

**KIGALI INSTITUTE OF SCIENCE AND TECHNOLOGY  
INSTITUT DES SCIENCES ET DE TECHNOLOGIE DE KIGALI**

Avenue de l'Armée, B.P. 3900 Kigali, Rwanda



**FACULTY OF ENGINEERING**

**DEPARTMENT OF CIVIL ENGINEERING AND ENVIRONMENTAL  
TECHNOLOGY**

**A THESIS**

**ON**

**IMPROVEMENT OF KIGALI CITY BUS SERVICES IN  
TERMS OF BUS ROUTES AND BUS STOPS**

*Submitted by*

**BAGANIZI PATRICK EMILE (REG. N<sup>o</sup> PG2011561)**

*Under the guidance of*

**Dr PAUL TIMMS**

*Submitted in partial fulfilment of the requirements for the award of*

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**TRANSPORTATION ENGINEERING AND ECONOMICS**

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**KIGALI INSTITUTE OF SCIENCE AND TECHNOLOGY  
INSTITUT DES SCIENCES ET DE TECHNOLOGIE DE KIGALI**

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**C E R T I F I C A T E**

This is to certify that the Thesis Work entitled “**IMPROVEMENT OF KIGALI CITY BUS SERVICES IN TERMS OF BUS ROUTES AND BUS STOPS**” is a record of the original bonafide work done by BAGANIZI PATRICK EMILE (REG. N°: PG2011561) in partial fulfilment of the requirement for the award of Master of Science Degree in Transportation Engineering and Economics of Kigali Institute of Science and Technology during the Academic Year 2011-2012.



.....  
**SUPERVISOR**  
**Dr PAUL TIMMS**

.....  
**HEAD**  
Dept. of CE & ET

*Submitted for the final defense of thesis held at KIST on .....*

## **DECLARATION**

I hereby declare that the thesis entitled “**IMPROVEMENT OF KIGALI CITY BUS SERVICES IN TERMS OF BUS ROUTES AND BUS STOPS**” submitted for the Degree of Master of Science is my original work and the thesis has not formed the basis for the award of any Degree, Diploma, Associateship, Fellowship of similar other titles. It has not been submitted to any other University or Institution for the award of any Degree or Diploma.

Place: **KIGALI**

Date: September 30<sup>th</sup>, 2013

**BAGANIZI PATRICK EMILE**

**KIGALI INSTITUTE OF SCIENCE AND TECHNOLOGY  
INSTITUT DES SCIENCES ET DE TECHNOLOGIE DE KIGALI**

Avenue de l'Armée, B.P. 3900 Kigali, Rwanda



**FACULTY OF ENGINEERING**

**DEPARTMENT OF  
CIVIL ENGINEERING AND ENVIRONMENTAL TECHNOLOGY**

**BONAFIDE CERTIFICATE**

Certified that this thesis titled “**IMPROVEMENT OF KIGALI CITY BUS SERVICES IN TERMS OF BUS ROUTES AND BUS STOPS**” is the bonafide work of **BAGANIZI PATRICK EMILE (Reg. N<sup>o</sup>: PG2011561)** who carried out the research under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion for this or any other candidate.



**Dr PAUL TIMMS**

**SUPERVISOR**

**Senior Lecturer**

**Master of Science Programme in  
Transportation Engineering and  
Economics**

**KIST**

*Dedicated*

To my beloved wife Anny and my children Alvin Lorrays and  
Candy Lorrienne

To my mother and father

To my family and my family – in – law

## **ABSTRACT**

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Public transport is the best way of providing mobility to people who do not have access to private cars, or to provide the alternative option to private car mobility. The main transport system used for Rwanda is bus transport. Today, public transport is adopted for many purposes such as providing mass mobility, reducing energy consumption and hence protecting the environment, and creation of job opportunities. As the bus transport system is very important on these points of views, the critical issue remains whether the bus transport services are adequately provided to satisfy the demand.

The City of Kigali has been rapidly growing in terms of population and the infrastructure and services provided have been overtaken by this rapid growth of the population. In this research, a thorough analysis of bus services provided to the City resident was made and particular attention paid to the adequacy of bus routes and stops services. The bus transport is useful to the people using it if it is accessible and attractive.

The aim of this research is to get information data on public transport in terms of bus routes and bus stops, to assess if the bus routes and bus stops are well designed to provide the optimum services to users and then to propose the improvements that have to be made to the current situation.

The primary method used for this research is the interview through questionnaires that were distributed to a sample of the population of the City of Kigali. The decision – makers in the City of Kigali public transport were also interviewed to compare their views of the provided bus services with these of the general public and to know if there are some planned improvement to the service.

The results indicated that the bus services provided in the City of Kigali do not satisfy the users. Bus routes are not sufficient to serve all the City of Kigali

residents adequately and the bus stops services do not meet the users' needs. The views of the population are similar to these of decision – makers considering the bus routes, but somehow different when we consider the bus stops services.

Finally, the research proposes the guidance on improvements to be made to the bus services in the City of Kigali on bus routes and bus stops by the year 2018, and advocate different subject to be tackled in further researches, with respect to the improvement of the City of Kigali bus services.

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## TABLE OF CONTENTS

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ABSTRACT.....	i
ACKNOWLEDGEMENTS.....	iii
TABLE OF CONTENTS.....	iv
LIST OF TABLES.....	ix
LIST OF FIGURES.....	x
LIST OF SYMBOLS AND ABBREVIATIONS.....	xii
CHAPTER 1 INTRODUCTION.....	1
1.1.    GENERAL INTRODUCTION.....	1
1.2.    RESEARCH JUSTIFICATION.....	2
1.3.    PROBLEM STATEMENT.....	3
1.4.    AIMS OF THE RESEARCH.....	5
1.5.    RESEARCH OBJECTIVES.....	6
1.6.    SCOPE OF THE RESEARCH.....	7
1.7.    RESEARCH METHODOLOGY.....	8
1.8.    BENEFITS OF THE RESEARCH.....	9
1.9.    DISSERTATION STRUCTURE.....	10
CHAPTER 2 LITERATURE REVIEW.....	12
2.1.    URBAN BUS TRANSPORT.....	12
2.1.1.    Introduction.....	12
2.1.2.    Bus transport in rapidly growing cities in developing countries.....	12

2.1.3.	Performance evaluation of Bus Transport system .....	13
2.2.	BUS ROUTES .....	18
2.2.1.	Optimum bus routes systems .....	20
2.2.2.	Bus routes in rapidly growing cities of developing countries.....	24
2.3.	BUS STOPS .....	26
2.3.1.	Bus stops system .....	26
2.3.2.	Optimum services provided by bus stops .....	28
2.3.3.	Optimum spacing of bus stops .....	30
2.3.4.	Best examples of bus stops systems in developing countries .....	31
2.4.	CONCLUDING REMARKS .....	32
CHAPTER 3 AREA OF STUDY DESCRIPTION.....		33
3.1.	CITY OF KIGALI DESCRIPTION .....	33
3.2.	DEMOGRAPHIC CHARACTERISTICS.....	35
3.3.	SOCIO – ECONOMIC CHARACTERISTICS.....	37
3.4.	BACKGROUND OF THE CITY OF KIGALI IN TERMS OF BUS SERVICES.....	39
CHAPTER 4 DATA ON BUS ROUTES AND BUS STOPS IN THE CITY OF KIGALI .....		42
4.1.	DATA ON EXISTING BUS ROUTES .....	42
4.1.1.	Identification and description of bus routes available in the City of Kigali.....	42
4.2.	DATA ON EXISTING BUS STOPS .....	42

4.2.1.	Identification and description of bus stops available on the bus routes under study.....	42
4.3.	DATA FROM DECISION MAKERS.....	43
4.3.1.	Introduction.....	43
4.3.2.	Data from the Ministry of Infrastructure and Rwanda Transport Development Agency (RTDA).....	43
4.3.3.	Data from Rwanda Utilities Regulatory Authority (RURA) and the City of Kigali.....	45
CHAPTER 5 SURVEY DATA COLLECTION AND ANALYSIS .....		47
5.1.	DATA COLLECTION BY QUESTIONNAIRE.....	47
5.1.1.	Questionnaire design.....	47
5.1.2.	Questionnaire administration and feedback.....	48
5.1.3.	Perception of city residents of the benefits of public transport.....	49
5.2.	CONVENIENCE OF BUS ROUTES TO BUS USERS .....	52
5.2.1.	Perception of bus routes available in the City of Kigali by respondents ..	52
5.2.2.	Perception of suitable bus routes system in the City of Kigali by respondents .....	53
5.3.	CONVENIENCE OF BUS STOPS TO BUS USERS .....	54
5.3.1.	Perception of bus stops in the City of Kigali by respondents .....	54
5.4.	CONVENIENCE OF BUS SERVICES TO BUS USERS.....	60
5.4.1.	Use of bus services in general by respondents.....	60
5.4.2.	Perception of bus services availability in general by respondents.....	61
5.4.3.	Perception the City of Kigali residents on the number of passengers .....	62

5.4.4.	Perception the City of Kigali residents on buses cleanness .....	63
5.4.5.	Choices of users in terms of better services and related costs .....	63
5.4.6.	Perception the City of Kigali residents on services in general .....	64
5.5.	CONCLUDING REMARKS.....	65
CHAPTER 6 BUS SYSTEM EVALUATION IN THE CITY OF KIGALI.....		66
6.1.	INTRODUCTION .....	66
6.2.	ANALYSIS OF EXISTING BUS ROUTES AND BUS STOPS .....	66
6.1.1.	Analysis of City of Kigali existing bus routes.....	66
6.1.2.	Analysis of City of Kigali bus stops system on selected routes .....	68
6.2.	COMPARISON OF THE VIEWS.....	71
6.2.1.	Comparison of the respondents’ views with the decision – makers views....	71
6.3.	CONCLUDING REMARKS.....	72
CHAPTER 7 OPTIMUM BUS SYSTEM IN CITY OF KIGALI .....		73
7.1.	INTRODUCTION .....	73
7.2.	IDENTIFIED BUS TRANSPORT INNOVATIONS IN THE CITY OF KIGALI	73
7.2.1.	Projection of public transport use in City of Kigali in 2018 horizon .....	73
7.2.2.	Best innovations in terms of bus routes in City of Kigali .....	73
7.2.3.	Best innovations in terms of bus stops in City of Kigali.....	76
7.3.	OPTIMUM BUS SYSTEM IN CITY OF KIGALI IN TERMS OF BUS ROUTES .....	79
7.3.1.	Bus Zone I.....	80
7.3.2.	Bus Zone II .....	80

7.3.3. Bus Zone III.....	81
7.3.4. Bus Zone IV.....	82
7.4. OPTIMUM BUS SYSTEM IN CITY OF KIGALI IN TERMS OF BUS STOPS .....	83
7.5. ASSESSMENT OF APPLICABILITY OF BEST INNOVATIONS IN PUBLIC TRANSPORT IN THE CITY OF KIGALI.....	86
7.6. CONCLUDING REMARKS.....	86
CHAPTER 8 CONCLUSION AND RECOMMENDATIONS .....	87
8.1. GENERAL CONCLUSION .....	87
8.2. RECOMMENDATIONS .....	88
LIST OF REFERENCES .....	89
APPENDIXES.....	93

## LIST OF TABLES

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Table 1: Public Transport Benefits and Costs.....	14
Table 2: Evolution of the City of Kigali population and area.....	36
Table 3: Questionnaire distribution in the City of Kigali.....	49
Table 4: Importance given by respondents to bus services linking city suburbs to the city centre.....	49
Table 5: Importance given by respondents to the bus services stopping near their location.....	50
Table 6: Importance given by respondents to providing weekend bus services.....	50
Table 7: Importance given by respondents to buses providing access to shops.....	50
Table 8: Importance given by respondents to buses providing access to schools and colleges.....	50
Table 9: Importance given by respondents to buses providing access to hospitals.....	51
Table 10: Importance given by respondents to providing evening bus services.....	51
Table 11: Perception of City of Kigali residents on bus routes to various areas of the City of Kigali.....	52
Table 12: Time taken by respondents to reach the nearest bus stop.....	54
Table 13: City of Kigali residents' estimation of the suitable distance at which a bus stops should be from their homes.....	56
Table 14: Time taken by City of Kigali residents to reach their final destination from the bus stops.....	57
Table 15: Suitable distance from the bus stops to the final destination for the City of Kigali residents.....	58
Table 16: Use of bus services by City of Kigali residents.....	60
Table 17: Perception of City of Kigali residents on the availability of bus services.....	61
Table 18: Perception of City of Kigali residents on the number of passengers.....	62
Table 19: Perception of City of Kigali residents on bus cleanness.....	63
Table 20: City of Kigali residents' views on the bus services improvements.....	64

## LIST OF FIGURES

---

Figure 1: Topographic map of the City of Kigali.....	3
Figure 2: An aerial picture of one urban area in the City of Kigali.....	4
Figure 3: An aerial view of one rural area in the City of Kigali.....	4
Figure 4: Conversion of goals and local conditions set into bus transport system.....	15
Figure 5: City of Kigali with various Districts and Sectors.....	33
Figure 6: City of Kigali road network.....	35
Figure 7: Evolution of the City of Kigali.....	36
Figure 8: Evolution of the City of Kigali population.....	37
Figure 9: Population of the City of Kigali by gender and by Districts.....	38
Figure 10: Poverty indexes in the City of Kigali.....	38
Figure 11: Distribution of bus routes in the City of Kigali up to August 30, 2013.....	40
Figure 12: City of Kigali residents' views on bus services benefits.....	51
Figure 13: City of Kigali residents' perception of available bus routes.....	53
Figure 14: Time spent by City of Kigali residents to reach the nearest bus stop.....	55
Figure 15: City of Kigali residents' views on the proximity of bus stops from their home.....	56
Figure 16: Time spent by City of Kigali residents from bus stops to their destination.....	57
Figure 17: City of Kigali residents' views on the bus stops proximity to their destination.....	59
Figure 18: Use of bus services by City of Kigali residents.....	60
Figure 19: Perception of bus availability by City of Kigali residents.....	61
Figure 20: Perception of bus passengers by City of Kigali residents.....	62
Figure 21: Perception of bus cleanness by City of Kigali residents.....	63
Figure 22: City of Kigali residents' perception on bus services improvements.....	64
Figure 23: Routes lengths from the City Centre to various areas.....	67
Figure 24: Routes lengths from Nyabugogo to various areas.....	68
Figure 25: Routes lengths for other routes outlets.....	68

Figure 26: Average bus stops spacing on selected routes / ongoing way.....	69
Figure 27: Average bus stops spacing on selected routes / back going way.....	70
Figure 28: Proposed basic bus stop facility.....	85



## **LIST OF SYMBOLS AND ABBREVIATIONS**

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BNR:	National Bank of Rwanda
BRT:	Bus Rapid Transit
CBD:	Central Business District
e.g.:	For example
E:	East
etc.:	And so on
KBS:	Kigali Bus Service
Km/hr:	Kilometre per hour
Km:	Kilometre
km <sup>2</sup> :	Square kilometre
m :	metre
MININFRA:	Ministry of Infrastructure
mins:	minutes
pcu:	Passenger Car Unit
RTDA:	Rwanda Transport Development Agency
RURA:	Rwanda Utilities Regulatory Authority
RWF:	Rwandan Francs
S:	South
TOD:	Transit – Oriented Development
US\$:	United States of America Dollar

## **CHAPTER 1 INTRODUCTION**

### **1.1. GENERAL INTRODUCTION**

Public transport is the most affordable way of movement for people in the rapidly growing city and must be given higher attention in order to meet the users demand (The World Bank, 2013a).

Like most of other sub – Saharan cities, the City of Kigali is growing very fast in terms of population density and this population growth estimated at 4.0 percent (4.0%) (Institute of Statistics, Rwanda, 2012) must be coupled with infrastructures development and appropriate and reliable public transport system. The majority of the City population estimated at eighty percent (80%) relies to public transport for their day to day movements and the main public transport mode used by Kigali City residents is bus services. They provide links to public services, enable people to get to their work or place of education, allow people to get to the shops, to visit friends and family and to get to the recreational areas. Given the key role played by buses in the City of Kigali, it is important that passengers receive a high level of service.

Public transport is a public service, and should provide service levels that comply with public demand (Soehodho & Nahry, 2006). With a population growth and urbanization growth like the ones observed in the City of Kigali, public service needs to be continuously updated to be adapted to the users' benefits. For passengers to have the optimum level of service the bus routes should be well defined and sufficient, and the bus stops well designed to meet the passengers' requests.

The City population growth in some extent has overtaken the infrastructures growth and the bus stops and routes are no longer relevant to provide the required level of service to bus users in many zones of the City of Kigali (Mininfra, 2012). According to (Phanikuma & Bhargab Maitra, 2006), travel needs in developing countries are largely served by public transportation systems, especially bus transportation systems.

From the very beginning, the main purpose of public transport has been to provide easy mobility to people without private cars. Nowadays, the public transport is adopted for many purposes, such as reducing traffic jams, providing mass mobility, reduction of air pollution and creating development opportunities (Mees et al, 2010).

Improving bus service means providing a reliable and convenient alternative to driving to a wide range of people using that service so that even the non – bus users should be interested (Gris Orange Consultant for Transport Canada, 2012).

It is in this regards that there is a need to assess the current situation of bus stops and bus routes to determine at which extent they fulfil the users' requests, and propose the ways of improvement of the situation according to the continuous increase of number of service users.

## **1.2. RESEARCH JUSTIFICATION**

Bus transport is a mode of transport that needs to be continuously monitored to assess its effectiveness and its efficiency. The best way to make this assessment is to have the users' view and the operators' views. The bus users need to have optimum level of service and this is achieved by improving the access to the bus stops, improving the services provided by bus stops, availing bus routes to all the city location where the service is needed and by ensuring that the users are satisfied with the service provided to them.

However, there are financial constraints on the public transport system so that an “optimum level of service” in a particular location is dependent upon the finances available.

The ability to improve the bus transport system relies on the ability to measure the bus transport system. As stated by (Polzin et al, 2002), the planning and operation of public transport services are closely tied to the ability to measure the spatial and temporal accessibility of the public transport system.

It is in this regards that arises the need for assessment of bus routes available within the City of Kigali and bus stops available on these routes.

### 1.3. PROBLEM STATEMENT

Bus transportation in the City of Kigali faces many problems resulting from the mismatch between the supply of bus transport services and the rapidly growing demand. The high bus transport demand has been attributed to City of Kigali rapid and uncontrolled growth, which led to the supply being overtaken by the demand. This has contributed to insufficient or inadequate provision of public transport in general and bus services in particular. Hence, the supply of bus services is insufficient throughout the City of Kigali (RURA, 2013).

Rural areas of the City of Kigali are deprived of bus services as there are no bus routes heading to various areas of the City of Kigali. Figure 1 shows the topographic map of the City of Kigali with the boundaries of the urban area, Figure 2 shows a picture of an urban area of the City of Kigali while Figure 3 shows a picture of a rural area of the City of Kigali.

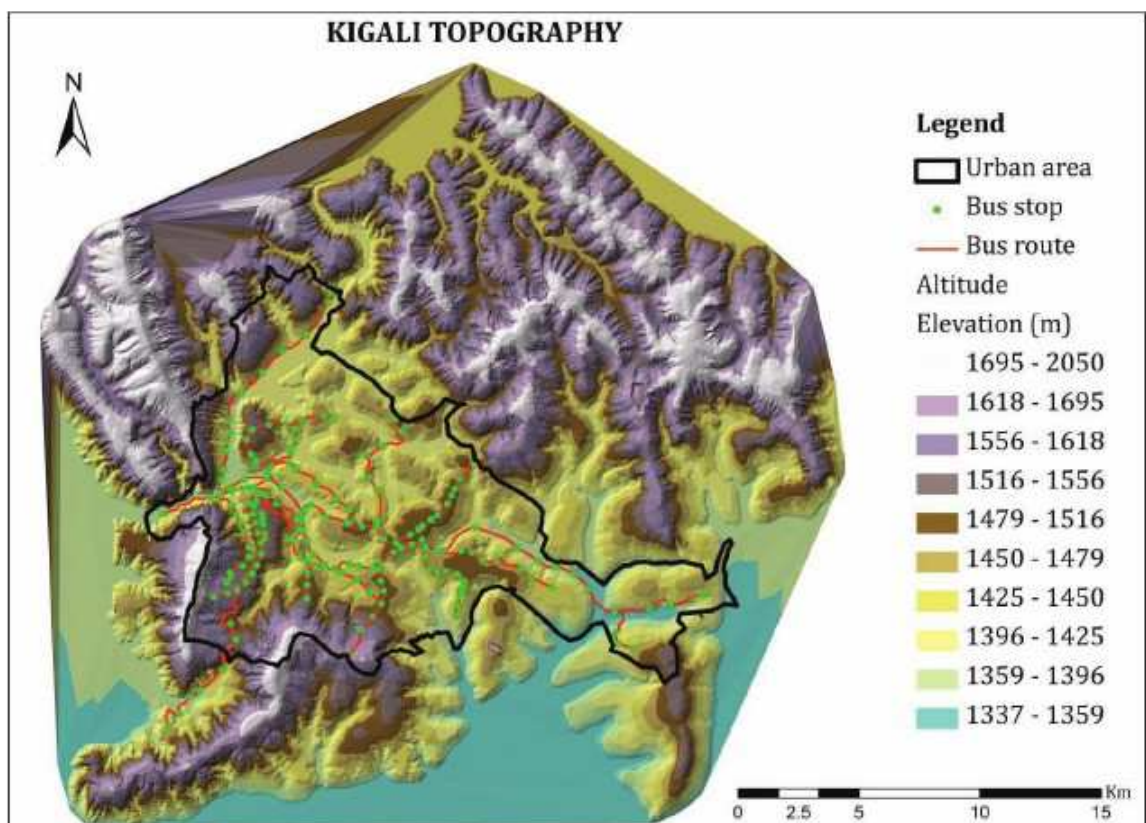
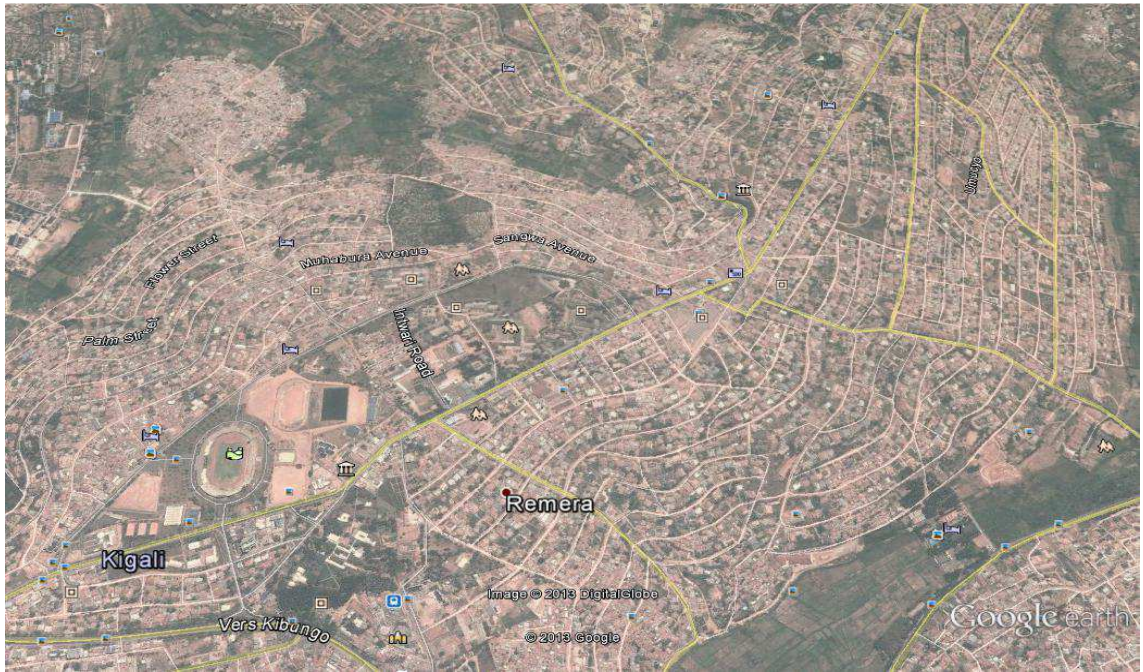
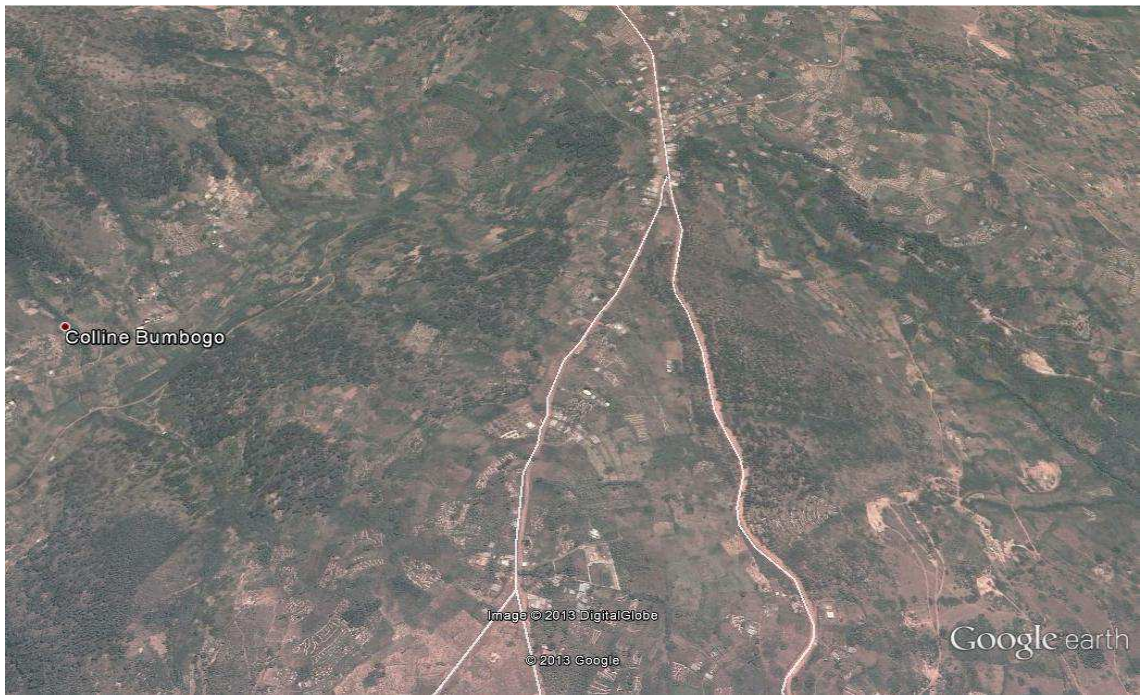


Figure 1: Topographic map of the City of Kigali



**Figure 2: An aerial picture of one urban area in the City of Kigali**



**Figure 3: An aerial view of one rural area in the City of Kigali**

Where the bus services are available, users have to walk around one kilometre to get to the bus stops, and when they get there, they have to wait around one

hour or more queuing before boarding the bus and they don't even have any information about the time the next bus will be arriving or the available buses on that line. The majority of the bus stops are not even designed to provide a shelter to users during hot sun or raining periods.

This shows that the level of service provided in bus transportation is low and needs to be improved to meet the users' expectations which are highlighted in this research.

The insufficiency and inadequacy of bus services affects the general public as the bus transport is the way of transport that the majority of the City of Kigali residents are comfortable to afford. It affects the national economy also in the sense that the transport cost is increased and people waste so much time on queues or walking to get to the nearest bus stop.

It therefore important to analyse the bus transport in the City of Kigali and have a clear picture of all the inadequacy encountered in this sector in terms of bus routes and bus stops. This research is designed in this regards. It intends to examine the level of service provided to bus users in the City of Kigali, and how these services contribute to the socio – economic activities of beneficiaries. The research consists of the analysis of current bus routes and bus stops and service capacity constraints.

After a thorough analysis of the services available in terms of bus routes and bus stops in the City of Kigali, an adequate system will be designed. This adequate bus transportation system will be implemented in five years period.

#### **1.4. AIMS OF THE RESEARCH**

This research has the following main aims:

- To get the information data on the public transport in the City of Kigali in terms of bus stops and bus routes
- To assess through interviews if the bus stops are well designed to meet the passenger's requests and needs
- To assess through interview if the bus routes are well planned to reach all the City residents and if they are convenient to bus users

- To analyse what improvement should be made to public transport in the City of Kigali in five years period considering bus routes and bus stops.

