9.1 TERMS OF REFERENCE FOR THE ENVIRONMENTAL IMPACT ASSESSMENT

TECHNICAL SPECIFICATIONS

1. INTRODUCTION

1.1 Background and Objectives of the Study

As in many cities in the world, solid waste management in Nairobi City is facing several problems of great importance that can directly affect the environment and the health of the population. Among the problems can be mentioned the unsanitary condition of the disposal site favoring the reproduction of sickness vectors, pollution of surface and ground water, smell and dust production with reduction of the aesthetic condition of the city. Besides, the waste collection is inefficient because the number of collection trucks is inadequate and those existing are old and suffer constant breakdowns, resulting in a low coverage of the service, favoring the illegal dumping anywhere, representing a potential impact on public health and the environment.

Under these circumstances, the Government of Kenya has made every effort to improve the sanitary environment of Nairobi City, and as part of its strategy, has requested the technical cooperation of Japan to conduct a study on solid waste management. The objectives of the Study include the formulation of a Master Plan and Feasibility Study for the selected project(s) in order to manage the solid waste produced in Nairobi City and thus to upgrade the environmental quality of the city and health condition of its residents.

1.2 Objectives of the Environmental Impact Assessment

Environmental Impact Assessment (EIA) is required as a part of the feasibility study to delineate the characteristics of the project and potential natural and social impacts resulting from project implementation. It also proposes a suitable approach to identify significant impact and impact sources, and proper measures are suggested to mitigate adverse effects.

1.3 Project Selected for EIA

One of the priority projects chosen under the Master Plan is the construction of a new landfill site as a part of the solid waste management improvement program of Nairobi City. For this project, Initial Environmental Examination was conducted on the candidate sites, and a detailed EIA shall be executed in this stage of the Study on two candidates sites, which were chosen for the proposed project to prevent or mitigate possible negative effects on the environment that could emerge from project implementation.

1.4 Project Justification

The Dandora Disposal Site categorized as an open dumping type has a detrimental effect on public health and the environment of the surrounding area due not only to air and water pollution but also to the associated problem of insects and animal pest. For

this reason the construction of a new landfill site in a sanitary manner is highly recommendable to improve the environmental quality of the city and the level of public health of the population.

1.5 Project Description

The proposed project is the construction of a new landfill site for domestic waste to serve the whole urban area of Nairobi City. This Project is selected as one of the priority projects to be analyzed in the feasibility stage of the Study.

Mainly, the new landfill site shall consist of the following components:

(1) Fence
(2) Building
(3) Truck scale
(4) Roads
(5) Ramps
(6) Drainage
(7) Gas and leachate control system
(8) Wells for ground water monitoring
(9) Structures for solid waste retention

2. SCOPE OF WORK

2.1 General

The Terms of Reference for EIA has been prepared with respect to the findings in the Initial Environmental Examination (IEE) conducted during the Master Plan Phase.

The EIA is to be carried out by a local consultant under the supervision of the JICA Study Team on two candidates sites based on the Terms of Reference and taking into account the existing laws and regulations related to environment in Kenya and the international standards.

The EIA report shall include all results of the analysis compiled as follows:

(1) Introduction

  (a) Background of the Project
  (b) Brief explanation of the site and a location map
  (c) Description of the Project
  (d) Legislative and regulatory framework

(2) Present Environmental Condition

  (a) Natural environmental conditions
  (b) Social environmental aspects

(3) Public awareness

(4) Analysis of alternatives (design, location, technology, etc.)

(5) Identification of potential impact and impact sources

(6) Assessment of environmental impacts

(7) Description of preventive or mitigation measures against adverse effects

(8) Environmental management plan

(9) Environmental monitoring plan

(10) Drafting of EIA

(11) Conclusion and recommendations

(12) Bibliography

(13) Appendices

The report shall be duly prepared and submitted to the Nairobi City Council for approval.

2.2 Work Items and Contents

The Environmental Impact Assessment shall be carried out in accordance with the Terms of Reference and as instructed by the JICA Study Team.

The two candidate sites, the Ruai Area and the Ngong Road Forest Area, are shown in **Fig. 1**, and the items and contents of the required work to be executed for each candidate site are as given below.

2.2.1 Ruai Area

(1) Present Environmental Condition

(a) Natural Environmental Condition

(i) Water Quality

Components	Parameter	Number of Samples	
		Water	Sediment*
Surface Water (Nairobi River)	Pb, Cr^{+6}, Cu, Fe, Mn, Zn, Hg, As, DO, BOD, COD, TN, Total Coliform, Fecal Coliform, pH, SS, Pesticides	2 samples/river × 1 river × 2 times = 4 samples Samples shall be taken from Nairobi River, one from up stream and one from down stream of the proposed site. The first sampling should be conducted on a dry day while the second one after a rainy day.	1 sample/river x 1 river x 2 times = 2 samples. Samples shall be taken from Nairobi River bottom, just in front of the proposed site. The first sampling should be conducted on a dry day while the second one after a rainy day.
Groundwater (Existing well and well to be constructed by the JICA Study Team for hydrogeological survey)	Colour, EC, pH, Total Coliform, Fecal Coliform, Turbidity, Chloride, Sulphate, Hardness, Permanganate, Nitrate, Nitrite, NH3, TN, Fluoride, Pb, Cr, Cu, Fe, Mn, Zn, Hg, As	1 sample/well × 2 wells × 2 times = 4 samples One sample shall be taken from an existing well and the other one from the well to be constructed by the JICA Study Team. The first sampling should be conducted on a dry day while the second one after a rainy day.	
Drinking Water (Existing pipeline or distribution system)	Colour, pH, Total Coliform, Fecal Coliform, Turbidity Permanganate, Nitrate, Nitrite, NH3, TN, Fluoride, Pb, Cr, Cu, Fe, Mn, Zn, Hg, As, Pesticides	1 sample/point × 2 points × 2 times = 4 samples The first sampling should be conducted on a dry day while the second one after a rainy day.	

