



University of Nairobi

School of Engineering

**Use of GIS to Assess the Impact of Relocation of Project Affected Persons:
Case Study of the Railway Reserve in Soweto East, Kibera**

By

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Declaration

I, Edgar Selebwa Lugonzo, hereby declare that this project is my original work. To the best of my knowledge, the work presented here has not been presented for a degree in any other Institution of Higher Learning.

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Name of student: Edgar Selebwa Lugonzo

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Date

This project has been submitted for examination with my approval as university supervisor.

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Name of supervisor: Prof. G. C. Mulaku

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Date

Dedication

I dedicate this project to my supportive wife, Jamila Mumani who has given me support in the course of doing the project. Special dedication goes to my late parents who were instrumental in my education.

Acknowledgements

I acknowledge my supervisor Prof. G.C. Mulaku; his guidance and advice has been invaluable throughout my research period. It has been a great honour working with him.

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Above all I thank God for taking me this far.

Abstract

Relocation of people encroaching on public or private land has always been a challenge all over the world. In most cases brute force has been used to evict encroachers leading to loss of lives and destruction of property. The Railway reserve in Kibera has been heavily encroached which affects the operations of the trains. Eviction attempts by Kenya Railways have been met with violent resistance. These attempts have not been successful. This research aimed at assessing the impact of relocation of project affected persons in Soweto East. The specific objectives of the research were to identify and map existing encroachment on the reserve. They also included mapping the extent of World Bank sponsored houses for relocation. The research also looked into the effectiveness of the Relocation Action Plan (RAP) project, and analysed the social impact of the project.

Encroachment on the Railway reserve within the study area was identified; structures within the reserve were digitized to show the extent of the existing encroachment. The impact of the study offers better relocation prospects by having the Project Affected Persons (PAPs) non-spatial attributes linked to the spatial location of their structures. In so doing it addressed the problem of eliminating ineligible persons from the process while also providing a water tight solution to the Railway Right of Way.

The final output of the research includes maps and charts showing the effectiveness of the World Bank sponsored Relocation Action Plan project. Analysis on the impact of the project has also been done in the research, and this has shown that the relocation has been partially done. Better relocation strategies have been recommended in the project.

Table of Contents

Cover Page.....	i
Declaration.....	ii
Dedication.....	iii
Acknowledgements	iv
Abstract.....	v
Table of Contents	vi
List of Figures.....	ix
List of Plates	x
List of Tables	xi
List of Acronyms.....	xii
Definitions	xiii
CHAPTER 1: INTRODUCTION	1
1.1 Background.....	1
1.2 Problem Statement	3
1.3 Objectives.....	6
1.4 Justification for the Study.....	7
1.5 Area of Study.....	7
1.6 Scope of work	10
1.7 Organization of the report	10
CHAPTER 2: LITERATURE REVIEW.....	11
2.1 Project Related Relocations.....	11
2.2 The Kenya slum Upgrading Programme (Kensup) - Kibera situation	12
2.2.1 Kensup Goals.....	12
2.3 Case Studies	14

2.3.1 Mumbai Urban Transport Project in India.....	14
2.3.2 Magallanes, Philippines.....	16
2.3.3 Relocation Action Plan, a World Bank Sponsored Programme in Kenya	17
CHAPTER 3: MATERIALS AND METHODS.....	19
3.1 Data.....	19
3.1.1 Orthomosaic.....	19
3.1.2 Railway Network	19
3.1.3 Administrative Boundaries	19
3.2 Tools	20
3.2.1 Hardware	20
3.2.2 Software.....	20
3.3 Preparation of Data	21
3.3.1 Overlay	21
3.3.2 Digitization	21
3.3.3 Comparison between RAP houses and the Design	24
3.3.4 Questionnaire Research Design	25
3.3.5 Data Collection	25
CHAPTER 4: RESULTS AND DISCUSSIONS.....	26
4.1 Results.....	26
4.1.1 PAPs relocation.....	26
4.1.2 Transparency within the Relocation process	27
4.1.3 Rating the process	27
4.1.4 Relocation on the ground.....	28
4.1.5 Status of the Railway Reserve	29
4.1.6 Design versus Actual Construction.....	32

4.2 Discussion of Results.....	34
CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS	36
5.1. Conclusions	36
5.2. Recommendations.....	37
REFERENCES.....	38
APPENDICES	41
Appendix A: Relocation questionnaire.....	42
Soweto East Relocation Questionnaire	42
Appendix B: Railway line design, Nairobi - Kibera section.....	45
Appendix C: World Bank funded RAP houses design	46

List of Figures

Figure 1: Map of Kibera within Nairobi County	8
Figure 2: Kibera Villages.....	9
Figure 3: Structures encroaching on the Railway Reserve within Soweto East	22
Figure 4: RAP houses in Soweto East	23
Figure 5: Design overlay.....	24
Figure 6: Relocation within Soweto East.....	26
Figure 7: Rating of the relocation process	28
Figure 8: Relocation within Soweto East.....	29
Figure 9: Existing encroachments on the railway reserve after relocation.....	30
Figure 10: Pending construction sites	33

List of Plates

Plate 1: Encroachment on the Railway Reserve	5
Plate 2: Residents doing business on the Railway track	6
Plate 3: Existing encroachments on the railway reserve, as at August, 2016.....	31
Plate 4: Encroachments and dumping on the railway reserve as at August, 2016.....	32

List of Tables

Table 1: Household Survey.....	18
Table 2: Data and Datasets	20
Table 3: REMU Data on relocation the of Soweto East PAPs	29
Table 4: Design versus actual construction	32

List of Acronyms

AfDB:	African Development Bank
GIS:	Geographical Information System
IASC:	Inter-Agency Standing Committee
ID:	Identity
KENSUP:	Kenya Slums Upgrading Programme
KR:	Kenya Railways Corporation
LPG:	Liquefied Petroleum Gas
M.S.L:	Mean Sea Level
NGOs:	Non- Governmental Organisations
PAPs:	Project Affected Persons
R&R:	Resettlement and Rehabilitation
RAP:	Relocation Action Plan
REMU:	Relocation Management Unit
RoW:	Right of Way
RVR:	Rift Valley Railways
SEC:	Settlement Executive Committee
VGI:	Volunteered Geographic Information
WB:	World Bank

Definitions

Compensation: A payment made in monetary form or kind for land or development that is taken by a project during construction.

Involuntary resettlement: Resettlement is involuntary when people are moved without giving permission or when the affected people do not have power to decline the relocation. .

Baraza: Public meeting for dialogue.

Participatory enumeration: This is a process where information is gathered and in most cases it is constructed and done by the affected people.

Cut- off date: The date enumeration begins. It is a sort of a deadline for enumeration and does not include the people who come in after it has lapsed.

Encroachment: Intrusion onto a person's territory without permission.

CHAPTER 1: INTRODUCTION

1.1 Background

Relocations all over the world have been a hot issue that must be handled with care since they involve loss of livelihoods and moving to unfamiliar areas for the affected people. Resettlements have sometimes been violent since the affected people often resist moving and the people evicting them may not offer an alternative place for relocating. The World Bank and other humanitarian institutions have come up with guidelines for involuntary resettlement. These guidelines include:

- Avoiding resettlement, where relocation should be the last resort
- Ensuring community participation in the relocation process
- Resettlement to be regarded as an opportunity for sustainable development
- Compensation procedure should be defined. Procedures should be defined early enough and a cut-off date set to discourage speculators from taking advantage of the process
- Compensation should be at the same worth of the asset during the time of acquisition.
- Compensate the loss of customary rights for example community shrines and land used as grazing areas

Planned relocations should be carried out in a respectable manner that is humane and preserves human dignity. It should also learn from past experiences that have been successful and acceptable to all.

Good practices recommended include participatory enumerations. Participatory specifications not only assemble information for neighbourhood planning; they fabricate consensus and guarantee that all views given by inhabitants are incorporated in the negotiations (Network, 2010). The participatory enumerations involve collecting information about the people living in the informal sector, this information is mainly gathered from family and work overviews, lodging profiling and structure reviews. Plans are drawn and neighbourhood censuses for relocating and other purposes are conducted. Innovative approaches are being employed as an

alternative to forced evictions. They include:Regularisation, upgrading of the settlements , guided land development, land readjustment, and building trunk infrastructure. Participatory enumeration activities lead to:

1. Strengthening acceptability and legitimacy of the process by neighbourhood groups through tapping local learning
2. Successful usage of existing abilities and assets
3. Quality of data collected
4. Trust and confidence by all parties
5. Opportunities for further engagement between community and relevant institutions
6. Effective reactions to neighbourhood conditions and needs

The land Act 2012 (Revised 2016) has incorporated the evictions and resettlement procedures that guide evictions. It states the general principles that guide evictions in Kenya, and shall be on basis that:-

Every person has inherent dignity and the right to have that dignity respected and protected. It likewise expresses that, "the national and county Governments and any association, body or person when reacting to a circumstance of removal of unlawful occupiers under this act, might consider their rights and opportunities as set out in the Bill of Rights of the constitution".

When relocating people, adaptation to the new environment is usually a key component, therefore in this project relocation will be based within the same locality thus creating an environment of familiarity and ease of adaptation. The IASC operational guidelines on the protection of persons in situations of natural disasters specify that people should be evacuated as close as possible to their habitual residence. Smith and Sherbinin (2014) drew out some lessons from development related displacement, noting that resettlement is a complex process with many risks and reconstruction model, loss of land, employment and access to common resources. People in danger need not to be worried that their rights cannot be secured by government and

that re-settlement is not carried out on flimsy grounds. If the people perceive the threat to their lives and livelihoods as high by staying where they are, they may be more likely to consider relocation (Ferris, 2014). The political decision making process also becomes viable if people believe that relocation is the best adaptation option to provide long-term protection (Correa et.al,2011). This project will explore how Geospatial techniques can be used to assess and analyze the impact of a World Bank funded project of relocating families living on the railway reserve. In so doing, the project will assess whether the project was successful and met its intended objectives. It will also look into the effectiveness of the project in terms of the social well-being of the project affected persons (PAPs). Before the implementation of this project there have been several attempts to evict people or to relocate the railway line which have been unsuccessful. Both suggestions have not been tenable; relocating the railway line will be an expensive venture due to the cost involved in terms of acquiring new land and construction cost. On the other hand, evicting people has been met with resistance and previous attempts have not achieved anything.