## 1.5. RESEARCH OBJECTIVES

This research will have the following main objectives:

- **Objective 1:** Documenting and highlighting the benefits of bus transport for both users and non-users in general. The research will firstly show various merits of public transport in rapidly growing city like Kigali and how the city population should benefit from using well planned and improved public transport system rather than using other means.
- **Objective 2:** Documenting best examples of bus services in terms of bus routes and bus stops in various countries. In this research, we will provide best examples of counties whereby optimum bus services are provided to users. Special focus will be made on sub – Saharan counties to meet the Kigali City context. The bus services to be focussed on will be bus routes and bus stops and level of service provided to passengers.
- **Objective 3:** Identifying the bus routes that are available to bus users in the City of Kigali and bus stops available on each route. During this research, we will determine all the available bus routes in Kigali City from the city centre to various locations within the City limits. On these available bus routes, the available bus stops will be identified.
- **Objective 4:** Assessment of the effectiveness of bus routes and bus stops to bus users. After the identification of available bus routes and bus stops, a thorough assessment will be made to determine if the bus routes are well designed to meet the passengers’ needs and comfort

and if the bus stops are well provided to give the optimum level of service to bus users.

- **Objective 5**: Identifying the development and innovations that should be made to bus services in terms of bus routes and bus stops in Kigali City. After the assessment of bus services provided to Kigali City population, the research will bring to the light the new developments and innovations that should be brought to the public transport in terms of bus routes and bus stops to attract more passengers and to provide high level of service. Among these developments, we can mention the Bus Rapid Transit (BRT) which is likely to be implemented by 2025 in Kigali. However, this study will focus on non – BRT corridors.
- **Objective 6**: Adapting these improvements to the current situation and projection to the future use. After assessing the current situation and highlighting the improvements and innovations that should improve the public transport, this research will propose the ways of adapting the new improvements to the Kigali City current situation and will project the situation to the 2018 year horizon.
- **Objective 7**: Assessment of the applicability of these improvements. The research will finally assess the applicability of introduction of the new development and innovations to public transport in terms of financial means and the ability of bus users to afford them.

## **1.6. SCOPE OF THE RESEARCH**

This research will focus on the evaluation of bus services within the urban boundaries of the City of Kigali. The bus routes to be considered are those originating from the City Centre and ending at various points of the urban part of the City of Kigali. The population living in the rural part of the City of Kigali will be also questioned to have their views on bus routes and bus stops, even though the bus services are nearly unavailable in these areas.



## **1.7. RESEARCH METHODOLOGY**

In order to fulfil the objectives of this research, the methods used to achieve each of the above listed objectives are the following:

- For objective one and objective two which are documenting and highlighting the benefits of use of public transport and documenting of best example of bus services, the method used is the research through international literature. We went through available literature in the libraries and on the internet and chose the most suitable ones to support this research.
- For the objective three which consists on the identification of available bus routes and bus stops on each route, the method used is the search of data through the City of Kigali authorities, transport authorities in the City of Kigali, the Rwanda Utilities Regulatory Agency (RURA) and the Ministry of Infrastructure and comparison of the available data with the onsite data obtained through physical survey.
- For objective four which consists on the assessment of the effectiveness of bus routes and bus stops to bus users, the method used is the survey method by use of a questionnaire. This method was adopted as the most suitable for this main objective of the research for the following reasons:
  - ✓ It was the easiest less costly way of reaching many people to have their views and reactions about the services they are given in terms of bus services and bus routes;
  - ✓ By properly selecting the samples of respondents, we will be sure that the collected data will be representing the general feeling of the Kigali City population;
  - ✓ The questionnaire is a convenient way of data gathering as it can be administrated to respondents by various ways. During our research, questionnaires were administrated to respondents directly in their hands and interviews were done face – to – face with the respondents.

- ✓ As the survey with questionnaire provide all the respondents with a standardized stimulus, this method is ideal for scientific research. Also, our possible bias was eliminated as the respondents' views were the only ones to be considered.
- ✓ As the questionnaire was designed so that the questions provide uniform definitions and are easy to understand, there was high level of precision in data gathering.

The survey was conducted on bus users on non-users, and the respondents were adult persons (above eighteen years old).

- For the objective five, six and seven which consist on the identification of innovations that should be brought to the existing bus transport services in Kigali City and their applicability, the method used was the research through the existing literature and studies and assessment of the most relevant approach according to the current and future situation. These three objectives were considered highly strategic in nature as the research is not making detailed plan of City of Kigali's public transport, rather, it is giving strategic level – of – service guidelines. To achieve these objectives, we had to interview decision – makers within the Ministry of Infrastructure, the City of Kigali, Rwanda Transport Development Agency (RTDA) and Rwanda Utility Regulatory Agency (RURA).

## **1.8. BENEFITS OF THE RESEARCH**

This research is very beneficial to City of Kigali Authorities, to bus operators and to bus users.

The research will benefit to the City of Kigali as it will provide the views of City residents about the bus services provided to them and the expected improvements that the City should make on bus transport.

The bus operators will benefits is a sense that the services bottlenecks will be identified and area of improvements provided to them to bring their business at a better level.

For bus users, the benefits are many as the research is designed to provide better bus services to users. Their views and expectation will be explored and an optimal bus service within the City of Kigali will be designed.

In addition, this research will benefit to the social – economic growth of the country in general as the majority of the population use the bus transport, and by saving on time spent on bus services, their wealth will be improved.

Finally, this research will provide an opportunity to further researches by individuals and organizations.

## **1.9. DISSERTATION STRUCTURE**

**Chapter one** briefly highlights the justification and background of the research, with the problem statement, research aim, research objectives and the methodology used to achieve these objectives. The benefits of this research are also highlighted in this chapter.

**Chapter two** deals with the literature review where the theoretical concepts of urban bus transport are described. Also in this chapter, optimum bus routes systems and optimum bus stops systems are described. This chapter covers objective one and two of the research which consist of the documentation on optimum bus transport systems.

**Chapter three** describes the City of Kigali, its geographical social, economic and demographic characteristics; and the current situation relative to bus transport.

**Chapter four** is about all the data collected concerning the bus routes and bus stops in the City of Kigali, and the data collected from the decision makers in the Ministry of Infrastructure, Rwanda Transport Development Agency (RTDA), Rwanda Utilities Regulatory Authority (RURA) and the City of Kigali. This chapter covers the objective three of the research which consists of identifying the bus services provided in the City of Kigali.

**Chapter five** describes the general perception of bus services by city residents and the possible improvements that should be made to bus transport system. This description is given by data collected using a questionnaire and their analysis. This chapter covers the objective four of the research which consists of the assessment of the current bus system.

**Chapter six** compare the views from the questionnaire interviews with the decision – makers’ views and the existing situation. This chapter covers the objective four of the research which consists of the assessment of the current bus system.

**Chapter seven** propose the innovations to be brought to the bus system and their applicability to the City of Kigali. This chapter covers the objective five, six and seven of the research which consist of proposing the improvements to the bus transport and to assess their applicability to the City of Kigali.

**Chapter eight** consists of general conclusion and recommendations based on research findings.

## **CHAPTER 2 LITERATURE REVIEW**

### **2.1. URBAN BUS TRANSPORT**

#### **2.1.1. Introduction**

City activities are closely related to the movement of population from the place where they live to various areas where these activities are located. People need transport for their day to day activities such as work, business, education, shopping and leisure. The optimum means of movement utilized in urban areas is public transport in general, and bus transport in particular. This is because the buses transport system is the effective way of transport and also environmentally friendly alternative to accommodate the movements of a large number of people. A private car which is equivalent to one pcu carries an average of two (2) people, while a large bus which is equivalent to three point five (3.5) pcu carries an average of thirty (30) people.

According to (Wikipedia, 2013a), urban or suburban services is the most common type of public transport bus service, and is used to transport large numbers of people in urban areas, or to and from the suburbs to population centres. These services are often organised on a network basis centred on an urban centre of a town, or across a city, and may involve universal liveries, or specific route branded buses. The system used on these services is the transit bus also referred to as a commuter bus or city bus. The conventional buses are the most used in developing countries in Africa, in the view that they offer relatively low running costs, routes flexibility and permeability into town and city centres (Davison & Knowles, 2006).

Considering this research scope, we will focus on bus transport system which is operated by small minibuses, medium buses and large buses. The research will not consider the Bus Rapid Transit System nor the dedicated bus lanes system.

#### **2.1.2. Bus transport in rapidly growing cities in developing countries**

The actuality prevailing in almost all the countries is the public awareness of economic costs of traffic congestion in urban areas and environmental degradation

resulting from this congestion. The authorities in various countries are willing to promote the public transport in general and bus transport in particular which is a better environmental friendly transport system. In developing countries like Rwanda, bus transport plays a major role in population movements as it is economically efficient; it used by the majority of the population and is the best solution to serve high – density and rapidly growing cities (Vuchic, 2002; Badami & Hyder, 2007).

As stated by (Litman, 2013), high quality public transit provides numerous benefits including congestion reductions, road and parking facility cost savings, consumer savings, reduced accident risk, improved mobility for non-drivers and reduced chauffeuring burdens for motorists, energy conservation, pollution emission reductions, support for more efficient land use development, and improved public fitness and health. The major issue in developing countries is that the existing bus transport system cannot accommodate the demand due to various factors such as inadequate road infrastructure, uncontrolled expansion of the cities, high urban population growth, and relatively low level of incomes and poor traffic management (Iles, 2005).

In rapidly growing cities, buses have to compete for spaces with other transport modes. This affects considerably the bus services provided to users in various ways. Firstly, buses conflict with other vehicles in numerous intersections and hence obstructing or delaying the buses to reach the bus stops. Secondly, when a bus has to enter or leave bus stops, it has to deal with other traffic present on the road, hence resulting in further delay in service provision. In addition, the speeds of buses operating in mixed traffic are influenced by stops spacing, dwell times, stops due to traffic signals and interferences from other traffic operating on the same road (TRB, 2000). These various interferences have a big impact on the level of service provided by bus transport to users. It is in this regard that the bus transport needs to be structured in cities to meet the expectations of users and to contribute to the population life improvement.

### **2.1.3. Performance evaluation of Bus Transport system**

The ability to improve a bus transport system performance is closely tied to the ability to determine this performance and to measure it. The public transport can

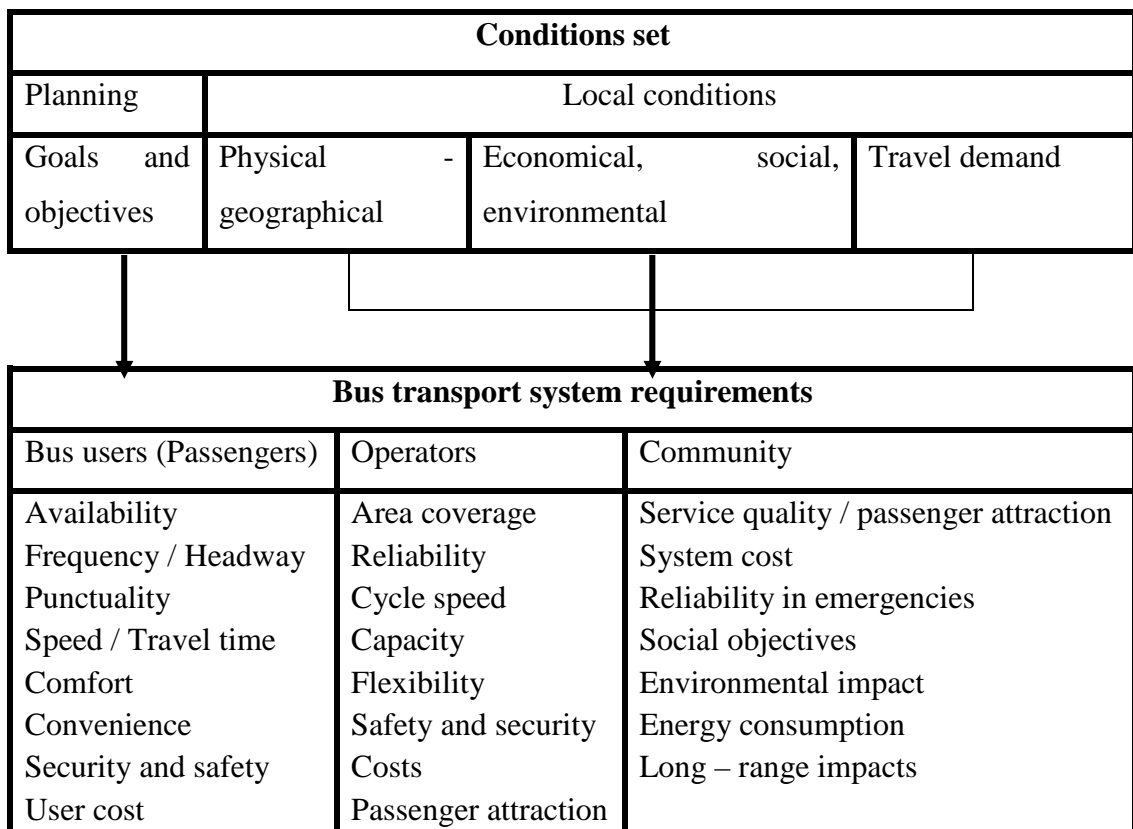
be evaluated according to various factors to determine the benefits and the costs (Litman, 2013). Public transport in general and bus transportation in particular can have various benefits and costs to be considered in performance evaluation, many of which tend to be overlooked or undervalued in conventional transportation evaluation system (Litman, 2013). Table 1 shows the public transport benefits and costs.

**Table 1: Public Transport Benefits and Costs**

<b>Benefit category</b>	<b>Improved Transit Service</b>	<b>Increased Transit Travel</b>	<b>Reduced Automobile Travel</b>	<b>More Transit – Oriented Development (TOD)</b>
<b>Indicators</b>	<b>Service Quality (speed, reliability, comfort, safety, etc.)</b>	<b>Transit Ridership</b>	<b>Mode Shifts or Automobile Travel Reductions</b>	<b>Portion of Development That Reflects TOD Design Features</b>
<b>Specific benefits</b>	<ul style="list-style-type: none"> <li>• Improved convenience and comfort for existing users.</li> <li>• Equity benefits (since existing users tend to be disadvantaged)</li> <li>• Option value (the value of knowing that an option exists for possible future use).</li> <li>• Improved operating efficiency (if service speed increases).</li> </ul>	<ul style="list-style-type: none"> <li>• Mobility benefits to new users.</li> <li>• Increased fare revenue.</li> <li>• Increased public fitness and health (if transit travel stimulates more walking or cycling trips).</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced traffic congestion.</li> <li>• Road and parking facility cost savings.</li> <li>• Consumer savings.</li> <li>• Reduced chauffeuring burdens.</li> <li>• Increased traffic safety.</li> <li>• Energy conservation.</li> <li>• Air and noise pollution reductions.</li> </ul>	<ul style="list-style-type: none"> <li>• Additional vehicle travel reductions (“leverage effects”).</li> <li>• Improved accessibility, particularly for non-drivers.</li> <li>• More efficient development (reduced infrastructure costs).</li> <li>• Farmland and habitat preservation.</li> </ul>

Source: (Litman, 2013)

These benefits and costs reflect the passenger, operator and authorities' perspective. They are used as measures to evaluate the bus transport performance. The bus service providers (operators) pay much attention on benefits that are concerned with bus transport efficiency, where much emphasis is given on the optimum utilization of available labour and capital resources by the bus transport system (Balcombe et al, 2004). Meanwhile, these bus transport performance indicators have been criticized as they insufficiently address the importance to bus users and the community at large (UITP, 2008). In contrast, the bus transport system as a service should be passenger based, and by taking into consideration the performance indicators which are important to bus users, the ridership would be increased and the equity in service provision should be easily assessed (Stanley J. & Stanley J., 2004). Considering the requirements of bus transport systems, their evaluation can be based on the conditions set according to different perspectives as illustrated in Figure 4.



Source: (Vuchic, 2005)

**Figure 4: Conversion of goals and local conditions set into bus transport system**



### **2.1.3.1. Bus transport system from passenger perspective**

The major considerations of bus users are the bus availability and the comfort and convenience when the buses are available (Roads Service & Translink, 2005).

By bus availability, the passenger has in his / her perspective that the service is adequate if the service is near his / her area of location and ready to be used whenever the passenger intends to use it. This may be achieved if the passenger can easily get to and from the bus stops, have enough information on the use of the service, and sufficient capacity of buses is available whenever needed (Mees et al, 2010). If one or more of these conditions are not met, the bus transport will not be the favourable option for a particular trip, the trip will be definitely abandoned or another means of transport used (TRB, 2000). To the passenger perspective, the availability of a bus transport system is determined by spatial availability, temporal availability, information availability and capacity availability; and all these conditions must be fulfilled.

After the availability of the bus transport, the passenger looks at the service comfort and convenience to compare with other transport modes and determine which service to use (Stanley & Stanley, 2004). The bus comfort and convenience to passenger are essential to make bus transport competitive with other modes of public transport. The comfort of buses is determined by vehicle design and construction, the maintenance standards, the bus cleanness, the loads factors and the driving standards (Iles, 2005). This means that the external aspects of buses must be attractive to passengers.

By bus service convenience, the passenger intends the service to be accessible, readily delivered, and punctual. The service has also to provide security and safety to users and the travel time has to be relatively small (Kessides, 2005).

### **2.1.3.2. Bus transport system from operator perspective**

For the bus transport system to be fully functioning, it needs to have serious operators. After it has been designed and operated to meet the passengers' demand, the bus transport system has to be technically and economically efficient (Nash, Journal of Transport Economics and Policy, 1978). From the operators'

perspective, the requirements to perform a bus transport system are somewhat different from the users' requirements as theirs are much benefit oriented. They are much concerned with the organizational performance of the bus system.

According to (Litman, 2013), the public transit can benefit businesses by improving employee access, reducing costs and supporting community land use and economic development. But on the operators' point of view, the performance of bus transport system is evaluated in terms of cost – efficiency indicators and cost – effectiveness indicators such as operating expenses per vehicle revenue kilometre and / or hour and vehicle expenses per passenger kilometre and / or passenger trip (TRB,2000).

The bus operators will choose the routes that have a large number of passengers and the routes with less number of passengers will be ignored. Again, their timetable will be set to operate their buses at times when they are sure to make maximum profits (Mohring, 1971). This perspective totally contrasts with the main objective of public transport which is to make the service affordable to all.

### **2.1.3.3. Bus transport system from authorities perspective**

The population is generally concerned with the costs and negative aspects of the bus transport system. The authorities have to regulate the public transport in general and the bus transport in particular to overcome all the possible adverse effects. According to (Litman, 2013), transit services and support strategies such as commute trip reduction programs and transit oriented development can provide government savings and achieve public objectives under the following considerations:

- *Transportation Agency:* Transit improvements are often the least-cost way to improve mobility, reduce urban traffic and parking congestion, and address particular problems, such as congestion during roadway construction projects or special events.
- *Social Services:* Transit services support public services by providing access to medical services, education and employment by disadvantaged populations.
- *Schools and Colleges:* Public transit can make education more affordable and available to disadvantaged students, and helps reduce traffic and parking problems around schools and campuses.

- *Economic Development*: Transit services support economic development, by reducing government and business costs, improving access to jobs, and supporting various economic development efforts such as urban redevelopment and tourism.
- *Land Use Planning*: Transit can help support strategic land use objectives, such as redevelopment of existing urban communities and reduced sprawl.
- *Special Events*: Transit can help address traffic and parking problems that occur during major sport and cultural events.
- *Environmental Quality*: Public transit can help achieve energy conservation, pollution emission reduction and green space preservation objectives.

#### **2.1.3.4. Best perspective to be considered**

The performance and delivery of bus transport system depend highly on which perspective it is viewed and the measures used to measure them. These measures are very different and sometimes contrast themselves when considering the users' perspective, the operators' perspective or the authorities' perspective (Litman, 2013). It is therefore complex and tricky to measure the bus transport system as the factors and goals considered are different from the various points of view.

To determine which perspective to be considered in evaluating the bus transport system, choice has to be made on which goals and objectives to be considered (Casey & Collura, 1994). Passengers being the customers for which the service is provided (UITP, 2008), their perspective must be given much attention than other perspectives. Bus transport operators must do all their best to meet the passengers' requirements (Casey & Collura, 1994).

This research will therefore determine the level of access to bus services by City of Kigali residents and the level of service provided to them. The study will be based on the users' perspective and will be user – oriented.

## **2.2. BUS ROUTES**

(Fan & Machemehl, Journal of Transportation Engineering, 2006) stated that public transit has been widely recognized as a potential way of reducing air

pollution, lowering energy consumption, improving mobility, and lessening traffic congestion. Designing an operationally and economically efficient bus transit network is very important for the urban area's social, economic, and physical structure. Generally speaking, the network design problem involves the minimization or maximization of some intended objective subject to a variety of constraints, which reflect system performance requirements and/or resource limitations.

The bus route designate the itinerary followed by buses from the start point which is generally a bus station to various end points which are located to the various locations of a study area (Cohen, 2003; UITP, 2008). In this research, we will focus on bus routes running in the urban area of the City of Kigali and on the improvements that should be made on these routes.

According to (Litman, 2013), the urban bus transport system should be improved for the following reasons:

- Aging population, rising fuel prices, increasing urbanization, increasing traffic congestion, rising roadway expansion costs, and changing consumer preferences and increasing health and environmental concerns are shifting travel demand from automobile to alternative modes.
- Many cities have recently experienced redevelopment and population growth, and some trends (smaller households, more elderly people, increased popularity of urban loft apartments, increased value placed on walkability, etc.) support increased urbanization.
- Many cities have reached a size and level of traffic demand that justifies more reliance on transit, including many areas previously classified as *suburban* that are becoming more urbanized, and so experience increased congestion, commercial clustering, land values and parking problems that make transit cost effective.
- There is a growing realization among transportation professionals and much of the general public that there is a value to having a more diverse transportation system.

### 2.2.1. Optimum bus routes systems

The criteria used to determine the optimum bus network vary from the evaluator's point of view (Litman, 2013; Benn, for TRB, 1995). According to a study conducted by (Benn, for TRB, 1995), he stated that there are basic criteria to determine an optimum bus routes system and secondary criteria.

The basic criteria for the bus routes design are the followings:

- **Population density:** The population density represents the number of people residing per square meter. It is the best representation of the potential, in terms of daily trips, at the point of origin. Population density is the most elemental of factors. Given that the fundamental purpose of bus transport is to carry passengers, in volume, this indicator reveals how many people live where (Benn, 1995). This means that the bus routes are designed in terms of the number of people leaving in a particular area as they are the first beneficiary of bus transit system.
- **Employment density:** Employment density represents the number of jobs per square meter. Typically, work trips account for well over one-half of a transit system's ridership (Benn, 1995). In designing the bus routes, special attention has to be taken to the areas where the jobs sectors are concentrated.
- **Route Coverage (Spacing Between Other Bus Routes and Corridors):** This refers to the spacing distance between adjoining routings. The route coverage criterion guides spacing between bus services, geographically distributing them within the service area. This is done to maximize patron accessibility to transit service within the resources available to the agency (Benn, 1995). The bus operators will need to have a full control on their fleet and will not run buses on same routes at the same time as this should affect their profits. By establishing ideal distances between bus routes, transit agencies attempt to ensure that routes do not overlap covered areas and that transit services are well distributed throughout the jurisdiction.

- ***Limitations on the number of deviations or branches:*** In this criterion, deviation, or branching, involves selected trips leaving the main-line of the route; the deviation is viewed with regard to the routing of the main bus route, not the streets over which the main bus route operates. This criterion provides for regularity in the pattern of a bus routing, whatever the directness of the main routing may be (Benn, 1995).
- ***Equal (geographic) coverage throughout the local tax base area:*** Bus routes operate in jurisdictions or other political subdivisions based on local tax base contribution considerations. Some transit systems operate a network design based on geographic considerations of local tax contributions. This is the least used criterion of the five basic ones and reflects policy decision more than planning practice. Because routes operate at different levels of intensity, use of this criterion by no means reflects service levels. A route that operates to provide geographic coverage may not provide meaningful service at all. Indeed, it may be reflective of the old franchise trip, i.e., a token trip that operates to establish presence on the route, if not service (Benn, 1995).

Apart from these basic criteria in bus routes design, there are also secondary criteria used in the design of bus routes.

According to (Benn, 1995), these secondary criteria are ten and are summarized as follows:

- ✓ ***System design considerations such as enhancement of timed transfers:*** This criterion refers to the relationship between a new routing and existing routes in the system. Such aspects as whether there will be a timed transfer where a new route intersects with an existing one, or whether routes share common terminals and bus loops, are considerations under this criterion.
- ✓ ***Streamlining / reduction of duplication:*** This criterion refers to a situation where two or more distinct routings, that serve the same

passenger market(s), appear within close or overlapping proximity. Streamlining / reduction is designed to control the duplication of bus routings to ensure that transit services are adequately distributed geographically within a service area. By ensuring that overlapping covered areas for different bus routes are minimized, services can be more widely dispersed within an agency's jurisdiction (Benn, 1995). This criterion is very important for the cities where there are many areas that need to be covered by bus transit services and many routes are interlinked.

- ✓ *Network Connectivity*: This criterion refers to the physical relationship of a new routing to the existing route system already in place at the agency. When a new routing is being introduced into a system, its relationship to the system as a whole must be considered (e.g., is a radial route being introduced into a grid system). Network connectivity, although similar to “system design considerations”, focuses on the route's relation to the system as a whole and not specifically to any other individual route or group of routings (Benn, 1995).
- ✓ *Service Equity*: Service equity can mean many things. To some, it is compliance with Title VI of the Civil Rights Act, which provides for equitable distribution of transit resources. To others it is simply the distribution of service or the use of population – based criteria (Benn, 1995). For the area under study, this criterion means that the bus services should be available to all the population without consideration of the urban area and the rural area. The problem is that the bus transport system is mainly operated by private operators and that they are not ready to operate in the rural part of the city.
- ✓ *Route directness*: For transit systems that use this criterion, a mathematic assessment is used to measure a route's deviation from a linear path in one or more of the following ways:
  - Additional travel time for a one-way bus trip

- Additional travel time required over an automobile making the same trip
  - Mileage limitations that permit a maximum deviation per route
  - Time limit increase in average travel times per passenger
  - An absolute limit to the total number of pathway deviations
  - The pathway deviation(s) must not lower the average productivity of the route or the deviation should have a higher productivity rating than that for the line as a whole (Benn, 1995).
- ✓ *Service proximate to as many residences as possible:* The objective of this criterion in bus route designing is to get as close as possible to a rider's residence without unnecessarily delaying or detouring other riders.
  - ✓ *Service to as many non-residential trip generators as possible:* The objective here is to get as close as possible to a rider's non-home destination without unnecessarily delaying or detouring other riders. The riders under consideration here are those travelling for business, leisure or educational activities.
  - ✓ *Limitation on the number of transfers required of riders:* This criterion considers whether the design of the route calls for a significant number of its users to transfer, an important consideration in designing or redesigning a bus route. An area could be served with a feeder route where virtually all riders will be required to transfer to complete their trip, or the route itself could be designed to operate a full distance, for example to the city centre and the need for transfers would be obviated for many (Benn, 1995).
  - ✓ *Bus stop sitting:* The site of a bus stop can be near-side (just before the cross street at the intersection), far-side (just after the intersection), or midblock (on the block face between two intersections). The key practice that underlies sound sitting is support from the responsible party (typically a municipality) to properly designate the length, mark, and sign, and to enforce against



encroachments. Short stops and cars parked in zones limit adequate curbing (Benn, 1995).

- ✓ *Bus stop spacing*: Bus stop spacing is the distance between adjoining service stops of a route. Transit operators have developed standards regarding bus stop spacing as part of their effort to balance the tradeoffs between rider convenience (stops with easy walking distances) and speed (Benn, 1995).

### **2.2.2. Bus routes in rapidly growing cities of developing countries**

The rapid growth of the cities and the population growth associated with it is a really big challenge for the bus transport in most of the cities of the developing countries (World Bank, 2013b). This is because it is difficult to cope with the rapid and non – predictable growth of the city’s population and area.

Bus transport systems in many of Africa countries face the problems of insufficient road infrastructure, organizational and institutional framework and lack of sufficient funds (UITP, 2008).

According to (Litman, 2013), the guidance to evaluate the bus transport services includes the following:

- ✓ *Availability* (when and where transit service is available), and *coverage* (the portion of a geographic area, or the portion of common destinations in a community, located within reasonable distance of transit service).
- ✓ *Frequency* (how many trips are made each hour or day).
- ✓ *Travel speed* (absolute and relative to automobile travel).
- ✓ *Reliability* (how frequently service follows published schedules).
- ✓ *Integration* (ease of transferring within the transit system and with other travel modes).
- ✓ *Price structure and payment options*.

- ✓ User *comfort* and *security*, including riding on, walking to, and waiting for transit.
- ✓ *Accessibility* (ease of reaching transit stations and stops, particularly by walking).
- ✓ *Universal design* (ability to accommodate diverse users including people with disabilities, baggage, inability to understand local languages, etc.).
- ✓ *Affordability* (user costs relative to their income and other travel options).
- ✓ *Information* (ease of obtaining information about transit services).
- ✓ *Aesthetics* (appearance of transit vehicles, stations, waiting areas and documents).
- ✓ *Amenity* (extra features and services that enhance user comfort and enjoyment).

These criteria are used to assess the quality and the quantity of service offered by a public transport system's bus route (Benn, 1995).

