | A.A Rano Nigeria Limited | 11, Tafawa Balewa Road, Nassarawa Lga, Kano State |
| 7 | A.A Rano Nigeria Limited | Along Zaria Road Gyadi-Gyadi, Tarauni Lga, Kano State |
| 8 | A.A Rano Nigeria Limited. | Along Zaria Road |
| 9 | A.A Rano Nigeria Limited. | Along Hadejia Road, Yankaba, Nassarawa Lga, Kano State |
| 10 | A.A. Rano Nigeria Limited | Kano-Gwarzo Road Opp Buk New Site, Kumbotso Lga, Kano |
| 11 | A.A. Ibrahim & Co Nigeria Limited | Gwarzo Rd, Dorayi Babba, Gwale Lga, Kano |
| 12 | A.A.S Marmro Nigeria,Limited. | Kurnar Asabe |
| 13 | A.B Radda | Ibb Way, Opp K/Waibai Market, Fagge Kano |
| 14 | A.B.Y Petroleum Nigeria Limited | Airport Road, Nassarawa Lga Kano |
| 15 | A.B.Y. Petroleum Nigeria Limited | Along Aminu Kano Way, Dala Lga Kano |
| 16 | A.B.Y. Petroleum Nigeria Limited | Along T/Yola Road, Dala, Kano State |
| 17 | A.G.Y.L Merchandise Nigeria Limited. | Katsina Road, Bachirawa, Fagge Lga, Kano |
| 18 | A.Y Maikifi Oil & Gas Company Limited. | Along Maiduguri Off Zaria Road |
| 19 | A.Y Maikifi Oil & Gas Company Limited. | Along Katsina Road, R/Lemo, K/Jajira, Fagge Lga, Kano State |
| 20 | A.Y Rimi Venture Limited. | Opp. Digital Bridge Institute |
| 21 | A.Y Suleman | Along Zaria Road |
| 22 | Aa Goron Dutse | Km-7, Maiduguri Road, Kumbotso Lga, Kano State |
| 23 | Absa Nigeria Limited. | Katsina Road Rijiyar Lemo |
| 24 | Ado Abdullahi Petroleum Ltd | Abdullahi Bayero Way Opp Kano State Poly |
| 25 | Advance Link Petroleum Limited | Zaria Road, Amaryawa Village, Kumbotso Lga, Kano |
| 26 | Advance Link Petroleum Limited. | Along Ibrahim Taiwo Road, Fagge, Kano State |
| 27 | Agyl Merchandise Nigeria Limited | No-1, Mile 9, Katsina Road, Ungogo Lga, Kano State |
| 28 | Aire Integrated Services Nigeria. | 110 Dala Hosp Road, K/Ruwa, Dala Lga, Kano State, |
| 29 | Alaj Petroleum Company Limited. | Km-2 Katsina Road, Kadawa, Ungogo Lga, Kano State |
| 30 | Alaj Petroleum Company Limited. Alasan Ahmad And Sons Petroleum Nig. | |
| 31 | Ltd | Kano-Challawa Road, Kumbotso Lga, Kano State |
| 32 | Alasan Shuaibu | Along Zaria Road |
| 33 | Alfatashir Nigeria Llimited. | Dala Hospital Road, Kofar Ruwa, Dala Lga, Kano State |
| 34 | Alfatashir Nigeria Llimited. | Along Madobi R/About, Kumbotso Lga, Kano State |
| 35 | Alfatashir Nigeria Llimited. | Plot 2 &3, Zaria Road, Tarauni Lga, Kano State |
| 36 | Alh Nababa Abdulmumini | Airport Road, Nassarawa Lga Kano Along Eastern Bye-Pass Rd, Tunshama, Nassarawa Lga, Kano |
| 37 | Alh. Bukar Makoda & Sons Limited. | Along Eastern Bye-Pass Rd, Hotoron Arewa, Nassarawa, Kano |
| 38 | Alh. Bukar Makoda & Sons Limited. | |
| 39 | Alh. Sale Ali Nagero & Sons Limited. | At No-C2, Na'ibawa Quarters, Zaria Road, Kumbotso, Kano |