1.2 Problem Statement

There has been heavy encroachment on railway reserves across the country leading to loss of human life due to train accidents. The railway line at Kibera is heavily encroached as seen in Plate 1. It has also been vandalized several times hampering seamless transportation of goods and people to the Western part of the country, Uganda and Rwanda. Visibility at curves is poor due to structures within the corridor, and this is coupled with occasional train derailling posing a risk to the encroachers along the reserve. Since this is an accident prone area the trains have to slow down at this section leading to delays and loss of man hours. The Rift Valley Railways (RVR) is occasionally forced to use two locomotives to pull the trains since at low speeds the engine loses its power necessitating a back up. RVR has also stopped transportation of some products like the Liquefied Petroleum Gas (LPG) since the smoking and cooking near the railway line poses danger of a fire outbreak. All these have resulted into losses for the concessionaire. The rail track at this section is also prone to vandalism, degradation, which might result in derailment.

Kibera people have used the railway line as a dumping site; this reduces the stability of the railway track and leads to poor drainage of the track. It is also a hygienic concern to the track maintenance crew.

A major reason so many people are forced to stay in informal settlements is the State's failure to put an appropriate regulatory framework in place for providing low-cost housing or access to secure and serviced land. With nowhere to go, people encroach on unoccupied land, including areas that have been set aside for roads, railways and other public uses. For example, in Nairobi, about 2 million people, or 55% of the city's total population, live in the 200 informal settlements on only 5% of the city's total land (UN-Habitat, 2010).

Most of the slum dwellers in urban areas cannot access credit facilities that will enable them buy houses. Such financing does not allow for instalment payment from organized groups (Ferris, 2014).

Conventionally, during relocation exercises, there is usually a head count of the affected people with no GIS backing. Using these methods, it is usually hard to identify the eligible PAPs since many unaffected people show up for the exercise and occasionally double claims are recorded. One of the programmes that have been made to improve the sector is the World Bank funded project, Relocation Action Plan (RAP) in Kibera. Implementation of the project has not been easy for the managers. It has posed social, political, and economical challenges that have affected smooth relocation. This attempt has had its successes in relocating some people within Soweto East village but it has not met the major objective of clearing the railway reserve for train operations.



Plate 1: Encroachment on the Railway Reserve



Plate 2: Residents doing business on the Railway track

1.3 Objectives

The project has major and specific objectives. The major objective is to use GIS technology to assess the impact of Relocation for Project Affected persons within the Railway reserve in Soweto East.

Specific objectives will be:

1. To identify and map existing encroachments on the Railway reserve
2. To Map and establish the extent of the World Bank project
3. To establish the effectiveness of the World Bank relocation project i.e. whether it met the initial objectives of safety of the PAPs and a secure railway reserve
4. To analyze the social impact of the relocation on the Project Affected Persons (PAPs)

1.4 Justification for the Study

This study will help government agencies in proper relocation of Project Affected Persons and people who have encroached government land according to the proposed Eviction and Resettlement Bill, if it becomes law. This project will adopt the World Bank policies that guide eviction and relocation on involuntary basis. The government through Kenya Railways will be able to safeguard its reserve and ensure the safety of its citizens. A GIS based system of identification of beneficiaries can be used in the development of an involuntary relocation scheme, which can be implemented by Kenya Railways. It also provides an alternative to forced evictions, and a framework for negotiations. It ensures that only eligible beneficiaries are relocated. There is need to negotiate with the government to find alternative means of preservation of the reserve while also addressing the needs of the slum dwellers.

1.5 Area of Study

The area of study will be Soweto East Village Kibera, Nairobi, Kenya. Kibera is an informal settlement within Nairobi County. It has approximately 250, 000 people living in several settlements within Nairobi. Until recently Kibera had no clean and adequate. Water was fetched from the nearby Nairobi dam. Decent toilets are rare in Kibera. One pit latrine is shared by up to 50 shacks. Most of the buildings in Kibera have an area of 12 ft *12 ft (3.7m*3.7m). These buildings are made of mud on the walls and are roofed with a corrugated tin. The floor is made of dirt (Blatchford, Mogharreban, & Park, 2016).