(UITP, 2008) gives the overview of public transport in sub – Saharan Africa and the best examples in bus transport. In many of the countries, bus transport is run informally and in non – organized systems. However, some good examples should be pointed out in particular in the field of the implementation of dedicated roads in the framework of BRT projects: Lagos and Johannesburg have launched operation of its BRT, and others are underway in Dar-Es-Salam and Accra. The construction of roads for exclusive use by public transport with the aim of structuring the city must be widely encouraged in Africa (UITP, 2008).

## **2.3. BUS STOPS**

### **2.3.1. Bus stops system**

A bus stop is a location along a line at which buses stop to pick up or drop off passengers (Vuchic, 2005). Buses have been the main public transport system in most cities, and bus-stops are the places where passengers and buses meet each other. In today's society everyone should be able to access the bus system and obtain the benefits it offers. Accessibility to public transport is important because it is the default means of travel for everyone (Benn, 1995). The service offered by urban bus transportation, besides the coverage of the network, route frequency, price, availability of service routes etc, includes accessibility to bus stop. Every transit trip begins and ends with pedestrian travel. Good pedestrian facilities often make the trip to stops more enjoyable, thus making it easier for people to choose both modes of transportation to go to work, shopping, or other activities. All transit facilities and the transportation routes that lead to them need to be safe, convenient, and accessible. If people do not feel safe or comfortable walking to stops, then they are likely to choose other modes of travel, such as a car (Litman, 2013).

Bus stops should be located where they are convenient to use and the safety of passengers and other road users has been taken into account (Roads Service & Translink, 2005). In the selection of bus stops locations, following factors should be taken into consideration (El-Geneidy et al, 1971):

- Generally placing stops at the far side of intersections with signal priority;
- Selecting stop locations well connected to the pedestrian infrastructure, providing easy neighbourhood access;
- Ensuring that stop locations facilitate safe street crossing;
- Preserving stops with a history of regular lift activity;
- Locating stops in a way that minimizes effects associated with traffic delay and traffic safety;
- Ensuring compatibility of stops with adjacent properties;
- Locating opposing stops in pairs;

- Ensuring that stop sites are on level slopes with adequate visibility; and
- Ensuring that stop location decisions reflect input from the public and from neighbourhood and business associations.

However, some of these conditions are hard to meet with the cities having irregular topography such as locating stops on level slopes.

Good bus stop accessibility is an essential part of any successful urban mass-transit system.

What constitutes "good," however, depends upon your point of view. From the perspective of the city agency that is responsible for its management, a good accessibility is one that has low maintenance requirements and is vandal-resistant. From the user's point of view, an ideal accessibility is one that allows visibility and easy access to the bus, is comfortable and convenient, provides clear information, and is safe (Balcombe et al, 2004).

In designing new developments, any required bus stop sites should be located so that they are integral to the housing layout.

It is important that the stops are established during construction of the roads and preferably before the occupation of adjacent premises (Roads Service & Translink, 2005).

(Roads Service & Translink, 2005) also states that it is generally not advisable to position bus stops opposite each other on a two-lane carriageway. Safety and sightline considerations suggest a **minimum** separation of three bus lengths (**36m**), with the stops positioned in such a way that the buses stop "tail to tail" and move off away from each other. This is the advisable sitting system for bus stops.

Bus stops should be located as close as possible to locations of passengers' destinations such as schools, shops, libraries, old people's homes, hospitals, railway stations etc (Litman, 2012). This should be done to favour the bus users in accessing various services. In the absence of any better alternatives, where there is a need for a bus stop close to a bend or the crest of a hill, there may be cause for concern on safety grounds that the bus or its intending passengers may be at risk from other vehicles. In such cases, consideration should be given to an advanced warning sign (Roads Service & Translink, 2005).

(Roads Service & Translink, 2005) also recommend that it is preferable that bus stops be positioned away from local drainage facilities such as gullies. Slotted gratings can present difficulties for people with walking aids and those wearing shoes with pointed heels. Gullies can also block causing bad smells which can be a major inconvenience to waiting passengers.

All these factors and conditions should be taken into consideration in bus stops system design to meet the operators' requirements and to benefit bus users as they are the first beneficiaries of the system.

### **2.3.2. Optimum services provided by bus stops**

Apart from allowing passenger to board on buses or off buses, the bus stops should provide other basic services to bus users.

(Tauranga City Council, 2010) highlighted the optimum services that should be provided by bus stops as follows:

- Every bus stop must be marked on the road or clearly demarcated. The marking should meet the requirements of bus stop dimensions.
- Every bus stop must be identified by a bus stop sign.
- Unobstructed areas should be created within the entire boarding and alighting zone where possible, by moving street furniture downstream of the bus stop, rationalizing it or removing it altogether. This will help the visibility of approaching buses as well as increasing pedestrian space (White, 2002).
- A passenger hardstand area with a sealed smooth surface provides a connection between the bus doors and the nearby footpath, which is particularly important for wheelchair users and other people with mobility impairments. It also defines the waiting and circulating space around the bus stop passenger facilities. All the bus stops should be provided with hardstand area (Transport for London, 2009).
- Kerbs need to be high enough to minimise the step up to the bus, while taking into account the ground clearance of buses and the

possibility of overhang. The bus stop needs to be carefully located so that passengers are not required to board the bus from access points with dropped kerbs.

- The bus stop and the area surrounding it should be well lit at night. Poorly lit areas at bus stops can impact on the personal security of waiting passengers and the visibility between drivers and waiting passengers. Ideally, the lighting will also provide bus stop users with the opportunity to survey the surrounding area at night.
- The bus stop should have appropriate pedestrian crossing facility downstream of the bus stop box to enable passengers to cross the road.
- The bus stops should be provided with a shelter to accommodate passengers and protect them against weather adverse effects. Bus stops shelter should meet the basic requirements such as to protect bus users, inform them, provide comfort and promote safety.
- The bus stops should be provided with a seat. People need to feel comfortable waiting for a bus. Many people, particularly the elderly cannot comfortably wait for a bus without sitting down.
- Every boarding stop should be provided with a printed timetable and preferably an accompanying map showing the times and routes of each bus service passing the stop. The map should indicate the location of the bus stop.
- Real time information units to provide up to date information on the expected time of arrival of any given service at the stop. Real time information in general has proved to be a valuable tool in building and maintaining patronage (particularly in congested cities) as the information it provides gives passengers confidence in the time they have to wait for the next service.

All these requirements are very important and should be provided on bus stops in order to attract more passengers and to provide them with optimum service.

### 2.3.3. Optimum spacing of bus stops

The optimum spacing of bus stops on a bus route varies from country to country and from city to city, but there are some best practices that are used in the design of bus stops spacing (Roads Service & Translink, 2005; Tauranga City Council, 2010; Litman, 2013; Balcombe et al, 2004).

(Roads Service & Translink, 2005) suggest the design standards for residential areas where walking distances to reach the bus stop vary up to a maximum of four hundred meters (400 m). The convenience of location of bus stop is of prime importance for existing bus users and to encourage new users. (Roads Service & Translink, 2005) recommend that these standards should be used provided that:

- ✓ No resident has to walk more than four hundred meters (**400 m**) from their home to the bus stop;
- ✓ The majority of residents have no more than two hundred meters (**200 m**) to walk between their homes and the bus stop;
- ✓ In the case of residences designed specifically for the elderly and mobility impaired, there should be not more than a hundred meters (**100 m**) between the development and the bus stop; and,
- ✓ Where there are gradients, the suggested walking distances should be reduced by ten meters (**10 m**) for every one meter (**1m**) rise or fall.

(Tauranga City Council, 2010) took into consideration the service efficiency in determination of bus stops spacing. Speed and reliability is vital to increasing public transport use on priority bus routes. Bus journey times are affected by the number of stops on a route and therefore a careful balance must be achieved. The higher service frequency and additional facilities at stops can provide some compensation to passengers who are disadvantaged by having further to walk.

Access is more of a priority in the city centre and other activity centres where there is increased demand for convenient stopping points. Additional bus stops may be provided in these areas if there is an identified need e.g. a major demand generator located nearby.

According to (Tauranga City Council, 2010), distances should be standardised as much as possible, while bearing in mind the other criteria in these guidelines.

The following are recommended distances between bus stops:

- ✓ High frequency corridors (<10 mins between buses at peaks): **400-500m**
- ✓ Medium frequency corridors (10-30 mins between buses at peaks): **300-400m**
- ✓ Low frequency corridors (>30 mins between buses at peaks): **200-300m**

Wherever a service travels in both directions along a road, inbound and outbound pairs of stops should be spaced opposite each other, tail to tail (or as close as possible), at a safe location to cross the road (Tauranga City Council, 2010)

These are some examples of bus stops spacing design guidelines that should be followed in bus transport system design. It can be noted that a maximum spacing of four hundred meters (**400 m**) between bus stops should be adopted as the optimum.

#### **2.3.4. Best examples of bus stops systems in developing countries**

As summarized by (UITP, 2008), bus transport in sub – Saharan developing countries is still problematic to passengers as the services provided are at low level. However, the countries that introduced the BRT system improved considerably the level of service in terms of bus stops. These countries are South Africa, Ghana, Nigeria and Tanzania (UITP, 2008)

The market for urban passenger transport has experienced major change in many developing countries in Africa, Asia, and the Middle East for a variety of economic, political, and societal reasons and due to fundamental political and economic transition.

One common characteristic of the experience of developing countries is that the frameworks in which the urban transport sector exists change, and often change



rapidly. In some cases, the main reason is because society itself is changing. In other cases, it is because a framework is lacking or contains inherent weaknesses that need to be adjusted (Schöbel, 2006).

#### **2.4. CONCLUDING REMARKS**

Public transport is essential in developing countries and needs to be continuously monitored and enhanced to meet the rapidly growing demand. In many of the cases, the population growth overtakes the service improvement and this is the major cause of public transport inadequacy. Performance measures and optimum level of service that should be provided to passengers are therefore required to analyse the existing bus system, to evaluate its deficiencies and to search for a solution in order to provide optimum service to users. It is in this respect that the ability to quantify the availability of bus routes and bus stops that meet the passenger's requirements is crucial in order to determine the areas of improvement within the city.

Public transport providers and operators have to bear in mind that the first service beneficiary is the passenger and strive to provide him with optimum level of service. This chapter has identified the urban public transport, bus routes and bus stops best performance indicators which are relevant to the rapidly growing cities such as the City of Kigali and that should be used in the existing system improvement.

## CHAPTER 3 AREA OF STUDY DESCRIPTION

### 3.1. CITY OF KIGALI DESCRIPTION

The City of Kigali which is the area of this study is the capital city of Rwanda and the largest business centre of the country. The City is composed of three Districts, thirty five (35) sectors, one hundred sixty one (161) cells and one thousand and sixty one (1061) villages (Imidugudu) (Kigali City, 2013a). Figure 5 shows the administrative delimitation of the City of Kigali.



(Source: (Kigali City, 2013a)

**Figure 5: City of Kigali with various Districts and Sectors.**

The City of Kigali is the capital city of Rwanda and was established in the year 1907 by Dr Richard Kandt, the first European Resident of Rwanda. At the time of its creation, the City of Kigali was a small village. At the date of the country's independence on July 1<sup>st</sup>, 1962, Kigali was declared the capital city of Rwanda with a

population estimated between five thousands (5,000) and six thousands (6,000) and the urban area of approximately three square kilometres (3 km<sup>2</sup>). Between the year 1962 and the year 1984, the population and the built area of the City of Kigali expanded rapidly. The population grew to one hundred fifty thousands (150,000) and the city built area grew to approximately twelve square kilometres (12 km<sup>2</sup>) (Kigali City, 2013c). The city of Kigali continued its expansion until the 1994 genocide against Tutsi.

After the 1994 genocide against Tutsi which destroyed much of the country's achievements and which took the life of more than one million people all over the country, the City of Kigali strived to recover and to gain its glance. Only in 1999 did the population of Kigali exceed its pre-genocide level.

The City of Kigali is subdivided in an Urban area and in a Rural area. The urban area is 30% of the total City area and the rural area is 70% of the total City area in terms of built up space (Kigali City, 2013a).

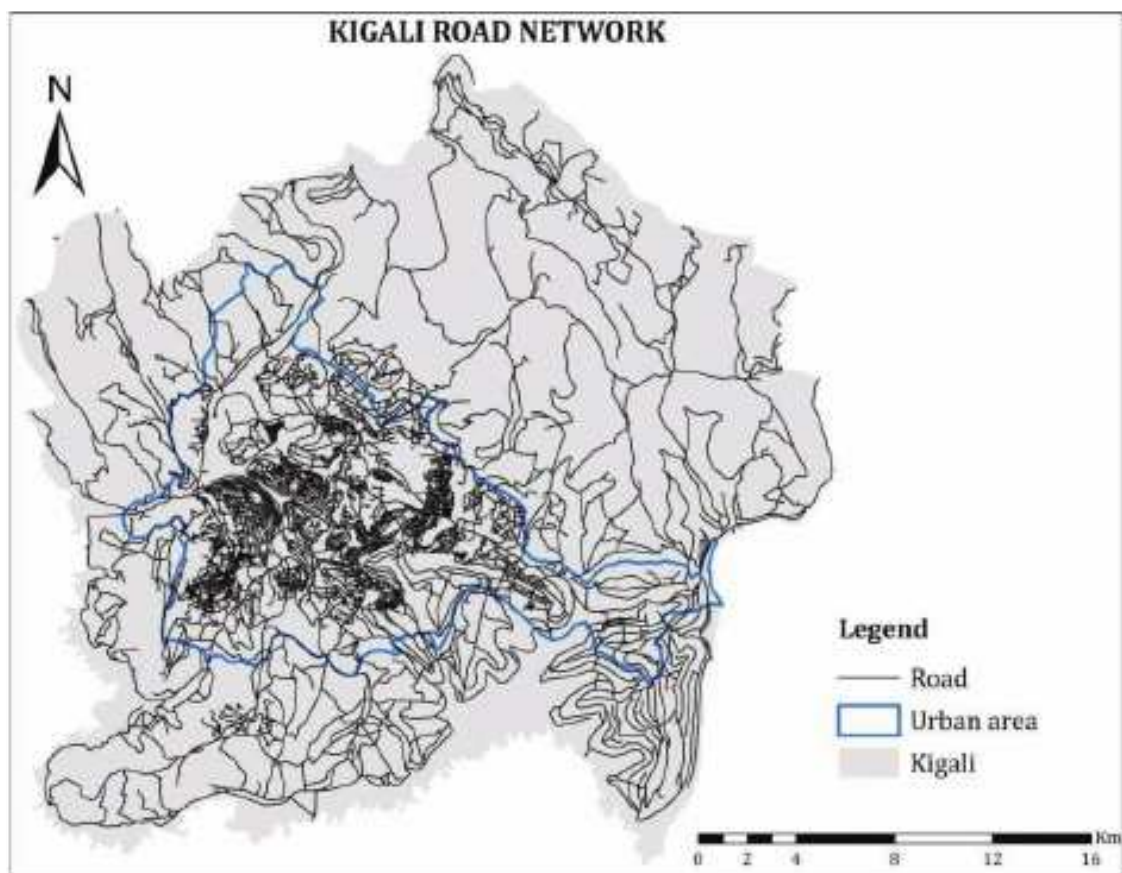
Since 1999, the population and the built area of Kigali have continued to grow at a rate around 6%. Today the City of Kigali forms a unique strategic site for its inhabitants, investors and tourists from all over the world.

The City of Kigali has a tropical climate, a high altitude with mountainous landscape sprawling across the ridges and wet valleys in between. The rapid growth of the City has resulted in unplanned settlements in various areas making the public transport planning in these areas difficult or inexistent (City of Kigali, 2013; The World Bank, 2013a).

The City of Kigali is geographically located at the heart of Rwanda with a latitude of 1° 58" S and a longitude of 30° 07" E. The city is built on numerous hills, sprawling across four ridges with valleys in between. The rapidly growing city, Kigali is the country's most important commercial centre and main port of entry. It is serviced by an efficient International Airport (Kigali International Airport located at Kanombe, ten kilometres from the CBD) and connected to neighbouring countries of Uganda, Democratic Republic of the Congo, Tanzania and Burundi by tarmac roads.

Bus service is available within the urban area whereas this service is nearly unavailable in the rural parts of the City of Kigali. Figure 6 shows the roads available in the City of Kigali with the delimitations of the urban area.

Generally in Rwanda, and particularly in the City of Kigali, private car ownership has been increasing rapidly, which would likely to induce more and more congestion and pollution. This is because private car is the most inefficient road user as far as space occupancy, pollution control and congestion management are concerned. Due to the rapid increase of population and car ownerships, consequently increase in traffic volumes in recent years, traffic congestion and the deterioration of overall transport system have increased remarkably in Kigali City (MININFRA, 2012).



**Figure 6: City of Kigali road network.**

### **3.2. DEMOGRAPHIC CHARACTERISTICS**

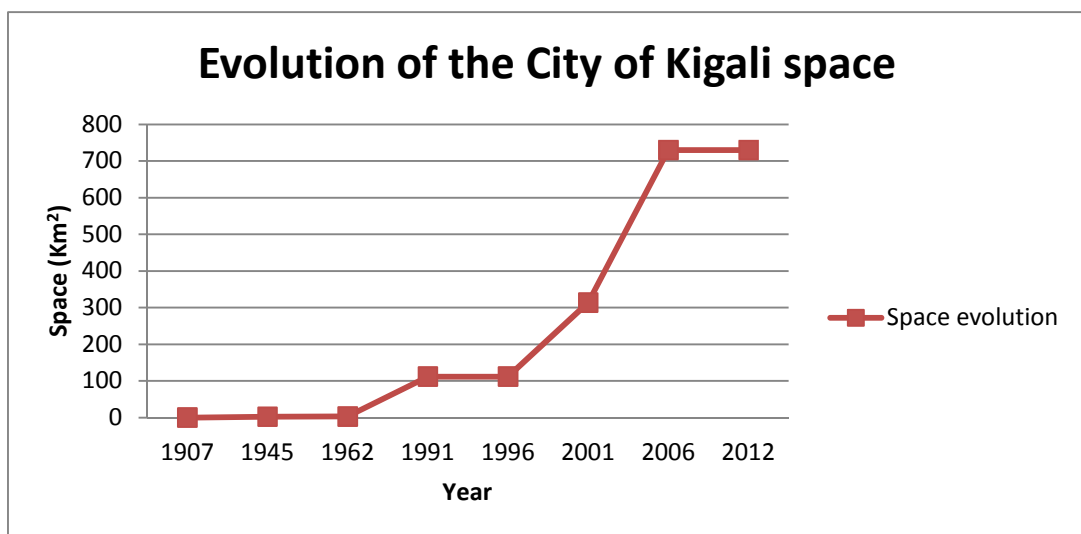
The population of the City of Kigali is growing rapidly. The population of Kigali was 608,141 as per last population census carried out in August 2002. The estimated present population of Kigali in 2013 are approximately over 1.135 million

(Kigali City, 2013b, Republic of Rwanda, 2013a; MININFRA, 2012) as shown by the provisional results of last census carried out in the year 2012. The majority of the population, i.e. 60% of the Kigali City population lives in the urban area of the city which constitutes 30% of the total Kigali City space. The following table shows the evolution of the City of Kigali population versus City of Kigali area growth.

**Table 2: Evolution of the City of Kigali population and area**

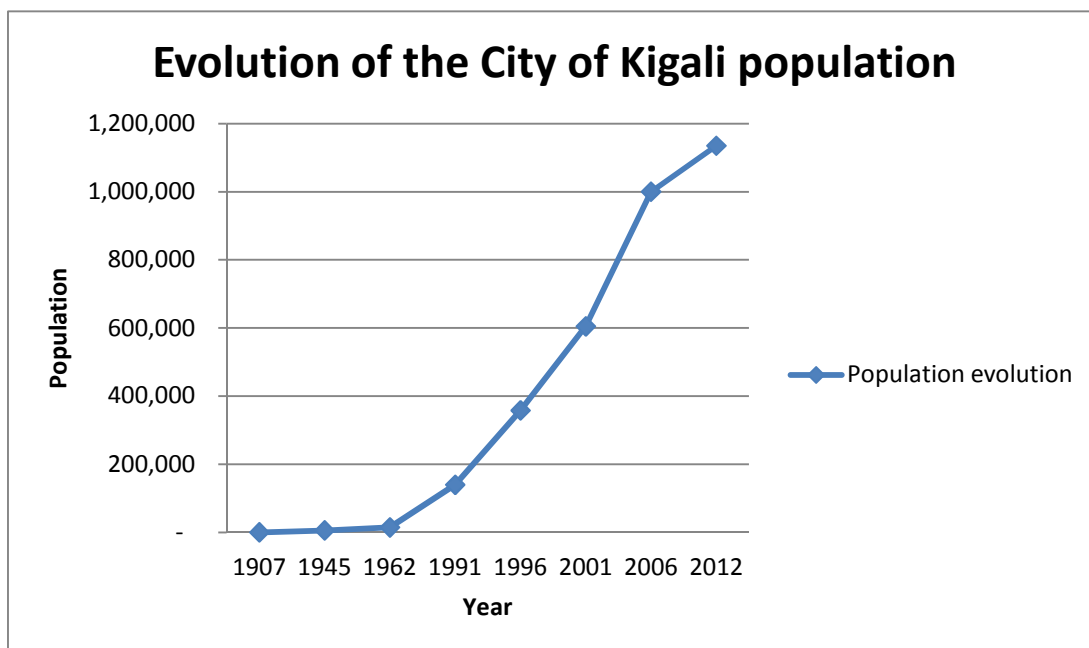
Year	Space	Number of inhabitants
1907	0.08	357
1945	2.5	6,000
1962	3	15,000
1991	112	140,000
1996	112	358,200
2001	314	605,000
2006	730	1,000,000
2012	730	1,135,000

Source: (Kigali City, 2013a, MININFRA, 2012)



Source: (Kigali City, 2013a; MININFRA, 2012)

**Figure 7: Evolution of the City of Kigali**



Source: (Kigali City, 2013a; MININFRA, 2012)

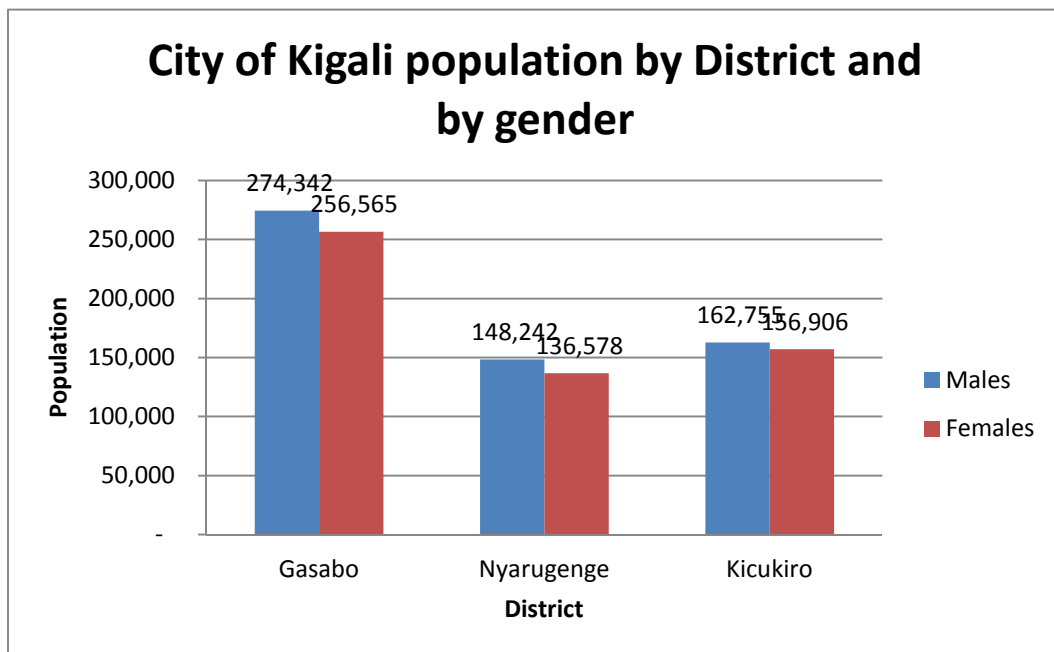
**Figure 8: Evolution of the City of Kigali population**

These figures show that the population of the City of Kigali is continuously increasing even though the City space remains the same as after the administrative reform that fixed the City boundaries in 2005.

### 3.3. SOCIO – ECONOMIC CHARACTERISTICS

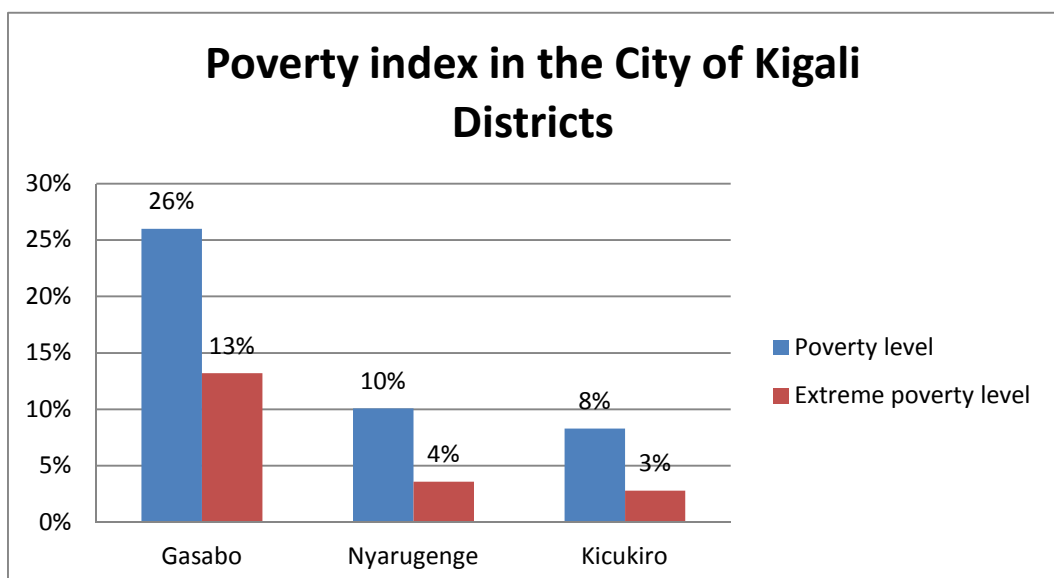
According to the provisional results of 2012 Population Census, Gasabo District has the highest population in the City of Kigali (274,342 males and 256,565 females) while Nyarugenge District has 148,242 males and 136,578 females and Kicukiro District counts 162,755 males and 156,906 females. These Districts are shown in Figure 5. 27.7% of the households in City of Kigali are female headed households, 10.3% are headed by people with disabilities while 19.3% are headed by widows. Kicukiro District has the least poverty levels at 8.3% while Gasabo poverty level is estimated at 26% and Nyarugenge District poverty level estimated at 10.1%. The poverty levels are high in Gasabo (poverty level estimated at 26% and extreme poverty

estimated at 13.2%), Nyarugenge District poverty levels are estimated at 10.1% for poverty level and 3.6% for extreme poverty level while in Kicukiro District the poverty levels are estimated at 8.3% and 2.8% for extreme poverty level (Kigali City, 2013b).



Source: (Kigali City, 2013b)

**Figure 9: Population of the City of Kigali by gender and by Districts**



Source: (Kigali City, 2013b)

**Figure 10: Poverty indexes in the City of Kigali**

While the economic base of Rwanda is agriculture and tourism where their economic input is estimated at more than 90%, the situation is changing radically in urban areas. The service sector is increasingly gaining much importance with banks and multinational organizations moving their offices to Kigali. This has generated numerous diversified employment opportunities within the City of Kigali, but still the informal business sector occupies the bigger part as it involves around 60% of the City of Kigali population. The remaining part of the population working in formal sector is distributed in economic sectors as follows:

- 13% are civil servants with 35% females
- 8.3% are businessmen or shopkeepers (formal business) with 46% females
- 4.8% are working in agriculture and farm primary sectors with a proportion of 73% as female
- 14.4% are working in formal private sector where the men dominate as the female proportion is 27%.