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| 40 | Alh. Usman Abdullahi Doka & Sons. | Kano-Daura, Sabon Gari Doka, Ungogo Lga, Kano |
| 41 | Alhaji Shehu Yaro Haske Nigeria Limited | Sharada Industrial Area, Phase Ii, Gwale Lga, Kano |
| 42 | Ali Musa Nigeria Limited. | Along Waika-Dawanau Road, Dala Lga, Kano |
| 43 | Al-Ihsan Transport Nigeria Limited. | Sharada Industrial Area, Phase Ii, Gwale Lga, Kano |
| 44 | Allah Na Nan Nigeria Limited. | Along Zaria Road, Malikawa Qtrs, Kumbotso, Kano State |
| 45 | Almoda Petroleum Limited. | Katsina Road, Opp Army Barrack, Dala Lga, Kano |
| 46 | Almoda Petroleum Limited. | Opp Orion Cinema, K/Wambai, Municipal Lga, Kano |
| 47 | Altaslim Petroleum Nigeria Limited. | Gwarzo Road, Dorayi Babba M/Park, Gwale Lga, Kano |
| 48 | Ammasco International Limited. | Zaria Road, U/Uku, Tarauni, Kano State |
| 49 | Amg | Along Zaria Road |
| 50 | Aminco International Nigeria Limited. | Km 1 Madobi Road, Kumbotso Lga, Kano State |
| 51 | Ammasco International Limited. | 50, Kofar Mazugal Road, Dala Lga, Kano |
| 52 | Aona Zuma | Airport Round About |
| 53 | Asab Oil & Marketing Company Limited | Along Daura Road, Doka Village, Ungogo, Kano State |
| 54 | Asaija Oil Nigeria Limited. | Along Eastern Bye-Pass Road, Unguwa Uku, Tarauni, Kano |
| 55 | Ascon | Unguwa Uku Motor Park, Tarauni Lga, Kano State |
| 56 | Audu Manager & Sons Nigeria Limited. | Maiduguri Road, Mariri Village, Kumbotso Lga, Kano |
| 57 | Audu Manager & Sons Nigeria Limited. | Along Maiduguri Road |
| 58 | Azman Oil & Gas Limited. | Airport Road, Adjacent To Eldrado Cinema |
| 59 | Azman Oil & Gas Limited. | Along Club Road, Bompai, Nassarawa Lga, Kano |
| 60 | Azman Oil & Gas Limited. | At Plot131, Ibrahim Taiwo Road, Fagge Lga, Kano State |
| 61 | Azman Oil & Gas Limited. | Along Katsina Road, R/Lemo, Dala Lga, Kano |
| 62 | Azman Oil & Gas Limited. | Along Maiduguri |
| 63 | Azman Oil & Gas Limited. | France/Murtala Mohd Way, Fagge Lga, Kano |
| 64 | B.I. Petroleum Nigeria Limited. | Gwarzo Road, Motor Park, Km-5, Gwale, Kano |
| 65 | B.I. Petroleum Nigeria Limited. | Kano-Challawa Road, Kumbotso Lga, Kano State |
| 66 | BA Bello | Km-12, Kano-Zaria Road, Wailari, Kumbotso Lga, Kano State |
| 67 | Bamzy Limited | Eastern Bye-Pass Road, Kumbotso, Kano |
| 68 | Bataiya Enterprises Nigeria Limited. | Km 2, Gwarzo Road, K/Kabuga, Gwale Lga, Kanoi |
| 69 | Bbsy General Merchant Limited. | Panshekara Rd, Madobi R/About, Kumbotso Lga, Kano |
| 70 | Biram Oil & Gas Mktg.Company Limited. | Along Gwarzo Road, Kabuga, Gwale Lga, Kano |
| 71 | Biram Oil & Gas Mktg.Company Limited. | Eastern Bye-Pass Road, Kawaji, Nassarawa Lga Kano |
| 72 | Biram Oil & Gas Mktg.Company Limited. | Km-7, Hadejia Road, Nassarawa Lga, Kano State |
| 73 | Biram Oil & Gas Mktg.Company Limited. | Along Maiduguri Road |
| 74 | Bulsawa Petroleum Nigeria Limited. | Km 10, Zaria Rd, Na'ibawa Qtrs, Tarauni Lga Kano State |
| 75 | Chula Oil Company Limited. | Along Eastern Bye-Pass, Hotoro, Nassarwa Lga, Kano |
| 76 | Criss Cross Pet. Mktg. Co. Nigeria Limited. | 13, Court/Middle Road, Sabon Gari, Fagge Lga, Kano |
| 77 | Criss Cross Pet. Mktg. Co. Nigeria Limited. | 1c, Enugu Road, Sabon Gari, Fagge Lga, Kano State |
| 78 | Criss Cross Pet. Mktg. Co. Nigeria Limited. | 42, Ibrahim Taiwo Road, Fagge Lga, Kano State |
| 79 | Criss Cross Pet. Mktg. Co. Nigeria Limited. | Km 5, Zaria Road, Kumbotso Lga, Kano State |
| 80 | Dan Marna | Yahaya Gusau Road, Gwale Lga, Kano |
| 81 | Dankano Oil & Chemical Marketing Co. Limited. | Along Kabuga-Gwarzo Road, Ungogo, Kano State |

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| 82 | Danlami Petr. & Trans. Nigeria Limited. | Along Zaria Road, U/Uku, Tarauni, Kano State |
| 83 | Farhan Oil Ltd | Old Katsina Road, Federal Sect, Dala Lga, Kano State |
| 84 | Fari Oil Limited. | 2 Zaria Road, Na'ibawa, Kumbotso Lga, Kano Stae Kumbotso Secreteriat Road, Gadama Village, Kumbotso, Kano |
| 85 | Gasau Petroleum Limited. | |
| 86 | Gasau Petroleum Limited. | No-1, Coca-Cola Junction, Challawa Road, Kumbotso |
| 87 | I. B. S. | Kofar Ruwa M/Park, Dala Lga, Kano State |
| 88 | Idris Makole & Sons | Along Maiduguri Road, Mariri, Kumbotso, Kano |
| 89 | Imad Oil& Gas Limited. | Along Maiduguri Road, Farawa, Kumbotso, Kano |
| 90 | Insibal | Along Kano-Gwarzo Road, R/Zaki, Ungogo Lga, Kano State |
| 91 | Ismariya Comapany Nigeria Limited. | Eastern Bye-Pass, Hotoro, Maraba, Tarauni Lga, Kano Plot 103a, Katsin Rd, Opp Nitel Training School, Fagge, Kano |
| 92 | J.Inkande Nigeria Limited. | |
| 93 | Jahun Petroleum Nigeria Limited. | Eastern Bye-Pass Road, Tarauni Lga, Kano |
| 94 | Kajtraco Nigeria Limited. | 90 Maiduguri Road, Nassaraw Lga, Kano State |
| 95 | Kamaras Global Merchant Limited. | Along Danbatta-Daura Road, Sabon G/Doka, Ungogo, Kano |
| 96 | Lamohd Petroleum Marketing. | Independence Road, Bompai, Nassarawa, Kano |
| 97 | Lifur Oil & Gas Limited. | Zungeru Road, Sabon Gari, Fagge Lga, Kano State |
| 98 | M.K Ahmad | Along Maiduguri Road |
| 99 | M.K.K. Oil Company Limited. | Katsina Road, Bachirawa, Ungogo, Kano State |
| 100 | Magarsiku Internationa Company. | Along Maiduguri Road Hotoro Round About |
| 101 | Maiburgami Oil And Gas | Kano-Challawa Road, Kumbotso Lga, Kano State Along Eastern Bye-Pass Road, Hotoro, Nassarawa Lga, Kano |
| 102 | Majiya Petroleum Nigeria Limited. | |
| 103 | Malikawa Petr. Nigeria Limiited. | Kofar Ruwa M/Park, Dala Lga, Kano State |
| 104 | Malikawa Petr. Nigeria Limiited. | Kofar Ruwa M/Park, Dala Lga, Kano State |
| 105 | Mansur Yusuf Nigeria Limited. | Along Madobi Road, Gezawa Village, Kumbotso, Kano |
| 106 | Matrix | Along Zaria Road |
| 107 | Murna Oil And Gas Limited | Katsina Road Bachirawa |
| 108 | Musa Aminu Petroleum Enterprises. | Km 11 Maiduguri Road, Mariri, Kumbotso Lga, Kano |
| 109 | Musa Mailafiya Petroleum Nigeria. | Katsina Road, Rijjiyar Lemo, Dala Lga, Kano |
| 110 | Musbahu Garba Nigeria Limited. | Challawa Road, Panshekara, Kumbotso Lga, Kano |
| 111 | Na'adade Petroleum Limited. | No-3zaria Road, Nassarawa Lga, Kano State |
| 112 | Nabila Oil Mill Limited | Hadejia Road |
| 113 | Nana Petr. & Allied Prod. Limited. | Yahaya Gusau Sharada, Ind Est Phase I, Gwale Lga, Kano |
| 114 | Nazalco Enterprises | Eastern Bye-Pass Road |
| 115 | Nicabon Petroleum Limited. | Km 12, Zaria Road, Wailari Village, Kumbotso, Kano |
| 116 | Nipco Plc | Along Gwarzo Road, Kabuga, Gwale Lga, Kano |
| 117 | Nipco Plc | Along Maiduguri Road Hotoro Round About Km 4, Kano-Madobi Road, Kunyan-Ta-Inna, Kumbotso Lga, Kano |
| 119 | Pic Oil Nigeria Limited. | |
| 120 | Premier Oil & Gas Company Limited. | Zoo Road, Tarauni Lga, Kano State |
| 121 | Pure Oil & Gas Limited. | Buk Road, Kofar Kabuga, Gwale Lga, Kano |
| 122 | Rahamaniyya Oil & Gas Limited. | Km-2, Zaria Road, U/Uku, Tarauni Lga, Kano |
| 123 | Rimi Holdings Nigeria Limited. | Km-5, Hadejia Road, Nassarawa, Kano |
| 124 | Rimi Holdings Nigeria Limited. | Along Katsina Road, Tudun Bojuwa, Fagge Lga, Kano |
| 125 | Rimi Holdings Nigeria Limited. | Along Link Road, Unguwa Uku, Tarauni Lga, Kano State |