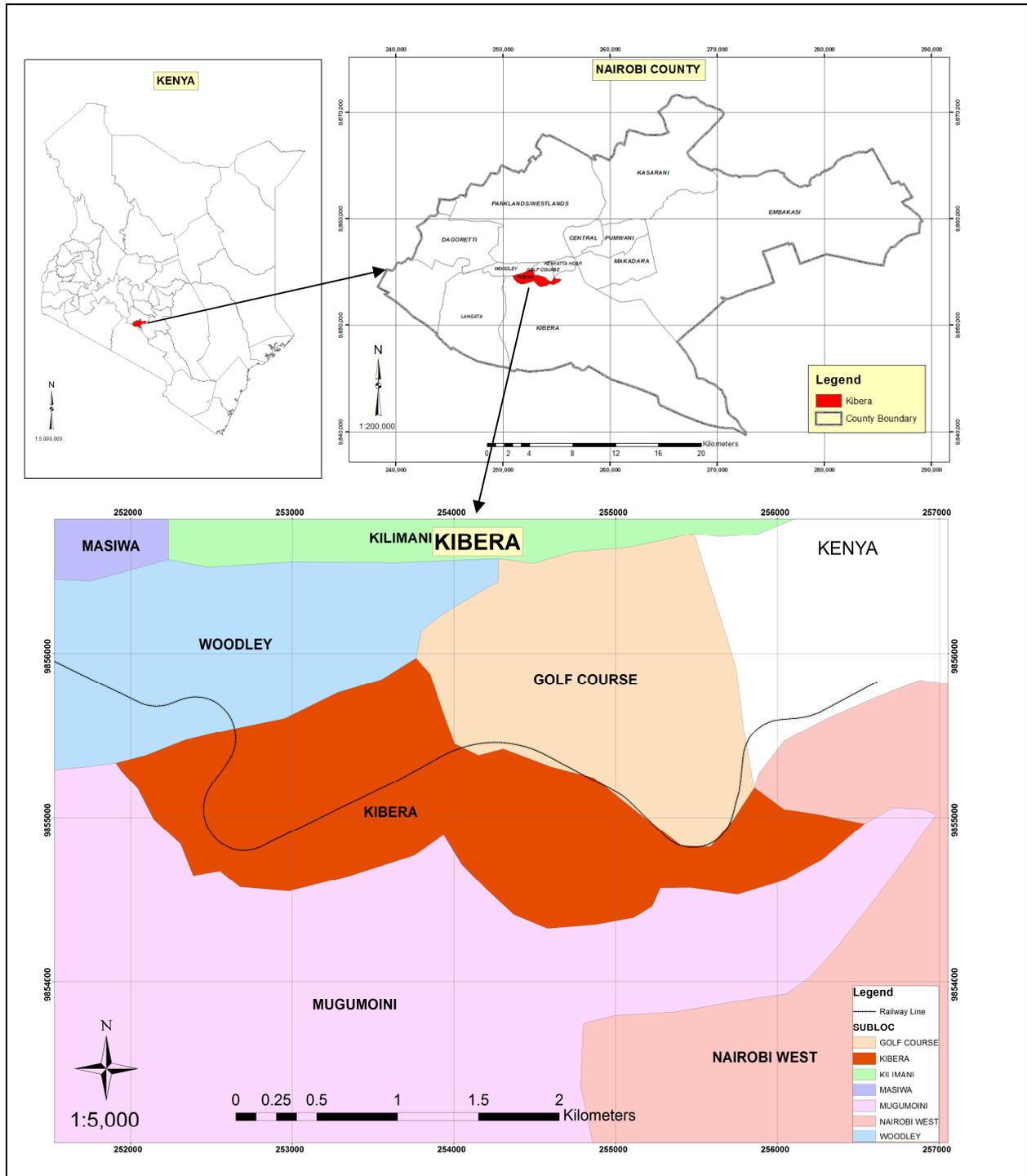


Figure 1: Map of Kibera within Nairobi County

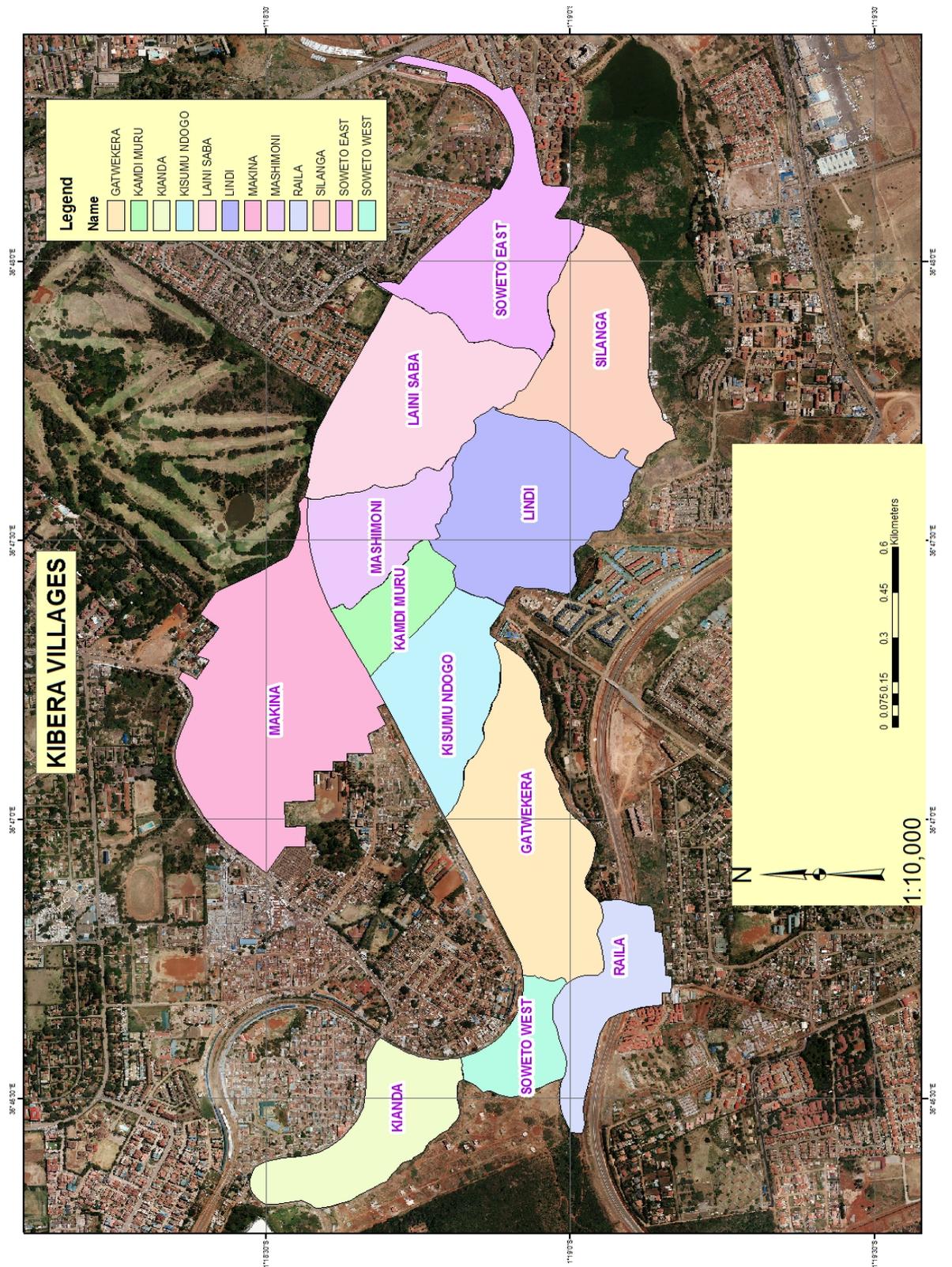


Figure 2: Kibera Villages

1.6 Scope of work

The study will mainly focus on the spatial aspect of the relocation process avoiding details of other aspects such as political and economical. The project will be limited to the relocation action plan. Even though the project can be applied to the whole of Kibera region along the railway line, it will be limited to Soweto East village within the larger Kibera.

1.7 Organization of the report

This report has five distinct chapters. The first Chapter one dwells on the background information, problem statement, objectives of the research, justification of the research, area of research, and scope of work.

Chapter two, the literature review, reviews some similar relocations that have been done in the world. It shows how the relocations were undertaken and their results. It also contains what the Government of Kenya has done on slum upgrading.

Chapter three outlines the methods and materials used in the research. It gives a step by step guide on how the project was undertaken from data acquisition, manipulation, analysis and logical steps on how the results were achieved.

Chapter four discusses the results achieved and lastly Chapter five entails the study conclusions and recommendations. Chapter five is then followed by project references and appendices.

CHAPTER 2: LITERATURE REVIEW

2.1 Project Related Relocations

Relocations of people encroaching on public or private land are often confrontational with excess force and crude means being employed. Many a times, they lead to loss of lives and destruction of property. While there is a lot of academic work and policy which has been done on displacement and migration, little has been done on planned relocation. Some relocation involves the moving of people to decanting sites like what was done to Kibera residents in 2010. Most slum dwellers are faced by the challenge of tenure insecurity. Statistics released by monitoring NGOs show that close to 10 million people have been forcefully evicted between the periods of 2003 to 2008 (UN Habitat, 2010). This paints a grim picture of relocations within the informal areas. Attempts have been made to create alternative residential areas for people in Kibera but it has always been difficult to implement them.

Encroachment on railway reserves is not new in Kenya since the Railway line from Mombasa to Kisumu has been having encroachments in different sections for long. In Mombasa, encroachment has been witnessed in the Bangladesh informal settlement in Changamwe Constituency. Similarly in Naivasha encroachment has been witnessed at the Morendat Station. In Nakuru at Kampi Ya Moto station the railway line has been heavily encroached. In Nairobi heavy encroachment has been observed in several sections in Mukuru and Kibera amongst others. In Kibera encroachment has been rampant and demolition of structures created animosity between the residents and the Kenya Railway Corporation. Persons encroaching on the railway reserve have been served with several notices but they ignore the notices and come back immediately after being evicted.

Several attempts have been made to ensure that residents do not encroach on the railway reserve and such include safety awareness campaigns by NGOs, Railway eviction notices and the Kenya Slum Upgrading Programme by the Government through the Ministry of Housing. In all these attempts Geospatial techniques have not been fully explored in order to have a holistic solution to the encroachment menace. As a result the residents having been frustrated by the attempts formed a welfare group to work with different parties.

This welfare group comprises of residents living on the reserve only, and hence directly affected by the project. The group is organized through a leadership structure consisting of the Chairman, Secretary, Treasurer , and members giving a total of around 18 members. It is this group that spearheaded the negotiations with the parties on the behalf of project affected persons (PAPs). Alongside this group the business people formed their own welfare group since they considered their issues to be different from those of the group above. Therefore, it was necessary to incorporate the two groups. The new group drew membership from different sections ranging from Laini saba on Mbagathi Way to Kianda on Ngong road.

Forceful evictions have always been the order of the day in the country. Residents of Mitumba slum were forcefully evicted from their structures by the Kenya Airports Authority for encroaching on their land. Residents of Kyangómbe and Masai village were also evicted for constructing their shelters on the flight path. In 2012 residents of Mukuru kwa Njenga slums were also forcefully evicted by a private developer leading to the death of three people (Nation, 2012). The situation in the country is dire and needs innovative approaches in order to offer long lasting solutions to this problem.

All over the world displacements have been caused by several projects, the projects are mainly in the transport industry, energy sector, water projects, agriculture expansion, and setting up of parks and forest reserves.

2.2 The Kenya slum Upgrading Programme (Kensup) - Kibera situation

The objective of this programme was to improve livelihoods of people living and working in slums and informal settlements in urban areas of Kenya through housing improvement, income generation, and provision of security of tenure and physical and social infrastructure (Sara-Candiracci, 2007). The actual target was to improve the livelihoods of 1.6 million households living in slums in Kenya (Muraguri, 2011). The programme was to be implemented in the city of Nairobi, Mombasa City, Kisumu, Mavoko, all former provincial headquarters, and towns that exceeded a population of over 20,000 people (Muraguri, 2011).

2.2.1 Kensup Goals

Kensup goals were:

- Community organization and mobilization
- Provision of security of tenure and residential security
- Preparation of city/town strategic and master plans
- Prevention of proliferation of slums
- Conflict prevention and management in the targeted
- Shelter improvement: security of tenure or residential security, housing development and improvement
- Employment and income generation: markets, skills enhancement, micro-financing and credit systems
- Environmental and solid waste management: garbage collection and treatment systems, cleaning of Ngong River
- Provision of social infrastructure: schools, health centres, community centres and recreational facilities
- Provision of social infrastructure: sewerage system, water supply, and sanitation, access roads, storm water drainage, electricity and street lighting
- Addressing issues of HIV/AIDS: HIV education and awareness, counselling and testing centres, HIV dedicated clinics (Muraguri, 2011)

Participatory enumeration has been used as one of the solutions to this problem. Community mapping was used as part of enumeration. Community maps and sketches were compiled with the help of the residents. Enumerations were done differently and separately from mapping. This system of working brought some conflicts and disputes since some residents contested it. Even though sketch maps were drafted it was a challenge moving the residents since the enumeration data was not linked to the maps. It became a challenge to verify the results of the enumeration. Decanting sites were constructed to temporarily hold the PAPs as a permanent solution was

being looked into. Since this was a government led project and there was no existing community group, the Government formed a Settlement Executive Committee (SEC) which was to work on behalf of those being relocated. This team was selected through a Chief's *baraza* and comprised of the Chair, Secretary, Treasurer, and political representatives. Most of the members were not in touch with the real issues on the ground. Construction of new houses for the slum dwellers took a long time and the residents started renting their decanting site houses as they moved back to their shacks. Furthermore, the decanting sites were far from the many essential services like clinics, schools, markets, and they also lacked water. Conflicts between landlords and tenants were another hindrance to the project implementation. Lack of adequate land for resettlement which was mainly due to lack of prior planning slowed the process (Muraguri, 2011). A lot of lessons were drawn from this attempt, a key one being that it was critical to prepare the locations where the PAPs will be moved before implementing the project. Even though the programme is still ongoing, it has several teething problems, like decanting houses being rented to third parties while the beneficiary moves back to the shacks and this might lead to its failure. So far the achievements of this project were; construction of the 3 roomed decanting sites, household and socio-economic mapping, enumeration of the residents, and preparation of a land use plan and the attempted construction of an access road within Soweto East (Muraguri, 2011). Formation of housing cooperatives societies, SECS, Community self help groups and capacity building within the slums has been one of the highlights of the programme. For such programme to be successful it must be structured with a clear Resettlement Action Plan (RAP) which is achievable and time bound.

2.3 Case Studies

2.3.1 Mumbai Urban Transport Project in India

The Mumbai Urban Transport Project (MUTP) was begun in 2002, and it was to encourage urban financial development and enhance the personal satisfaction by cultivating the improvement of a productive and practical urban transport framework including compelling organizations to address issues of the clients in the Mumbai Metropolis (Eerd and Banashree, 2013). The project displaced over 17,500 households, this translated to around one hundred thousand people and 1,855 business units. 100 religious and community properties were also displaced. In this project the community was given a chance to voice their concerns and

everyone fully participated. It turned out to be the largest in terms of enumeration and relocation within a slum. A resettlement arrangement was produced that depended on the World Bank automatic resettlement strategy. It suggested each impacted family unit ought to be completely made up for loss of land and resources and that every single affected family including landowners, inhabitants, and squatters be given substitution in terms of lodging or business premises of 22s square feet (20.8 square metres).