#### **3.4. BACKGROUND OF THE CITY OF KIGALI IN TERMS OF BUS SERVICES**

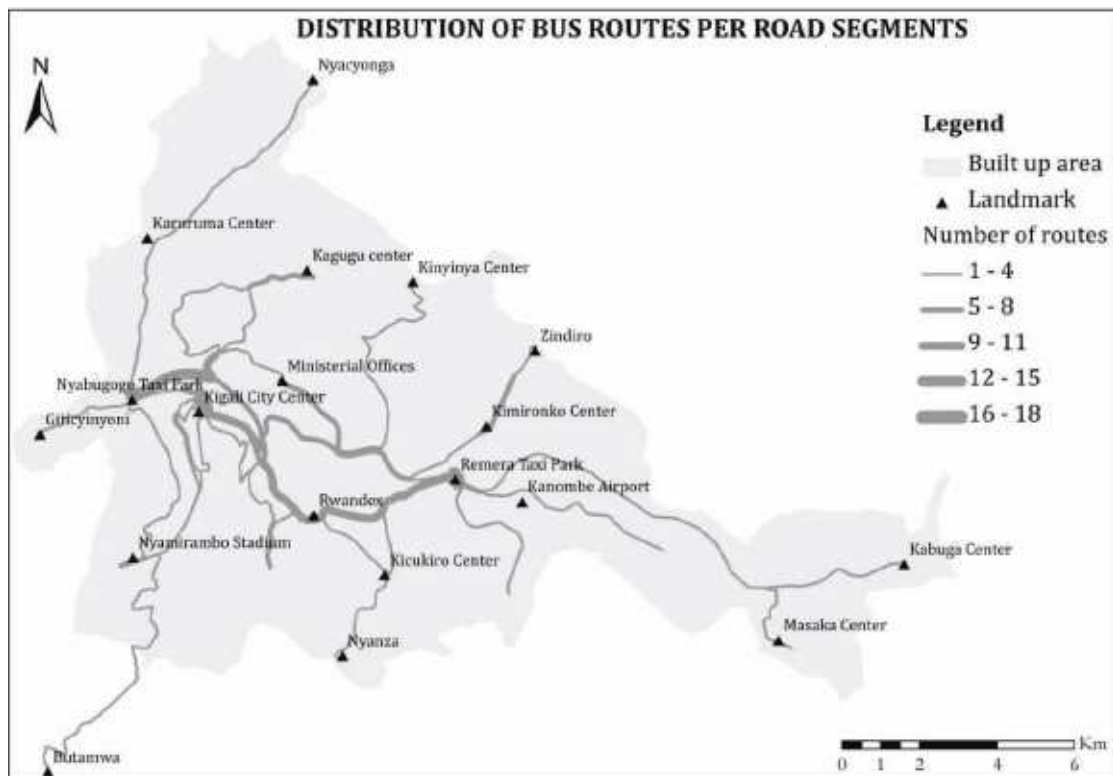
With regards to the bus transport, the service used to be run in anarchic manner before the year 1994. After the year 1994, the City of Kigali was still in the reconstruction phase, and the buses were still operating without clear guidelines. The buses used to operate in the City of Kigali were mainly minibuses – defined as cars with a capacity of transporting 15 – 20 persons – and were the routes operated on were defined by bus operators themselves.

As the years were going on, the minibuses were complemented by the introduction of coasters – defined as cars with a capacity of transporting 20 – 35 persons – and more recently the introduction of buses – defined as cars with a capacity of transporting more than 35 persons – (RURA, 2013).



The bus transport within the City of Kigali is now organized as the bus operators have grouped themselves in cooperatives or private companies. Until August 30<sup>th</sup>, 2013, the City of Kigali after consultations with the Rwanda Utilities Regulatory Authority (RURA), traffic police and public transport companies, was divided into four (4) main trajectories and each one has a specific common transport company assigned to carry passengers.

*Kigali Bus Service* (KBS) was given the City Centre – Rwandex – Remera – Samuduha (Kabeza) route with N<sup>o</sup> 1, while *Royal Express* was assigned the route City Centre – Rwandex – Sonatubes – Kicukiro centre with N<sup>o</sup> 4. *Rwanda Federation of Transport Cooperatives* (RFTC) was assigned two lines: City Centre – Rwandex – Remera – Kanombe with N<sup>o</sup> 2 and City Centre – Kimihurura – Chez Lando – Kimironko – Zindiro with N<sup>o</sup> 3. The remaining bus operators were assigned the remaining routes. Much of these operators utilized minibuses. These routes are shown in Figure 11.



**Figure 11: Distribution of bus routes in the City of Kigali up to August 30, 2013**

There was no specific schedule for bus transport in the City of Kigali as the buses wait to fill up before leaving the terminals, and then pick up and drop off passengers frequently en route.

The City of Kigali faces the problem of insufficient bus routes and bus stops especially in the city centre, but strategies have been put in place to resolve these problems by the year 2020 (MININFRA, 2012), such as the introduction of new bus routes and assigning specific bus route to one bus operator.

The actual bus fare is fixed at nineteen Rwandan Francs (19 RWF) by kilometre i.e. 0.029 US\$, but this fare normally ranges between one hundred and ten Rwandan Francs (110 RWF) i.e. 0.17 US\$ and two hundred and sixty Rwandan Francs (260 RWF) i.e. 0.405 US\$, according to the route travelled as bus users pay depending on the route travelled and not the distance travelled (RURA, 2012; BNR, 2013a; MININFRA, 2012).

During waiting times, bus users form orderly queues and board buses in the sequence they arrived. Buses do not load more than the designed seating capacity as the enforcement by traffic police is tough.

In terms of bus transport infrastructure, buses operate on a main circular road in the CBD and radial network connecting the main hubs in the City. There are traffic signals on main routes and the traffic police officers are present on all the conflicting points of the city routes. Buses operate generally on paved roads.

## **CHAPTER 4 DATA ON BUS ROUTES AND BUS STOPS IN THE CITY OF KIGALI**

### **4.1.DATA ON EXISTING BUS ROUTES**

#### **4.1.1. Identification and description of bus routes available in the City of Kigali**

According to the available data from Rwanda Utility Regulatory Agency (RURA), the City of Kigali Authority and field survey, the bus transport services are operated on the various routes linking the City Centre to various areas on one hand, on the other hand, the bus routes link Nyabugogo Bus Terminal to various areas, Remera Bus Terminal to various outlets, Kicukiro Bus Terminal to various areas and Kimironko Bus Terminal to various areas.

The routes linking the City Centre to various city areas with their corresponding lengths are provided in Appendix 1.

These data were collected before the new bus transport system starts in the City of Kigali on August 30<sup>th</sup>, 2013.

### **4.2.DATA ON EXISTING BUS STOPS**

#### **4.2.1. Identification and description of bus stops available on the bus routes under study**

In this research, we will essentially put much attention on bus stops along the bus routes linking the City Centre and the various city outlets. It is in this regards that we recorded data concerning these bus stops spacing on these routes. The total list of routes under study and stops spacing on these routes are given in Appendix. The data collected (Appendix 2) show that the stops spacing in the CBD is very large (more than 1,000 m) on all the bus routes and the spacing also becomes large when the route reach the rural area of the City of Kigali.

## **4.3.DATA FROM DECISION MAKERS**

### **4.3.1. Introduction**

In order to identify the innovations that should be brought to the existing bus transport services in Kigali City and their applicability, we had to interview decision – makers within the Ministry of Infrastructure, the City of Kigali, Rwanda Transport Development Agency (RTDA) and Rwanda Utility Regulatory Agency (RURA) to assess what is planned for bus transport in the City of Kigali in the near future. This was done because the objectives of this research were considered highly strategic in nature as the research is not making detailed plan of City of Kigali’s public transport, rather, it is giving strategic level – of – service guidelines.

The questions asked to decisions makers are the followings:

- Do you think the available bus transport system in the City of Kigali is appropriate to accommodate the demand and needs adequately?
- How do you consider the level of service provided to bus users in the City of Kigali?
- Is there any improvement planned to be done on bus transport in the City of Kigali within the 2025 horizon?
- If there are improvements planned, what are these that concern the bus routes and what impact they are planned to have?
- What are the planned improvements on bus stops and what is their impact on bus services in the City of Kigali?
- What is planned to improve the general level of service provided by bus transport system in the City of Kigali?

### **4.3.2. Data from the Ministry of Infrastructure and Rwanda Transport Development Agency (RTDA)**

The Ministry of Infrastructure is in charge of elaborating the public transport policies and politics and Rwanda Transport Development Agency (RTDA) is in charge of implementing these policies and politics throughout the country. It is in this

regards that the data collected from these two institutions are hereby summarized as follows:

- The bus services provided to users are not adequate and have to be improved in order to make them competitive so that they attract even the private car owners. To achieve this, the following measures are proposed in the short and medium term and should be implemented before 2020:
  - ✓ First of all, a “Smart growth” land-use and transport policy for the Kigali City will be adopted, which will ensure high density, mixed use and accessible transport and land – use development in the line with Kigali Conceptual Master Plan and the proposed “National Strategy for Climate Change and Low Carbon Development”.
  - ✓ In order to develop a sustainable public transport system for the City of Kigali, an integrated traffic demand and supply management approach will be adopted in different phases;
  - ✓ For the control of increasing parking demand and to control traffic congestion, appropriate parking policy for both private and public transport vehicles will be developed for the City of Kigali, Central Business District in particular;
  - ✓ To ensure availability and reliability of the bus service, a combination of radial and circular bus services will be developed with strict time schedule and real time information system;
  - ✓ In order to consolidate the existing fragmented minibus service operation, measures will be taken to encourage fewer number of bus operators in form of public limited companies with a large fleet of standard high occupancy vehicles;
  - ✓ To integrate multi-mode, multi-route and multi-operator public transport system, a smart and integrated public transport ticketing system will be introduced;
  - ✓ To integrate pedestrians with the public transport system, efforts will be made to develop pedestrian friendly transport system by providing adequate footpath and at grade priority crossing systems for the pedestrians;

- ✓ Finally, to ensure uninterrupted movements of public transport vehicles in major transports corridors giving them absolute priority, Dedicated Bus lane, Bus Rapid Transit and a scheduled feeder service system will be developed in the City of Kigali.

All these improvements will be done to bus transport system in the City of Kigali and their implementation is planned before the year 2020.

#### **4.3.3. Data from Rwanda Utilities Regulatory Authority (RURA) and the City of Kigali**

RURA, as the regulatory authority, sets up public transport regulations and the City of Kigali implements these regulations. That is the reason why the data collected from the decision makers in these two institutions are grouped together and summarized below;

- The main information obtained from these two institutions is that the current bus transport in the City of Kigali is not adequate and has to be improved to meet the passengers' needs.
- Among the improvements planned in the near future, the first one is that RURA will no longer issue public transport licences to individual transporters. From July 1<sup>st</sup>, 2013, all public transporters will have to be grouped in firms, cooperatives or associations in order to get the licence to operate public transport services.
- In conjunction with the City of Kigali, RURA divided the City of Kigali in five bus transport zones and launched a public tender to award each zone to a successful public operator. The main routes will be fed by feeder and inter – zonal routes and operators for the different zones will be identified according to buses' colours.
- Bus operators will operate on each of four public transport zones where as the fifth zone which is made up of the Central Business District shall be a neutral zone where public transport vehicles from the other four zones shall meet.
- Bus transport zones are made up of trunk routes which are routes emanating from each zone heading towards the Central Business District, intra – zone

routes which are routes within a given public transport zone and inter – zone routes which are routes connecting two different public transport zones.

- Along trunk routes, the allowed minimum size of a public transport vehicle is a 25 – seats bus where as on intra – zone and inter – zone routes the allowed minimum size of a public transport vehicle is an 18 – seats bus. Buses operating on routes of a given routes must have the same colour that is different from that of the other zones.
- After this open competition, RURA and the City of Kigali signed the public transport contract with three bus operators who won the tender, and effective from August 30<sup>th</sup>, 2013, bus transport system in the City of Kigali is organized as described in Appendix 3

## **CHAPTER 5 SURVEY DATA COLLECTION AND ANALYSIS**

### **5.1.DATA COLLECTION BY QUESTIONNAIRE**

#### **5.1.1. Questionnaire design**

To have the views of City of Kigali residents about the bus services provided to them and the improvements that should be made, we conducted a survey using a pre – designed questionnaire. A full detailed sample of the questionnaire is provided in Appendix 4.

The questionnaire used during the survey is subdivided in four parts:

- a) General questions about the respondents identity and the general use of bus services:
  - A question about the respondent age
  - A question about the area of residence of the respondent in the City of Kigali
  - A question about the age of the respondent
  - A question to know if the respondent uses bus services and for which purpose
  - A question to know the type of Bus Company mostly used by the respondent.
- b) The second part is constituted by the questions about the bus stops:
  - How long does it take the respondent to walk from his / her home to the nearest bus stop?
  - Do the bus services from the nearest bus stop go to any of the places the respondents would want to go?
  - How near the respondent would like the bus stop to be from his / her home?
  - What time does it take the respondents from the bus stop / bus station to his / her final destination?
  - How near the respondent would like the bus stop to be to his / her final destination?
- c) The third part is about the questions on bus routes in the City of Kigali:
  - A question about what the respondent think about bus routes to various areas of the City of Kigali



- Are there any areas or places in the City of Kigali that the respondents think are poorly served by buses?
- d) The fourth part of the questionnaire was about the benefits of bus transport in general and the bus services provided to the users:
- From a list of benefits that should be provided by bus services (Linking all city suburbs to City Centre, stopping near my location, providing weekend bus services, providing access to shops, providing access to schools and colleges, providing access to hospitals, providing evening bus services); the respondents were requested to state if the service is “very important”, “moderately important” or “unimportant”.
  - Two questions asking the respondents if they would like more bus stops and slower services or if they would prefer less bus stops and faster services.
  - A question about when the respondents use the bus services.
  - A question about when the respondents would like to use the bus services.
  - A question about how many times per day the respondents use bus services.
  - A question about how many times per week the respondents use bus services.
  - Are buses available whenever the respondents need to use them?
  - A question about how the respondents could describe the bus services provided to them in terms of passengers.
  - A question about how the respondents could rate the bus services provided to them in terms of cleanliness.
  - A question about the preference of respondents preference in terms of bus size; and lastly
  - A question about the improvements the respondents would like to see in bus services in the City of Kigali.

### **5.1.2. Questionnaire administration and feedback**

Before conducting the survey, we requested the approval of the City of Kigali authorities and this approval was granted. In order to have the maximum responsiveness rate, we opted for interviews on the bus terminals in the City Centre and on door to door in the suburbs and in the rural area of the city. The three Districts of the

City of Kigali in which the interviews were carried out are shown in Figure 1, Figure 4 and Figure 5.

Table 3 shows the quantitative distribution of questionnaires in the three Districts of the City of Kigali as shown on Figure 5.

**Table 3: Questionnaire distribution in the City of Kigali**

S N <sup>o</sup>	District	Urban area	Rural area	Total
1	Nyarugenge	55	10	65
2	Gasabo	60	10	70
3	Kicukiro	55	10	65
<b>Total</b>		<b>170</b>	<b>30</b>	<b>200</b>

A total number of two hundred interviews were conducted, with one hundred seventy (170) in the urban area of the City of Kigali, and thirty (30) interviews in the rural area of the City of Kigali. The total number of males interviewed is one hundred and eight (108) and females are ninety two (92).

### **5.1.3. Perception of city residents of the benefits of public transport**

All the persons interviewed during this research consider the public transport service in general and the bus transport in particular as a very beneficial service. Out of two hundred people interviewed, the following tables show the responses concerning the importance of the bus services to be provided in the City of Kigali:

**Table 4: Importance given by respondents to bus services linking city suburbs to the city centre**

Importance level	Respondents	Percentage (%)
Very important	128	64
Important	59	29.5
Moderately important	13	6.5
Unimportant	0	0

**Table 5: Importance given by respondents to the bus services stopping near their location**

<b>Importance level</b>	<b>Respondents</b>	<b>Percentage (%)</b>
Very important	28	14
Important	59	28.5
Moderately important	80	40
Unimportant	33	16.5

**Table 6: Importance given by respondents to providing weekend bus services**

<b>Importance level</b>	<b>Respondents</b>	<b>Percentage (%)</b>
Very important	113	56.5
Important	68	34
Moderately important	19	9.5
Unimportant	0	0

**Table 7: Importance given by respondents to buses providing access to shops**

<b>Importance level</b>	<b>Respondents</b>	<b>Percentage (%)</b>
Very important	130	65
Important	59	29.5
Moderately important	11	5.5
Unimportant	0	0

**Table 8: Importance given by respondents to buses providing access to schools and colleges**

<b>Importance level</b>	<b>Respondents</b>	<b>Percentage (%)</b>
Very important	126	63
Important	57	28.5
Moderately important	17	8.5
Unimportant	0	0

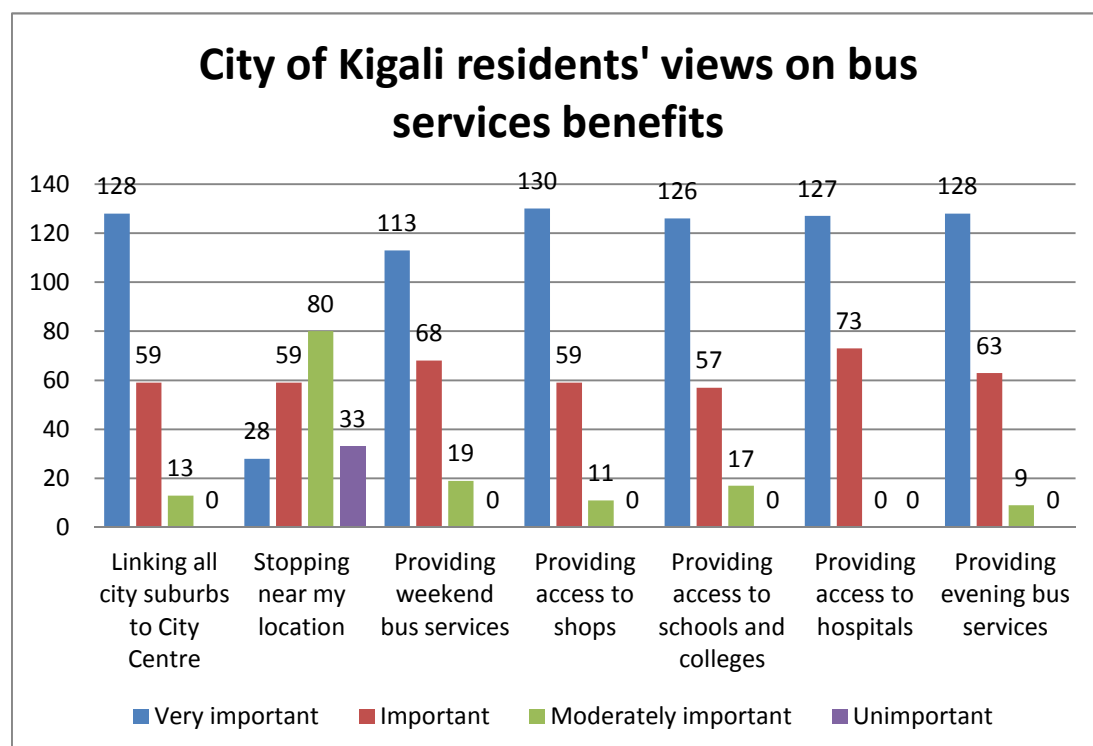
**Table 9: Importance given by respondents to buses providing access to hospitals**

Importance level	Respondents	Percentage (%)
Very important	127	63.5
Important	73	36.5
Moderately important	0	0
Unimportant	0	0

**Table 10: Importance given by respondents to providing evening bus services**

Importance level	Respondents	Percentage (%)
Very important	128	64
Important	63	31.5
Moderately important	9	4.5
Unimportant	0	0

The City of Kigali residents has different views on bus services benefits. Figure 12 shows the importance the City of Kigali residents give to various bus services benefits.



**Figure 12: City of Kigali residents' views on bus services benefits**

The figure shows that the City of Kigali residents considers the following bus services as services of high importance and benefits:

- Linking all city suburbs to City Centre
- Providing weekend bus services
- Providing access to shops
- Providing access to schools and colleges
- Providing access to hospitals
- Providing evening bus services;

While they consider that to stop near their location is not the primary service to be provided by buses.

## **5.2.CONVENIENCE OF BUS ROUTES TO BUS USERS**

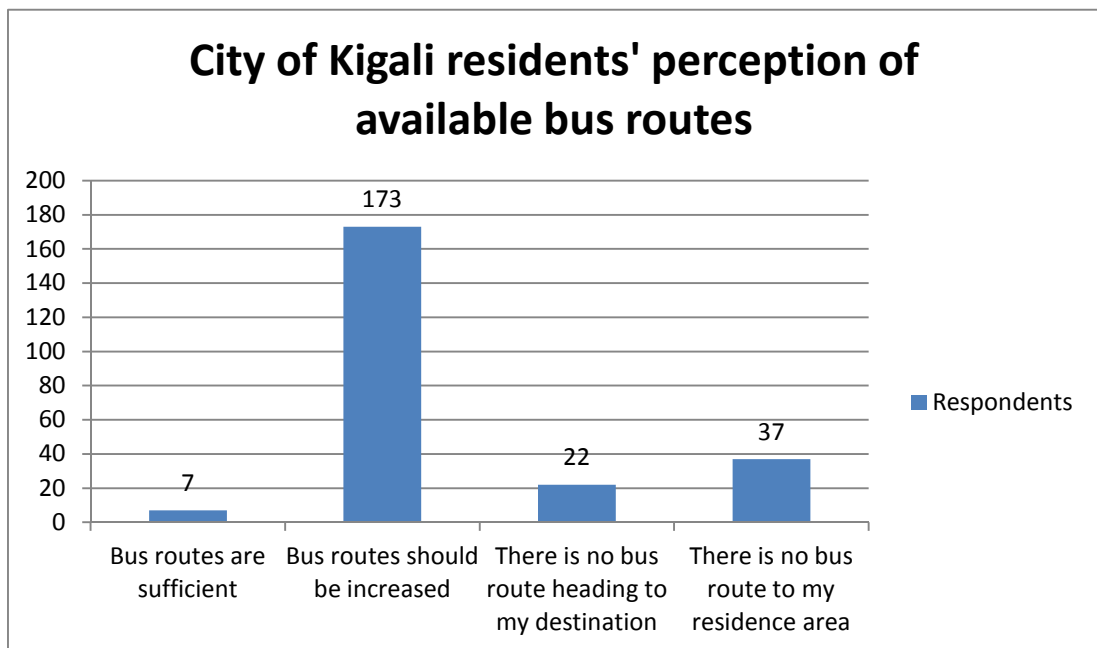
### **5.2.1. Perception of bus routes available in the City of Kigali by respondents**

During this research, City of Kigali residents were asked various questions concerning available bus routes and the following table show their views:

**Table 11: Perception of City of Kigali residents on bus routes to various areas of the City of Kigali**

<b>Criteria</b>	<b>Respondents</b>	<b>Percentage</b>
Bus routes are sufficient	7	3.5
Bus routes should be increased	173	86.5
There is no bus route heading to my destination	22	11
There is no bus route to my residence area	37	18.5

The table shows that the views of the City of Kigali about available bus routes in the City of Kigali are different and this is represented in Figure 13.



**Figure 13: City of Kigali residents' perception of available bus routes**

The graph shows that the great majority of respondents estimate that available bus routes in the City of Kigali are not sufficient and should be increased so that all the population are served. A small portion of the respondents (3.5%) estimate that the bus routes are sufficient, but this portion is not representative.

### **5.2.2. Perception of suitable bus routes system in the City of Kigali by respondents**

- On the question about if they feel that there are areas in the City of Kigali which are poorly served by buses, one hundred sixty seven (167) responses were affirmative while only thirty three (33) responses were negative.
- On the question concerning the improvements that should be made to bus services, ninety three (93) respondents stated that there should be more bus routes in the City of Kigali.

### 5.3.CONVENIENCE OF BUS STOPS TO BUS USERS

#### 5.3.1. Perception of bus stops in the City of Kigali by respondents

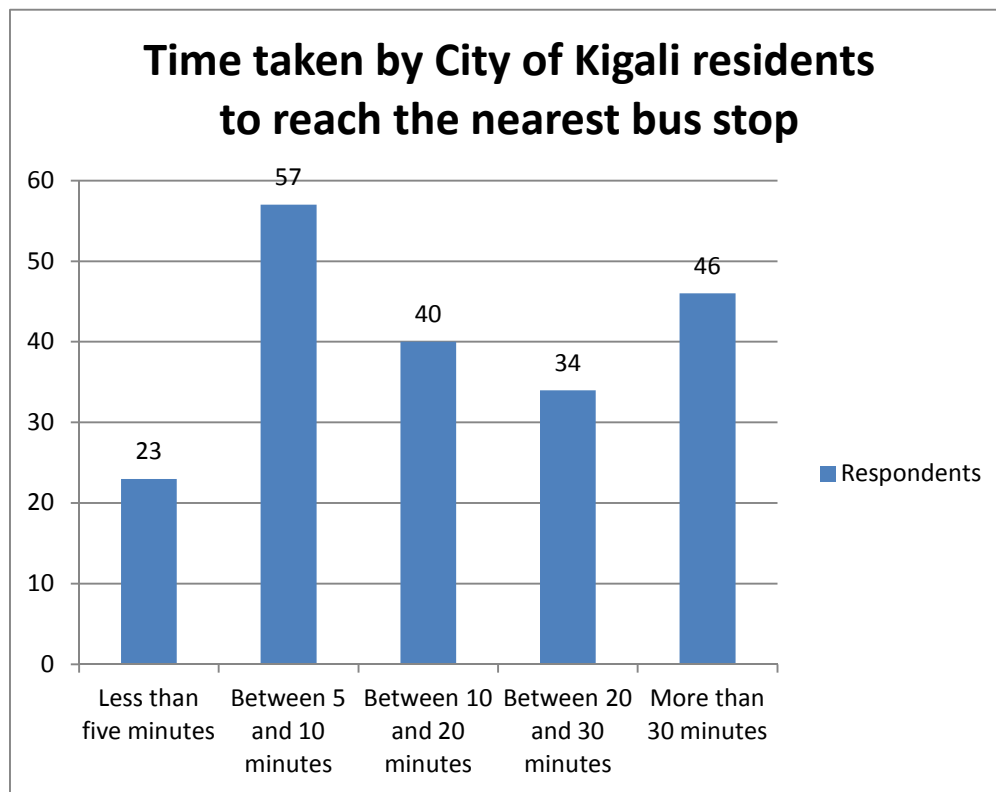
Various questions concerning the availability of bus stops and their convenience to bus users were asked to the sampled people of the City of Kigali and they gave the following views:

- Concerning the bus stop location compared to the respondents homes:

**Table 12: Time taken by respondents to reach the nearest bus stop**

<b>Time taken</b>	<b>Respondents</b>	<b>Percentage</b>
Less than five minutes	23	11.5
Between 5 and 10 minutes	57	23.5
Between 10 and 20 minutes	40	20
Between 20 and 30 minutes	34	17
More than 30 minutes	46	23

The time spent by the City residents to reach the nearest bus stop from their home is different from one respondent to another and the respective times are represented in Figure 14.



**Figure 14: Time spent by City of Kigali residents to reach the nearest bus stop**

According to ([walkingenglishman.com](http://walkingenglishman.com)) and ([walking.about.com](http://walking.about.com)), an adult walks in average 2.5 miles per hour considering the nature of the walking terrain and the walking conditions. By converting in metric system ([thecalculatorsite.com](http://thecalculatorsite.com)), this walking speed is equivalent to 4.02336 kilometres per hour. This means 67.05 metres per minute.

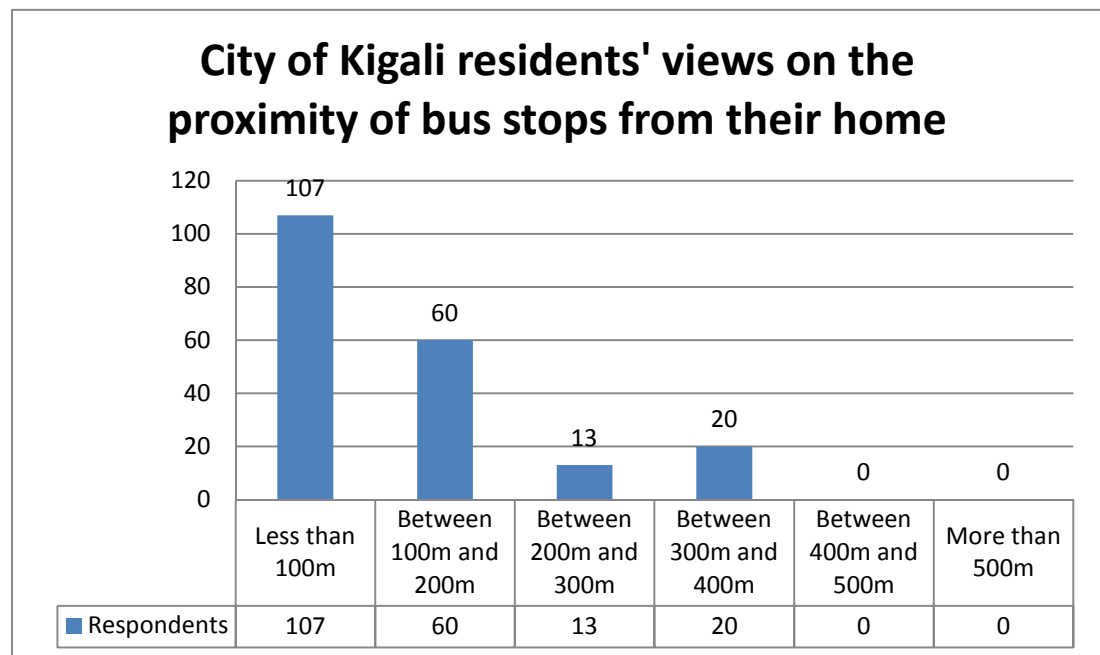
Considering the walking time spent by respondents to reach the nearest bus stop, it can be seen that forty percent (40%) of the respondents walk less than 670.5 m. The remaining sixty percent (60%) walk more than 670.5 m with 23% walking more than 2011.5 metres to reach the nearest bus stop from their home.