| | | |
|-----|--|--|
| 126 | Rimi Holdings Nigeria Limited. | Along Maiduguri Road Hotoro Round About |
| 127 | Ruqee Petr. Co. Ltd | Kano-Challawa Road, Kumbotso Lga, Kano State |
| 128 | S.D.Y. Engrg. & Constrc. Co. Limited. | Along Independence Road, Bompai, Nassarwa Lga, Kano |
| 129 | S.G Petroleum Marketing Company. | Kofar Ruwa M/Park, Dala Lga, Kano State |
| 130 | S.G Petroleum Marketing Company. | Kofar Ruwa M/Park, Dala Lga, Kano State |
| 131 | Sadan Petroleum Limited | Eastern Bye-Pass Road, Kumbotso, Kano |
| 132 | Sahas Company Limited | Eastern Bye-Pass Road |
| 133 | Salisu Garba & Sons. | Km-9, Hadejia Road, Nassaraw Lga, Kano State |
| 134 | Sanduff Oil & Gas Limited. | Maiduguri Road, Kumbotso Lga, Kano |
| 135 | Sani Brothers Transport Limited. | Along Buk Road, Sharada, Gwale Lga, Kano State |
| 136 | Sani Brothers Transport Limited. | Katsina Road, Bachirawa, Ungogo, Kano State |
| 137 | Sansul Integrated | Katsina Road |
| 138 | Shaheed Petroleum Ltd | Along Zungeru Road, Fagge Lga Kano |
| 139 | SID | Along Zaria Road |
| 140 | T.B.F. Nigeria Limited. | No1 Jakara Qtrs, Kano Municipal Lga, Kano |
| 141 | T.S.G. Oil & Gas Limited. | Along Lawan Danbazau/Off Buk/Zaria Rd, Municipal, Kano Kano-Gwarzo Road Opp Buk New Site, Kumbotso Lga, Kano |
| 142 | Tambari Zango Nigeria Limited | Along Link Road, Unguwa Uku, Tarauni Lga, Kano State |
| 143 | Uralo Petroleum Limited. | Along Aminu Kano Way Goron Dutse |
| 144 | Uramco | Along Maiduguri, Mariri, Kumbotso, Kano |
| 145 | Yar Sarki Nigeria Limited. | Kano-Gwarzo Road Opp Buk New Site, Kumbotso Lga, Kano |
| 146 | Yasara International Oil Service Limited | 41 Ibrahim Taiwo Road, Fagge Lga, Kano |
| 147 | Yasara International Service Limited | 41 Ibrahim Taiwo Road, Fagge Lga, Kano |
| 148 | Zahab Nigeria Ltd | Madobi Road Kunyan Tasidi Village, Kumbotso Lga, Kano |

Appendix III: NNPC Filling Stations in Kano Metropolis

| S/N | Company Name | Detailed Location Address |
|-----|---------------------------------------|--|
| 1 | NNPC | Plot-12, Buk Road, Gwale, Kano |
| 2 | NNPC (A.U Future Investiment Limited) | Along Kano-Gwarzo Road, R/Zaki, Ungogo Lga, Kano State |
| 3 | NNPC (Magarsiku INTn. Company) | Along Gwarzo Road, Kabuga, Gwale Lga, Kano |
| 4 | NNPC | Hadejia Road Opp Rimi Holdings |
| 5 | NNPC | Hadejia Road |
| 6 | NNPC (Danlami Petr. & Trans. Limited) | Katsina Road, Bachirawa, Dala, Kano |
| 7 | NNPC (HAAB Investment Limited) | Along Katsina Road, Bachirawa, Ungogo Lga, Kano |
| 8 | NNPC (Kamaras Global) | Along Katsina Road, Kurnar Asabe, Dala Lga, Kano |
| 9 | NNPC Kano Mega Station | Along Maiduguri Road, Hotoro, Nassarawa, Kano |
| 10 | NNPC | Along Maiduguri Road |
| 11 | NNPC | Gyadi-Gyadi Round About |

Appendix IV: Filling Stations Not Meet 15 Meter Distance From Road

| S/N | Company Name | Location |
|-----|---|---|
| 1 | Oando Nigeria Plc | No 1 Bello Road, Nassarawa Lga, Kano State |
| 2 | Total Finaelf Nigeria Plc | Along Buk, Municipal, Kano State |
| 3 | Criss Cross Pet. Mktg. Co. Nigeria Limited. | 13, Court/Middle Road, Sabon Gari, Fagge Lga, Kano |
| 4 | Asab Oil & Marketing Company Limited | Along Daura Road, Doka Village, Ungogo, Kano State |
| 5 | T.B.F. Nigeria Limited. | No1 Jakara Qtrs, Kano Municipal Lga, Kano |
| 6 | A.Y Rimi Venture Limited. | Along Katsina Road, R/Lemo, K/Jajira, Fagge Lga, Kano State |
| 7 | Forte Oil | New Road, Sabon Gari Kano |
| 8 | Alasan Shuaibu | Along Zaria Road |

Appendix V: Filling Stations Not Meet 100m Distance from Hospital

| S/N | Company Name | Address |
|-----|---|--|
| 1 | Oando Nigeria Plc | Km-E3, Aminu Kano Way (Sani Mainagge), Gwale Lga, Kano |
| 2 | Total Finaelf Nigeria Plc | Court Road, S/Gari, Fagge Lga, Kano State |
| 3 | Criss Cross Pet. Mktg. Co. Nigeria Limited. | 13, Court/Middle Road, Sabon Gari, Fagge Lga, Kano |
| 4 | Musa Mailafiya Petroleum Nigeria. | Katsina Road, Rijiyar Lemo, Dala Lga, Kano |
| 5 | Ruqee Petr. Co. Ltd | Kano-Challawa Road, Kumbotso Lga, Kano State |