Retailers and private land proprietors, who were affected, were offered the chance to purchase extra floor space of the same extent to an extra 525 square feet (48.77 square metres) on payment of an approved cost (Giovannetti, 2009). Local participation was encouraged which ensured that the process was fully owned and accepted by the PAPs. Innovative approaches were introduced in this project that was emulated in other projects across India.

The venture included creating resettlement designs and NGOs with broad experience working with slum groups in Mumbai were utilized to aid the resettlement of the slum tenants. The NGOs did mapping and standard financial studies, these studies characterized who was qualified for remuneration and they gave accommodation on the relocation venues. The mapping involved use of plans, satellite imagery, and details from the locals who were fully attached to the project. Structures were digitized from the satellite imagery and the enumeration data used to link them with owners. NGOs involvement in collecting baseline data, proactive consultation, and mobilizing support for shifting helped to ensure that relocation of affected people was largely peaceful and free of any incidents. The project had its challenges especially regarding eligibility of the PAPs to be resettled and quality of data collected. This was mainly due to lack of capacity on the part of the NGOs in carrying out the project.

Through consultation, marking each and every house door and area was done. This was a challenge as there was no clear-cut demarcation of the house. One could not easily discern the starting point and ending point of a house. The community together with the NGOs carried out rough mapping which assisted the plane-table surveyors. Numbering was done and matched with maps. Using the numbers, the surveyors took over and measured the sites. They faced resistance from some community leaders leading to delays in the implementation of the project. The numbers painted on each structure were used as an interview schedule number which was critical

in collecting information and forming the registers. Using the register, households were grouped into units of 50 and another round of checking was undertaken to make sure no one was left out.

The project was successful with over 100, 000 people being moved to a new location to pave way for the construction of improved rail and road networks. The residents were moved to an environment that is safe, secure, and had better infrastructure as compared to their shacks where they faced constant threat of being hit by the passing trains. While plots were available within their dwelling area, apartments were not developed. So families were moved to permanent structures (which were at that point available) where the neighbourhood worked for them, others were moved to decanting sites where family units moved with an understanding that they would be suited at areas that were satisfactory to them (D'Cruz and Mulayan, 2014). Being one of the biggest relocation projects ever done by the World Bank in partnership with the local authorities, the project also had its shortcomings. Several residents and business people made their dissatisfaction known to the World Bank on various resettlements and rehabilitation (R&R) programmes (Andolan, n.d.). It was widely viewed that the relocation benefited the builders through development incentives more than the slum dwellers. It has also been argued that the resettlement sites which are 8-40 kms away from the original dwelling place were far from their working stations and schools which resulted to economic losses. It also inconvenienced the school going children who had to travel long distances to attend school. Several complaints on shoddily constructed flats which were small were also received. Resettlement and Rehabilitation programme for this project never put in place relocation of shops and commercial premises. This resulted in some of the PAPs using their new houses for commercial use leading to congestion in the houses.

2.3.2 Magallanes, Philippines

The Philippines government intended to construct and restore 150 kilometres of railway. The major concern to this project is the encroachments of slum dwellers along the railway line. The project was to affect 90,000 poor urban families, some of the families belonged to the Philippines National Railways - Magallanes Neighbourhood Association. The Association undertook a baseline survey to collect information on the affected people. The government did its own survey to identify the people to be relocated. When the two sides met, there were a lot of inconsistencies since some people who were in the Association list were missing from the

government list. The listing of men as household heads posed a challenge to the households led by women, divorcees, and unmarried couples.

After negotiations, the association's list was used as the master list after the Government agreed to include all the people who were left out. In this project, the list was used as the basis for relocating the affected people from Manila to Cabuyao. In this scenario there was no mapping done but the government depended mainly on the enumerations done by the Association. Relocation was purely based on the agreement between the Government and the association. In the end there were complaints as the government did not meet some of the demands by the association (UN- Habitat, 2010). This criterion is similar to the one used in Rusumo Relocation project for persons who were affected by the construction of the Regional Rusumo Hydro Power project in Tanzania. It involved an inventory of the people who were affected (Webber, 2010).

2.3.3 Relocation Action Plan, a World Bank Sponsored Programme in Kenya

This was an initiative led by the World Bank and the Kenyan government through Kenya Railways Corporation. The major aim of the project was to upgrade the living conditions of slum dwellers in Mukuru and Kibera slums residing on the Railway reserve. This was also meant to preserve the railway right of way (RoW) and lead to efficient running of the trains. A lot of lessons were drawn from the programme as it promised to achieve much in terms of plans and designs that were proposed. The RAP project aimed at having slum dwellers live in their present locations, but in better houses and within a safe zone from the operations of the trains. Disaster Risk Prevention from hazards was the major guidance of this project.

It involved mapping of structures using satellite imagery in Kibera and Mukuru slums. It involved identification and numbering of structures within the 60 m railway reserve. The following structures were mapped according to REMU data.

Table 1: Household Survey

<u>Structure Type</u>	<u>Kibera</u>	<u>Mukuru</u>	<u>Total</u>
Residential & Business Units	6952	2615	9567
Public Utilities(Including toilets, Water points, Bathrooms)	258	532	790
Informal Schools	43	5	48
Post election violence victims structures	23	-	23
<u>Grand Total</u>			10428

Source: REMU

PAPs were moved to decanting sites as construction was being done. These sites were temporary houses for the PAPs. Relocation has been successfully done in Mukuru and some sections in Kibera. The management has been receiving complaints from the affected persons and so far 7,350 complaints have been received, 2,064 complaints have been resolved and the remaining cases have not been resolved. In Soweto East the principle of 1 PAP 1 unit was followed and each structure owner was allocated 1 unit. The structure owners were also financially compensated depending on the number of structures (Pamoja Trust, 2011).

CHAPTER 3: MATERIALS AND METHODS

3.1 Data

3.1.1 Orthomosaic

An aerial image of Kibera of 10cm resolution taken in 2016 was used. Image was acquired from Ramani Geo-systems.

3.1.2 Railway Network

The centreline of the Railway network covering the city of Nairobi was sourced from the Kenya Railways Corporation.

3.1.3 Administrative Boundaries

Administrative boundaries were sourced from the Survey of Kenya and were used to delineate the boundaries of Kibera and villages within the slum.

Table 2: Data and Datasets

No.	Data Type	Characteristics	Source
1	Aerial Imagery (2016)	10 cm resolution	Ramani Geosystems
2	Kibera Household Survey data	Soweto East survey data	Pamoja Trust
3	Administrative boundary data	Sub-location Shapefiles for Nairobi County	Survey of Kenya
4	Other attribute Data including project impact data	Semi/structured	Questionnaires, interviews, discussions, direct observation.
5	Schools Data	Schools shapefiles	Ministry of Education
6.	Railway Plans	Railway line sheets	Kenya Railways
7	RAP houses design	CAD Drawings	Relocation Management Unit (REMU)

3.2 Tools

3.2.1 Hardware

- A personal computer
- Camera
- Questionnaire

3.2.2 Software

- ArcGIS 10.2.1
- Global Mapper 15

- Autocad 2007
- SPSS

3.3 Preparation of Data

Aerial imagery was acquired and manipulated into Geotiff format which was the most appropriate format. All the other datasets were also manipulated into acceptable formats. Datasets to be used were projected onto Arc 1960 Datum with a projection of Universal Transverse Mercator (UTM) for uniformity and ease of use.

3.3.1 Overlay

The Aerial imagery was opened in ArcGIS software. Administrative boundaries were overlaid on the image to ease the identification of the affected area. The area of interest was clearly identified and delineated.

3.3.2 Digitization

a. Mapping of the railway centreline

From the aerial imagery the centreline of the Railway line was digitized and stored in a file geodatabase on the ArcGIS. Since the Railway reserve covers a corridor of 60m, a buffer of 60m, 30m on either side of the Railway line was created as shown in Figure 3.

Non-spatial data acquired from the NGOs were sorted and relevant information extracted from the statistics.

With the railway reserve created, the encroachment within the reserve was mapped out. All the structures within the Railway reserve were digitized using ArcGIS as shown in Figure 3.

b. Mapping of Existing encroachments

Using aerial imagery of March, 2016, the encroachments within the railway reserve were identified and digitized.