* Only heavy metals will be analyzed in sediment.

(ii) Fauna and Flora

Existing species, endangered or not, habitat, etc., in the proposed area.

(iii) Landscape

Topography, geology, land use, etc.

(iv) Soil Pollution

Components	Parameter	Number of Samples
Sludge	Pb, Cr^{+6}, Cu, Fe, Mn, Zn, Hg	2 samples/pond × 1 pond = 2 samples Samples shall be taken from the bottom of the primary pond (one from the inlet and one from the center) currently used for domestic wastewater treatment
Soil	Pb, Cr^{+6}, Cu, Fe, Mn, Zn, Hg	1 sample/point × 2 points = 2 samples One sample shall be taken from around the primary pond and the other one from around the maturation pond. Samples shall be taken from a depth of 50 cm.

(v) Noise

2 spots × 1 time/hour × 12 hours = 24 samples

Locations of spots shall be the same to those selected for the traffic survey.

(vi) Offensive Odor

H_2S

1 spot × 2 times = 2 samples

(Range of measurement: 0.02-0.2 ppm)

NH_3

1 spot × 2 times = 2 samples

(Range of measurement: 1-5 ppm)

Samples shall be taken from around the primary pond. One sampling should be conducted on a dry day while the other sampling after a rainy day.

(b) Social Environmental Aspects

(i) Analysis of Population Affected by the Project

Manner of Subsistence

Income Level, Education Level

Population and Compositon

Housing

Health Condition and Sanitation

Number of patients due to waterborne and other communicable diseases.

Water supply coverage.

Sewage disposal methods.

Garbage disposal methods.

Custom, Religion

(ii) Traffic Survey

2 spots × 1 time/hour × 12 hours = 24 samples

One spot survey shall be located on the main road and the other spot on the road entering the proposed area.

(3) Analysis of Alternatives (design, location, technology, etc.)

(4) Identification of Potential Impact and Impact Sources

(5) Assessment of Environmental Impacts

(6) Description of Preventive or Mitigation Measures against Adverse Effects

(7) Environmental Management Plan

(8) Environmental Monitoring Plan

(9) Draft of EIA

2.2.2 Ngong Road Forest Area

(1) Present environmental condition

(a) Natural Environmental Conditions

(i) Water Quality

Components	Parameter	Number of Samples
Surface Water (Two rivers to be specified by the Engineer)	NH_3, TN, Nitrite, Nitrate, DO, BOD, COD, TN, Total Coliform, Fecal Coliform, pH, SS, Pesticides	2 samples/river × 2 rivers × 2 times = 8 samples Samples shall be taken from both rivers and the sampling point shall be up and downstream of the proposed site. The first sampling should be conducted on a dry day while the second one after a rainy day
Groundwater (Existing well and well to be constructed by the JICA Study Team for hydrogeological survey)	Colour, EC, pH, Total coliform, Fecal Coliform, Turbidity, Chloride, SO_4, Hardness, Permanganate, Nitrate, Nitrite, NH_3, TN, Fluoride, Pb, Cr, Cu, Fe, Mn, Zn, Hg, As	1 sample/well × 2 wells × 2 times = 4 samples One sample shall be taken from an existing well and the other one from the well to be constructed by the JICA Study Team. The first sampling should be conducted on a dry day while the second one after a rainy day.
Drinking Water (Existing pipelines or distribution system)	Colour, pH, Total Coliform, Fecal Coliform, Turbidity Permanganate, Nitrate, Nitrite, NH_3, TN, Fluoride, Pb, Cr, Cu, Fe, Mn, Zn, Hg, As, Pesticides	1 sample/point × 2 points × 2 times = 4 samples The first sampling should be conducted on a dry day while the second one after a rainy day.

(ii) Fauna and Flora

Existing species, endangered or not, habitat, etc., in the proposed area.

(iii) Landscape

Topography, geology, land use, etc.

(iv) Noise

2 spots × 1 time/hour × 12 hours = 24 samples

Locations of spots shall be the same as those selected for the traffic survey.

(b) Social Environmental Aspects

(i) Analysis of Population Affected by the Project

Manner of Subsistence

Income Level, Education Level

Population and Composition

Housing

Health Condition and Sanitation

Custom, Religion

(ii) Traffic Survey

2 spots × 1 time/hour × 12 hours = 24 samples

One spot survey shall be located on the main road and the other one on the road entering the proposed area.

(3) Analysis of Alternatives (design, location, technology, etc.)

(4) Identification of Potential Impact and Impact Sources

(5) Assessment of Environmental Impacts

(6) Description of Preventive or Mitigation Measures against Adverse Effects

(7) Environmental Management Plan

(8) Environmental Monitoring Plan

(9) Draft of EIA

2.2.3 Public Awareness (for both sites)

The public awareness survey shall include:

(1) Necessity of new disposal sites
(2) Environmental degradation of Nairobi City due to waste
(3) Importance of sanitary improvement
(4) Willingness to participate in the SWM improvement for Nairobi City

This survey shall be conducted by interviews to the people who are going to be benefited and/or affected by the project. The location and number of families to be interviewed shall be as follows:

Item No.	Location	Number of Families
High Income Area		
(1)	Langata	2
(2)	Runda	2
(3)	Spring Valley	2
(4)	Loresho	2
(5)	Kitisuru	2
Middle Income Area		
(1)	Buru-Buru	5
(2)	Umoja	5
(3)	Komarock	5
(4)	Kahawa West	5
(5)	Nairobi West	5
(6)	Ngara East	5
(7)	South B	5
(8)	Madaraka	5
(9)	Ngumo	5
(10)	Uhuru	5
(11)	Kariobangi South	5
Low Income Area		
(1)	Makadara	5
(2)	Makongeni	5
(3)	Dandora	5
(4)	East Leigh	5
(5)	Mathare North	5
(6)	Muthurwa	5
(7)	Kibera State	5
(8)	Kawanware	5
(9)	Bahati	5
(10)	Kariobangi North	5
Slum Area		
(1)	Kitui Village	5
(2)	Kibera	5
(3)	Mathare South	5
(4)	Korogocho	5
(5)	Kayaba	5
Other Areas		
	Communities located near the candidate sites (Ruai and Ngong Road Forest Areas)	100
Total		240

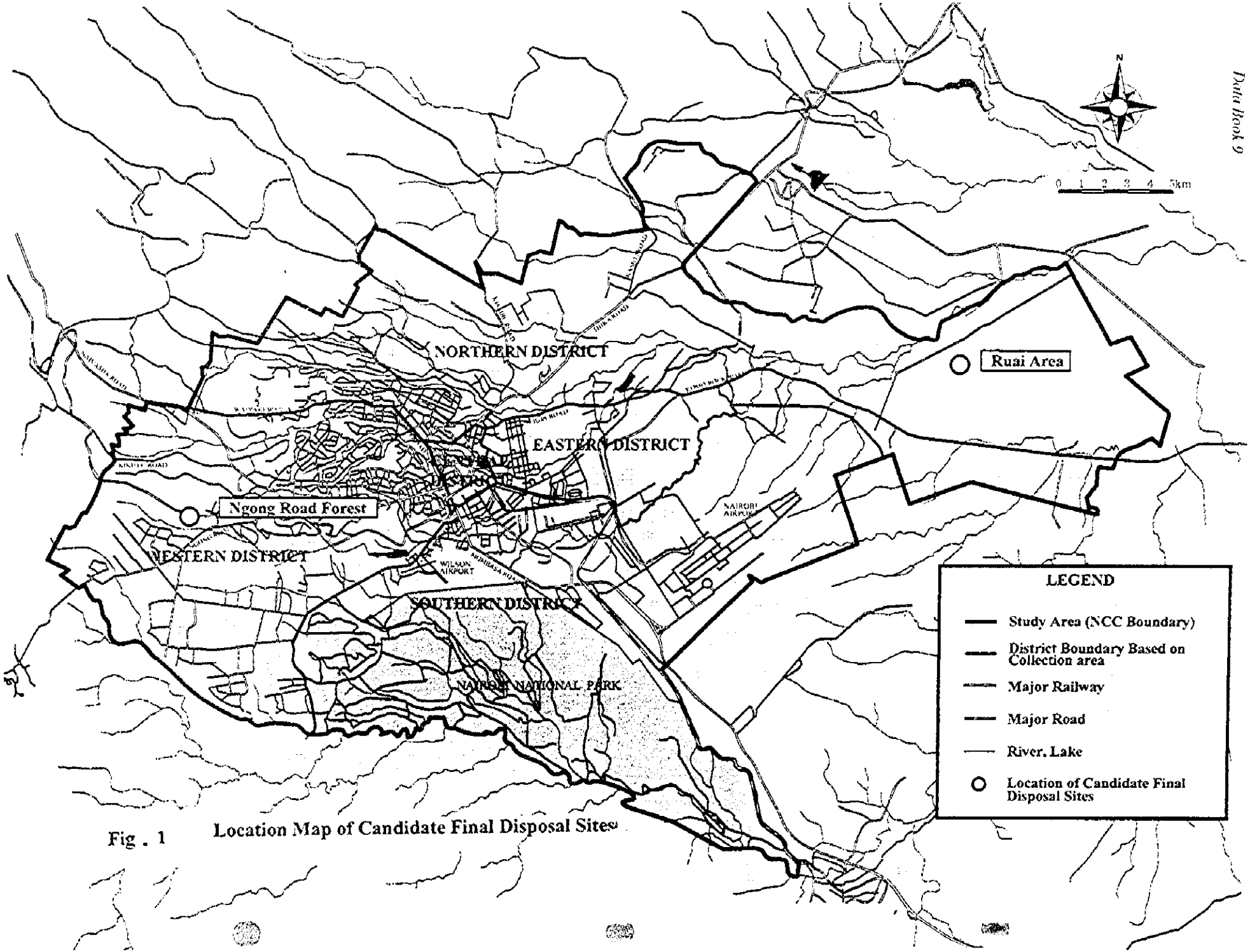


Fig . 1 Location Map of Candidate Final Disposal Sites

3. METHODOLOGY

3.1 Data Collection and Analysis Methods

Execution of the EIA will start with the collection of existing data and information on natural and social environment in and around the candidate sites. These data, so called primary data, may be available in relevant institutions or agencies and will be used for further analysis work on environmental components of the Study. In addition, information on specific items shall be obtained through field investigation and measurement.

Kenyan Standards shall be used for analyzing the environmental components described in the scope of work. However, presently, some standards are still in the process of formulation and in these special cases international standards shall be used.

3.2 Methods for Identification of Impacts and Determination of Significant Impacts

(1) Identification of Impacts and Impact Sources

Environmental impacts and impact sources shall be predicted for each phase of project implementation, i.e., construction, operation and closure of the disposal site, and should generally be made with the use of quantitative data. If such data is difficult to obtain, qualitative prediction procedures shall be used.