Appendix VI: Filling Station And Their Addresses in Kano Metropolis

| S/N | Company Name | Detailed Location Address | Lon | Lat |
|-----|----------------------------------|---|---------|----------|
| 1 | Advance Link Petroleum Limited | Abdullahi Bayero Way Opp Kano State Poly 32a, Airport Road, Nassarawa LGA, Kano State | 8.54435 | 11.99336 |
| 2 | Mobile Oil Nigeria Ltd | 181a Airport Road, Nassarawa LGA, Kano State | 8.54484 | 12.02109 |
| 3 | Total Finaelf Nigeria Plc | 181b Airport Road, Nassarawa LGA, Kano State | 8.54323 | 12.02521 |
| 4 | Total Finaelf Nigeria Plc | Airport Road, Nassarawa LGA Kano | 8.54275 | 12.02535 |
| 5 | A.B.Y. Petroleum Nigeria Limited | Airport Road, Adjacent To Eldrado Cinema | 8.54263 | 12.01178 |
| 6 | Azman Oil | Airport Road, Nassarawa LGA Kano | 8.5442 | 12.01952 |
| 7 | A.A Rano | Airport Road, Nassarawa LGA Kano | 8.54064 | 12.02676 |
| 8 | Alh Nababa Abdulmumini | Airport Road, Nassarawa LGA Kano | 8.53539 | 12.03485 |
| 9 | Oando Nigeria Plc | Km-E3, Aminu Kano Way (Sani Mainagge), Gwale LGA, Kano | 8.49653 | 11.98811 |
| 10 | M.R.S Oil & Gas Company Limited | Along Aminu Kano Way | 8.49548 | 11.99109 |
| 11 | Uramco | Along Aminu Kano Way Goron Dutse | 8.49448 | 12.00417 |
| 12 | A.B.Y. Petroleum Nigeria Limited | Along Aminu Kano Way, Dala LGA Kano | 8.49896 | 12.01109 |
| 13 | African Petroleum Plc | Bello Road, Kano Municipal LGA, Kano State | 8.53668 | 12.00702 |

| | | | | |
|----|--|---|---------|----------|
| 14 | Con Oil Nigeria Ltd | Plot 7655, Bello Road, Fagge LGA, Kano State | 8.53358 | 12.00474 |
| 15 | Oando Nigeria Plc | No 1 Bello Road, Nassarawa LGA, Kano State | 8.5341 | 12.00428 |
| 16 | A.A Rano Nigeria Limited. | Along Bompai Road, By Central Hotel, Nassarawa, Kano | 8.54392 | 12.00404 |
| 17 | Total Finaelf Nigeria Plc | Along Buk, Municipal, Kano State | 8.50419 | 11.96667 |
| 18 | Nnpc | Plot-12, Buk Road, Gwale, Kano | 8.49824 | 11.98034 |
| 19 | Oando Nigeria Plc | Along Buk, Municipal, Kano State | #Ref! | #Ref! |
| 20 | Pure Oil & Gas Limited. | Buk Road, Kofar Kabuga, Gwale LGA, Kano Along Buk Road, Sharada, Gwale LGA, Kano | 8.48241 | 11.98341 |
| 21 | Sani Brothers Transport Limited. | State | 8.5085 | 11.98252 |
| 22 | Oando Nigeria Plc | 197, Club Road, Nassarawa LGA, Kano | 8.56658 | 12.00864 |
| 23 | Oando Nigeria Plc | No 1, Club Road, Nassarawa LGA, Kano Along Club Road, Bompai, Nassarawa LGA, Kano | 8.55004 | 12.00775 |
| 24 | Azman Oil & Gas Limited. | | 8.55174 | 12.01965 |
| 25 | Total Finaelf Nigeria Plc | Court Road, S/Gari, Fagge LGA, Kano State | 8.53444 | 12.01950 |
| 26 | Criss Cross Pet. Mktg. Co. Nigeria Limited. | 13, Court/Middle Road, Sabon Gari, Fagge LGA, Kano | 8.53473 | 12.01945 |
| 27 | Alaj Petroleum Company Limited. | 110 Dala Hosp Road, K/Ruwa, Dala LGA, Kano State, Dala Hospital Road, Kofar Ruwa, Dala LGA, Kano State | 8.50198 | 12.02074 |
| 28 | Alfatashir Nigeria Llimited. | Dala Hospital Road, Kofar Ruwa, Dala LGA, Kano State | 8.50184 | 12.02479 |
| 29 | A. A. Babura | Dala Hospital Road, Kofar Ruwa, Dala LGA, Kano State | 8.50102 | 12.02928 |
| 30 | Kamaras Global Merchant Limited. | Along Danbatta-Daura Road, Sabon G/Doka, Ungogo, Kano | 8.44949 | 12.08277 |
| 31 | Alh. Usman Abdullahi Doka & Sons. | Kano-Daura, Sabon Gari Doka, Ungogo LGA, Kano | 8.45033 | 12.08301 |
| 32 | Asab Oil & Marketing Company Limited | Along Daura Road, Doka Village, Ungogo, Kano State | 8.45034 | 12.08154 |
| 33 | African Petroleum Plc | Eastern Bypass Kawaji Qtrs, Nassarawa LGA, Kano State Eastern Bypass Road, Na'ibawa, Kumbotso, Kano | 8.58613 | 12.00988 |
| 34 | Oando Nigeria Plc | | 8.56419 | 11.92335 |
| 35 | Alh. Bukar Makoda & Sons Limited. | Along Eastern Bye-Pass Rd, Tunshama, Nassarawa LGA, Kano | 8.58678 | 11.99271 |
| 36 | Alh. Bukar Makoda & Sons Limited. | Along Eastern Bye-Pass Rd, Hotoron Arewa, Nassarawa, Kano | 8.59059 | 11.98476 |
| 37 | Asaija Oil Nigeria Limited. | Along Eastern Bye-Pass Road, Unguwa Uku, Tarauni, Kano | 8.5794 | 11.94501 |
| 38 | Biram Oil & Gas Mktg. Company Limited. | Eastern Bye-Pass Road, Kawaji, Nassarawa LGA Kano | 8.58681 | 12.00849 |
| 39 | Chula Oil Company Limited. | Along Eastern Bye-Pass, Hotoro, Nassarwa LGA, Kano | 8.59298 | 11.97149 |
| 40 | Ismariya Comapany Nigeria Limited. | Eastern Bye-Pass, Hotoro, Maraba, Tarauni LGA, Kano | 8.58672 | 11.95481 |
| 41 | Jahun Petroleum Nigeria Limited. | Eastern Bye-Pass Road, Tarauni LGA, Kano | 8.58427 | 11.95352 |
| 42 | Sadan Petroleum Limited | Eastern Bye-Pass Road, Kumbotso, Kano | 8.5866 | 11.95578 |
| 43 | Majiya Petroleum Nigeria Limited. | Along Eastern Bye-Pass Road, Hotoro, Nassarawa LGA, Kano | 8.59015 | 11.98301 |
| 44 | Bamzy Limited | Eastern Bye-Pass Road, Kumbotso, Kano | 8.56651 | 11.92599 |
| 45 | Sahas Company Limited | Eastern Bye-Pass Road | 8.59065 | 11.95851 |