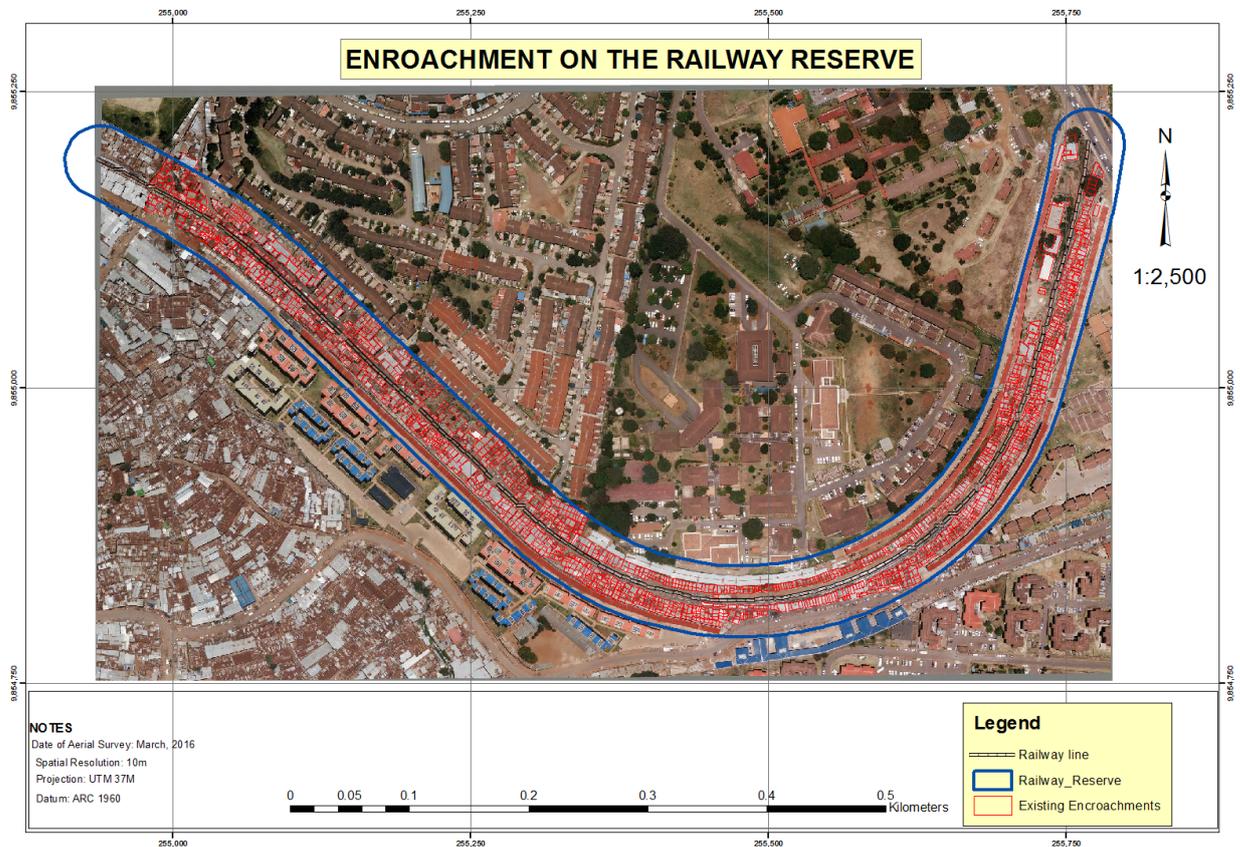


Figure 3: Structures encroaching on the Railway Reserve within Soweto East

After the digitizing of the encroachment was done, World Bank houses within the reserve were also identified and digitized as shown in Figure 4. Some of the houses that stand within the railway reserve have been occupied. Others have not been occupied due to the fact that they are still under construction. RAP houses were to accommodate all the PAPs encroaching on the railway reserve.

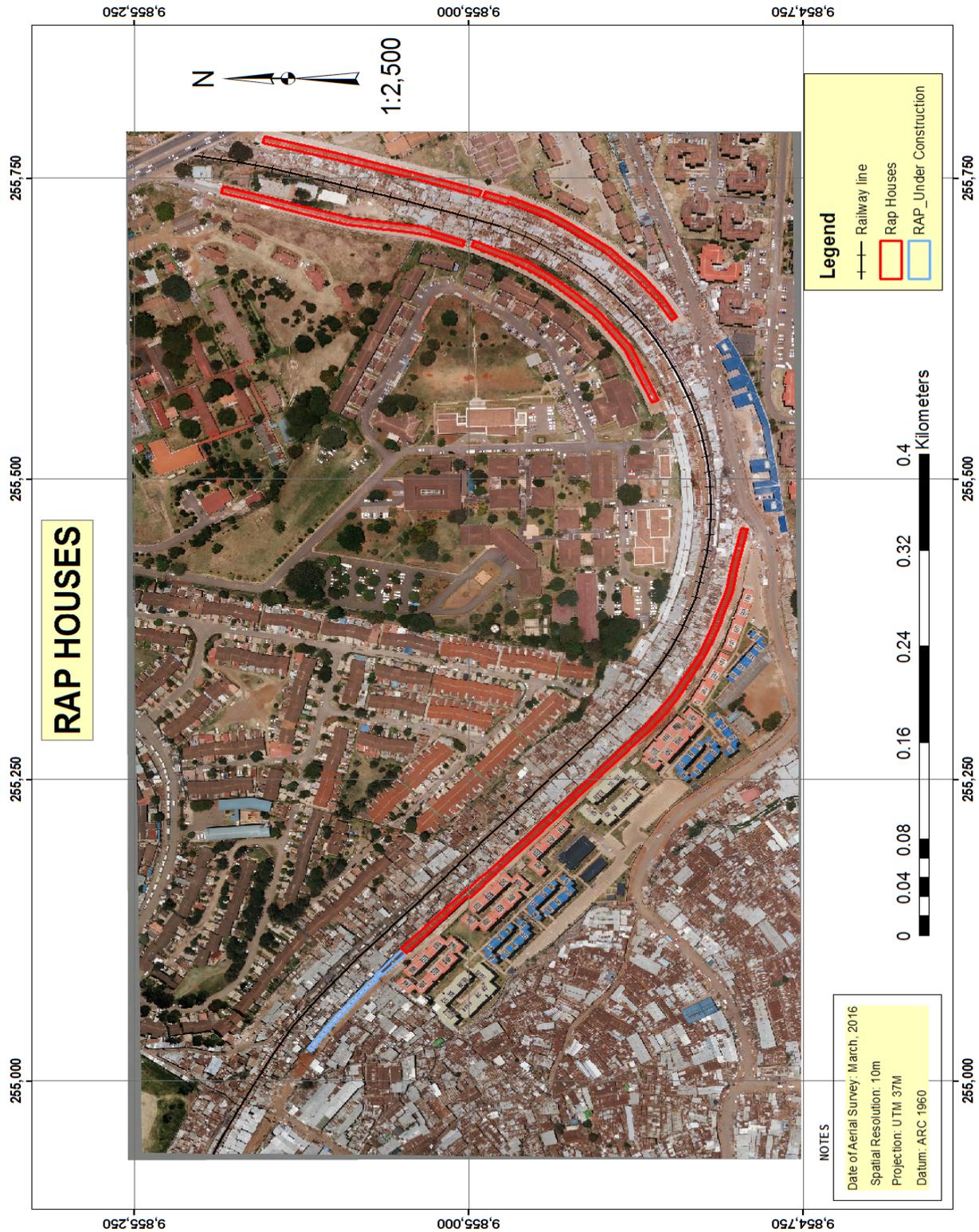


Figure 4: RAP houses in Soweto East

3.3.3 Comparison between RAP houses and the Design

Problems experienced in relocation of project affected persons were partly due to shortage of relocation units. A comparison was done between the design and the constructed units (see Table 4).

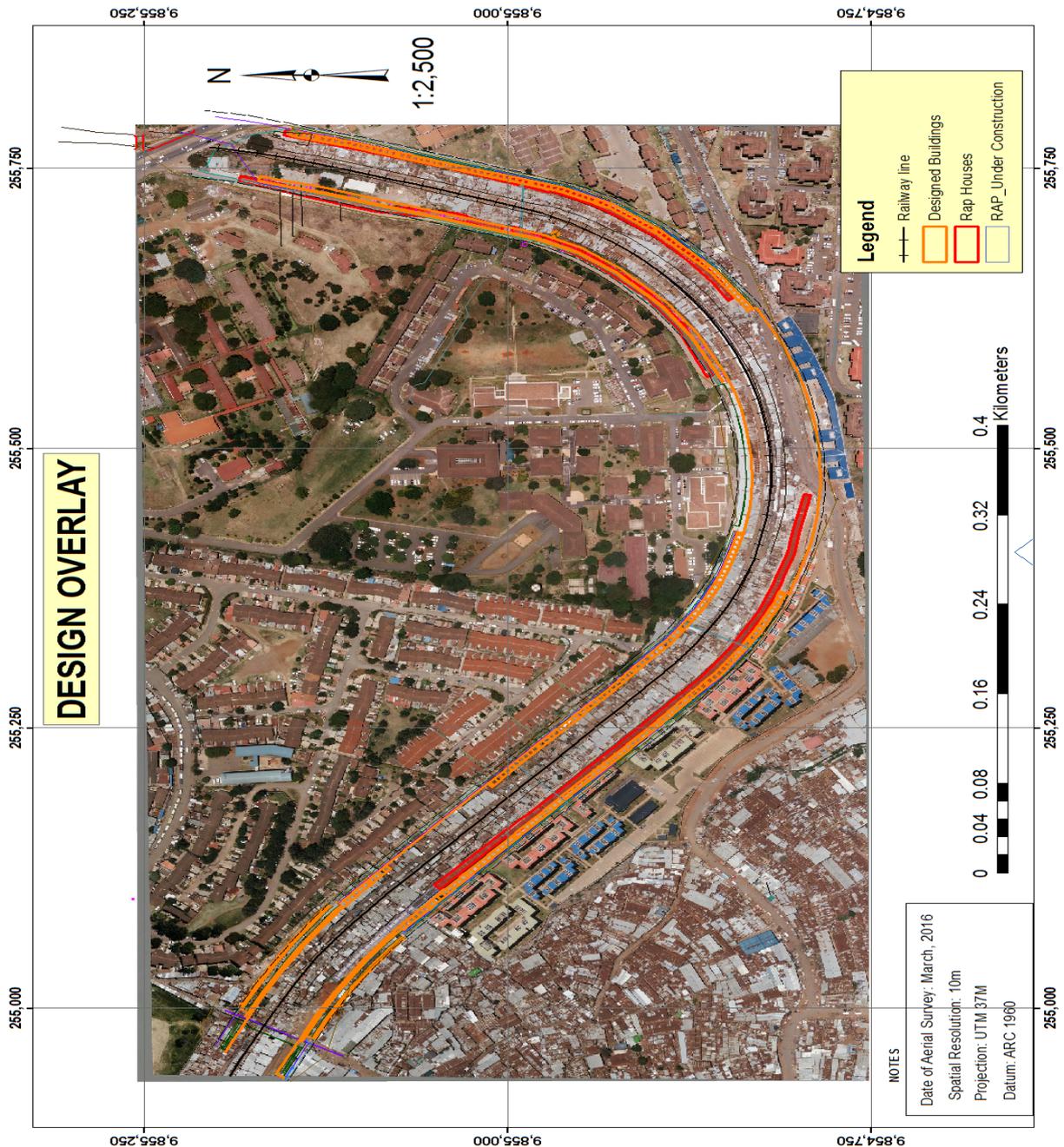


Figure 5: Design overlay

The design was overlaid on the aerial image to compare if the design was implemented as planned. Measurements of the area covered by the design were taken and compared against the existing RAP houses.