However, the City of Kigali would like to have a quite different situation as shown and represented in Table 13 and Figure 15.



**Table 13: City of Kigali residents' estimation of the suitable distance at which a bus stops should be from their homes**

Suitable distance of bus stops location from respondent's home	Respondents	Percentage
Less than 100m	107	53.5
Between 100m and 200m	60	30
Between 200m and 300m	13	6.5
Between 300m and 400m	20	10
Between 400m and 500m	0	0
More than 500m	0	0



**Figure 15: City of Kigali residents' views on the proximity of bus stops from their home.**

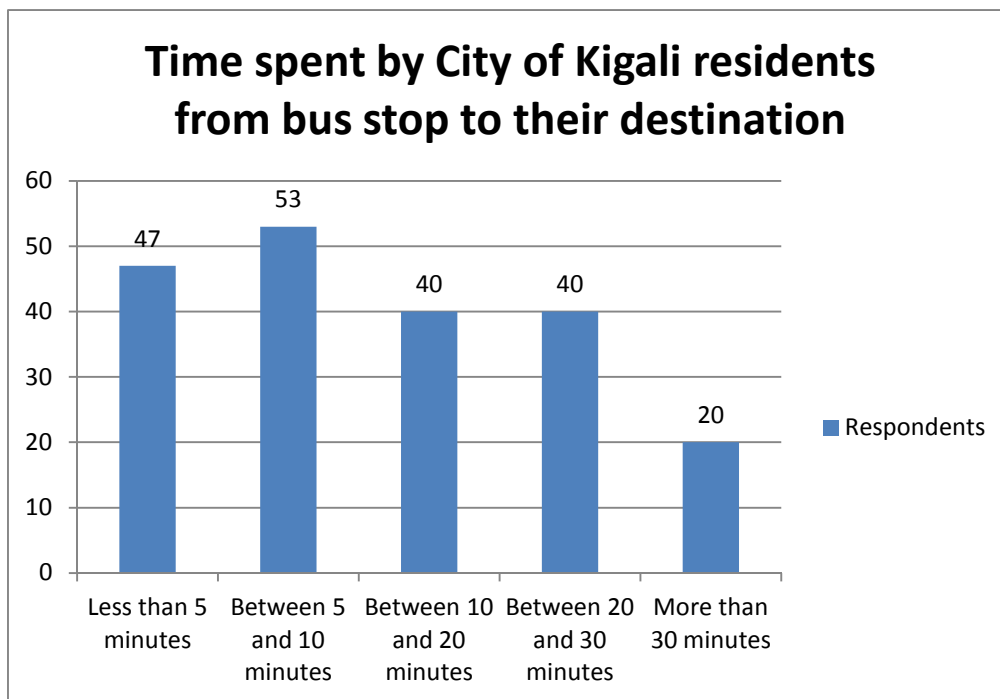
This figure shows that more than fifty percent of respondents would like to have the bus stop at less than a hundred metres (100m) from their home (53.5% of the respondents). Also, all the respondents in general would like that the distance from their home to the nearest bus stop be less than four hundred metres (400m).

- Concerning the location of bus stops with relation to the respondents final destinations :

**Table 14: Time taken by City of Kigali residents to reach their final destination from the bus stops**

<b>Time taken</b>	<b>Respondents</b>	<b>Percentage</b>
Less than 5 minutes	47	23.5
Between 5 and 10 minutes	53	26.5
Between 10 and 20 minutes	40	20
Between 20 and 30 minutes	40	20
More than 30 minutes	20	10

These working times from the bus stops to the final destinations of respondents are represented in Figure 16.



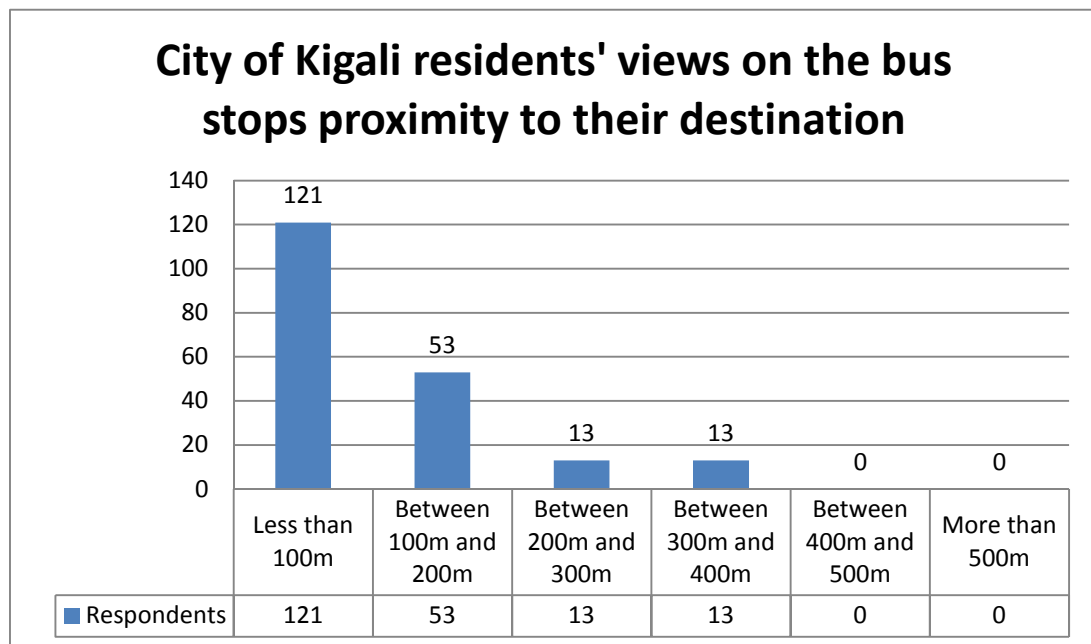
**Figure 16: Time spent by City of Kigali residents from bus stops to their destination**

Based also on the conversion of walking time into distance provided by (walkingenglishman.com) and (walking.about.com), we can conclude that to reach the final destination from the bus stops, fifty percent (50%) of the respondents walk less than 670.5 metres while the remaining fifty percent (50%) have to walk more than 670.5 metres. The perception of non – bus users was also taken into consideration to estimate the time from home to bus stops or from bus stops to final destination (office, school, hospital...).

This walking distance from the existing bus stops in the City of Kigali up to the final destination of bus users is quite different of the distance wished by bus users as shown Table 15 and represented in Figure 17.

**Table 15: Suitable distance from the bus stops to the final destination for the City of Kigali residents**

<b>Suitable distance</b>	<b>Respondents</b>	<b>Percentage</b>
Less than 100 metres	121	60.5
Between 100 and 200 metres	53	26.5
Between 200 and 300 metres	13	6.5
Between 300 and 400 metres	13	6.5
Between 400 and 500 metres	0	0
More than 500 metres	0	0



**Figure 17: City of Kigali residents' views on the bus stops proximity to their destination**

All the respondents estimate that the bus should drop them at a distance which is less than four hundred metres (400m) to their destination. A large majority of the respondents i.e. eighty seven percent of the respondents (87%) estimate that this distance should be less than two hundred metres (200m).

- On the question whether the bus services from their nearest bus stop go to any of their place of destination, one hundred forty three (143) persons responded affirmatively while forty four (44) responded negatively.
- On the question concerning the improvements that should be made to bus transport, twenty seven (27) persons responded that there should be more bus stops in the City of Kigali.

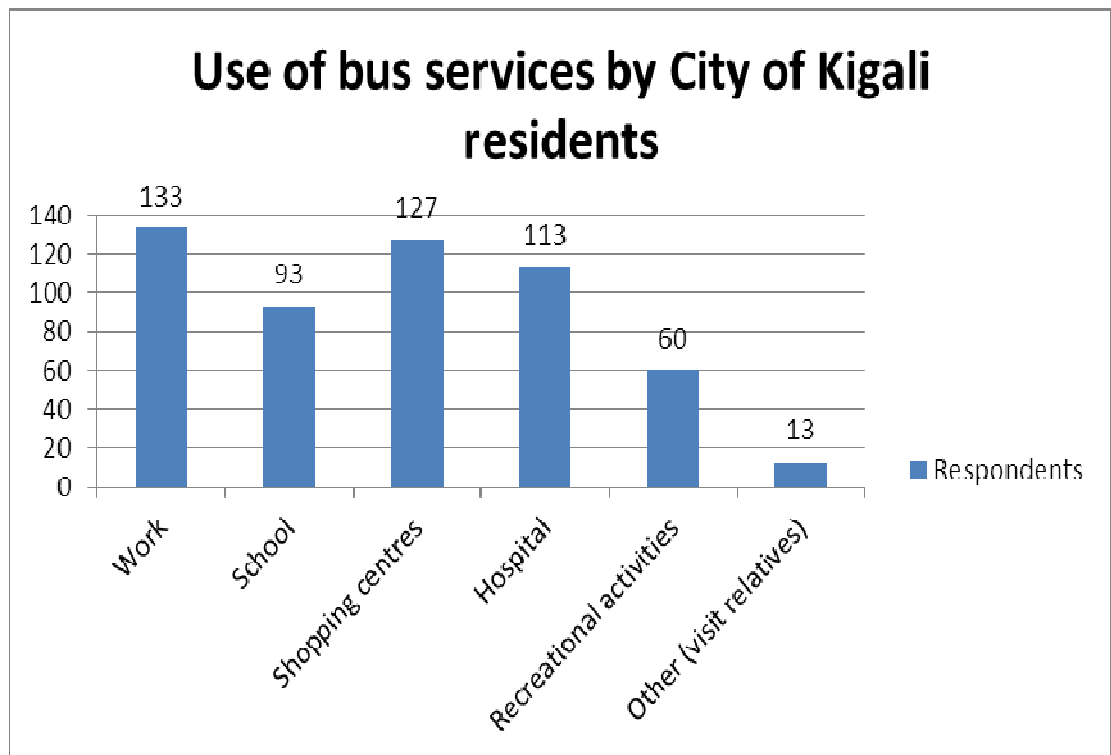
## 5.4.CONVENIENCE OF BUS SERVICES TO BUS USERS

### 5.4.1. Use of bus services in general by respondents

The City of Kigali residents use the bus services for different purposes as shown in Table 16 and represented in Figure 18.

**Table 16: Use of bus services by City of Kigali residents**

Bus travel purpose	Respondents	Percentage
Work	133	71.1
School	93	49.7
Shopping centres	127	67.9
Hospital	113	60.4
Recreational activities	60	32.1
Other (visit relatives)	13	7.0



**Figure 18: Use of bus services by City of Kigali residents**

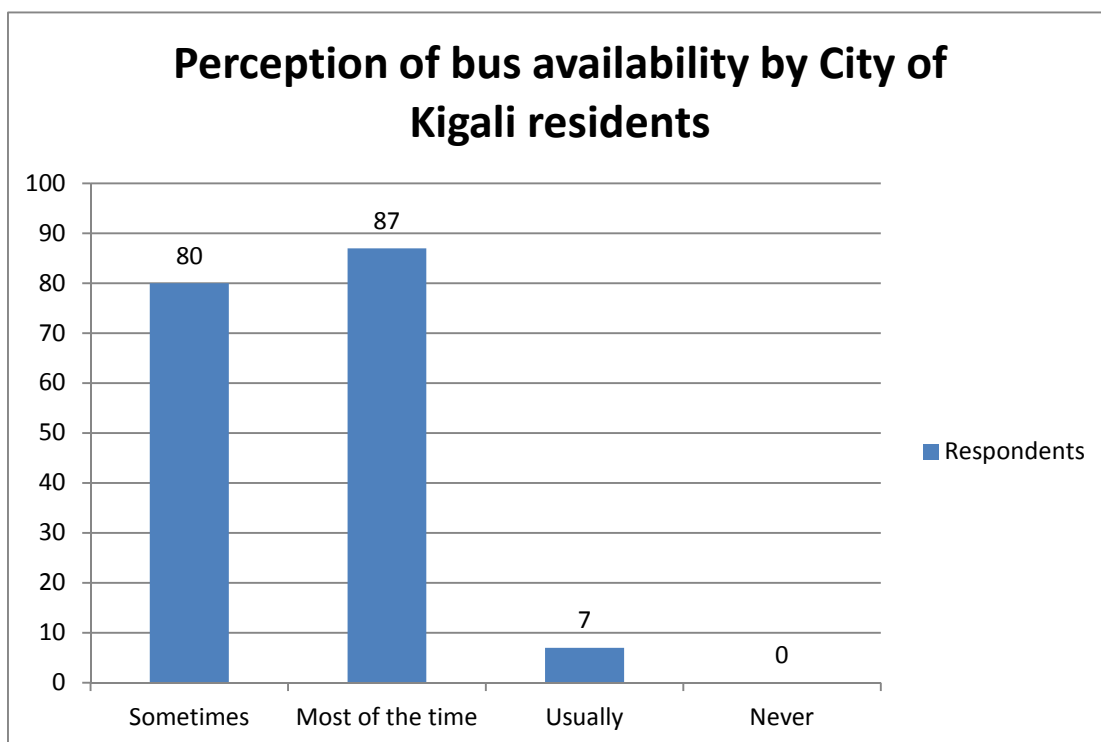
The majority of City of Kigali residents use bus services to go to work, to shopping centres, to hospitals and to school respectively. A small number uses bus services to go to recreational activities and other purposes. Some respondents use bus services for more than one purpose.

#### 5.4.2. Perception of bus services availability in general by respondents

Table 17 shows the perceptions of the City of Kigali on the availability of bus services to users. These perceptions as represented graphically in Figure 19.

**Table 17: Perception of City of Kigali residents on the availability of bus services**

Bus availability	Respondents	Percentage
Sometimes	80	42.8
Most of the time	87	46.5
Usually	7	3.7
Never	0	0



**Figure 19: Perception of bus availability by City of Kigali residents**

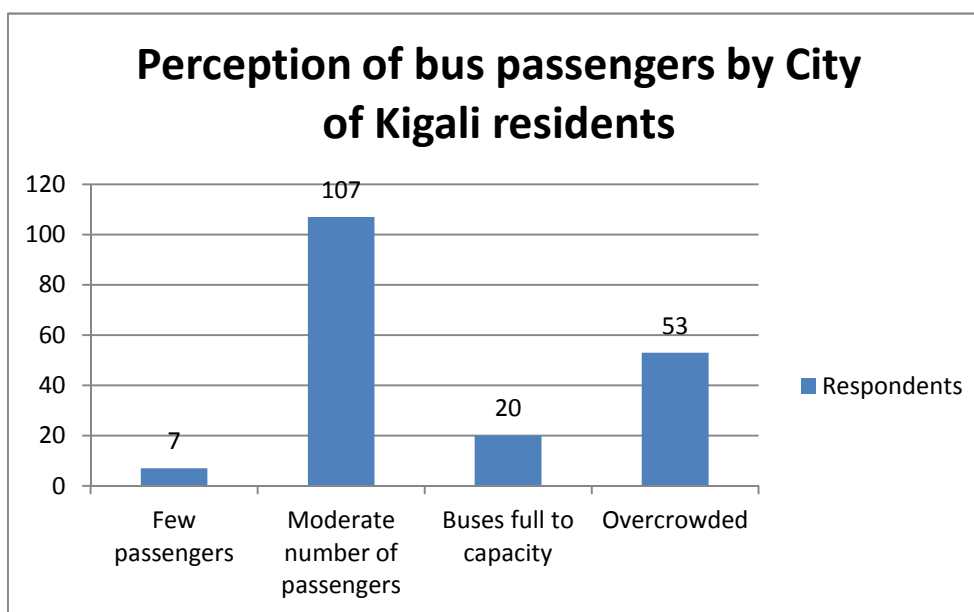
The respondents consider that generally the bus services are available when needed as no one responded that bus services are never available.

### 5.4.3. Perception the City of Kigali residents on the number of passengers

The City of Kigali residents' perceptions on number of passengers in buses are shown in Table 18 and represented graphically in Figure 20.

**Table 18: Perception of City of Kigali residents on the number of passengers**

Estimation of passengers	Respondents	Percentage
Few passengers	7	3.74
Moderate number of passengers	107	57.22
Buses full to capacity	20	10.70
Overcrowded	53	28.34



**Figure 20: Perception of bus passengers by City of Kigali residents**

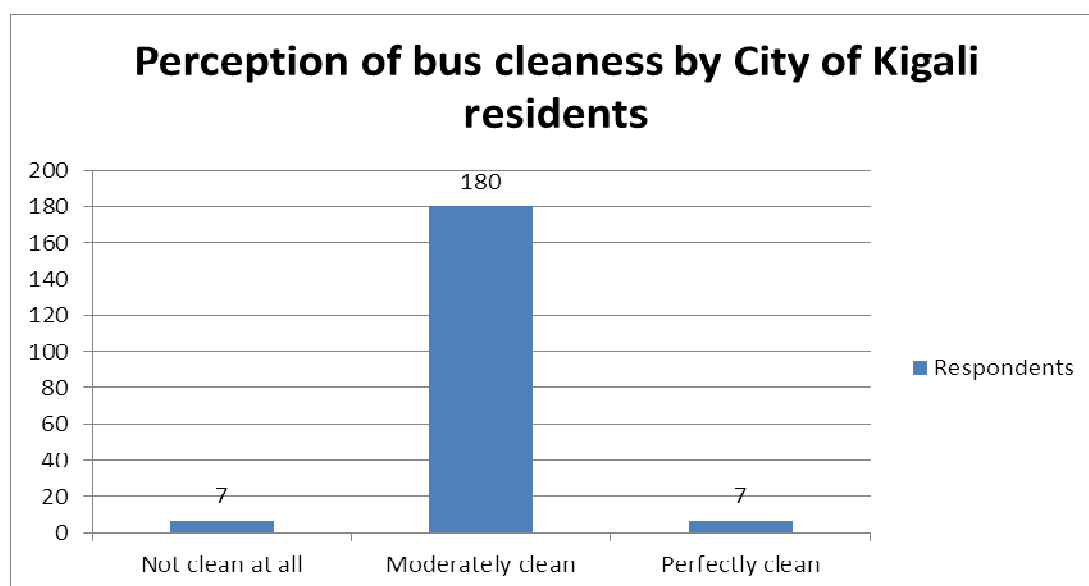
Fifty four percent (54%) of the respondents estimate that the numbers of passengers on buses are moderate or few while ten percent (10%) estimate that buses are full to capacity and 26.5% estimate that buses are overcrowded.

#### 5.4.4. Perception the City of Kigali residents on buses cleanness

**Table 19: Perception of City of Kigali residents on bus cleanness**

Bus cleanness	Respondents	Percentage
Not clean at all	7	3.61
Moderately clean	180	92.78
Perfectly clean	7	3.61

The majority of respondents who judged the bus cleanness estimated that the buses are moderately clean (92.8%) while a small number (3.6%) estimated that buses are perfectly clean and another 3.6% estimated that buses are not clean at all.



**Figure 21: Perception of bus cleanness by City of Kigali residents**

#### 5.4.5. Choices of users in terms of better services and related costs

In this research, people were asked if they would like more bus stops and slower services or if they would like less bus stops and faster services.

- Forty (40) persons responded that they would like more bus stops and slower service while one hundred and sixty (160) were against the idea.



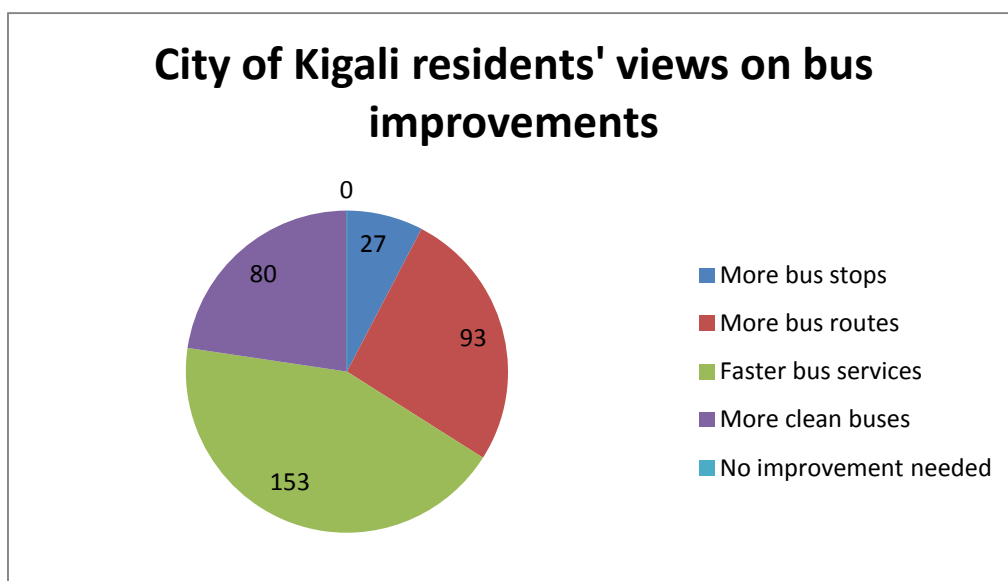
- One hundred and seventy three (173) persons responded that they would prefer less bus stops and faster service, while twenty seven (27) persons were against this idea.

#### 5.4.6. Perception the City of Kigali residents on services in general

The City of Kigali residents' satisfaction in public transport is very important as the bus services are designed to serve them. If they are not satisfied with the service provided, this means that the service needs to be improved to satisfy the usual users and to attract new users. Table 20 and Figure 22 show the views of City of Kigali residents about the type of improvements that should be made to the bus services.

**Table 20: City of Kigali residents' views on the bus services improvements**

Designation	Number	Percentage (%)
More bus stops	27	13.5
More bus routes	93	46.5
Faster bus services	153	76.5
More clean buses	80	40
No improvement needed	0	0



**Figure 22: City of Kigali residents' perception on bus services improvements**

As shown by the figure, all the people interviewed are not satisfied by the existing bus services and need that some improvement to the service should be made. The majority needs faster bus services, while 46.5% need more bus routes and 40% need more clean buses. A small number of respondents (13.5%) need more bus stops. There is no respondent who think that there is no improvement needed in bus services. Some of the respondents made more than one choice in the improvements that should be done to the bus services.

## **5.5.CONCLUDING REMARKS**

Data collection is a crucial step in the research as the data collected show the true picture of the situation under analysis. In this chapter, we have presented and analysed the data as collected on the field and with the views of the City of Kigali residents about the bus transport system as it is now. The principal findings in this survey are that the City of Kigali residents estimate the bus services provided as inadequate. The bus routes are not sufficient and bus stops are not adequately located and the services provided have to be improved.

This survey is the basis on which we will construct a better bus service that should be provided in the City of Kigali and will guide us in proposing the improvements to be made on the service. Such improvements were the subject of the interview survey.

## **CHAPTER 6 BUS SYSTEM EVALUATION IN THE CITY OF KIGALI**

### **6.1. INTRODUCTION**

This chapter provides the performance evaluation of bus transport system in the City of Kigali according to the data obtained from the questionnaire, the decision – makers interviews and the existing situation. It gives the situational analysis according to the City of Kigali residents’ points of views and the existing bus routes and bus stops in the City of Kigali, in comparison with how the authorities perceive the bus transport system.

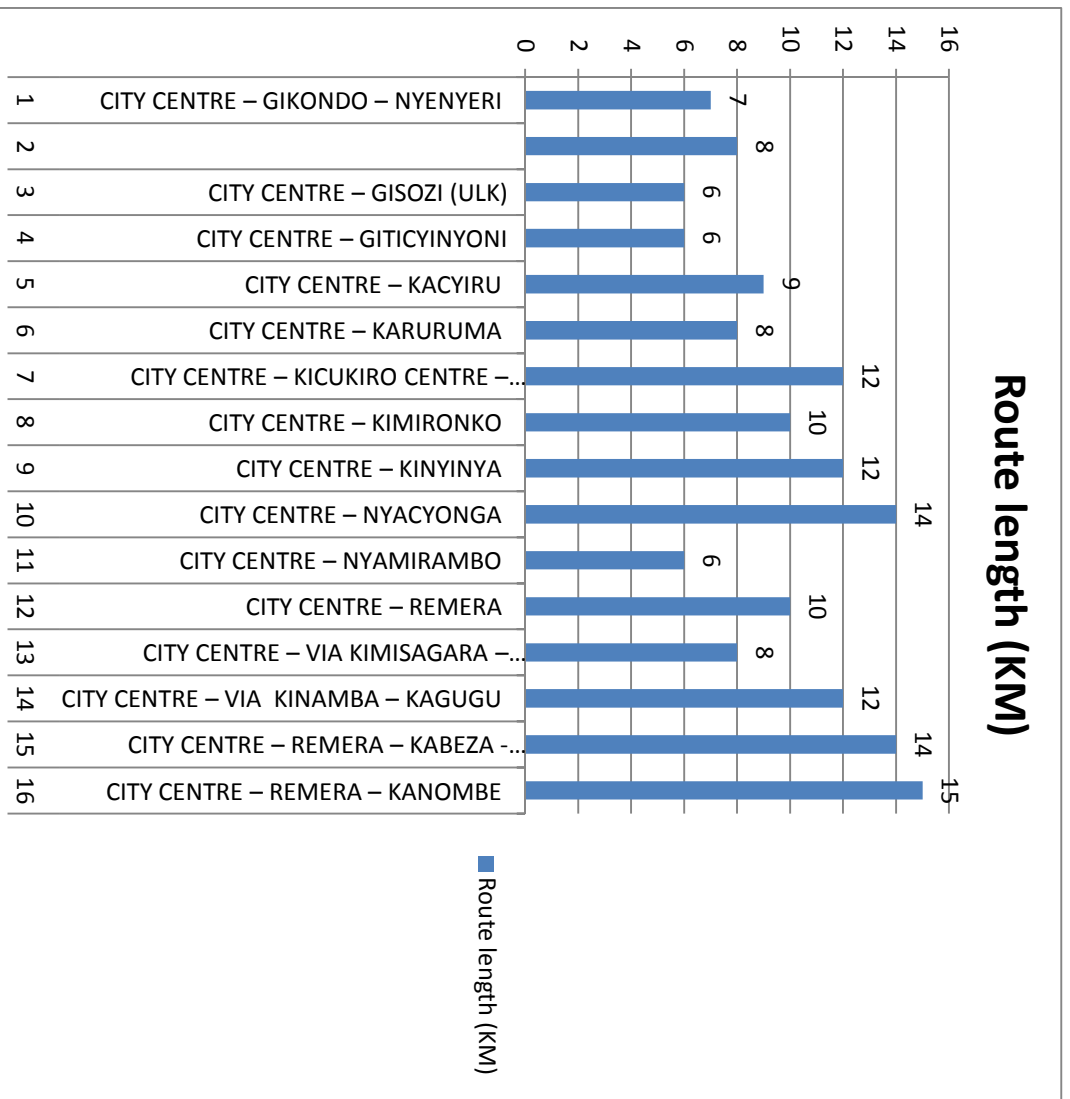
### **6.2. ANALYSIS OF EXISTING BUS ROUTES AND BUS STOPS**

#### **6.1.1. Analysis of City of Kigali existing bus routes**

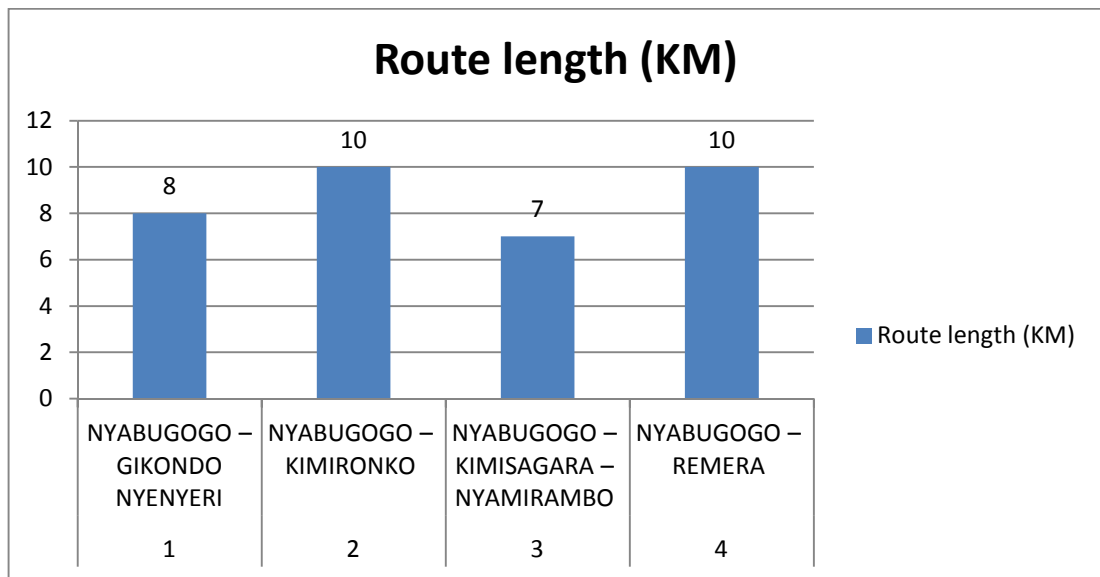
The spatial coverage of bus transport system is an important factor to measure the ease at which the service can be reached at various locations. The current road network in the City of Kigali on which buses operate is equal to 127 and the total length of bus routes is 261 Km. Hence the corresponding bus routes overlapping coefficient is 2.1. The route overlapping describes the repetition of bus routes on a particular road segment and the higher the overlapping coefficient, the higher the opportunity to travel to numerous destinations and for direct trips. The normal threshold is 5 (Vuchic, 2005) and this means that the overlapping coefficient for the City of Kigali bus routes is very low.