(2) Significant impacts

The significance of environmental impacts shall be shown in three levels; i.e., high, moderate and low, in accordance with the magnitude of impact in each phase. Significant impact shall be determined on the basis of non-negligible environmental changes induced by project implementation.

3.3 Method of Assessment of Environmental Impacts

The forecasting results shall be assessed by comparing them with values specified in standards used as assessment targets and also with analogous precedents.

4. WORK SCHEDULE

The shall Environmental Impact Assessment be completed on schedule. Two (2) copies of the draft report on Environmental Impact Assessment shall be submitted to the JICA Study Team by December 5, 1997. However, follow-up actions shall be taken by the Contractor until final approval of the report by the Government of Kenya. Two (2) original and one (1) copy of the approved report shall be submitted to the JICA Study Team by January 15, 1998.

9.2
INITIAL ENVIRONMENTAL EXAMINATION

9.2 INITIAL ENVIRONMENTAL EXAMINATION

1. NGONG ROAD FOREST CANDIDATE SITE

(1) Natural Condition

Generally, the place selected by the Kenyan authorities concerned for the final candidate disposal site, is located on a flat land at about 10 km west of Nairobi City. The location of the disposal site (20 ha) is composed by grassland (about 10 ha) and forest (about 10 ha). The soil composition varies from sandy clay to murran (soft rock) within a depth of about 1.5 m, based on the observation of excavations. The area is unfenced and is owned by the Central Government. Some parts of the area is presently used for soil extraction and pasture for livestock.

(2) Socioeconomic Condition

As mentioned before, the site selected is composed of grassland surrounded by forest. In some parts of the proposed site, extraction of soil for road construction could be observed. Besides, some people use the place for grazing. The Ngong Forest Primary School with 900 students and around 23 houses are located in the vicinity of the site. These houses are provided by the government to the people who work in the Department of Forest.

(3) Fauna and Flora

The site is located inside of the Ngong Forest which is gazetted under the forest act. The grassland side is surrounded mainly by Eucalyptus which were planted in the 1940's according to officials of the Department of Forest although indigenous species were also observed near the Ngong Primary School. No wild life could be observed at the time of the examination while a variety of birds live in the place.

The Ngong and Karura forests are the two main areas providing the City with greenery. It should be noted that the tree species in Nairobi are indigenous, ornamental and exotic.

(4) Water

The existing surface water near the candidate site is the Matoine River which at the moment of the observation was of red colour attributable possibly to soil erosion made by rainfall. Matoine River is used downstream of the proposed site for watering three nurseries. Regarding drinking water, the service is provided by NCC in the vicinity of the site.

(5) Air and Noise

During the survey, no air pollution or generation of noise could be noted.

(6) Landscape

The place is located on flat land and composed of grassland and forest.

(7) Others

About 300 meters from the grassland side towards the Matoine River can be found an oil pipeline belonging to the Kenyan Pipeline Company.

(8) Conclusion

The major constraint for the construction of a disposal site in the place is the forest which should be destroyed to complete the required area of 20 ha. In this sense, during the EIA stage, careful attention should be paid to the existing species and the potential impacts of the project implementation on the existing environment of the site should be forecast.

The result of the EIA shall provide the necessary data to assess whether or not this project is viable in the selected site.

2. RUAI AREA CANDIDATE SITE

(1) Natural Condition

Generally, the place is located on flat land adjacent to the Nairobi River at about 30 km east of Nairobi City. The place available for the disposal site is a grassland of about 20 ha., next to the actual Dandora Estate Sewage Treatment Works. The place is fenced and is owned by NCC.

There are no trees in the site except the riverine vegetation (forest) on the left bank of Nairobi River, and the place is presently used for pasture of livestock.

Presence of many varieties of birds which feed on the insects and fishes from the ponds of the sewage works, has been observed.

(2) Socioeconomic Condition

There is no population living near the site, although it is important to mention that the Ruai area corresponds mainly to the low income area of subsistence cultivators, pasture caretakers and small-scale traders.

(3) Water

Nairobi River is next to the site and at the moment presents characteristics of pollution.

Before entering the site, the water supply system owned by NCC serve a population of about 5,000 inhabitants. The system is composed of deep well, reservoir and pipelines for distribution. The people served from the system have complained of brown teeth and salty taste, assuming that these are due

mainly to the presence of high concentration of fluoride and calcium carbonate in water.

(4) Air and Noise

During the survey, no air pollution or generation of noise could be noted.

(5) Landscape

The place is located on flat land adjacent to the Narobi River.

(6) Conclusion

Sewage Treatment Plant can coexist with the proposed solid waste dumping site because of the available large land for a long term demand expansion and because some similar characteristics of treatment. In addition, there are no significant socioeconomic activities at the site.

9.3
STANDARDS APPLIED IN THE EIA STUDY

Table 9.3-1 WHO Guidelines for Drinking Water Quality

A. Inorganic constituents of health significance

Parameter	Unit	Guideline value	Remarks
Asernic	mg/l	0.05	
Asbestos		no value set	
Barium		no value set	
Beryllium		no value set	
Cadmium	m/gl	0.005	
Chromium	mg/l	0.05	
Cyanide	m/gl	0.1	
Flouride		1.5	natural or deliberately added; local or climatic conditions may necessitate adaptation.
Hardness	m/gl	no health related set value	
Lead	m/gl	0.05	
Mercury	m/gl	0.001	
Nickel	m/gl(N)	no set value	
Nitrate	m/gl	10 (=44 mg/lN03)	
Selenium	m/gl	0.01	
Silver	m/gl	no set value	
Sodium	m/gl	no set value	