| | | | | |
|----|---|--|---------|----------|
| 46 | Nazalco Enterprises Criss Cross Pet. Mktg. Co. Nigeria Limited. | Eastern Bye-Pass Road 1c, Enugu Road, Sabon Gari, Fagge LGA, Kano State | 8.58772 | 11.99270 |
| 47 | Mobile Oil Nigeria Ltd | Km 15 Gwarzo Road, Kofar Kabuga , Gwale LGA, Kano State | 8.53726 | 12.02248 |
| 48 | Mobile Oil Nigeria Ltd | Km 6, Gwarzo Road Kofar Kabuga, Gwale LGA, Kano State | 8.43302 | 11.96462 |
| 49 | Mobile Oil Nigeria Ltd | Gwarzo Rd, Rimin Gata Village, Dambare, Kumbotso LGA, Kano State | 8.48071 | 11.98647 |
| 50 | Con Oil Nigeria Ltd M.R.S Oil & Gas Company Limited | Km 12, Gwarzo Road, Dala LGA, Kano State | 8.43679 | 11.96576 |
| 51 | A.A.S Marmro Nigeria,Limited. | Gwarzo Rd, Dorayi Babba, Gwale LGA, Kano Along Gwarzo Road, Kabuga, Gwale LGA, Kano | 8.46619 | 11.97986 |
| 52 | Nipco Plc Nnpc (A.U Future Investiment Limited) | Along Kano-Gwarzo Road, R/Zaki, Ungogo LGA, Kano State | 8.46155 | 11.97818 |
| 53 | Altaslim Petroleum Nigeria Limited. | Gwarzo Road, Dorayi Babba M/Park, Gwale LGA, Kano | 8.47186 | 11.98250 |
| 54 | Bataiya Enterprises Nigeria Limited. | Km 2, Gwarzo Road, K/Kabuga, Gwale LGA, Kano | 8.45589 | 11.97667 |
| 55 | Dankano Oil & Chemical Marketing Co. Limited. | Along Kabuga-Gwarzo Road, Ungogo, Kano State | 8.44908 | 11.97300 |
| 56 | Nnpc (Magarsiku Internationa Company) | Along Gwarzo Road, Kabuga, Gwale LGA, Kano | 8.48223 | 11.98847 |
| 57 | B.I. Nigeria Ltd | Gwarzo Road, Motor Park, Km-5, Gwale, Kano | 8.46644 | 11.98073 |
| 58 | Biram | Along Gwarzo Road, Kabuga, Gwale LGA, Kano | 8.47299 | 11.98293 |
| 59 | Insibal Yasara International Oil Service Limited | Along Kano-Gwarzo Road, R/Zaki, Ungogo LGA, Kano State | 8.45124 | 11.97377 |
| 60 | Insibal Yasara International Oil Service Limited | Kano-Gwarzo Road Opp Buk New Site, Kumbotso LGA, Kano | 8.47566 | 11.98397 |
| 61 | Tambari Zango Nigeria Limited A.A. Ibrahim & Co Nigeria Limited | Kano-Gwarzo Road Opp Buk New Site, Kumbotso LGA, Kano | 8.43855 | 11.96762 |
| 62 | Tambari Zango Nigeria Limited A.A. Ibrahim & Co Nigeria Limited | Kano-Gwarzo Road Opp Buk New Site, Kumbotso LGA, Kano | 8.42702 | 11.96143 |
| 63 | Total Finaelf Nigeria Plc | Hadejia Road, Motor Park, Nassarawa LGA, Kano State | 8.41537 | 11.95927 |
| 64 | A.A. Rano Nigeria Limited Biram Oil & Gas Mktg.Company Limited. | Along Hadejia Road, Yankaba, Nassarawa LGA, Kano State | 8.4219 | 11.95971 |
| 65 | Rimi Holdings Nigeria Limited. | Km-7, Hadejia Road, Nassarawa LGA, Kano State | 8.59281 | 12.01028 |
| 66 | Rimi Holdings Nigeria Limited. | Km-5, Hadejia Road, Nassarawa, Kano Km-9, Hadejia Road, Nassaraw LGA, Kano State | 8.58702 | 12.01053 |
| 67 | Salisu Garba & Sons. | Hadejia Road | 8.59074 | 12.01038 |
| 68 | Nabila Oil Mill Limited | Hadejia Road | 8.59433 | 12.01029 |
| 69 | Forte Oil Company Limited | Hadejia Road | 8.60531 | 12.01168 |
| 70 | Nnpc | Hadejia Road Opp Rimi Holdings | 8.60802 | 12.01216 |
| 71 | Nnpc | Hadejia Road | 8.61318 | 12.01261 |
| 72 | A.B.Y Petroleum Nigeria Limited. | Ibb Way, Opp K/Waibai Market, Fagge Kano 44, Ibrahim Taiwo Road, Fagge LGA, Kano State | 8.59402 | 12.01113 |
| 73 | Oando Nigeria Plc | | 8.58823 | 12.01132 |
| 74 | Oando Nigeria Plc | | 8.52379 | 12.00977 |
| 75 | Oando Nigeria Plc | | 8.53413 | 12.00047 |