Considering the route length which is defined as the distance travelled by buses to link two end – terminals, (Ceder, 2007) state that this should be kept within 40 to 100 minutes for one way travel, which is 12 to 30 Km based on bus operating speed of 20Km/hr. For the City of Kigali, the average bus routes length is nine kilometres (9 Km) and based on the above stated standard, this average route length is acceptable.

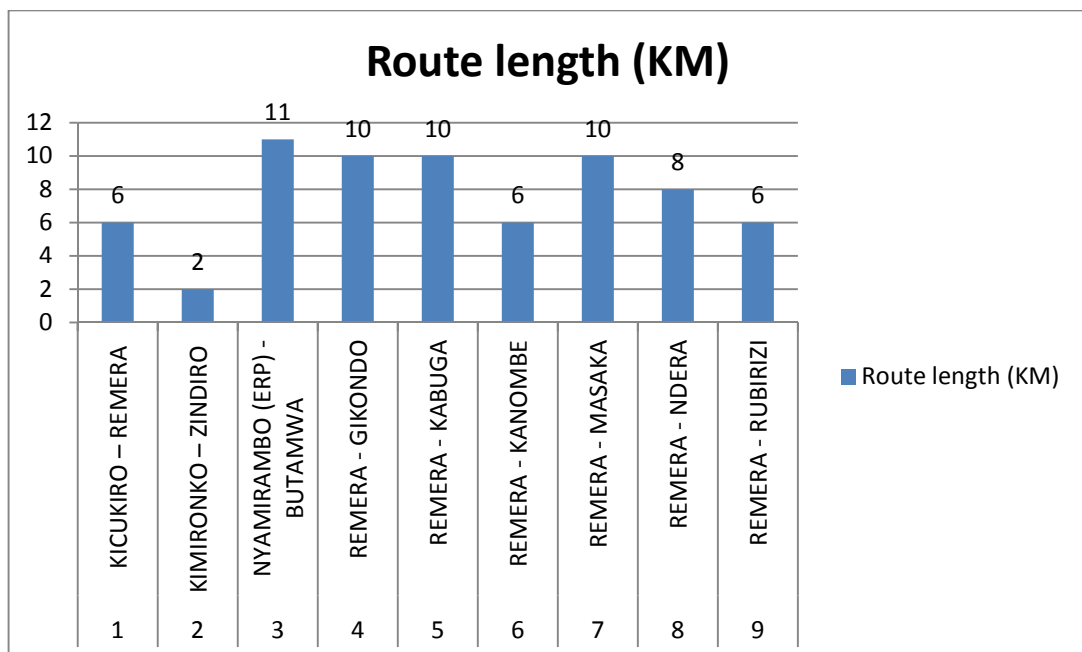
The following graphs show the variation of routes length in the City of Kigali. The information on bus routes was obtained from the City of Kigali and RURA.



**Figure 23: Routes lengths from the City Centre to various areas**



**Figure 24: Routes lengths from Nyabugogo to various areas**



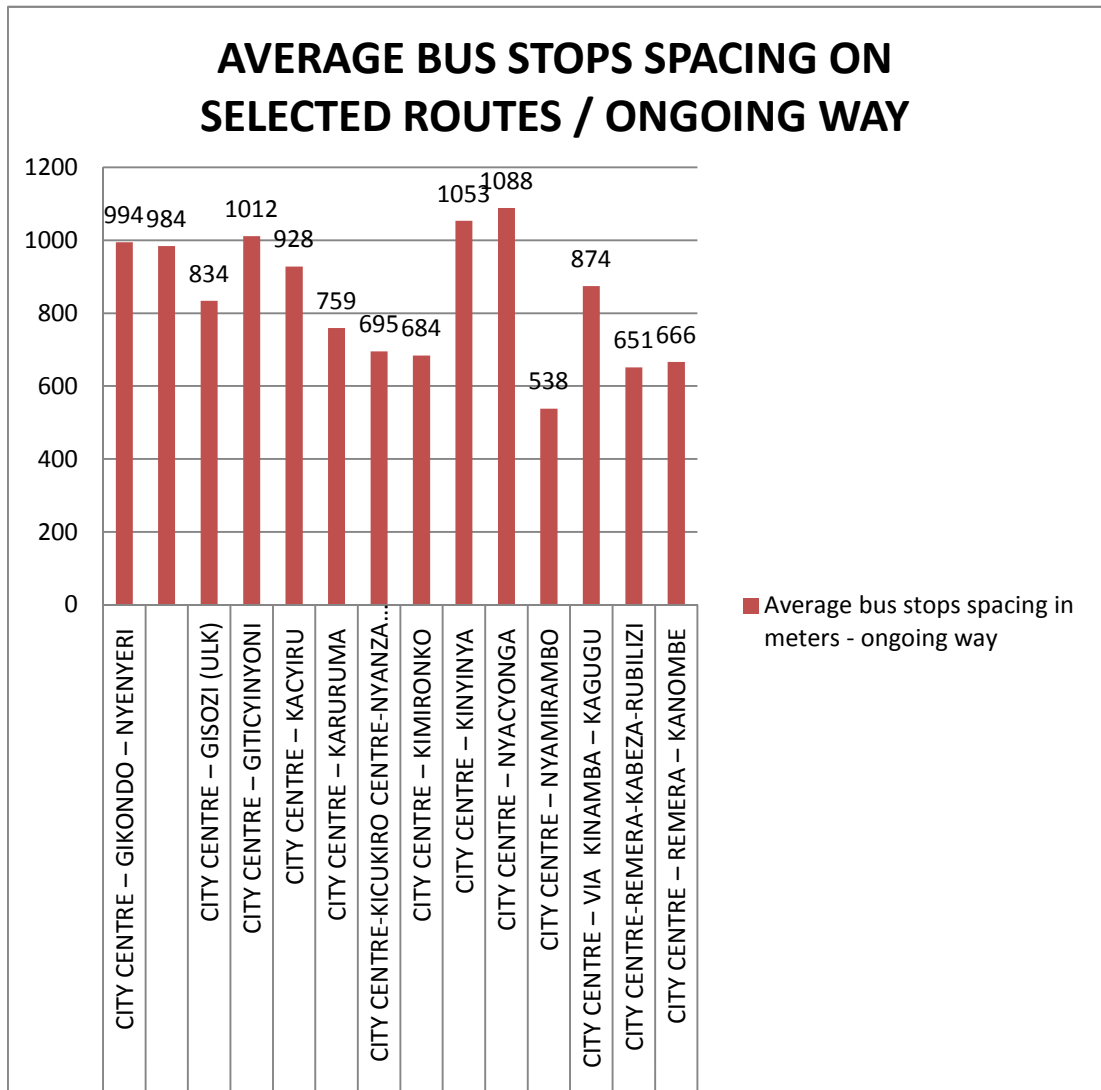
**Figure 25: Routes lengths for other routes outlets**

### 6.1.2. Analysis of City of Kigali bus stops system on selected routes

According to (Translink, 2005), (Ceder, 2011) and (Tauranga City Council, 2010) the optimum spacing between two bus stops is four hundred meters (400

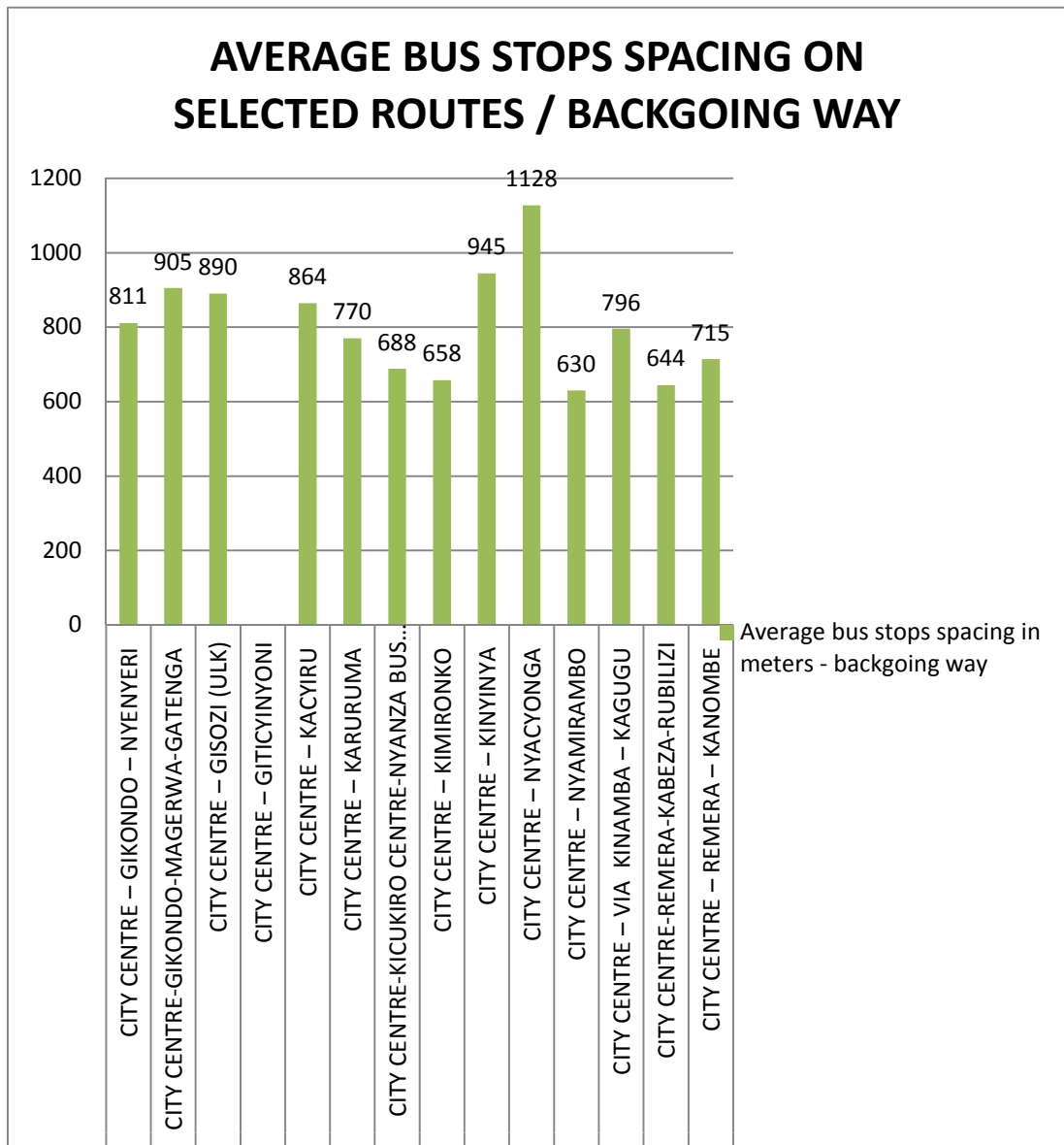
m) maximum. The walking distance to reach the bus stop from the passengers' origin or to leave the bus stop to passengers' destinations should also be below four hundred meters (400 m).

Figure 26 shows the average bus spacing on selected routes – ongoing way in the City of Kigali.



**Figure 26: Average bus stops spacing on selected routes / ongoing way**

Figure 27 shows the average bus spacing on selected routes – back going way in the City of Kigali.



**Figure 27: Average bus stops spacing on selected routes / back going way**

As shown by these two graphs, the small average spacing between bus stops is found on CITY CENTRE – NYAMIRAMBO route where it is equal to five hundred thirty eight meters (538 m) on ongoing way and six hundred thirty meters (630 m) on back going way. In all the ways, this average spacing distance is far beyond the recommended spacing of four hundred meters (400 m); which shows that the bus stops spacing is not well designed on all bus routes in the City of Kigali.

## **6.2. COMPARISON OF THE VIEWS**

### **6.2.1. Comparison of the respondents' views with the decision – makers views**

The general perception of the City of Kigali residents on the available bus services is that the bus routes are not sufficient as they do not reach all the City corners as shown in Chapter 5, Figure 13 and in the Section 5.2.2. The bus services provided in general also have to be improved as the users estimate that there are not adequate as shown in Figure 22 of the Section 5.4.6.

Concerning the bus stops system, the stops are generally located on a considerable distance so that the City residents estimate that they have to walk a very considerable time to reach them (Figure 15 and 16 in Chapter 5). They estimate that the bus stops spacing is not adequately designed. The respondents estimate also that the services provided on bus stops do not meet the users' requirements (Figure 17 and 22).

The decision – makers on public transport in the City of Kigali have the same view as the City residents concerning the bus routes and the bus services to be provided to users as shown in Chapter 4 Section 3). They are aware that the bus routes available have to be increased in order to provide the bus access to all the City residents. The bus services provided have also to be improved as the competent authorities agreed that there are plans to do so and the measures have already been taken, the remaining step is their implementation.

However, the big difference of view between the City residents and the decision – makers concern the bus stops spacing. The decision – makers estimate that the spacing as it is now and described in Section 6.1 is adequate and has not to be changed, the improvement to be done should be to provide the necessary basic services on these stops. This view of the decision – makers should be interpreted as the change in the bus stops spacing should require other investments as the roads infrastructures are already in place.



### **6.3. CONCLUDING REMARKS**

The analysis of collected data, being data collected through existing situation, data collected through questionnaire and data collected through decision makers, show that the current bus situation in the City of Kigali is not adequate and does not meet the passengers' requests.

Therefore, this bus transport system has to be improved in terms of bus routes and bus stops to make it attractive to both existing bus users and non – bus users.

## **CHAPTER 7 OPTIMUM BUS SYSTEM IN CITY OF KIGALI**

### **7.1. INTRODUCTION**

After analysing the existing situation in the City of Kigali in terms of bus routes and bus stops, this chapter provides the optimum bus system that should fulfil the passengers' needs and should be convenient according to the nature of the City. The people interviewed showed that the existing bus transport system is not adequate as shown in Chapter 5, Figure 13, 14, 15, 16 and 16 and has to be improved. This system will be based on the findings from data collected and described in Chapter 4, Chapter 5 and Chapter 6; and the estimated future growth of the City of Kigali.

### **7.2. IDENTIFIED BUS TRANSPORT INNOVATIONS IN THE CITY OF KIGALI**

#### **7.2.1. Projection of public transport use in City of Kigali in 2018 horizon**

As described in Chapter 3, Section 2, Figure 8, the estimated present population of Kigali in 2013 are approximately over 1.135 million (Kigali City, 2013b, Republic of Rwanda, 2013a; MININFRA, 2012) as shown by the provisional results of last census carried out in the year 2012, with the annual growth of 4.0 percent (Institute of Statistics, Rwanda, 2012). By projecting this population growth, the population of the City of Kigali will be approximately 1.437 million in 2018. This means that by 2018, the population using the public transport will be almost one and half times of the number using this service now. Hence, public transport service has to be planned accordingly in terms of infrastructure and equipments.

#### **7.2.2. Best innovations in terms of bus routes in City of Kigali**

The best innovations in terms of bus routes proposed in this research are based on the criteria set by (Benn, for TRB, 1995), as described in Chapter 2.

Based on basic criteria for the bus routes design point of view:

- a) ***Population density***: Considering that the bus routes are designed in terms of the number of people leaving in a particular area as they are the first beneficiary of bus transit system; the bus routes in the City of Kigali should first concentrate on the urban area of the City which is highly populated. This means that the bus routes system has to take into consideration the areas where high density of people is found. However, taking into consideration that even if the population in the rural area of the City of Kigali is scattered but dense, these areas have also to be provided with bus routes to serve these populations.
- b) ***Employment density***: The employment concentration in the City of Kigali is found in the CBD, Kacyiru area and peripherals where markets are located. The bus routes system has to take into consideration these areas and special attention has to be given to these areas where the jobs sectors are concentrated.
- c) ***Route Coverage (Spacing Between Other Bus Routes and Corridors)***: This criteria is mainly referring to the bus operators' interests and should not be given higher consideration as the main purpose of this research is to provide solutions to the problems encountered by the City of Kigali residents in bus transport system. The design of bus routes system has to be done in a way that bus users are privileged with bus access but also considering the bus operators' demands and viewpoints in order to have a successful system.
- d) ***Limitations on the number of deviations or branches***: In order to have a well designed bus routes system, the main bus routes in the City of Kigali have to be well defined with feeder bus routes from all the areas of the City. This will make all the City areas served with bus routes system.
- e) ***Equal (geographic) coverage throughout the local tax base area***: This criterion should not be given much attention in the design of bus routes system in the City of Kigali as the aim of this research is to provide accessibility and better bus services to all City residents.

Based on the secondary criteria in bus routes design, the innovations proposed to the bus service in the City of Kigali are:

- a) ***System design considerations such as enhancement of timed transfers***: As this research showed that the existing bus routes are not enough and need to be increased, the new routes proposed have to be well designed to fit in the existing

system and such that the transfers from one route to another or from the feeder route to the main route are done smoothly. Also, consideration has to be taken for the passengers leaving one route and connecting to another route.

- b) *Streamlining / reduction of duplication:* The bus transport in the City of Kigali cannot be operated without having overlapping routes. However, considering that there are many areas of the City that are not served in terms of bus routes, the bus routes overlapping has to be reduced as possible and the bus services provided in all the City of Kigali corners.
- c) *Network Connectivity:* This criterion refers to the physical relationship of a new routing to the existing route system already in place at the agency. This means that the new system proposed have to take into consideration the bus agencies already operating on these routes and how the new proposed routes will be operated.
- d) *Service Equity:* This criterion is the main focus of the research. Bus services have to be available to all the population without consideration of the urban area and the rural area. The problem is that the bus transport system is mainly operated by private operators and that they are not ready to operate in the rural part of the city. So, the City of Kigali and RURA authorities have to set up measures and guidelines aiming to provide bus services to all the population without distinction.
- e) *Route directness:* Considering the City of Kigali topography, the new bus route system has to be made with main routes as direct as possible with feeder routes serving these main routes.
- f) *Service proximate to as many residences as possible:* The objective of this criterion in bus route designing is to get as close as possible to a rider's residence without unnecessarily delaying or detouring other riders. For the City of Kigali situation, the innovation to be brought to the system is to have enough number of bus routes reaching all the City corners.
- g) *Service to as many non-residential trip generators as possible:* As many people in the City of Kigali use bus services for business, educational or leisure travels, the bus routes systems has to reach all the areas of business, schools or recreational areas within the City's boundaries.

- h) Limitation on the number of transfers required of riders:* This criterion considers whether the design of the route calls for a significant number of its users to transfer, an important consideration in designing or redesigning a bus route. For the case of the City of Kigali, all the area will be served with feeder routes where virtually all riders will be required to transfer to complete their trip. However, people residing along the main routes will not have to transfer to complete their trip.
- i) Bus stop sitting:* The sitting of bus stops on a designed bus route is essential. The site of a bus stop can be near-side (just before the cross street at the intersection), far-side (just after the intersection), or midblock (on the block face between two intersections). The City of Kigali authorities together with the Ministry of Infrastructure will have to properly designate the length, mark, and signs, and to enforce against encroachments on designated bus stops.
- j) Bus stop spacing:* Bus stop spacing is the distance between adjoining service stops of a route. Transit operators have developed standards regarding bus stop spacing as part of their effort to balance the tradeoffs between rider convenience (stops with easy walking distances) and speed. For the City of Kigali bus routes, this spacing must meet the passengers' requirements of service accessibility.

### **7.2.3. Best innovations in terms of bus stops in City of Kigali**

The innovations in terms of bus stops proposed in the City of Kigali are grouped in three categories:

#### **a) Bus stops sitting (location) criterion:**

The innovations proposed for this category are based on (Roads Service & Translink, 2005) and (El-Geneidy et al, 1971):

- Bus stops should be generally located at the far side of intersections with signal priority;
- Bus stop locations should be selected on areas well connected to the pedestrian infrastructure, providing easy neighbourhood access;
- Bus stops sitting has to ensure that stop locations facilitate safe street crossing;
- Bus stops with a history of regular lift activity have to be preserved;

- Bus stops have to be located in a way that minimizes effects associated with traffic delay and traffic safety;
- Compatibility of bus stops with adjacent properties has to be ensured;
- Opposing bus stops have to be located in pairs;
- Bus stop sites should be on level slopes with adequate visibility; and
- Bus stop location decisions should reflect input from the public and from neighbourhood and business associations.
- In designing new developments, any required bus stop sites should be located so that they are integral to the housing layout.
- Opposite bus stops have to be located with a minimum separation of three bus lengths (36m), with the stops positioned in such a way that the buses stop “tail to tail” and move off away from each other.
- Bus stops should be located as close as possible to locations of passengers’ destinations such as schools, shops, libraries, old people’s homes, hospitals and business centres.
- Bus stops should be positioned away from local drainage facilities such as gullies.

**b) Bus stops spacing criterion:**

The innovations proposed under this criterion are derived (Roads Service & Translink, 2005 and Tauranga City Council, 2010).

The bus locations in the City of Kigali have to follow these guidelines:

- ✓ No resident has to walk more than four hundred meters (**400 m**) from their home to the bus stop;
- ✓ The majority of residents have no more than two hundred meters (**200 m**) to walk between their homes and the bus stop;
- ✓ In the case of residences designed specifically for the elderly and mobility impaired, there should be not more than a hundred meters (**100 m**) between the development and the bus stop; and,
- ✓ Where there are gradients, the suggested walking distances should be reduced by ten meters (**10 m**) for every one meter (**1m**) rise or fall.
- ✓ A maximum spacing of four hundred meters (**400 m**) between bus stops should be adopted as the optimum.

**c) Services provided on bus stops criterion:**

Apart from allowing passenger to board on buses or off buses, the bus stops should provide other basic services to bus users. These services have been highlighted by (Tauranga City Council, 2010) and should be available on all bus stops in the City of Kigali:

- Every bus stop must be marked on the road or clearly demarcated. The marking should meet the requirements of bus stop dimensions.
- Every bus stop must be identified by a bus stop sign.
- Unobstructed areas should be created within the entire boarding and alighting zone where possible, by moving street furniture downstream of the bus stop, rationalizing it or removing it altogether.
- All the bus stops should be provided with a passenger hardstand area with a sealed smooth surface providing a connection between the bus doors and the nearby footpath, which is particularly important for wheelchair users and other people with mobility impairments.
- Kerbs need to be high enough to minimise the step up to the bus, while taking into account the ground clearance of buses and the possibility of overhang. The bus stop needs to be carefully located so that passengers are not required to board the bus from access points with dropped kerbs.
- The bus stop and the area surrounding it should be well lit at night. Poorly lit areas at bus stops can impact on the personal security of waiting passengers and the visibility between drivers and waiting passengers. Ideally, the lighting will also provide bus stop users with the opportunity to survey the surrounding area at night.
- The bus stop should have appropriate pedestrian crossing facility downstream of the bus stop box to enable passengers to cross the road.
- The bus stops should be provided with a shelter to accommodate passengers and protect them against weather adverse effects. Bus stops shelter should meet the basic requirements such as to protect bus users, inform them, provide comfort and promote safety.

- The bus stops should be provided with a seat. People need to feel comfortable waiting for a bus. Many people, particularly the elderly cannot comfortably wait for a bus without sitting down.
- Every boarding stop should be provided with a printed timetable and preferably an accompanying map showing the times and routes of each bus service passing the stop. The map should indicate the location of the bus stop.
- Real time information units to provide up to date information on the expected time of arrival of any given service at the stop. Real time information in general has proved to be a valuable tool in building and maintaining patronage as the information it provides gives passengers confidence in the time they have to wait for the next service.

All these requirements are very important and should be provided on City of Kigali bus stops in order to attract more passengers and to provide them with optimum service.

### **7.3. OPTIMUM BUS SYSTEM IN CITY OF KIGALI IN TERMS OF BUS ROUTES**

The optimum bus system to be provided in the City of Kigali is the one reaching all the City residents being in the urban area of the City or the rural area of the City. For the time being as described in Chapter 5 and Chapter 6, some City locations are deprived of bus transport system and people have to walk considerable distance to reach the nearest bus stop (Figure 13, Figure14 and Figure 16).

To design an optimum bus route system from the existing road network, we identified suitable roads for public transport network extension. This was adopted as the more viable option economically than constructing new roads. This new bus route system proposed covers all the City areas and is derived from the existing public transport zones elaborated by the City of Kigali together with RURA as described in Appendix 3.

Each zone is made of trunk routes which are connected to feeder routes designed to allow all the City of Kigali population access the bus services adequately. The proposed bus zones are based on the existing bus stations which are REMERA, KABUGA, KICUKIRO CENTRE, NYABUGOGO and CBD Zone.



### **7.3.1. Bus Zone I**

This bus zone is derived to REMERA bus station and is made of the following trunk routes:

- i) Remera – Murindi – Kabuga – Rugende
- ii) Remera – Murindi – Masaka – Rusheshe
- iii) Remera – Chez Lando – Kacyiru – Nyabugogo
- iv) Rubilizi – Kabeza – Remera – Rwandex – CBD
- v) Kanombe Military Hospital – Remera – Sonatubes – Rwandex – CBD
- vi) Remera – Sonatubes – Kicukiro Centre

For this zone which has to serve the main portion of the rural area of the City of Kigali, the proposed feeder routes are:

- Gicaca – Rugende
- Rutunga – Gikomero – Ndera – Murindi
- Masaka – Masaka Hospital – Kabuga
- Busanza – Rubilizi
- Busanza – Kanombe Military Barracks

### **7.3.2. Bus Zone II**

This bus zone is derived from KICUKIRO CENTRE bus station and GIKONDO zone, and the proposed trunk bus routes are:

- i) Saint Joseph – Kicukiro Health Centre – Sonatubes – Rwandex – CBD

- ii) Saint Joseph – La Luna d’Or – Kicukiro Centre – Zion Temple – Rwandex – CBD
- iii) Nyanza Taxi Park – Kicukiro Centre – Gatenga – Magerwa – CBD
- iv) Nyanza Taxi Park – Kicukiro Centre – Zion Temple – Rwandex – Nyabugogo Taxi Park
- v) Nyanza Taxi Park – Kicukiro Centre – Sonatubes – Rwandex - CBD
- vi) Bwerankoli – Nyenyeri – SEGEM – Rugunga – ETO – CBD
- vii) Kicukiro Centre – Sonatubes – Gishushu – Kacyiru – Nyabugogo
- viii) Bwerankoli – Nyenyeri – SEGEM – Kanogo – Nyabugogo

The proposed feeder routes for this zone are:

- Karembure – Nyanza – Kicukiro Centre
- Rebero – Kicukiro Centre
- Gahanga – Nyanza – Kicukiro Centre
- Muyange – Kagarama – Kicukiro Centre
- APADE – Sonatubes
- BRALIRWA – Sonatubes

### **7.3.3. Bus Zone III**

This bus zone is derived mainly on KIMIRONKO bus station and KACYIRU area and the proposed trunk routes are:

- i) Bumbogo – Zindiro – Kimironko Bus Station – Chez Lando – Kimihurura – CBD

- ii) Kimironko – Kacyiru – Kinamba – Nyabugogo Bus Station
- iii) CBD – Kimihurura – RDB – Nyarutarama – Kagugu – FAWE – ULK – Kinamba – Muhima – CBD
- iv) CBD – Kinamba – Gakinjiro – FAWE – Kagugu Primary School – Batsinda
- v) CBD – Kimihurura – KBC – Kacyiru Ministères – Kacyiru Sector Office – Mamans Sportives
- vi) CBD – Kinamba – Gaculiro – Kinyinya

The proposed feeder routes for this bus zone are:

- Umushumba Mwiza – Bibare Suburbs – KIE – Kimironko Bus Station
- RDB – Umudugudu URWEGO – Contrôle Technique – Kimironko Bus Station
- Kibagabaga – Kibagabaga Hospital – Kimironko Bus Station
- Kimironko Bus Station – Kibagabaga Hospital – Caiman – Nyarutarama
- Jurwe – Bumbogo – Zindiro
- Gishaka – Bumbogo – Zindiro
- Kinamba – Gasabo District Office – US Embassy Residence
- Kacyiru Ministères – Kimicanga
- SOPETRAD – Kiyovu Suburbs – PEAGE

#### **7.3.4. Bus Zone IV**

This bus zone is mainly based on NYAMIRAMBO region and the areas served by NYABUGOGO Bus Station. The proposed trunk routes for this bus zones are:

- i) CBD – Gitega – Biryogo – Rafiki – Nyamirambo Stadium

- ii) CBD – Muhima – Nyabugogo – Gatsata – Karuruma – Nyacyonga
- iii) CBD – Muhima – Nyabugogo – Kimisagara – Nyakabanda – Tapis Rouge
- iv) Nyamirambo Stadium – Kuri 40 – Biryogo – Cercle Sportif – Kanogo – Poids Lourds – Nyabugogo Bus Station
- v) Nyabugogo Bus Station – Giticyinyoni – Runda

The feeder routes proposed for this zone are:

- Mageragere – Rwarutabura – Nyamirambo
- Gikomero – Rutunga – Nyacyonga
- Jali – Gihogwe – Karuruma
- Nduba – Jabana
- Kuri 40 – Cercle Sportif Rugunga
- Kimisagara – Biryogo
- Butamwa – Giticyinyoni – Nyabugogo Bus Station
- Kanyinya – Giticyinyoni – Nyabugogo Bus Station

#### **7.4. OPTIMUM BUS SYSTEM IN CITY OF KIGALI IN TERMS OF BUS STOPS**

The bus stops available on bus routes of the City of Kigali do not meet the passengers' requests as we have described the situation in Chapter 5 and Chapter 6 (Figure 15 and Figure 17). The optimum situation concerning the bus stops in the City of Kigali is proposed taking into consideration that the City of Kigali authorities cannot have the financial resources to modify all the system. That is why the proposed system relies on the already existing bus stops and their amelioration. The new bus stops system has also to follow the guidelines provided in Chapter 7, section 2.3.