B:Constituents of aesthetic significance

Parameter	Unit	Guideline Value	Remarks
Aluminium	mg/l	0.2	
Chloride	mg/l	2.5	
Colour	TCU	15	
Copper	mg/l	1	
Detergents		ngvs	no foaming seen
Hardness	mg/l	500	
Hydrogen sulphide	-	not detectable by consumers	
Iron	mg/l	0.3	
Manganese	mg/l	0.1	
Oxygen-dissolved	-	ngvs	
PH	-	6.5-8.5	
Sodium	mg/l	200	
Solids-dissolved	mg/l	1000	
Sulphate	mg/l	400	
Taste & odour	-	inoffensive to most consumers	
Temperature	-	ngvs	
Turbidity	NTU	5	prefarably <1 for good disinfection
Zinc	mg/l	5	

Source: WHO 1984

Table 9.3-1 WHO Guidelines for Drinking Water Quality (cont.)

C: Microbiological and biological constituents

Organism	Unit	Guideline value	Remarks
I. MICROBIOLOGICAL QUALITY			
A: Piped water supplies			
A1: Treated water entering the distribution system			
Faecal coliforms	no/100ml	0	turbidity <1NTU; fordisinfection with chlorine,PH preferably <8.0;
Coliform organisms	no/100ml	0	free chlorine residual 0.2–0.5mg/l following 30 mins. minimum contact
A2: Untreated water entering the distribution system			
Faecal coliforms			
Coliform organisms	no/100ml	0	in 98% of samples examined through
	no/100ml	0	out the year–in the case of large supplies when sufficient samples are examined
Coliform organisms	no/100ml	3	in an occasional sample, but not in consecutive samples
A3: Water in the distribution system			
Faecal coliforms	no/100ml	0	
Coliform organisms	no/100ml	0	in 95% of samplesexamined through out the year–in the case of large supplies when sufficient samples are examined
Coliform organisms	no/100ml	0	in an occasiona sample, but not in consecutive sample
B: Unpiped water supplies			
Faecal coliforms	no/100ml	0	in consecutive samples should not
Coliform organisms	no/100ml	10	occur repeatedly, if occurrence is frequent and if sanitary protection cannot be improved, an alternative source must be found if possible
C: Bottled drinking –water			
Faecal coliforms	no/100ml	0	be found if possible
Coliform organisms	no/100ml	0	source should be free from faecal contamination
D: Emergency water supplies			
Faecal coliforms	no/100ml	0	advise public to boil water in case of
Coliform organisms	no/100ml	0	failure to meet guidance values
II. BIOLOGICAL QUALITY			
Protozoa(pathogenic)	–	ngvs	
Helminths(pathogenic)	–	ngvs	
Free–living organisms (algae, worms, others)	–	ngvs	

ngvs = no guideline value set.

Source: WHO 1984.

Table 9.3-2 Criteria Developed by NCC for Drinking Water

(I) Toxic Substances

Parameter	Unit	Max. Limit
Lead	mg/l	0.05
Selenium	mg/l	0.01
Chromium	mg/l	0.05
Cadmium	mg/l	0.005
Barium	mg/l	1
Cyanide	mg/l	0.01
Mercury (total as Hg)	mg/l	0.001
Asernic as As	mg/l	0.05
Phenolic substance	mg/l	0.002
Radio Active Substances		
Gross Apha Activity	Bq/L	0.1
Gross Beta Actiity	Bq/L	1

(ii) Chemical Substances and Properties Affecting Potability

PH		6.5-8.5
Colour	Hanzen	15
Turbidity (clarity)	JTU	5
Taste, odour		Unobjectionable
Iron as Fe	mg/l	0.3
Manganese as Mn	mg/l	0.1
Calcium as Ca	mg/l	250
Chlorine concentration	mg/l	0.2 - 0.5
Suspended matter		
Total dissolved solids	mg/l	1500
Hardness as CaCo3	mg/l	500
Aluminium as Al	mg/l	0.1
Chloride as Cl	mg/l	250
Copper as Cu	mg/l	0.1
Sodium as Na	mg/l	200
Sulphate as S04	mg/l	400
Zinc as Zn	mg/l	5
Magnesium as Mg	mg/l	100

(iii) Substances Affecting Health

Nitrates as N03	mg/l	45
Nitrite as N02	mg/l	0.01
Flouride as F	mg/l	1.5

(iv) Bacteriological Standards

Bacteriological classifications of treated water is as follows:

1.Class I Excellent	Contains no coliforms and no E. coli
2. Class II Satisfactory	Contains 1 - 3 coliforms and no E. coli
3. Class III Suspicious	Contains 4 - 10 coliforms and no E. coli
4. (a) Class IV Unsatisfactory	Contains > 10 coliforms and no E. coli
n (b) Class IV Unsatisfactory	Contains > 10 coliforms and 1 or more E. coli

Treated water should be restricted to class I and II only.