3.3.4 Questionnaire Research Design

Questionnaires were administered to the affected people. This involved random sampling of the affected persons within Soweto East area.

3.3.5 Data Collection

Data collection was done by administering structured questionnaires to the affected persons. These questionnaires were open ended and were designed in an objective manner. Other methods that were used in the research were direct observations, one on one interview with village elders, and stakeholders. Photos of the general area were taken to make a clear comparison of the people relocated to the RAP houses and those still living in shacks. Consultations with the Relocation management Unit (Remu) on the ongoing project provided useful information for the project.

Questionnaires were administered to the Kibera Soweto East residents. This was done to both sets of project affected persons; those relocated into RAP houses and those still living in shacks. The objective of the questionnaires was to achieve the maximum information on the impact of the RAP programme. Information gathered was based on the ongoing RAP process, impact of the process, effectiveness and transparency within the project. Using questionnaires, the residents gave opinions on the best way to implement such a project without a lot of acrimony. Rating of the project was given with satisfactory level being at Excellent and less satisfied at Very poor. 100 Questionnaires were given out to the respondents. Sample questionnaire can be seen in Appendix A.

CHAPTER 4: RESULTS AND DISCUSSIONS

4.1 Results

4.1.1 PAPS relocation

100 people were interviewed on the success of the project and the results as in Figure 6. 60% of the people interviewed were successfully relocated to the new residential houses.

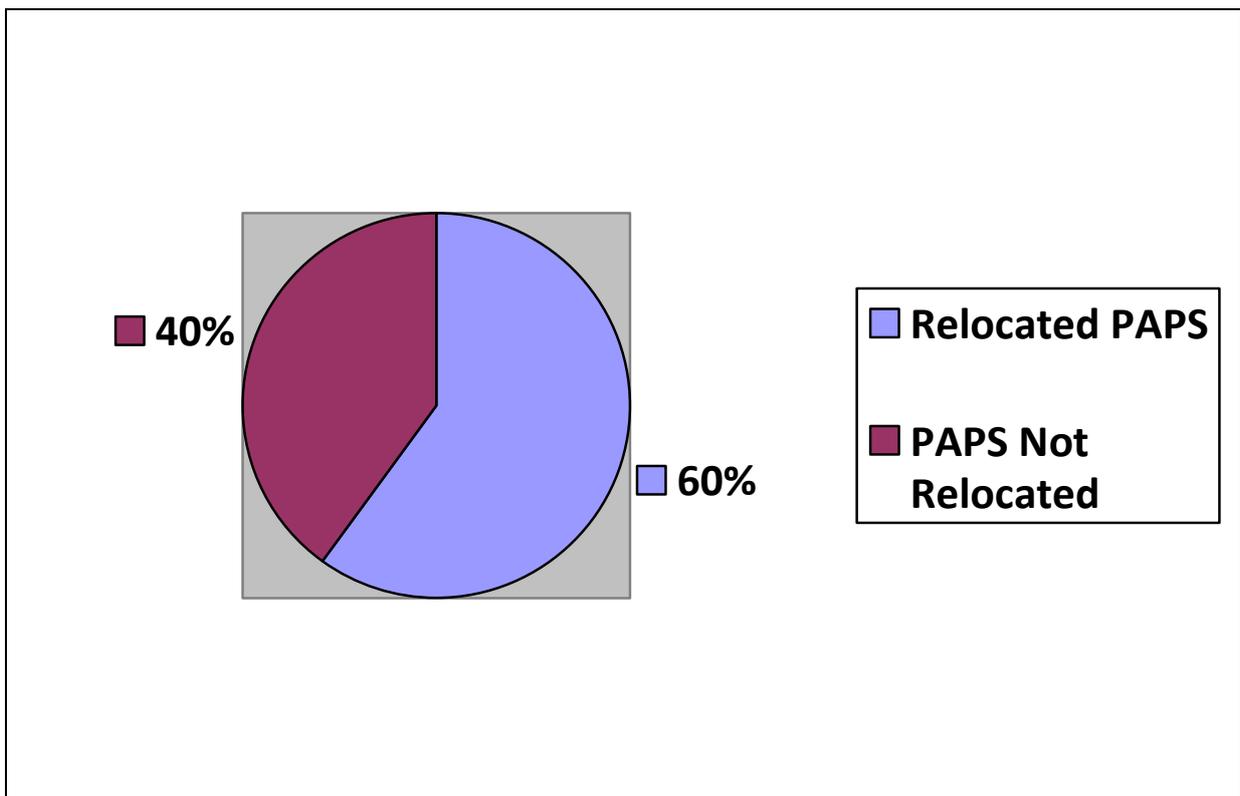


Figure 6: Relocation within Soweto East

4.1.2 Transparency within the Relocation process

The main aim of the question was to establish if the process was above board. Among the 100 PAPs interviewed, 70 % of the people agreed that the project was done in an open manner and surveyors re-did the enumeration for those who had been left out. 30% of the PAPs felt that the relocation project was not transparent. Their main reason was that those who were not enumerated were not given a fair hearing in the vetting process. There was a general feeling that there was favouritism during the relocation process. 10% of those who have not been relocated were confident of being relocated since their details were captured and were assured of houses after completion of all units.

4.1.3 Rating the process

The questionnaire sought information on the relocation process from the PAPs. PAPs were meant to rate the whole relocation exercise. It gave options of Excellent, Good, Fair, and Poor. The answers were as shown in Figure 7.

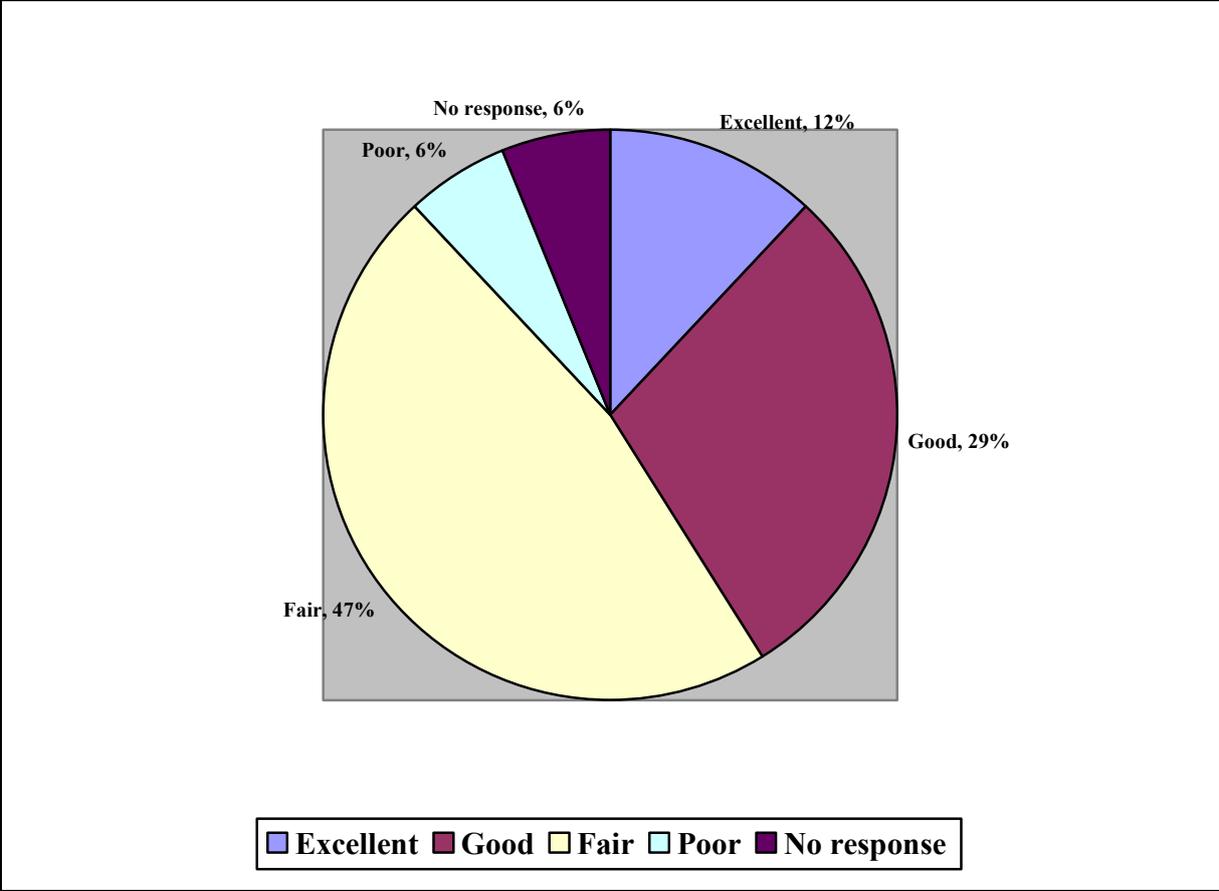


Figure 7: Rating of the relocation process

4.1.4 Relocation on the ground

Data obtained from the REMU showed that only 760 out of the total 1432 had been relocated in Soweto East. However, officials from Remu argued that there are some PAPs within Soweto East who agreed to be relocated to Mukuru and others are still waiting to be moved to new units near Kianda. These results are illustrated in Table 3 and Figure 8.