The proposed optimum bus stops system is as follows:

- ✓ The bus stops spacing should not exceed four hundred metres (400m) on all the bus routes in the City of Kigali. This means that on all the bus routes, the existing bus stops should be kept in position and the new ones introduced in between to reduce the spacing to the required distance.
- ✓ The location and sitting of the new bus stops has to follow the guidelines provided in Chapter 7, Section 2.3., point a).
- ✓ The services to be provided to all the bus stops in the City of Kigali are the followings:
  - Every bus stop must be marked on the road or clearly demarcated. The marking should meet the requirements of bus stop dimensions.
  - Every bus stop must be identified by a bus stop sign.
  - Unobstructed areas should be created within the entire boarding and alighting zone where possible, by moving street furniture downstream of the bus stop, rationalizing it or removing it altogether.
  - All the bus stops should be provided with a passenger hardstand area with a sealed smooth surface providing a connection between the bus doors and the nearby footpath, which is particularly important for wheelchair users and other people with mobility impairments.
  - Kerbs need to be high enough to minimise the step up to the bus, while taking into account the ground clearance of buses and the possibility of overhang. The bus stop needs to be carefully located so that passengers are not required to board the bus from access points with dropped kerbs.
  - The bus stop and the area surrounding it should be well lit at night.
  - The bus stop should have appropriate pedestrian crossing facility downstream of the bus stop box to enable passengers to cross the road.
  - The bus stops should be provided with a shelter to accommodate passengers and protect them against weather adverse effects. Bus stops shelter should meet the basic requirements such as to protect bus users, inform them, provide comfort and promote safety.

- The bus stops should be provided with a seat.
- Every boarding stop should be provided with a printed timetable and preferably an accompanying map showing the times and routes of each bus service passing the stop. The map should indicate the location of the bus stop.
- Real time information units to provide up to date information on the expected time of arrival of any given service at the stop.

✓ Figure 28 shows the proposed type of bus stop facility:



**Figure 28: Proposed basic bus stop facility.**

## **7.5. ASSESSMENT OF APPLICABILITY OF BEST INNOVATIONS IN PUBLIC TRANSPORT IN THE CITY OF KIGALI**

The proposed innovations are very essential in providing the best bus service to users. These innovations are proposed to make the bus transport in the City of Kigali more attractive and meet the passengers' requests and needs. The City of Kigali authorities together with the Ministry of Infrastructure and RURA should put much emphasis in their implementation.

As discussed in Chapter 4, Section 3.3., the City of Kigali and RURA have started to introduce new measures in bus transport system in the City of Kigali, intended to improve the services provided to users especially concerning the bus routes systems. This is a very good indicator showing that the proposed innovations can be implemented in the five years timeframe proposed by the research.

However, concerning the bus stops system, there are no tangible improvements seen or planned by the authorities up to now, even though the shelters are being progressively constructed on bus stops by private companies for their publicity.

Considering the efforts made by the City of Kigali authorities in improving the bus services access to all the City areas by increasing bus routes, these efforts are also possible to improve the bus stops accessibility and services.

## **7.6. CONCLUDING REMARKS**

This chapter provides the new bus system in the City of Kigali in terms of bus routes and bus stops. This system is designed to improve the bus services provided to City of Kigali residents and to make the bus transport system accessible to all, attractive and reliable.

The implementation of this new bus system with the proposed innovations falls under the willingness of the City of Kigali, MININFRA and RURA authorities, and according to the development of the City of Kigali, it is possible to implement this system in the proposed five years timeframe.

## **CHAPTER 8 CONCLUSION AND RECOMMENDATIONS**

### **8.1. GENERAL CONCLUSION**

Bus transport system in the City of Kigali faces multiple challenges stemming from a mismatch between the supply of public transport services and transit demand. An assessment of available public transport service was carried out to determine the level of service availability and adequacy across different locations of the city. This assessment was mainly focussed on bus routes and bus stops provided in the City of Kigali boundaries. To assess the discrepancy between supply and demand, we carried out a survey and compared the views of the bus users with the views of public transport decision – makers. After this analysis, we suggested the innovation leading to bus service improvement.

The main results of the research show that the bus services provided to the City residents is not adequate as there are areas of the City not covered by the system especially the rural area, and where the system is available; people have to walk around one kilometre to reach them. Also, the bus users are not satisfied with the services provided and advocate for their improvements.

Based on these results, we have identified what should be improved to ultimately provide a better bus service in the City of Kigali in terms of bus routes and bus stops; and then we proposed the innovations that have to be brought to the bus transport system in the City of Kigali. The main improvement is to increase the bus routes and the bus stops on these routes. Also, the services provided on bus stops have to be improved to provide the satisfaction to the system users.

The implementation time of these proposed innovations in the new bus system in the City of Kigali is estimated to be five years period i.e. by the year 2018, and based on the willingness of the implementing authorities to provide better services to the City residents and the already bus transport measures taken, we can be assured that the new system can be operational by then.



## **8.2. RECOMMENDATIONS**

Based on gathered data and on the basis of the observations, the undertaken service performance assessment and the new bus system proposed, we make the following recommendations:

- The research was mainly focussed on the spatial coverage of bus transport system in the City of Kigali. Further studies should concentrate on other bus transport system components.
- The analysis of bus transport service provided in the City of Kigali reveals a considerable variability of service provision between different areas of the City. At some extent, this reflects inadequate planning in bus transport service provision. On the other hand this variability would be explained by the fact that in general operators prefer paved roads over the unpaved ones (Iles, 2005). Moreover, a number of roads in the City of Kigali are narrow for effective car traffic, and this could restrain larger buses to operate in those roads. Therefore, the extension as well as the rehabilitation of existing bus routes is recommended.
- The research suggested the extension of bus transport network coverage and the increase in bus stops on the network. A study on the optimization of bus routes and bus stops throughout the City of Kigali is recommended, considering that matching supply to demand through design of the appropriate bus route network structure would improve the access to the public transport service.

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## **APPENDIXES**

## APPENDIX 1

### EXISTING BUS ROUTES

**Bus routes linking City of Kigali Centre to various areas  
(Source: RURA, City of Kigali)**

S N°	Route name	Route length (KM)
1	CITY CENTRE – GIKONDO – NYENYERI	7
2	CITY CENTRE – GIKONDO – MAGERWA – GATENGA	8
3	CITY CENTRE – GISOZI (ULK)	6
4	CITY CENTRE – GITICYINYONI	6
5	CITY CENTRE – KACYIRU	9
6	CITY CENTRE – KARURUMA	8
7	CITY CENTRE – KICUKIRO CENTRE – NYANZA BUS TERMINAL	12
8	CITY CENTRE – KIMIRONKO	10
9	CITY CENTRE – KINYINYA	12
10	CITY CENTRE – NYACYONGA	14
11	CITY CENTRE – NYAMIRAMBO	6
12	CITY CENTRE – REMERA	10
13	CITY CENTRE – VIA KIMISAGARA – NYAMIRAMBO (TAPIS ROUGE)	8
14	CITY CENTRE – VIA KINAMBA – KAGUGU	12
15	CITY CENTRE – REMERA – KABEZA – RUBILIZI	14
16	CITY CENTRE – REMERA – KANOMBE	15

**Bus routes linking NYABUGOGO Bus Terminal to various city areas**

(Source: RURA, City of Kigali)

<b>S N°</b>	<b>Route name</b>	<b>Route length (KM)</b>
1	NYABUGOGO – GIKONDO NYENYERI	8
2	NYABUGOGO – KIMIRONKO	10
3	NYABUGOGO – KIMISAGARA –NYAMIRAMBO	7
4	NYABUGOGO – REMERA	10

**Bus routes linking KICUKIRO, KIMIRONKO, NYAMIRAMBO and REMERA to other city outlets**

(Source: RURA, City of Kigali)

<b>S N°</b>	<b>Route name</b>	<b>Route length (KM)</b>
1	KICUKIRO – REMERA	6
2	KIMIRONKO – ZINDIRO	2
3	NYAMIRAMBO (ERP) - BUTAMWA	11
4	REMER – GIKONDO	10
5	REMER – KABUGA	10
6	REMER – KANOMBE	6
7	REMER – MASAKA	10
8	REMER – NDERA	8
9	REMER – RUBIRIZI	6



## APPENDIX 2

### BUS STOPS ON VARIOUS ROUTES IN THE CITY OF KIGALI

#### Bus stops on CITY CENTRE – GIKONDO NYENYERI route

Route Name	Stop N°	Stop Name	Distance (m)
CITY CENTRE – GIKONDO NYENYERI	1	CITY CENTRE	0
CITY CENTRE – GIKONDO NYENYERI	2	KIYOVU JUNCTION TO CHEZ JOHN	3,340
CITY CENTRE – GIKONDO NYENYERI	3	RUGUNGA	490
CITY CENTRE – GIKONDO NYENYERI	4	INYANGE INDUSTRIES	1,180
CITY CENTRE – GIKONDO NYENYERI	5	ELECTROGAZ	370
CITY CENTRE – GIKONDO NYENYERI	6	IKIREZI	580
CITY CENTRE – GIKONDO NYENYERI	7	MEREZ 2	470
CITY CENTRE – GIKONDO NYENYERI	8	GIKONDO PRIMARY SCHOOL	530

#### Bus stops on GIKONDO NYENYERI – CITY CENTRE route

Route Name	Stop N°	Stop Name	Distance (m)
GIKONDO NYENYERI – CITY CENTRE	1	GIKONDO PRIMARY SCHOOL	0
GIKONDO NYENYERI – CITY CENTRE	2	MEREZ 2	530
GIKONDO NYENYERI – CITY CENTRE	3	IKIREZI	470
GIKONDO NYENYERI – CITY CENTRE	4	MIRONKO/OCIR THE	1,100
GIKONDO NYENYERI – CITY CENTRE	5	VOLTA SUPER	820
GIKONDO NYENYERI – CITY CENTRE	6	INYANGE INDUSTRIES	620
GIKONDO NYENYERI – CITY CENTRE	7	OMEGA HOUSE	800
GIKONDO NYENYERI – CITY CENTRE	8	PEYAGE	925
GIKONDO NYENYERI – CITY CENTRE	9	CITY CENTRE	1,225

**Bus stops on CITY CENTRE – GIKONDO MAGERWA – GATENGA route**

<b>Route Name</b>	<b>Stop N°</b>	<b>Stop Name</b>	<b>Distance (m)</b>
CITY CENTRE-GATENGA	1	CITY CENTRE	0
CITY CENTRE-GATENGA	2	PEYAGE	1,400
CITY CENTRE-GATENGA	3	STATION ENGEN (KANOGO)	1,500
CITY CENTRE-GATENGA	4	INYANGE INDUSTRIES	620
CITY CENTRE-GATENGA	5	CAMP ZAIRE	530
CITY CENTRE-GATENGA	6	MIRONKO/OCIR THE	670
CITY CENTRE-GATENGA	7	MAGERWA	1,245
CITY CENTRE-GATENGA	8	GATENGA PRIMARY SCHOOL	1,230
CITY CENTRE-GATENGA	9	ISONGA BAR	680

**Bus stops on GIKONDO MAGERWA – GATENGA – CITY CENTRE route**

<b>Route Name</b>	<b>Stop N°</b>	<b>Stop Name</b>	<b>Distance (m)</b>
GATENGA– CITY CENTRE	1	ISONGA BAR	0
GATENGA– CITY CENTRE	2	GATENGA PRIMARY SCHOOL	1,230
GATENGA– CITY CENTRE	3	MAGERWA	1,245
GATENGA– CITY CENTRE	4	MIRONKO/OCIR THE	670
GATENGA– CITY CENTRE	5	VOLTA SUPER	530
GATENGA– CITY CENTRE	6	INYANGE INDUSTRIES	620
GATENGA– CITY CENTRE	7	OMEGA HOUSE	800
GATENGA– CITY CENTRE	8	PEYAGE	925
GATENGA– CITY CENTRE	9	CITY CENTRE	1,220

**Bus stops on CITY CENTRE – GISOZI (ULK) route**

<b>Route Name</b>	<b>Stop N°</b>	<b>Stop Name</b>	<b>Distance (m)</b>
CITY CENTRE – GISOZI (ULK)	1	CITY CENTRE	0
CITY CENTRE – GISOZI (ULK)	2	MINISANTE	1,330
CITY CENTRE – GISOZI (ULK)	3	YAMAHA	800
CITY CENTRE – GISOZI (ULK)	4	KINAMBA1	800
CITY CENTRE – GISOZI (ULK)	5	KINAMBA JUNCTION TO GISOZI	400
CITY CENTRE – GISOZI (ULK)	6	ADVENTIST CHURCH	1,170
CITY CENTRE – GISOZI (ULK)	7	GISOZI SNACK BAR	640
CITY CENTRE – GISOZI (ULK)	8	ULK	700

**Bus stops on GISOZI (ULK) – CITY CENTRE route**

<b>Route Name</b>	<b>Stop N°</b>	<b>Stop Name</b>	<b>Distance (m)</b>
GISOZI (ULK) – CITY CENTRE	1	ULK	0
GISOZI (ULK) – CITY CENTRE	2	GISOZI SNACK BAR	700
GISOZI (ULK) – CITY CENTRE	3	ADVENTIST CHURCH	640
GISOZI (ULK) – CITY CENTRE	4	KINAMBA JUNCTION TO GISOZI	1,170
GISOZI (ULK) – CITY CENTRE	5	KINAMBA1	400
GISOZI (ULK) – CITY CENTRE	6	MUHIMA HOSPITAL	530
GISOZI (ULK) – CITY CENTRE	7	CITY CENTRE	1,900

**Bus stops on CITY CENTRE – GITICYINYONI route**

<b>Route Name</b>	<b>Stop N°</b>	<b>Stop Name</b>	<b>Distance (m)</b>
CITY CENTRE – GITICYINYONI	1	CITY CENTRE	0
CITY CENTRE – GITICYINYONI	2	MINISANTE	1,330
CITY CENTRE – GITICYINYONI	3	YAMAHA	900
CITY CENTRE – GITICYINYONI	4	KOBIL PETROLEUM STATION	270
CITY CENTRE – GITICYINYONI	5	MUHIMA SECTOR OFFICE	310
CITY CENTRE – GITICYINYONI	6	NYABUGOGO	670
CITY CENTRE – GITICYINYONI	7	GITICYINYONI	2,590

**Bus stops on CITY CENTRE – KACYIRU route**

<b>Route Name</b>	<b>Stop N°</b>	<b>Stop Name</b>	<b>Distance (m)</b>
CITY CENTRE – KACYIRU	1	CITY CENTRE	0
CITY CENTRE – KACYIRU	2	PEYAGE	1,400
CITY CENTRE – KACYIRU	3	STATION ENGEN	1,500
CITY CENTRE – KACYIRU	4	KIMICANGA 1	550
CITY CENTRE – KACYIRU	5	KIMICANGA 2	455
CITY CENTRE – KACYIRU	6	IFAK	800
CITY CENTRE – KACYIRU	7	EX – POSTE OFFICE	1,425
CITY CENTRE – KACYIRU	8	NOVOTEL	625
CITY CENTRE – KACYIRU	9	MINAGRI	600
CITY CENTRE – KACYIRU	10	IMIGRATION OFFICE	1,000

**Bus stops on KACYIRU – CITY CENTRE Route**

Route Name	Stop N <sup>o</sup>	Stop Name	Distance (m)
KACYIRU – CITY CENTRE	1	MININFRA OFFICE / KACYIRU	0
KACYIRU – CITY CENTRE	2	MINAGRI	910
KACYIRU – CITY CENTRE	3	REMA OFFICE	940
KACYIRU – CITY CENTRE	4	KBC	560
KACYIRU – CITY CENTRE	5	KIMIHURURA SECTOR OFFICE	965
KACYIRU – CITY CENTRE	6	KIMICANGA 2	800
KACYIRU – CITY CENTRE	7	KIMICANGA 1	455
KACYIRU – CITY CENTRE	8	STATION ENGEN	1,000
KACYIRU – CITY CENTRE	9	PEYAGE	925
KACYIRU – CITY CENTRE	10	CITY CENTRE (ETO MUHIMA)	1225

**Bus stops on CITY CENTRE – KARURUMA route**

Route Name	Stop N <sup>o</sup>	Stop Name	Distance (m)
CITY CENTRE - KARURUMA	1	CITY CENTRE	0
CITY CENTRE - KARURUMA	2	MINISANTE	1,330
CITY CENTRE - KARURUMA	3	YAMAHA	900
CITY CENTRE - KARURUMA	4	KOBIL PETROLEUM STATION	270
CITY CENTRE - KARURUMA	5	MUHIMA SECTOR OFFICE	310
CITY CENTRE - KARURUMA	6	NYABUGOGO TAXI PARK	670
CITY CENTRE - KARURUMA	7	GATSATA SECTOR OFFICE	660
CITY CENTRE - KARURUMA	8	GATSATA PRIMARY SCHOOL	1,130
CITY CENTRE - KARURUMA	9	KANYONYOMBA	450
CITY CENTRE - KARURUMA	10	KOBIL DEPOT	480
CITY CENTRE - KARURUMA	11	KILIMANJARO	1,250
CITY CENTRE - KARURUMA	12	KARURUMA	900

**Bus stops on KARURUMA – GATSATA – CITY CENTRE Route**

<b>Route Name</b>	<b>Stop N°</b>	<b>Stop Name</b>	<b>Distance (m)</b>
KARURUMA-GATSATA-CITY CENTRE	1	KARURUMA	0
KARURUMA-GATSATA-CITY CENTRE	2	KILIMANJARO	900
KARURUMA-GATSATA-CITY CENTRE	3	KOBIL DEPOT	1,250
KARURUMA-GATSATA-CITY CENTRE	4	KANYONYOMBA	480
KARURUMA-GATSATA-CITY CENTRE	5	GATSATA PRIMARY SCHOOL	450
KARURUMA-GATSATA-CITY CENTRE	6	GATSATA SECTOR OFFICE	1,170
KARURUMA-GATSATA-CITY CENTRE	7	NYABUGOGO TRAFFIC LIGHTS	680
KARURUMA-GATSATA-CITY CENTRE	8	MUHIMA MARKET	580
KARURUMA-GATSATA-CITY CENTRE	9	KOBIL PETROLUM STATION	410
KARURUMA-GATSATA-CITY CENTRE	10	YAMAHA	280
KARURUMA-GATSATA-CITY CENTRE	11	CITY CENTRE	1,500

**Bus stops on CITY CENTRE – KICUKIRO CENTRE – NYANZA BUS TERMINAL Route**

<b>Route Name</b>	<b>Stop N<sup>o</sup></b>	<b>Stop Name</b>	<b>Distance (m)</b>
CITY CENTRE-KICUKIRO CENTRE-NYANZA BUS PARK	1	CITY CENTRE	0
CITY CENTRE-KICUKIRO CENTRE-NYANZA BUS PARK	2	PEYAGE	1,400
CITY CENTRE-KICUKIRO CENTRE-NYANZA BUS PARK	3	STATION ENGEN (KANOGO)	1,500
CITY CENTRE-KICUKIRO CENTRE-NYANZA BUS PARK	4	INYANGE INDUSTRIES	620
CITY CENTRE-KICUKIRO CENTRE-NYANZA BUS PARK	5	CAMP ZAIRE	530
CITY CENTRE-KICUKIRO CENTRE-NYANZA BUS PARK	6	MIRONKO/OCIR THE	670
CITY CENTRE-KICUKIRO CENTRE-NYANZA BUS PARK	7	RWANDEX	500
CITY CENTRE-KICUKIRO CENTRE-NYANZA BUS PARK	8	EX AUDITOR GENERAL	720
CITY CENTRE-KICUKIRO CENTRE-NYANZA BUS PARK	9	BRALIRWA	400
CITY CENTRE-KICUKIRO CENTRE-NYANZA BUS PARK	10	GEMECA PETROLUM STATION	530
CITY CENTRE-KICUKIRO CENTRE-NYANZA BUS PARK	11	SONATUBES	450
CITY CENTRE-KICUKIRO CENTRE-NYANZA BUS PARK	12	BRALIRWA JUNCTION	320
CITY CENTRE-KICUKIRO CENTRE-NYANZA BUS PARK	13	COTRACO JUNCTION	270
CITY CENTRE-KICUKIRO CENTRE-NYANZA BUS PARK	14	ETO KICUKIRO	320
CITY CENTRE-KICUKIRO CENTRE-NYANZA BUS PARK	15	KICUKIRO CENTRE	520
CITY CENTRE-KICUKIRO CENTRE-NYANZA BUS PARK	15	KAGARAMA PRIMARY SCHOOL	720
CITY CENTRE-KICUKIRO CENTRE-NYANZA BUS PARK	16	KAGARAMA SECONDARY SCHOOL	850
CITY CENTRE-KICUKIRO CENTRE-NYANZA BUS PARK	17	NYANZA BUS PARK	1,500

**Bus stops on NYANZA BUS TERMINAL – KICUKIRO CENTRE – CITY CENTRE Route**

<b>Route Name</b>	<b>Stop N°</b>	<b>Stop Name</b>	<b>Distance (m)</b>
NYANZA BUS PARK-KICUKIRO CENTRE-CITY CENTRE	1	NYANZA BUS PARK	0
NYANZA BUS PARK-KICUKIRO CENTRE-CITY CENTRE	2	KAGARAMA SECONDARY SCHOOL	1,500
NYANZA BUS PARK-KICUKIRO CENTRE-CITY CENTRE	3	KAGARAMA PRIMARY SCHOOL	850
NYANZA BUS PARK-KICUKIRO CENTRE-CITY CENTRE	4	KICUKIRO CENTRE	720
NYANZA BUS PARK-KICUKIRO CENTRE-CITY CENTRE	5	ETO KICUKIRO	520
NYANZA BUS PARK-KICUKIRO CENTRE-CITY CENTRE	6	COTRACO JUNCTION	320
NYANZA BUS PARK-KICUKIRO CENTRE-CITY CENTRE	7	BRALIRWA JUNCTION	270
NYANZA BUS PARK-KICUKIRO CENTRE-CITY CENTRE	8	SONATUBES BEFORE ROND ABOUT	320
NYANZA BUS PARK-KICUKIRO CENTRE-CITY CENTRE	9	SONATUBES AFTER ROUND ABOUT	365
NYANZA BUS PARK-KICUKIRO CENTRE-CITY CENTRE	10	KOBIL STATION	500
NYANZA BUS PARK-KICUKIRO CENTRE-CITY CENTRE	11	AMASEZERANO COMMUNITY BANKING	440
NYANZA BUS PARK-KICUKIRO CENTRE-CITY CENTRE	12	RWANDEX	800
NYANZA BUS PARK-KICUKIRO CENTRE-CITY CENTRE	13	MIRONKO/OCIR THE	700
NYANZA BUS PARK-KICUKIRO CENTRE-CITY CENTRE	14	VOLTA SUPER	820
NYANZA BUS PARK-KICUKIRO CENTRE-CITY CENTRE	15	INYANGE INDUSTRIES	620
NYANZA BUS PARK-KICUKIRO CENTRE-CITY CENTRE	16	OMEGA HOUSE	800
NYANZA BUS PARK-KICUKIRO CENTRE-CITY CENTRE	17	PEYAGE	925
NYANZA BUS PARK-KICUKIRO CENTRE-CITY CENTRE	18	CITY CENTRE (SULFO)	1,225



**Bus stops on CITY CENTRE – KIMIRONKO route**

<b>Route Name</b>	<b>Stop N°</b>	<b>Stop Name</b>	<b>Distance (m)</b>
CITY CENTRE-KIMIRONKO	1	CITY CENTRE	0
CITY CENTRE-KIMIRONKO	2	PEYAGE	1,400
CITY CENTRE-KIMIRONKO	3	STATION ENGEN	1,500
CITY CENTRE-KIMIRONKO	4	KIMICANGA 1	550
CITY CENTRE-KIMIRONKO	5	KIMICANGA 2	455
CITY CENTRE-KIMIRONKO	6	IFAK	800
CITY CENTRE-KIMIRONKO	7	RUGANDO	1,425
CITY CENTRE-KIMIRONKO	8	MINIJUST	310
CITY CENTRE-KIMIRONKO	9	RDB JUNCTION	610
CITY CENTRE-KIMIRONKO	10	BEAU SEJOUR	545
CITY CENTRE-KIMIRONKO	11	FINA BANK	600
CITY CENTRE-KIMIRONKO	12	AMAHORO STADIUM	650
CITY CENTRE-KIMIRONKO	13	REMERA SECTOR	400
CITY CENTRE-KIMIRONKO	13	REMERA PRIMARY SCHOOL	210
CITY CENTRE-KIMIRONKO	14	KIE	445
CITY CENTRE-KIMIRONKO	15	KIMIRONKO BUS PARK	360

**Bus stops on KIMIRONKO – CITY CENTRE Route**

<b>Route Name</b>	<b>Stop N°</b>	<b>Stop Name</b>	<b>Distance (m)</b>
KIMIRONKO-CITY CENTRE	1	KIMIRONKO BUS PARK	0
KIMIRONKO-CITY CENTRE	2	KIE	280
KIMIRONKO-CITY CENTRE	3	REMERA PRIMARY SCHOOL	535
KIMIRONKO-CITY CENTRE	4	AMAHORO STADIUM	560
KIMIRONKO-CITY CENTRE	5	ICTR	450
KIMIRONKO-CITY CENTRE	6	CHEZ LANDO	435
KIMIRONKO-CITY CENTRE	7	BEAU SEJOUR	465
KIMIRONKO-CITY CENTRE	8	RDB JUNCTION	620
KIMIRONKO-CITY CENTRE	9	PARLIAMENT	600
KIMIRONKO-CITY CENTRE	10	KBC	550
KIMIRONKO-CITY CENTRE	11	KIMIHURURA SECTOR OFFICE	965
KIMIRONKO-CITY CENTRE	12	KIMICANGA 2	800
KIMIRONKO-CITY CENTRE	13	KIMICANGA 1	455

Route Name	Stop N <sup>o</sup>	Stop Name	Distance (m)
KIMIRONKO-CITY CENTRE	14	OMEGA HOUSE	1,000
KIMIRONKO-CITY CENTRE	15	PEYAGE	925
KIMIRONKO-CITY CENTRE	16	CITY CENTRE	1,225

#### Bus stops on CITY CENTRE – KINYINYA Route

Route Name	Stop N <sup>o</sup>	Stop Name	Distance (m)
CITY CENTRE- KINYINYA	1	CITY CENTRE	0
CITY CENTRE- KINYINYA	2	PEYAGE	1,400
CITY CENTRE- KINYINYA	3	STATION ENGEN	1,500
CITY CENTRE- KINYINYA	4	KIMICANGA 1	550
CITY CENTRE- KINYINYA	5	KIMICANGA 2	455
CITY CENTRE- KINYINYA	6	IFAK	800
CITY CENTRE- KINYINYA	7	RUGANDO	1,425
CITY CENTRE- KINYINYA	8	MINIJUST	310
CITY CENTRE- KINYINYA	9	RDB OFFICE	760
CITY CENTRE- KINYINYA	10	MTN CENTRE	1,300
CITY CENTRE- KINYINYA	11	ADVENTIST CHURCH	640
CITY CENTRE- KINYINYA	12	KIBAGABAGA JUNCTION	2,000
CITY CENTRE- KINYINYA	13	KINYINYA DUTCH WELL	1,500