Source: Water and Sewarage Department

Table 9.3-3 Japanese Water Quality Standard
(Receiving water)

a) Standards relating to protection of public health

Parameter	Permissible value (mg/l)
Cyanide	not detectable
Alkyl mercury	not detectable
Organic phosphorus (parathion, methyl parathion, methyl dimeton and EPN only)	not detectable
Cadmium	<0.01
Lead	<0.1
Hexavalent Chromium	<0.05
Arsenic	<0.05
Total mercury	not detectable

b) Standards relating to preservation of the Environment

b1) Rivers

Category	Use	Daily average value				
		pH	BOD (mg/l)	SS (mg/l)	DO (mg/l)	Coliform Bacteria (MPN/100 ml)
M	Water supply, class 1 conservation of the environment and uses of categories A to E	6.5-8.5	<1	<25	>7.5	<50
A	Water supply, class 2 fishery, class 1; bathing and uses of categories B to E	6.5-8.5	<2	<25	>7.5	<1000
B	Water supply, class 3 fishery, class 1; and and uses of categories C to E	6.5-8.5	<3	<25	>5	<5000
C	Fishery, class 3;indus trial water class 1, and uses of categories D to E	6.0-8.5	<5	<50	>5	-
D	Industrial water, class 2, agricultural water *, and uses of category E	6.0-8.5	<8	<100	>2	-
E	Industrial water, class 3;conserva-tion of environment	6.0-8.5	<10	**	>2	-

* For agricultural water, pH shall be between 6.0-7.5 and dissolved oxygen shall not be less than 5 mg/l .(The same applies to the standards for lakes).

** Floating matter should not be observed

Table 9.3-3 Japanese Water Quality Standard (cont.)

b2) Lakes

(natural, Lakes, reservoirs, marshes and artificial Lakes with more than 10 million m^3

Category	Use	Daily average value				
		pH	COD (mg/l)	SS (mg/l)	DO (mg/l)	Coliform Bacteria (MPN/100 ml)
AA	Water supply, class 1; fishery, class 1; conservation of natural environment and uses of categories A to C	6.5-8.5	<1	<1	>7.5	<50
A	Water supply, classess 2 and 3; fishery,class 2; bathing and uses of categories B to C	6.5-8.5	<3	<5	>7.5	<1000
B	Fishery, class 3; industrial water, class 1; agricultural water, and uses of category C	6.5-8.5	<5	<15	>5	-
C	Industrial water, class 2 conservavation of environment	6.0-8.5	<8	*	>2	-

* Floating matter should not be observed

b3) Coastal Waters

Category	Use	Daily average value				
		pH	COD (mg/l)	DO (mg/l)	Hexane (mg/l)	Coliform Bacteria (MPN/100 ml)
A	Fishery, class 1; bathing and uses of categories A to C	7.8-8.3	<2	>7.5	not detec-table	<1000 *
B	Fishery, class 2; industrial water and uses of category C	7.8-8.3	<3	>5	not detec-table	
C	Conservation of the environment	7.0-8.3	<8	>2	-	-

* For oyster culture this value must be <70

Table 9.3-4 Japanese Offensive Odour Control Law

Parameter	Value
H2S	0.02-0.06 mg/l (for residential area) 0.06-0.2 mg/l (for industrial area)
NH3	1.0-2.0 mg/l (on boundary line)

Table 9.3-5 Recommended Noise Levels by WHO in dB (A)

Premises	Type of Activity	Recorded Level
Homes (indoor)	Communication-speec Intelligibility	45
Community-outdor Residence	Annoyance	50-55
Ocupational exposures	Hearing loss	85-90

Table 9.3-6 Japanese Standards for Discharge into Public Water Course

Parameter	Unit	Value	
Living Environment			
Hydrogen ion concentration		5.8-8.6	(5.0-9.0)*
Biochemical oxigen demand	mg/l	160	(120)**
Chemical oxigen demand	mg/l	160	(120)**
Suspended Solids	mg/l	200	(150)**
Normal Hexane extract (mineral)	mg/l	5	
Normal Hexane extract (Animal and plant)	mg/l	30	
Phenol	mg/l	5	
Copper	mg/l	3	
Zinc	mg/l	5	
Fusible iron	mg/l	10	
Fusible manganese	mg/l	10	
Chromium	mg/l	2	
Fluorine	mg/l	15	
Escherichia coli	n°/ml	3000	
Nitrogen	mg/l	120	(60)**
Phosphorus	mg/l	16	(8)**
Hazard			
Cadmium and cadmium compound	mg/l	0.1	
Cyanogen compound	mg/l	1	
Organic phosphorus compound (parathion, methyl parathion, methyl di-methon and EP	mg/l	1	
Lead and lead compounds	mg/l	0.1	
Hexahydric chromium compounds	mg/l	0.5	
Arsenic and asernic compounds	mg/l	0.1	
Mercury, alkyl mercury and other mercury compounds	mg/l	0.005	
Alkyl mercury compounds	mg/l	Not detected	
Polychlorinated biphenyls	mg/l	0.003	
Dichloromethane	mg/l	0.2	
Carbon tetrachloride	mg/l	0.02	
1,2-Dichloroethane	mg/l	0.04	
1,1-Dichloroethylene	mg/l	0.2	
Cis-1,2-Dichloroethylene	mg/l	0.4	
1,1,1-Trichloroethane	mg/l	3	
1,1,2-Trichloroethane	mg/l	0.06	
Trichloroethylene	mg/l	0.3	
Tetrachloroethylene	mg/l	0.1	
1,3-Dichloropropane	mg/l	0.02	
Thiuram	mg/l	0.06	
Simazine	mg/l	0.03	
Benzene	mg/l	0.1	
Selenium	mg/l	0.1	

Legend

* Value for discharge into the ocean

** Daily average

9.3.7 Road Design Standard and Classification

REPUBLIC OF KENYA

MINISTRY OF PUBLIC WORKS

SCHEDULE OF CLASSIFIED ROADS 1994-1995

NAIROBI DISTRICT

Permanent Secretary
MOPW
P.O.Box 30260
NAIROBI

Chief Engineer Roads
P.O.Box 30260
NAIROBI

JUNE 1994

TABLE III Road length of all classified roads by surface type. 08/06/94

Area Covered : NAIROBI DISTRICT — Road Lenght in Km.