Table 3: REMU Data on relocation the of Soweto East PAPs

PAPs	Relocated	Pending	Total
Residential	760	672	1432
Business	656	50	651
Institutions	29	13	16

Source: Relocation Management Unit (Remu)

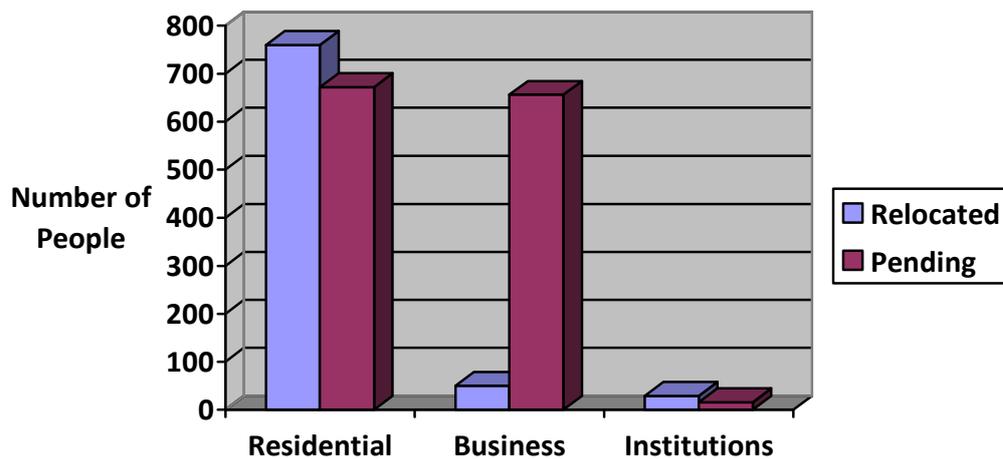


Figure 8: Relocation within Soweto East

4.1.5 Status of the Railway Reserve

The railway reserve is still heavily encroached with shanties and human activities as shown in Figure 9 and Plates 3 and 4.

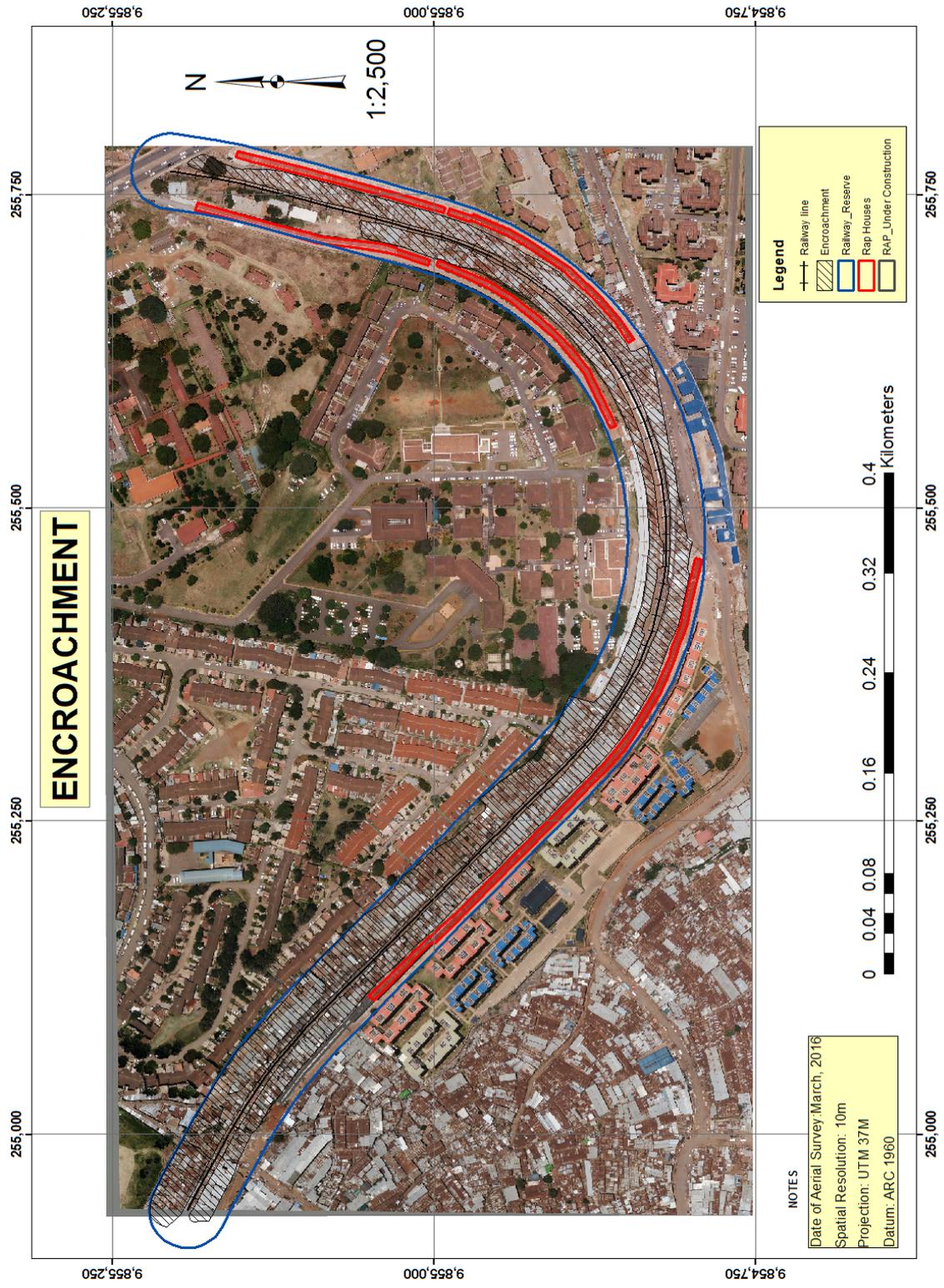


Figure 9: Existing encroachments on the railway reserve after relocation



Plate 3: Existing encroachments on the railway reserve, as at August, 2016



Plate 4: Encroachments and dumping on the railway reserve as at August, 2016

4.1.6 Design versus Actual Construction

The actual construction on the ground has taken an area of 5424 square meters out of the 10,248.83 square meters on the proposed design. The constructed, under construction and pending areas are shown in Figure 10.

Table 4: Design versus actual construction

Item	Area(Square meters)	Percentage
Total Area of the Design	10248.83	100%
Constructed area	5424.34	53%
Pending	4824.49	47%

Figure 10 shows the pending construction sites that have not been implemented.

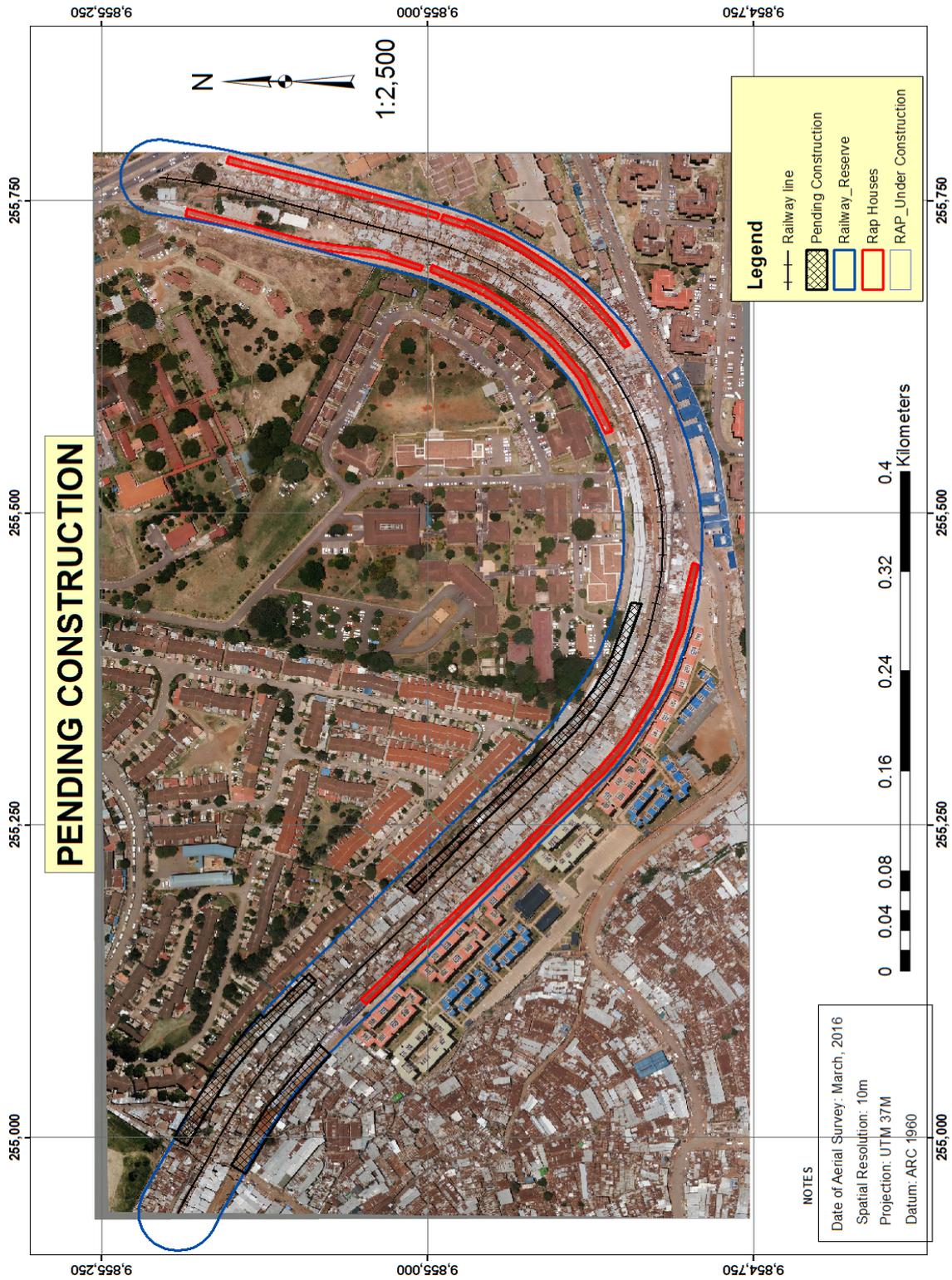


Figure 10: Pending construction sites

4.2 Discussion of Results

According to the people interviewed, 60% of the Soweto East population had been moved to the new units. The figure did not meet the expectations; this was largely due to fewer completed units within Soweto East. This shortage meant that some PAPs will have to wait a little longer for other units to be completed. According to REMU officials, a number of PAPs from Soweto East opted to move to Mukuru RAP houses. Scenarios like this lead to dismantling of the social set ups within the society. From this study it was noted that the data that was used during enumeration was not sufficient as it failed to put into consideration houses that shared same roof but demarcated to separate households. These houses were counted as one household. Structures that were within the reserve and had been several floors posed a challenge to the enumerators since they were mapped as one structure, linking these structure to the several PAPs was indeed an uphill task.