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|-----|---|--|---------|----------|
| 76 | Agyl Merchandise Nigeria Limited | Along Ibrahim Taiwo Road, Fagge, Kano State At Plot131, Ibrahim Taiwo Road, Fagge LGA, Kano State | 8.53414 | 11.99682 |
| 77 | Azman Oil & Gas Limited. Criss Cross Pet. Mktg. Co. | 42, Ibrahim Taiwo Road, Fagge LGA, Kano State | 8.53413 | 11.99882 |
| 78 | Nigeria Limited. Yasara International Service | | 8.53429 | 12.00012 |
| 79 | Limited | 41 Ibrahim Taiwo Road, Fagge LGA, Kano 16, Independence Road, Dakata, Nassarawa LGA, Kano State | 8.53486 | 11.99941 |
| 80 | Oando Nigeria Plc | | 8.5747 | 12.02211 |
| 81 | Lamohd Petroleum Marketing. S.D.Y. Engrg. & Constrc. Co. | Independence Road, Bompai, Nassarawa, Kano Along Independence Road, Bompai, Nassarwa LGA, Kano | 8.57241 | 12.02176 |
| 82 | Limited. | | 8.55131 | 12.02019 |
| 83 | T.B.F. Nigeria Limited. | No1 Jakara Qtrs, Kano Municipal LGA, Kano Km-9, Katsina/Daura Junction, Ungogo, Kano State | 8.50982 | 12.00131 |
| 84 | Mobile Oil Nigeria Ltd | | 8.45036 | 12.08018 |
| 85 | Con Oil Nigeria Ltd | Km 14, (Mile 9)Katsina Road, Ungogo LGA, Kano State No-1, Mile 9, Katsina Road, Ungogo LGA, Kano State | 8.45288 | 12.07797 |
| 86 | Aire Integrated Services Nigeria. | | 8.44749 | 12.08102 |
| 87 | A.Y Rimi Venture Limited. Alaj Petroleum Company | Along Katsina Road, R/Lemo, K/Jajira, Fagge LGA, Kano State Km-2 Katsina Road, Kadawa, Ungogo LGA, Kano State | 8.47451 | 12.05497 |
| 88 | Limited. A.Y Maikifi Oil & Gas Company | | 8.45765 | 12.07337 |
| 89 | Limited. | Katsina Road, Bachirawa, Fagge LGA, Kano Katsina Road, Opp Army Barrack, Dala LGA, Kano | 8.46816 | 12.06361 |
| 90 | Almoda Petroleum Limited. | | 8.50545 | 12.02928 |
| 91 | Azman Oil & Gas Limited. Nnpc (Danlami Petr. & Trans. | Along Katsina Road, R/Lemo, Dala LGA, Kano | 8.47486 | 12.05581 |
| 92 | Limited) | Katsina Road, Bachirawa, Dala, Kano Along Katsina Road, Bachirawa, Ungogo LGA, Kano | 8.46701 | 12.06498 |
| 93 | Nnpc (Haab Investment Limited) | | 8.46841 | 12.06232 |
| 94 | J.Inkande Nigeria Limited. | Plot 103a, Katsin Rd, Opp Nitel Training School, Fagge, Kano Along Katsina Road, Kurnar Asabe, Dala LGA, Kano | 8.51724 | 12.02895 |
| 95 | Nnpc (Kamaras Global) | | 8.49431 | 12.03315 |
| 96 | M.K.K. Oil Company Limited. Musa Mailafiya Petroleum | Katsina Road, Bachirawa, Ungogo, Kano State | 8.46593 | 12.06631 |
| 97 | Nigeria. | Katsina Road, Rijiyar Lemo, Dala LGA, Kano Along Katsina Road, Tudun Bojuwa, Fagge LGA, Kano | 8.48026 | 12.04767 |
| 98 | Rimi Holdings Nigeria Limited. | | 8.48187 | 12.04586 |
| 99 | Sani Brothers Transport Limited. | Katsina Road, Bachirawa, Ungogo, Kano State | 8.46441 | 12.06821 |
| 100 | A.Y Suleman | Opp. Digital Bridge Institute | 8.51653 | 12.02878 |
| 101 | Aona Zuma | Airport Round About | 8.51577 | 12.02843 |
| 102 | A.B Radda | Kurnar Asabe | 8.49173 | 12.03525 |
| 103 | Oando | Katsina Road Rijiyar Lemo | 8.47076 | 12.05939 |
| 104 | Total | Katsina Road Rijiyar Lemo | 8.47039 | 12.06104 |
| 105 | Ado Abdullahi Petroleum Ltd | Katsina Road Rijiyar Lemo | 8.4687 | 12.06182 |
| 106 | Murna Oil And Gas Limited | Katsina Road Bachirawa | 8.46166 | 12.07054 |
| 107 | Oando | Katsina Road | 8.44882 | 12.08103 |

| | | | | |
|-----|---|--|---------|----------|
| 108 | Sansul Integrated | Katsina Road | 8.44566 | 12.08203 |
| 109 | Ammasco International Limited. | 50, Kofar Mazugal Road, Dala LGA, Kano | 8.52265 | 12.00687 |
| 110 | Malikawa Petr. Nigeria Limited. S.G Petroleum Marketing | Kofar Ruwa M/Park, Dala LGA, Kano State | 8.499 | 12.02857 |
| 111 | Company. | Kofar Ruwa M/Park, Dala LGA, Kano State | 8.49899 | 12.02843 |
| 112 | A. A. Dangwaida | Kofar Ruwa M/Park, Dala LGA, Kano State | 8.49854 | 12.02828 |
| 113 | I. B. S. | Kofar Ruwa M/Park, Dala LGA, Kano State | 8.49879 | 12.02837 |
| 114 | Malikawa Petr. Nigeria Limited. S.G Petroleum Marketing | Kofar Ruwa M/Park, Dala LGA, Kano State | 8.499 | 12.02857 |
| 115 | Company. | Kofar Ruwa M/Park, Dala LGA, Kano State Opp Orion Cinema, K/Wambai, Municipal | 8.49899 | 12.02843 |
| 116 | Almoda Petroleum Limited. | LGA, Kano | 8.52467 | 12.00478 |
| 117 | Gusau Petroleum Limited. | Kumbotso Secretariat Road, Gadama Village, Kumbotso, Kano | 8.49539 | 11.89837 |
| 118 | Con Oil Nigeria Ltd | 16 Lagos Street(Coronation), Fagge LGA, Kano State | 8.53691 | 12.00705 |
| 119 | T.S.G. Oil & Gas Limited. | Along Lawan Danbazau/Off Buk/Zaria Rd, Municipal, Kano | #Ref! | #Ref! |
| 120 | Uralo Petroleum Limited. | Along Link Road, Unguwa Uku, Tarauni LGA, Kano State | 8.56612 | 11.94824 |
| 121 | Rimi Holdings Nigeria Limited. | Along Link Road, Unguwa Uku, Tarauni LGA, Kano State | #Ref! | #Ref! |
| 122 | Alfatashir Nigeria Limited. Aminco International Nigeria | Along Madobi R/About, Kumbotso LGA, Kano State | 8.47400 | 11.94421 |
| 123 | Limited. | Km 1 Madobi Road, Kumbotso LGA, Kano State | 8.46998 | 11.94508 |
| 124 | Bbsy General Merchant Limited. | Panshekara Rd, Madobi R/About, Kumbotso LGA, Kano | 8.4745 | 11.94347 |
| 125 | Mansur Yusuf Nigeria Limited. | Along Madobi Road, Gezawa Village, Kumbotso, Kano | 8.46216 | 11.94586 |
| 126 | Pic Oil Nigeria Limited. | Km 4, Kano-Madobi Road, Kunyan-Ta-Inna, Kumbotso LGA, Kano | 8.46748 | 11.94591 |
| 127 | M.R.S. Oil & Gas Limited. | Madobi Road, Kunyan-Ta-Inna Village, Kumbotso LGA, Kano | 8.44567 | 11.94279 |
| 128 | Zahab Nigeria Ltd | Madobi Road Kunyan Tasidi Village, Kumbotso LGA, Kano | #Ref! | #Ref! |
| 129 | Sanduff Oil & Gas Limited. | Maiduguri Road, Kumbotso LGA, Kano | 8.61497 | 11.93418 |
| 130 | Yar Sarki Nigeria Limited. | Along Maiduguri, Mariri, Kumbotso, Kano Maiduguri Roundabout, Hotoro, Tarauni LGA, Kano State, | 8.62857 | 12.00988 |
| 131 | African Petroleum Plc M.R.S Oil & Gas Company | Maiduguri Road, Hotoro, Tarauni LGA, Kano State | 8.58613 | 11.96286 |
| 132 | Limited | Km-2 Maiduguri Road, Hotoro Tarauni LGA, Kano State | 8.59035 | 11.96303 |
| 133 | Total Finaelf Nigeria Plc | Maiduguri Road, Farawa Village, Kumbotso LGA, Kano State | 8.58757 | 11.94122 |
| 134 | A.A Rano Nigeria Limited. | Km-7, Maiduguri Road, Kumbotso LGA, Kano State | 8.61719 | 11.94317 |
| 135 | Absa Nigeria Limited. Audu Manager & Sons Nigeria | Maiduguri Road, Mariri Village, Kumbotso LGA, Kano | 8.61412 | 11.94363 |
| 136 | Limited. | 90 Maiduguri Road, Nassaraw LGA, Kano State | 8.6137 | 11.96386 |
| 137 | Kajtraco Nigeria Limited. | Maiduguri Road, Opp Tarauni Market Junct, | 8.58789 | 11.97774 |
| 138 | M.R.S. Oil & Gas Limited. | Maiduguri Road, Opp Tarauni Market Junct, | 8.56481 | 11.94280 |