Class of road		Surface type: Bitumen	Gravel	Earth	TOTAL Km.
International Trunk Rds.	A	50.5	0.0	0.0	50.5
National Trunk Roads	B	8.3	0.0	0.0	8.3
Primary Roads	C	115.1	1.5	1.5	122.1
Secondary Roads	D	33.5	0.0	0.0	33.5
Minor Roads + SPR	E+	24.2	29.3	0.0	123.5
ALL CLASSES		351.6	30.8	1.5	383.9

TABLE III B Road length of Minor Roads and Special Purpose Roads by surface type. 08/06/94

Area Covered : NAIROBI DISTRICT — Road Lenght in Km.

Class of road		Surface type: Bitumen	Gravel	Earth	TOTAL Km.
Minor Roads	E	15.0	0.0	0.0	15.0
Government Access Rds	G	81.2	29.3	0.0	110.5
Settlement Roads	L	0.0	0.0	0.0	0.0
Rural access Rds	R	0.0	0.0	0.0	0.0
Sugar Roads	S	0.0	0.0	0.0	0.0
Tea Roads	T	0.0	0.0	0.0	0.0
Wheat Roads	W	0.0	0.0	0.0	0.0

Page 1

Road Rv Length. Surface Type and Traffic

110 NATPORT DISTRICT — Road Length in Km

Road Code		Description From / To	Road Length	Surface Type				Average Daily Traffic	
				Surface Dressing	Premix	Gravel	Earth	Total	Heavy
A2	1	AID4 / DR Kia Gatharaini Rv	15.4	15.4				6,100	1,300
A2	2	DR Kia Gatharaini Rv / AID4 d.c.	20.0		20.0			6,100	1,300
		Subtotal A2	35.4	15.4	20.0				
A100	4							0	0
A104	21	DR Mac Embakasi / DR Kia Uthiru	30.0		30.0			6,450	760
A104	22	Nairobi District dual carr.	25.1		25.1			6,100	760
		Subtotal A104	55.1		55.1				
A110	1							0	0
B10	1	A104 / Jomo Kenyatta Airport	4.3		4.3			0	0
B10	2	JK-Airport / A104	4.0		4.0			0	0
		Subtotal B10	8.3		8.3				
C58	10	A104 Magadira / DR Kaj Mbagathi	13.0		13.0			12,060	500
C59	1	A2 Ruaraka / R10 JK Airport	14.6		14.6			5,975	1,400
C60	10	C61 / Ngong Rd / DR Kaj But but	13.5		13.5			3,685	365
C61	1	A104 / Naivasha Rd / A104	13.5		13.5			12,500	1,150
C62	10	A2 / Limuru Rd / DR Kiambu	11.5	11.5				1,280	185
C63	10	C58 / Langata / DR Kia Dagor.	15.5		15.5			1,880	170
C64	10	A2 / Kiambu Rd / DR Kiambu	5.5		5.5			3,390	340
C89	1	A104-Embakasi-Old Airport Term	4.5		4.5			0	0
C98	10	C59 / Komarock Rd / DR Machako	25.0		25.0			1,330	570
C294	2	Embakasi Station Road	2.7	1.2		1.5		0	0
C304	1	Dagoretti Station Road	1.5				1.5	0	0
C396	1	Jamhuri Station Road	1.3		1.3			0	0
D378	20	DR Kiambu / D410 Mwimuto	2.5		2.5			1,500	95
D380	1	D400 / Kahawa Station	2.0		2.0			0	0
D400	10	C98 / Thika Rd / DR Kiambu	5.5		5.5			1,420	320
D408	1	C62 Red Hill Rd. / DR Kia	3.0		3.0			0	0
D409	20	DR Kiambu / D400 Kamita	4.5		4.5			620	70
D410	10	A104 Westlands / DR Kiambu	16.5		16.5			13,950	1,650
D412	1	C63 Dagoretti / C61 Riruta	5.5		5.5			2,340	350
E419	1	C60 / Karen	3.5		3.5			1,880	55
E423	1	A104 Uthiru / C63 Dagoretti	5.0		5.0			11	1
E1826	1	A104 / Railway Station	2.8	2.8				0	0
E1827	1	Kenyatta Avenue / Ngong Road	1.7	1.7				0	0
G1	1	State House	3.0		3.0			0	0
G2	1	D.O.'s Office Makadara & Court	0.3		0.3			0	0
G3	1	Jogoo Rd. Police st. & Prob. Host	0.3		0.3			0	0
G4	1	Shauri Moyo GK Camp	2.8		2.8			0	0
G5	1	Shauri Moyo Police Station	0.2			0.2		0	0

DEPARTMENT OF THE ENVIRONMENT
SCOTTISH DEVELOPMENT DEPARTMENT
THE WELSH OFFICE

Roads in urban areas

The following publications, also obtainable from Her Majesty's Stationery Office, should be consulted for revisions and extensions of advice:

Roads in Urban Areas Metric Supplement (1974).

*Design Bulletin No 32 — Residential Roads and Footpaths.

Supplement A Guide to Revisions 1979.

*Scottish equivalent contained in Scottish Housing Handbook Part 3.

LONDON
HER MAJESTY'S STATIONERY OFFICE

1.2.2 Passenger car units

Vehicles of different types require different amounts of road space because of variations in size and performance. In order to allow for this in capacity measurements for roads and junctions, traffic volumes are expressed in passenger car units (pcu's). The basic unit is the car (taxis, light vans and three-wheeler vehicles also count as one unit). As different types of vehicles affect the capacity of rural roads, urban roads, roundabouts and traffic signals in varying degrees, the weighting for each class of vehicle has to be varied to suit the purpose for which it is to be used. For example, a heavy goods vehicle on a rural road is rated as equivalent to 3 cars, but on an urban road to only 2, and at traffic signals to 1.75. The appropriate values for different types of vehicles under varying conditions are given in Table 1–3.