The relocation process was deemed largely successful by the PAPs interviewed. 70% were happy with the project. The fact that the surveyors involved in the project did the household survey several times before coming up with the final list of the affected people was appreciated by most PAPs. A majority of the PAPs who have been relocated observed that the people who were their neighbours in the shacks are still their neighbours in the relocation units. However, there are some claims of favoritism in the way houses were allocated. Claims of bribery and tribalism were noted during the study. REMU has been taking complaints from those PAPs who have not been relocated and vetting them to ensure they are eligible for relocation. The management of the relocation units has assured the remaining residents of being relocated once the new relocation units in Soweto East and Kianda are completed. Disparities within the process point to the fact that a thorough feasibility study was not conducted. Such a study would have foreseen the inherent problems that may arise during relocation and offered mitigation measures.

Implementing the proposed design (Appendix C) would have resulted in sufficient houses for the slum dwellers within the Railway reserve in Soweto East. Since the design was not followed to the letter with some earmarked areas not used for construction meant that there will be a shortage. Only 52% of the proposed design has been implemented as shown in Table 4.

Landlords and ladies have been a stumbling block to the relocation process since they keep renting out their structures even though they are set to be demolished. This has led to more than one claim to a structure. The relocation management unit has also failed in demolishing structures where relocation has taken place. With structures getting new tenants, the process of clearing the railway reserve becomes complicated. REMU has come up with alternative dispute resolutions (ADR) mechanism like using the neighbours to identify eligible PAPs in cases of multiple claims. REMU has also used village elders and SEC members to resolve disputes. Through this mechanism complaints have been invited and resolutions made. Meetings were organized to hear the complaints and most cases have been resolved amicably.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

The objectives of the project were:

- a. To identify and map existing encroachments on the Railway reserve
- b. To map and establish the extent of the World Bank sponsored RAP project
- c. To establish the effectiveness of the World Bank relocation project as to whether it met the initial objectives of safety of the PAPs and a secure railway reserve
- d. To analyze the social impact of the relocation on the Project Affected Persons (PAPs)

These have been achieved and it is concluded that:

- As much as relocation has taken place, it has not been fully successful. A lot has to be done to achieve full relocation. Only 52% spatial completion has been achieved at the moment.
- With proper planning, the railway reserve can be cleared of encroachments.
- PAPs within Soweto East who have been relocated are satisfied with the process. Most of them have been relocated within the same locality therefore maintaining existing social organization patterns.
- Conflict has been averted during the relocation process by constant sensitization, community awareness a grievance resolution mechanism. It has worked well for Soweto East.
- Linking spatial data and non-spatial information from the participatory enumerations is the best way to identify eligible PAPs for relocation.

- Most of the residents who have been relocated have access to water, clean toilets, and efficient waste disposal services. There has been a general improvement in their lives. However, the size of the rooms was a concern to many especially large families.

5.2. Recommendations

From the work carried out in the project, it is recommended that:

- In future, law enforcers and other state actors should use geospatial techniques to assist in the relocation of people who have been affected by projects and also relocating people from disaster prone areas. The affected people should be fully engaged in mapping of their areas through VGI.
- A number of complaints arose from the fact that the houses are small and need to be expanded or PAPs to be offered 2 units. It is therefore recommended that the size of the units be enlarged to accommodate big families.
- When it comes to implementing a project of such magnitude, legal issues will always arise from interested parties who in most cases are outsiders but beneficiaries of such situations. It will therefore be prudent for the implementing agency to dialogue with the real and affected beneficiaries to mitigate cases and issues that may arise. Alternative dispute resolution mechanisms should be put in place to avoid prolonged litigations which might affect the project.
- The Railway reserve can be secured by demolition of vacated houses. This will eliminate the act of landlords re-renting the houses after the tenants have been relocated.

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APPENDICES

Appendix A: Enumerations questionnaire

Appendix B: Railway line sheet

Appendix C: World Bank funded RAP Houses design

Appendix A: Relocation questionnaire

Soweto East Relocation Questionnaire

PART A: INTRODUCTION

This questionnaire is to help understand how effective the on-going relocation process is.

Declaration: This information is confidential and it will be used purely for academic purposes.

PART B: RELOCATION

- ✓ Has Actual Relocation taken place in your village?

Yes () No ()

- ✓ Have you been relocated?

Yes () No ()

- If Yes .Are you happy with the process?

Yes () No ()

- If No, What are the reasons for not relocating?

(a)

(b)

(c)

(d)

- 3) Do you think the process was transparent with genuine PAPs being relocated?

Yes () No ()

Explain your answer

.....
.....
.....

4) Do you think the Household survey done was comprehensive?

Yes () No ()

Explain your answer

.....
.....
.....

5) Rate the Relocation program as:

5 – Excellent ()

4 – Good ()

3 – Fair ()

2 – Poor ()

1 – Very Poor ()

6) Suggest ways that that can improve the relocation process

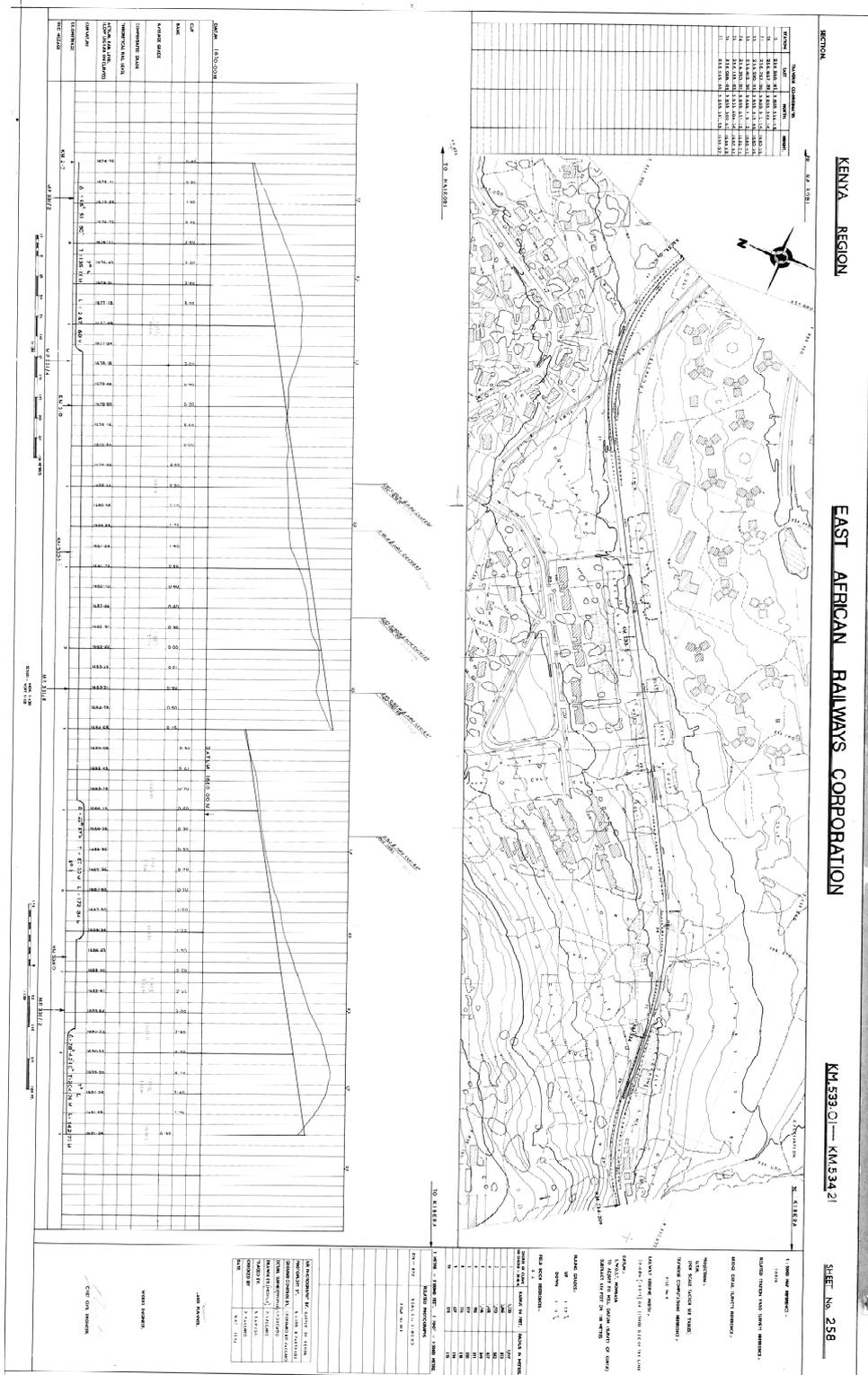
.....
.....
.....
.....
.....

Signature _____

Date _____

Thank you for your Time

Appendix B: Railway line design, Nairobi - Kibera section



Appendix C: World Bank funded RAP houses design