#### Bus stops on KINYINYA – CITY CENTRE Route

Route Name	Stop N <sup>o</sup>	Stop Name	Distance (m)
KINYINYA- CITY CENTRE	1	KINYINYA DUTCH WELL	0
KINYINYA- CITY CENTRE	2	KIBAGABAGA JUNCTION	1,500
KINYINYA- CITY CENTRE	3	TIGO OFFICE	2,100
KINYINYA- CITY CENTRE	4	MTN CENTRE	580
KINYINYA- CITY CENTRE	5	RDB OFFICE	1,260
KINYINYA- CITY CENTRE	6	RDB JUNCTION	320
KINYINYA- CITY CENTRE	7	PARLIAMENT	600
KINYINYA- CITY CENTRE	8	KBC	550
KINYINYA- CITY CENTRE	9	KIMIHURURA SECTOR OFFICE	965
KINYINYA- CITY CENTRE	10	KIMICANGA2	800

<b>Route Name</b>	<b>Stop N°</b>	<b>Stop Name</b>	<b>Distance (m)</b>
KINYINYA- CITY CENTRE	11	KIMICANGA1	455
KINYINYA- CITY CENTRE	12	STATION ENGEN	1,000
KINYINYA- CITY CENTRE	13	PEYAGE	925
KINYINYA- CITY CENTRE	14	CITY CENTRE	1,225

**Bus stops on CITY CENTRE – NYACYONGA Route**

<b>Route Name</b>	<b>Stop N°</b>	<b>Stop Name</b>	<b>Distance (m)</b>
CITY CENTRE-NYACYONGA	1	CITY CENTRE	0
CITY CENTRE-NYACYONGA	2	MINISANTE	1,330
CITY CENTRE-NYACYONGA	3	YAMAHA	900
CITY CENTRE-NYACYONGA	4	KOBIL PETROLEUM STATION	270
CITY CENTRE-NYACYONGA	5	MUHIMA SECTOR OFFICE	310
CITY CENTRE-NYACYONGA	6	NYABUGOGO TAXI PARK	670
CITY CENTRE-NYACYONGA	7	GATSATA SECTOR OFFICE	660
CITY CENTRE-NYACYONGA	8	GATSATA PRIMARY SCHOOL	1,130
CITY CENTRE-NYACYONGA	9	KANYONYOMBA	450
CITY CENTRE-NYACYONGA	10	KOBIL DEPOT	480
CITY CENTRE-NYACYONGA	11	KILIMANJARO	1,250
CITY CENTRE-NYACYONGA	12	KARURUMA	900
CITY CENTRE-NYACYONGA	13	KABUYE	2,980
CITY CENTRE-NYACYONGA	14	NYACYONGA	2,820

**Bus stops on NYACYONGA – CITY CENTRE Route**

<b>Route Name</b>	<b>Stop N°</b>	<b>Stop Name</b>	<b>Distance (m)</b>
NYACYONGA - CITY CENTRE	1	NYACYONGA	0
NYACYONGA - CITY CENTRE	2	KABUYE	2,840
NYACYONGA - CITY CENTRE	3	KARURUMA	2,990
NYACYONGA - CITY CENTRE	4	KILIMANJARO	900
NYACYONGA - CITY CENTRE	5	KOBIL DEPOT	1,250
NYACYONGA - CITY CENTRE	6	KANYONYOMBA	480

<b>Route Name</b>	<b>Stop N°</b>	<b>Stop Name</b>	<b>Distance (m)</b>
NYACYONGA - CITY CENTRE	7	GATSATA PRIMARY SCHOOL	450
NYACYONGA - CITY CENTRE	8	GATSATA SECTOR OFFICE	1,170
NYACYONGA - CITY CENTRE	9	NYABUGOGO TRAFFIC LIGHTS	680
NYACYONGA - CITY CENTRE	10	MUHIMA MARKET	580
NYACYONGA - CITY CENTRE	11	KOBIL PETROLUM STATION	410
NYACYONGA - CITY CENTRE	12	YAMAHA	280
NYACYONGA - CITY CENTRE	13	CITY CENTRE	1,500

**Bus stops on CITY CENTRE – NYAMIRAMBO Route**

<b>Route Name</b>	<b>Stop N°</b>	<b>Stop Name</b>	<b>Distance (m)</b>
CITY CENTRE - NYAMIRAMBO	1	CITY CENTRE	0
CITY CENTRE - NYAMIRAMBO	2	ETM	1420
CITY CENTRE - NYAMIRAMBO	3	METEO	420
CITY CENTRE - NYAMIRAMBO	4	GITEGA SECTOR OFFICE	460
CITY CENTRE - NYAMIRAMBO	5	BIRYOGO 1	540
CITY CENTRE - NYAMIRAMBO	6	BIRYOGO 2	290
CITY CENTRE - NYAMIRAMBO	7	FORTY	275
CITY CENTRE - NYAMIRAMBO	8	RAFIKI	450
CITY CENTRE - NYAMIRAMBO	9	CHARLES LWANGA	440
CITY CENTRE - NYAMIRAMBO	10	COURT	560
CITY CENTRE - NYAMIRAMBO	11	TAPIS ROUGE	410
CITY CENTRE - NYAMIRAMBO	12	KURYA NYUMA	650

**Bus stops on NYAMIRAMBO – CITY CENTRE Route**

<b>Route Name</b>	<b>Stop N°</b>	<b>Stop Name</b>	<b>Distance (m)</b>
NYAMIRAMBO – CITY CENTRE	1	KURYA NYUMA	0
NYAMIRAMBO – CITY CENTRE	2	TAPIS ROUGE	760
NYAMIRAMBO – CITY CENTRE	3	CHARLES LWANGA	625
NYAMIRAMBO – CITY CENTRE	4	7 <sup>th</sup> DAY ADVANTIST CHURCH	770
NYAMIRAMBO – CITY CENTRE	5	BIRYOGO 1	530
NYAMIRAMBO – CITY CENTRE	6	ONATRACOM	320
NYAMIRAMBO – CITY CENTRE	7	NYC	485
NYAMIRAMBO – CITY CENTRE	8	GITEGA	350
NYAMIRAMBO – CITY CENTRE	9	CAMP KIGALI	610
NYAMIRAMBO – CITY CENTRE	10	EX - RADIO RWANDA HQ	1120
NYAMIRAMBO – CITY CENTRE	11	CITY CENTRE	730

**Bus stops on CITY CENTRE – REMERA – KABEZA – RUBILIZI Route**

<b>Route Name</b>	<b>Stop N°</b>	<b>Stop Name</b>	<b>Distance (m)</b>
CITY CENTRE-RUBILIZI	1	CITY CENTRE	0
CITY CENTRE-RUBILIZI	2	PEYAGE	1,400
CITY CENTRE-RUBILIZI	3	ENGEN STATION (KANOGO)	1,500
CITY CENTRE-RUBILIZI	4	INYANGE INDUSTRIES	620
CITY CENTRE-RUBILIZI	5	CAMP ZAIRE	530
CITY CENTRE-RUBILIZI	6	MIRONKO/OCIR THE	670
CITY CENTRE-RUBILIZI	7	RWANDEX	500
CITY CENTRE-RUBILIZI	8	EX AUDITOR GENERAL	720
CITY CENTRE-RUBILIZI	9	BRALIRWA	400
CITY CENTRE-RUBILIZI	10	GEMECA PETROLUM STATION	530
CITY CENTRE-RUBILIZI	11	RTUC	380
CITY CENTRE-RUBILIZI	12	GOODYEAR	660
CITY CENTRE-RUBILIZI	13	ALPHA PALACE/JOB PETROLEUM	380
CITY CENTRE-RUBILIZI	14	PRINCE HOUSE	500
CITY CENTRE-RUBILIZI	15	KABEZA AFTER TRAFFIC LIGHTS	615

<b>Route Name</b>	<b>Stop N°</b>	<b>Stop Name</b>	<b>Distance (m)</b>
CITY CENTRE-RUBILIZI	16	ADVENTIST CHURH KABEZA	380
CITY CENTRE-RUBILIZI	17	FRIENDS CORNER	585
CITY CENTRE-RUBILIZI	18	EWSA/KABEZA	465
CITY CENTRE-RUBILIZI	19	NEW LA VERDURE	675
CITY CENTRE-RUBILIZI	20	UMUCYO	455
CITY CENTRE-RUBILIZI	21	KANOMBE SECTOR OFFICE	380
CITY CENTRE-RUBILIZI	22	SAMUDUHA	755
CITY CENTRE-RUBILIZI	23	RARDA OFFICE	1,220

**Bus stops on RUBILIZI – KABEZA – REMERA – CITY CENTRE Route**

<b>Route Name</b>	<b>Stop N°</b>	<b>Stop Name</b>	<b>Distance (m)</b>
RUBILIZI-CITY CENTRE	1	RARDA OFFICE	0
RUBILIZI-CITY CENTRE	2	SAMUDUHA	1,220
RUBILIZI-CITY CENTRE	3	KANOMBE SECTOR OFFICE	750
RUBILIZI-CITY CENTRE	4	UMUCYO	270
RUBILIZI-CITY CENTRE	5	NEW LA VERDURE	245
RUBILIZI-CITY CENTRE	6	EWSA/KABEZA	245
RUBILIZI-CITY CENTRE	8	ADVENTIST CHURH KABEZA	580
RUBILIZI-CITY CENTRE	9	KABEZA BEFORE TRAFFIC LIGHTS	260
RUBILIZI-CITY CENTRE	10	ALPHA PALACE/KOBIL	835
RUBILIZI-CITY CENTRE	11	ALPHA PALACE/JOB PETROLUM	230
RUBILIZI-CITY CENTRE	12	GOODYEAR	440
RUBILIZI-CITY CENTRE	13	SONATUBES	980
RUBILIZI-CITY CENTRE	14	KOBIL STATION	500
RUBILIZI-CITY CENTRE	15	AMASEZERANO COMMUNITY BANKING	440
RUBILIZI-CITY CENTRE	16	RWANDEX	800
RUBILIZI-CITY CENTRE	17	MIRONKO/OCIR THE	700
RUBILIZI-CITY CENTRE	18	VOLTA SUPER	820
RUBILIZI-CITY CENTRE	19	INYANGE INDUSTRIES	620
RUBILIZI-CITY CENTRE	20	OMEGA HOUSE	800
RUBILIZI-CITY CENTRE	21	PEYAGE	925
RUBILIZI-CITY CENTRE	22	CITY CENTRE	1,225

**Bus stops on CITY CENTRE – REMERA – KANOMBE Route**

<b>Route Name</b>	<b>Stop N°</b>	<b>Stop Name</b>	<b>Distance (m)</b>
CITY CENTRE- KANOMBE	1	CITY CENTRE	0
CITY CENTRE- KANOMBE	2	PEYAGE	1,400
CITY CENTRE- KANOMBE	3	STATION ENGEN (KANOGO)	1,500
CITY CENTRE- KANOMBE	4	INYANGE INDUSTRIES	620
CITY CENTRE- KANOMBE	5	CAMP ZAIRE	530
CITY CENTRE- KANOMBE	6	MIRONKO/OCIR THE	670
CITY CENTRE- KANOMBE	7	RWANDEX	500
CITY CENTRE- KANOMBE	8	EX AUDITOR GENERAL	720
CITY CENTRE- KANOMBE	9	BRALIRWA	400
CITY CENTRE- KANOMBE	10	GEMECA PETROLEUM STATION	530
CITY CENTRE- KANOMBE	11	RTUC	380
CITY CENTRE- KANOMBE	12	GOODYEAR	660
CITY CENTRE- KANOMBE	13	ALPHA PALACE/JOB PETROLUM	380
CITY CENTRE- KANOMBE	14	PRINCE HOUSE	500
CITY CENTRE- KANOMBE	15	GIPOROSO AFTER TRAFFIC LIGHTS	645
CITY CENTRE- KANOMBE	16	KUCYA MITZIG	415
CITY CENTRE- KANOMBE	17	AIRPORT	1,165
CITY CENTRE- KANOMBE	18	AIRPORT/MOSQUE	400
CITY CENTRE- KANOMBE	19	KANOGO	735
CITY CENTRE- KANOMBE	20	GASARABA	460
CITY CENTRE- KANOMBE	21	VICTORY MISSION CHURH	935
CITY CENTRE- KANOMBE	22	KONTINERI	380
CITY CENTRE- KANOMBE	24	NYARUGUNGA DISPENSARY	500
CITY CENTRE- KANOMBE	25	KANOMBE MILITARY HOSPITAL	900

**Bus stops on KANOMBE – REMERA – CITY CENTRE Route**

<b>Route Name</b>	<b>Stop N°</b>	<b>Stop Name</b>	<b>Distance (m)</b>
KANOMBE-CITY CENTRE	1	KANOMBE MILITARY HOSPITAL	0
KANOMBE-CITY CENTRE	2	NYARUGUNGA DISPENSARY	800
KANOMBE-CITY CENTRE	3	KONTINERI	480
KANOMBE-CITY CENTRE	4	VICTORY MISSION CHURH	360
KANOMBE-CITY CENTRE	5	GASARABA	1,000
KANOMBE-CITY CENTRE	6	KANOGO	460
KANOMBE-CITY CENTRE	6	AIRPORT/MOSQUE	680
KANOMBE-CITY CENTRE	8	AIRPORT ENTRANCE	420
KANOMBE-CITY CENTRE	9	KUCYA MITIZG	1,100
KANOMBE-CITY CENTRE	10	ALPHA PALACE/KOBIL	1,225
KANOMBE-CITY CENTRE	11	ALPHA PALACE/JOB PETROLUM	230
KANOMBE-CITY CENTRE	12	GOODYEAR	440
KANOMBE-CITY CENTRE	13	SONATUBES	980
KANOMBE-CITY CENTRE	14	KOBIL STATION	500
KANOMBE-CITY CENTRE	15	AMASEZERANO COMMUNITY BANKING	440
KANOMBE-CITY CENTRE	16	RWANDEX	800
KANOMBE-CITY CENTRE	17	MIRONKO/OCIR THE	700
KANOMBE-CITY CENTRE	18	VOLTA SUPER	820
KANOMBE-CITY CENTRE	19	INYANGE INDUSTRIES	620
KANOMBE-CITY CENTRE	20	OMEGA HOUSE	800
KANOMBE-CITY CENTRE	21	PEYAGE	925
KANOMBE-CITY CENTRE	22	CITY CENTRE	1,225

**Bus stops on CITY CENTRE – KAGUGU Route**

<b>Route Name</b>	<b>Stop N°</b>	<b>Stop Name</b>	<b>Distance(m)</b>
CITY CENTRE- KAGUGU	1	CITY CENTRE	0
CITY CENTRE- KAGUGU	2	PEYAGE	1,400
CITY CENTRE- KAGUGU	3	STATION ENGEN	1,500
CITY CENTRE- KAGUGU	4	KIMICANGA 1	550
CITY CENTRE- KAGUGU	5	KIMICANGA 2	455
CITY CENTRE- KAGUGU	6	IFAK	800
CITY CENTRE- KAGUGU	7	RUGANDO	1,425



<b>Route Name</b>	<b>Stop N<sup>o</sup></b>	<b>Stop Name</b>	<b>Distance (m)</b>
CITY CENTRE- KAGUGU	8	MINIJUST	310
CITY CENTRE- KAGUGU	9	RDB OFFICE	760
CITY CENTRE- KAGUGU	10	MTN CENTRE	1,300
CITY CENTRE- KAGUGU	11	ADVENTIST CHURCH	640
CITY CENTRE- KAGUGU	12	KOBIL STATION	1,180
CITY CENTRE- KAGUGU	13	ABERDEEN HOUSE	730
CITY CENTRE- KAGUGU	14	KINYINYA SECTOR OFFICE	750
CITY CENTRE- KAGUGU	15	KAGUGU PRIMARY SCHOOL	440

**Bus stops on KAGUGU – CITY CENTRE Route**

<b>Route Name</b>	<b>Stop N<sup>o</sup></b>	<b>Stop Name</b>	<b>Distance (m)</b>
KAGUGU-CITY CENTRE	1	KAGUGU PRIMARY SCHOOL	0
KAGUGU-CITY CENTRE	2	KINYINYA SECTOR OFFICE	440
KAGUGU-CITY CENTRE	3	ABERDEEN HOUSE	750
KAGUGU-CITY CENTRE	4	KOBIL STATION	910
KAGUGU-CITY CENTRE	5	TIGO OFFICE	1,170
KAGUGU-CITY CENTRE	6	MTN CENTRE	580
KAGUGU-CITY CENTRE	7	RDB OFFICE	1,260
KAGUGU-CITY CENTRE	8	RDB JUNCTION	310
KAGUGU-CITY CENTRE	9	PARLIAMENT	600
KAGUGU-CITY CENTRE	10	KBC	550
KAGUGU-CITY CENTRE	11	KIMIHURURA SECTOR OFFICE	965
KAGUGU-CITY CENTRE	12	KIMICANGA 2	800
KAGUGU-CITY CENTRE	13	KIMICANGA 1	455
KAGUGU-CITY CENTRE	14	OMEGA HOUSE	1,000
KAGUGU-CITY CENTRE	15	PEYAGE	925
KAGUGU-CITY CENTRE	16	CITY CENTRE	1,225

## **APPENDIX 3**

### **NEW BUS TRANSPORT SYSTEM IN THE CITY OF KIGALI FROM AUGUST 30<sup>TH</sup>, 2013**

#### **i) Public Transport Zone I**

This zone covers Remera, Kanombe (Kabeza), Nyarugunga, Rusororo (Kabuga), Masaka, and Ndera Sectors. The trunk routes of this public transport zone include the main routes connecting it to the CBD or to Nyabugogo Taxi Park.

##### **These routes are:**

- a) Kabuga – Murindi – Remera Taxi park – Sonatubes – Rwandex – Statistique – CHUK – Bank of Kigali
- b) Kabuga – Mulindi – Remera Taxi park – Rwandex – Nyabugogo
- c) Remera Taxi Park – Chez Lando – Kacyiru – Nyabugogo
- d) Rubirizi – Kabeza – Remera – Rwandex – Statistique – CHUK – Bank of Kigali
- e) Kanombe Military Hospital – Airport – Remera Taxi park – Sonatubes – Rwandex – Statistique – CHUK – Bank of Kigali

##### **Intra – zonal and inter – zonal routes for public transport zone I:**

- a) Remera Taxi park – Ndera
- b) Remera Taxi park – Murindi – Masaka – Rusheshe
- c) Remera Taxi park – Sonatubes – Kicukiro Centre
- d) Remera Taxi Park – Sonatubes – Rwandex – Gikondo (Nyenyeri) – Bwerankoli
- e) Masaka – Masaka Hospital – Kabuga

This Public Transport Zone I is operated by **KIGALI BUS SERVICES (KBS)** and buses are painted white and light green.

#### **ii) Public Transport Zone II**

This zone covers Niboye, Kicukiro, Kagarama, Kigarama, Gahanga, Gatenga and Gikondo sectors.

### **Trunk routes**

- a) Saint Joseph – Kicukiro Centre de Sante – Sonatubes – Rwandex – Chez Rubangura – EWSA HQ
- b) Saint Joseph – La Luna d’Or – Kicukiro Centre – Zion Temple – Rwandex – Chez Rubangura – EWSA HQ
- c) Nyanza Taxi Park – Kicukiro Centre – Gatenga – Magerwa – Chez Rubangura – EWSA HQ
- d) Nyanza Taxi Park – Kicukiro Centre – Zion Temple – Rwandex – Nyabugogo Taxi Park
- e) Bwerankoli – Nyenyeri – SEGEM – Rugunga – ETO – Statistique
- f) Bwerankoli – Nyenyeri – SEGEM – Kanogo – Nyabugogo

### **Intra – zonal and inter – zonal routes for public transport zone II:**

- a) Kicukiro Centre – Nyanza – Karembure
- b) Kicukiro Centre – Nyanza – Gahanga
- c) Kicukiro Centre – Kagarama – Muyange
- d) Kicukiro Centre – Gatenga – Magerwa – Nyenyeri
- e) Kicukiro centre – Sonatubes – Gishushu – Kacyiru

This Public Transport Zone II is operated by **ROYALE EXPRESS** and buses are painted white and orange.

### **iii) Public Transport Zone III**

This zone covers Kimironko, Remera (Nyarutarama), Gikomero, Rutunga, Bumbogo, Kacyiru, Kimihurura, Gisozi and Kinyinya sectors.

### **Trunk routes**

- a) ETO Muhima – CHUK – BK – Kimihurura – RDB – Nyarutarama – Kagugu – FAWE – ULK – Kinamba – Muhima – ETO
- b) Bumbogo (AZAM Round about) – Zindiro – Kimironko Taxi Park – Lando – Kimihurura – ETO – CHUK – BK
- c) ETO – Muhima – Kinamba – Gakinjiro – FAWE – Kagugu Primary School – Batsinda
- d) ETO – Kimihurura – KBC – Kacyiru Ministère – Kacyiru sector office – Mamans Sportives

- e) Nyabugogo Taxi Park – Kinamba – Kacyiru – Kimironko Taxi Park

**Intra – zonal and inter – zonal routes for public transport zone III:**

- a) Kimironko Taxi Park – Bibare – Prison Kimironko – Kimironko Taxi park
- b) Kimironko Taxi Park – KIE – Bibare – Mushumba Mwiza – Ku Cya Mutzig – Remera Taxi park – KIE – Kimironko Taxi park
- c) Kimironko Taxi par – Controle technique – Umudugudu Urwego –RDB
- d) Kimironko Taxi park – Kibagabaga Hospital – Caiman – Nyarutarama – Kabuga ka Nyarutarama – Junction Kinyinya and Kibagabaga – Kibagabaga Hospital – Kimironko Taxi Park
- e) Bumbogo (Zindiro) – Rutunga
- f) Nyabugogo Taxi Park – Kinamba – Gakinjiro – FAWE – Batsinda

This Pubic Transport Zone III is operated by **RWANDA FEDERATION OF TRANSPORT COOPERATIVES (RFTC)** and buses are painted white with a green band.

**Public Transport Zone IV:**

This zone covers Nyamirambo, Mageragere, Rwezamenyo, Nyakabanda, Kimisagara, Gitega, Kigali, Gatsata, Jali, Jabana, Nduba and Rutunga sectors.

**Trunk routes**

- a) CHUK – BK – ETO – Gakinjiro – Gitega – Biryogo – Rafiki - Ku rya Nyuma
- b) Sulfo – ETO – Main Roundabout – Nyabugogo – Kimisagara – Nyakabanda – Tapis Rouge
- c) Sulfo – ETO – Main Roundabout – Nyabugogo – Gatsata – Karuruma – Nyacyonga
- d) Nyabugogo – Giticyinyoni – Runda
- e) Nyamirambo (Ku rya nyuma) – kuri 40 – Biryogo – Cercle sportif de Rugunga – Kanogo – Poids Lourd – Nyabugogo Taxi Park.

**Intra-zonal and inter-zonal routes for public transport zone IV:**

- a) Nyamirambo – Rwarutabura – Mageragere
- b) Nyacyonga – Rutunga

c) Karuruma – Gihogwe – Jali

d) Jabana – Nduba

This Public Transport Zone IV is operated by **RWANDA FEDERATION OF TRANSPORT COOPERATIVES (RFTC)** and buses are painted white with a blue band.

➤ **Working hours & Bus schedule**

On trunk routes, the bus schedules are supposed to be:

- ✓ Daily working hours : 5h00 - 23h00
- ✓ Morning peak hours: 6h30 - 8h00 with a spacing of 5 minutes
- ✓ Evening peak hours: 17h30-20h00, with a spacing of 5 minutes also,
- ✓ During off Peak hours, the spacing will be 15 minutes
- ✓ On feeder and inter zonal routes, the spacing will be 30 minutes during the off peak hours and 15 minutes during the peak hours.

➤ These improvements started to be implemented on August 30<sup>th</sup>, 2013 and are supposed to resolve the issues arising in the City of Kigali public transport system.

## **APPENDIX 4**

### **SURVEY QUESTIONNAIRE**

## CITY OF KIGALI BUS SERVICES REVIEW QUESTIONNAIRE

**We would like to ask you some questions for a research on bus services that should be improved in terms of bus routes and bus stops. That is the public bus services that run in your area. Do not include coach services or private bus services. We are interested in your views even if you do not use local buses.**

**Feel free to respond to all the questions and the information provided will be confidential.**

1. Are you:

Male [ ]

Female [ ]

2. Where do you live? (District, Sector, Cell, Umudugudu)

.....

3. How old are you?

16 or under [ ]

17 to 25 [ ]

26 to 35 [ ]

36 to 45 [ ]

45 to 55 [ ]

55 to 65 [ ]

66 or over [ ]

4. Do you use buses in Kigali City?

YES [ ] NO [ ]

If yes, do you use them to travel to:

Work [ ]

School [ ]

Shopping centres [ ]

Hospital [ ]

Recreational activities [ ]

Other [ ] (Please specify below)

.....

5. Which bus service do you most often use?

– N° 1 KBS [ ]

– N° 2 R.F.T.C. [ ]

- N° 3 R.F.T.C. [ ]
- N° 4 ROYAL [ ]
- Other [ ]

6. How long does it take you to walk from your home to the nearest bus stop?

- Less than five minutes [ ]
- Between 5 and 10 minutes [ ]
- Between 10 and 20 minutes [ ]
- Between 20 and 30 minutes [ ]
- More than 30 minutes [ ]

7. Do the bus services from the nearest bus stop go to any of the places where you would want to go?

- Yes [ ]
- No [ ]

8. How near you would like the bus stop should be from your home?

- Less than a hundred metres [ ]
- Between 100 and 200 meters [ ]
- Between 200 and 300 metres [ ]
- Between 300 and 400 metres [ ]
- Between 400 and 500 metres [ ]
- More than 500 metres [ ]

9. What time does it take you from the bus stop to your final destination?

- Less than five minutes [ ]
- Between 5 and 10 minutes [ ]
- Between 10 and 20 minutes [ ]
- Between 20 and 30 minutes [ ]
- More than 30 minutes [ ]

10. What time does it take you from the bus station to your final destination?

- Less than five minutes [ ]
- Between 5 and 10 minutes [ ]
- Between 10 and 20 minutes [ ]
- Between 20 and 30 minutes [ ]
- More than 30 minutes [ ]

11. How near you would like the bus stop should be to your destination?

- Less than a hundred metres [ ]
- Between 100 and 200 meters [ ]
- Between 200 and 300 metres [ ]
- Between 300 and 400 metres [ ]
- Between 400 and 500 metres [ ]
- More than 500 metres [ ]



12. What do you think about bus routes to various areas of the City of Kigali?

- The bus routes are sufficient [ ]
- The bus routes should be increased [ ]
- There is no bus route heading to my destination [ ]
- There is no bus route to my residence area [ ]

13. Would you like more bus stops and slower service?

- Yes [ ]
- No [ ]

14. Would you like less bus stops and faster service?

- Yes [ ]
- No [ ]

15. When do you use buses?

- Weekdays [ ]
- Weekend [ ]
- Evenings [ ]

16. When would you like to use bus services?

- Weekdays [ ]
- Weekend [ ]
- Evenings [ ]

17. How many times per day do you use a bus?

- Once [ ]
- Twice [ ]
- Three times [ ]
- Four times [ ]
- More than four times [ ]

18. How many times per week do you use a bus?

- Every day [ ]
- One day per week [ ]
- Two times per week [ ]
- Three times [ ]
- Four times [ ]
- Five times [ ]

19. Are buses available whenever you need to use them on any route?

- Sometimes [ ]
- Most of the time [ ]
- Usually [ ]
- Never [ ]

20. Are there any areas or places in the City of Kigali that you feel are poorly served by buses?

Yes [ ] No [ ]

If YES, please specify below:

.....  
.....

21. From the list below, state if the service is “very important”, “moderately important” or “unimportant”.

- Linking all city suburbs to City Centre [ ]
- Stopping near my location [ ]
- Providing weekend bus services [ ]
- Providing access to shops [ ]
- Providing access to schools and colleges [ ]
- Providing access to hospitals [ ]
- Providing evening bus services [ ]

22. How could you describe the bus services provided to you in terms of passengers?

- There are few passengers [ ]
- There is a moderate number of passengers [ ]
- The buses are full to capacity [ ]
- The buses are overcrowded [ ]

23. How could you rate the bus services in terms of cleanness?

- Not clean at all [ ]
- Moderately clean [ ]
- Perfectly clean [ ]

24. What is your bus preference in terms of bus size?

- Small bus [ ]
- Medium bus [ ]
- Large bus [ ]

25. What type of improvement would you like to see in bus services?

- More bus stops [ ]
- More bus routes [ ]
- Faster bus service [ ]
- More clean buses [ ]
- No improvement needed [ ]

Thank you for taking the time to complete this questionnaire

For further information please contact Patrick Emile BAGANIZI via email at [bapem1@yahoo.fr](mailto:bapem1@yahoo.fr) or call on **+250 788352134**.