| Tarauni LGA | | | |
|-------------|--|---|------------------|
| 139 | Musa Aminu Petroleum Enterprises. | Km 11 Maiduguri Road, Mariri, Kumbotso LGA, Kano | 8.61503 11.96362 |
| 140 | Nnpc Kano Mega Station. | Along Maiduguri Road, Hotoro, Nassarawa, Kano | 8.59219 11.95375 |
| 141 | Imad Oil& Gas Limited. | Along Maiduguri Road, Farawa, Kumbotso, Kano | 8.60567 11.96166 |
| 142 | Total Finaelf Nigeria Plc | Along Maiduguri Road | 8.59512 11.96100 |
| 143 | Nnpc | Along Maiduguri Road | 8.59626 11.95367 |
| 144 | Oando Nigeria Plc | Along Maiduguri Road | 8.6045 11.94431 |
| 145 | Oando Nigeria Plc | Along Maiduguri Road | 8.6126 11.93255 |
| 146 | Total Finaelf Nigeria Plc | Along Maiduguri Road | 8.63086 11.95573 |
| 147 | Biram Oil & Gas Mktg.Company Limited. | Along Maiduguri Road | 8.60357 11.96137 |
| 148 | M.K Ahmad | Along Maiduguri Road | 8.5971 11.93363 |
| 149 | Idris Makole & Sons | Along Maiduguri Road, Mariri, Kumbotso, Kano | 8.62812 11.96837 |
| 150 | A.Y Maikifi Oil & Gas Company Limited. | Along Maiduguri Off Zaria Road | 8.55235 11.97125 |
| 151 | Azman Oil & Gas Limited. | Along Maiduguri | 8.55891 11.97212 |
| 152 | Audu Manager & Sons Nigeria Limited. | Along Maiduguri Road | 8.56033 11.96263 |
| 153 | Magarsiku Internationa Company. | Along Maiduguri Road Hotoro Round About | 8.59185 11.96327 |
| 154 | Rimi Holdings Nigeria Limited. | Along Maiduguri Road Hotoro Round About | 8.59321 11.96231 |
| 155 | Nipco Plc | Along Maiduguri Road Hotoro Round About | 8.59321 12.02027 |
| 156 | Oando Nigeria Plc | 2 Middle/Court Road, S/Gari, Fagge LGA, Kano State | 8.53474 12.01103 |
| 157 | African Petroleum Plc | Murtala Mohd Way (Leventis), Fagge LGA, Kano | 8.53425 12.01402 |
| 158 | Azman Oil & Gas Limited. | France/Murtala Mohd Way, Fagge LGA, Kano 85, Murtala Mohammed/Court Road, | 8.52625 12.01103 |
| 159 | Oando Nigeria Plc | Nassarawa LGA Kano | 8.53425 12.00909 |
| 160 | M.R.S Oil & Gas Company Limited | 96a, Murtala Muhammed Way, Nassarawa LGA, Kano State | 8.54321 12.02027 |
| 161 | Forte Oil | New Road, Sabon Gari Kano | 8.53472 12.02204 |
| 162 | Farhan Oil Ltd | Old Katsina Road, Federal Sect, Dala LGA, Kano State | 8.5163 11.91060 |
| 163 | Gusau Petroleum Limited. | No-1, Coca-Cola Junction, Challawa Road, Kumbotso | 8.46345 11.94630 |
| 164 | B.I. Petroleum Nigeria Limited. | Kano-Challawa Road, Kumbotso LGA, Kano State | 8.47481 11.90982 |
| 165 | Musbahu Garba Nigeria Limited. | Challawa Road, Panshekara, Kumbotso LGA, Kano | 8.46317 11.93762 |
| 166 | Alasan Ahmad And Sons Petroleum Nig. Ltd | Kano-Challawa Road, Kumbotso LGA, Kano State | 8.47192 11.92854 |
| 167 | Maiburgami Oil And Gas | Kano-Challawa Road, Kumbotso LGA, Kano State | 8.46898 11.95194 |
| 168 | Ruqee Petr. Co. Ltd | Kano-Challawa Road, Kumbotso LGA, Kano State | 8.47642 11.97034 |
| 169 | A.A Rano Nigeria Limited. | Kano-Challawa Road, Dukawuya | 8.48304 11.97998 |

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| 170 | Con Oil Nigeria Ltd | Sabo Bakin Zuwo, Tarauni , Kano State | 8.56025 | 12.0504 |
| 171 | Con Oil Nigeria Ltd | Sani Abacha Way, Nassarawa Kano State | 8.54126 | 11.96306 |
| 172 | African Petroleum Plc | Sharada Industry Estate, Dala LGA, Kano State | 8.50338 | 11.96145 |
| 173 | Alhaji Shehu Yaro Haske Nigeria Limited | Sharada Industrial Area, Phase Ii, Gwale LGA, Kano | 8.50136 | 11.97342 |
| 174 | Al-Ihsan Transport Nigeria Limited. | Sharada Industrial Area, Phase Ii, Gwale LGA, Kano | 8.51782 | 11.97303 |
| 175 | A.A Rano Nigeria Limited. | 11, Tafawa Balewa Road, Nassarawa LGA, Kano State | 8.51655 | 12.00687 |
| 176 | Mobile Oil Nigeria Ltd | 11, Tafawa Balewa Road, Nassarawa LGA, Kano State | 8.54436 | 11.99870 |
| 177 | A.G.Y.L Merchandise Nigeria Limited. | Along T/Yola Road, Dala, Kano State | 8.48437 | 12.01066 |
| 178 | Ali Musa Nigeria Limited. | Along Waika-Dawanau Road, Dala LGA, Kano | 8.48863 | 11.96585 |
| 179 | Dan Marna | Yahaya Gusau Road, Gwale LGA, Kano | 8.50454 | 11.97080 |
| 180 | Nana Petr. & Allied Prod. Limited. | Yahaya Gusau Sharada, Ind Est Phase I, Gwale LGA, Kano | 8.49930 | 12.02957 |
| 181 | Mobile Oil Nigeria Ltd | Along Zango Road, Dakata Nassarawa LGA, Kano State | 8.57800 | 11.95351 |
| 182 | African Petroleum Plc | Zaria Road U/Uku, Opp Fgc, Tarauni LGA, Kano State | 8.56426 | 11.96829 |
| 183 | Con Oil Nigeria Ltd | 852 Zaria Rd, Gyadi-Gyadi R/About, Tarauni LGA, Kano State | 8.55107 | 11.93554 |
| 184 | Con Oil Nigeria Ltd | Km 2, Zaria Road, Fiat Site, Kumbotso LGA, Kano State | 8.55831 | 11.93224 |
| 185 | Con Oil Nigeria Ltd | Km 2, Zaria Road, Na'ibawa, Kumbotso LGA, Kano State | 8.55648 | 11.93295 |
| 186 | M.R.S Oil & Gas Company Limited | Km 7, Zaria Road, Na'ibawa, Tarauni LGA, Kano State | 8.55582 | 11.92043 |
| 187 | Ba Bello | Km-12, Kano-Zaria Road, Wailari, Kumbotso LGA, Kano State | 8.5487 | 11.93295 |
| 188 | M.R.S Oil & Gas Company Limited | Along Zaria Road, Gyadi-Gyadi, Tarauni LGA, Kano State | 8.55582 | 11.90869 |
| 189 | Advance Link Petroleum Limited. | Zaria Road, Amaryawa Village, Kumbotso LGA, Kano | 8.54436 | 11.97330 |
| 190 | Alfatashir Nigeria Llimited. | Plot 2 &3, Zaria Road, Tarauni LGA, Kano State | 8.54574 | 11.93818 |
| 191 | Alh. Sale Ali Nagero & Sons Limited. | At No-C2, Na'ibawa Quarters, Zaria Road, Kumbotso, Kano | 8.56103 | 11.92421 |
| 192 | Allah Na Nan Nigeria Limited. | Along Zaria Road, Malikawa Qtrs, Kumbotso, Kano State | 8.55028 | 11.93604 |
| 193 | Bulsawa Petroleum Nigeria Limited. | Km 10, Zaria Rd, Na'ibawa Qtrs, Tarauni LGA, Kano State | 8.55891 | 11.92364 |
| 194 | Criss Cross Pet. Mktg. Co. Nigeria Limited. | Km 5, Zaria Road, Kumbotso LGA, Kano State | 8.55008 | 11.94980 |
| 195 | Danlami Petr. & Trans. Nigeria Limited. | Along Zaria Road, U/Uku, Tarauni, Kano State | 8.56588 | 11.93472 |
| 196 | Fari Oil Limited. | 2 Zaria Road, Na'ibawa, Kumbotso LGA, Kano Stae | 8.55747 | 11.95523 |
| 197 | Ascon | Unguwa Uku Motor Park, Tarauni LGA, Kano State | 8.56263 | 11.98554 |
| 198 | Na'adade Petroleum Limited. | No-3zaria Road, Nassarawa LGA, Kano State | 8.53448 | 11.91941 |
| 199 | Nicabon Petroleum Limited. | Km 12, Zaria Road, Wailari Village, | 8.54834 | 11.95487 |

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| 200 | Rahamaniyya Oil & Gas Limited. | Km-2, Zaria Road, U/Uku, Tarauni LGA, Kano | 8.56299 11.88267 |
| 201 | Amasco | Zaria Road, U/Uku, Tarauni, Kano State | 8.53991 11.90350 |
| 202 | Amg | Along Zaria Road | 8.54196 11.88724 |
| 203 | Aa Goron Dutse | Along Zaria Road | 8.53989 11.88319 |
| 204 | Alasan Shuaibu | Along Zaria Road | 8.54043 11.87394 |
| 205 | Sid | Along Zaria Road | 8.54857 11.96876 |
| 206 | Nnpc | Gyadi-Gyadi Round About | 8.55033 11.96744 |
| 207 | A.A. Rano | Along Zaria Road Gyadi-Gyadi, Tarauni LGA, Kano State | 8.55043 11.94469 |
| 208 | Matrix | Along Zaria Road | 8.56516 11.93341 |
| 209 | A.A. Rano | Along Zaria Road | 8.55623 11.96750 |
| 210 | Total Finaelf Nigeria Plc | Plot 10, Zoo Road, Kumbotso LGA, Kano State | 8.53016 11.97285 |
| 211 | M.R.S Oil & Gas Company Limited | Zoo Road, Gandun Albasa, Nassarawa LGA, Kano State | 8.53401 11.97271 |
| 212 | Premier Oil & Gas Company Limited. | Zoo Road, Tarauni LGA, Kano State | 8.53382 12.02829 |
| 213 | Shaheed Petroleum Ltd | Along Zungeru Road, Fagge LGA Kano | 8.52392 12.02777 |
| 214 | Lifur Oil & Gas Limited. | Zungeru Road, Sabon Gari, Fagge LGA, Kano State | 8.52496 12.02829 |