Table 1–3 Passenger car units

Class of vehicle	Equivalent value in passenger car units (pcu's)			
	Urban standards	Rural standards	Round-about design	Traffic signal design
Private car, taxi, motor cycle combination, light goods vehicle (up to 30 cwt. unladen)	1.00	1.00	1.00	1.00
Motor cycle (solo), motor scooter, moped	0.75	1.00	0.75	0.33
Medium or heavy goods vehicle (over 30 cwt. unladen), horse-drawn vehicle	2.00	3.00	2.80	1.75
Bus, coach, trolley bus, tram	3.00	3.00	2.80	2.25
Pedal cycle	0.33	0.50	0.50	0.20

1.2.3 Carriageway capacity

The speed of traffic in towns will be lower than that on rural roads and there will be less overtaking; drivers are prepared for these conditions and higher traffic densities can therefore be allowed. The design of main traffic routes in built-up areas should be based on peak-hour demands and not, as in rural areas, on the average daily traffic during August. Due allowance should be made, especially in intersection design, for tidal flows during the morning and evening peaks and for any other peaks during the day—as, for example, at lunch time.

Approximate practical capacities of urban roads between junctions are given in Tables 1–4 and 1–5, which cover a wide range of carriageway widths typical of both new and existing roads. On two-way carriageways capacity is relatively independent of distribution by direction and designs can be based on two-way flows; on the other hand, on dual or divided carriageways capacity is dependent on distribution by direction and designs must therefore be based on peak-hour flows in the busier direction of travel. Recommended carriageway widths for various types of road and some typical cross-sections are given in Chapter 4.

To secure good environmental conditions, roads within environmental areas not acting as *local distributors* should desirably not be loaded to their practical capacity. All roads in environmental areas should be so designed with regard to route and junctions that they are unattractive to traffic as through routes or short cuts.

Table 1-4 Practical capacities of two-way urban roads

Effective width of carriageway in feet (excluding refuges or centralreserve	2-lane			3-lane		4-lane			6-lane			Remarks
	20'	22'	24'	30'	33'	40'	44'	48'	60'	66'	72'	
Description	Capacity in pcu's per hour for BOTH directions of flow					Capacity in pcu's per hour for ONE direction of flow						(for definitions of road types see Section 2.1)
Urban motorway with grade separation and no frontage access								3,000			4,500	Applicable to the highest category of *distributor*
All-purpose road with no frontage access, no standing vehicles permitted and negligible cross-traffic	1,200	1,350	1,500	2,000	2,200	2,000	2,200	2,400	3,000	3,300	3,600	Appropriate for all-purpose *distributors*
All-purpose street with high-capacity junctions and 'No Waiting' restrictions	800	1,000	1,200	1,600	1,800	1,200	1,350	1,500	2,000 2,200 for dual carriageways	2,250 2,450	2,500 2,700	Applicable to those *distributors* and access *roads* where access to development is frequent but capacity is not unduly restricted by junctions
All-purpose street with capacity restricted by waiting vehicles and junctions	300 to 500	450 to 600	600 to 750	900 to 1,100	1,100 to 1,300	800 to 900	900 to 1,000	1,000 to 1,200	1,300 to 1,700	1,500 to 2,000	1,600 to 2,200	Typical of existing roads where waiting vehicles and junctions with heavy cross traffic severely limit capacity

Table 1-5 Practical capacities of one-way urban roads

Effective width of carriageway in feet (excluding refuges)	20'	22'	24'	30'	33'	36'	40'	44'	48'	Remarks
Description	Capacity in pcu's per hour									(for definitions of road types see Section 2.1)
Urban motorway with grade separation and no frontage access			3,000			4,500			6,000	Applicable to the highest category of *distributor*
All-purpose road with no frontage access, no standing vehicles and negligible cross-traffic	2,000	2,200	2,400	3,000	3,300	3,600	4,000	4,400	4,800	Appropriate for all-purpose *distributors*
All-purpose street with high-capacity junctions and 'No Waiting' restrictions	1,300	1,450	1,600	2,150	2,400	2,650	3,000	3,350	3,700	Applicable to those *distributors* and access roads when access to development is frequent but capacity is not unduly restricted by junctions
All-purpose street with capacity restricted by waiting vehicles and junctions	800	950	1,100	1,650	1,900	2,150	2,500	2,800	3,200	Typical of existing roads where waiting vehicles and junctions with heavy cross traffic severely limit capacity

9.4
NGONG FOREST OVERALL FLORA CHECKLIST

9.4 NGONG FOREST OVERALL FLORA CHECKLIST

Species	Family
1. *Abutilon mauritianum*	Malvaceae
2. *Acacia mearnsii*	Mimosaceae
3. *Acalypha paniculata*	Euphorbiaceae
4. *Achyranthes aspera*	Amaranthaceae
5. *Acokanthera schimperi -- kirururu*	Apocynaceae
6. *Acokanthera oppositifolia*	Apocynaceae
7. *Acrocarpus flaxinfolus*	
8. *Aerva lanata*	Amaranthaceae
9. *Ageratum conyzoides*	Compositae
10. *Ajuga remota*	Labiatae
11. *Albizia schimperiana*	Mimosaceae
12. *Alisma plantago-aquatica*	Verbenaceae
13. *Allophyllus rubifolias*	Sapidaceae
14. *Amanranthus graecizans*	Amaranthaceae
15. *Amaranthus hybridus*	Amaranthaceae
16. *Andropogon canaliculus*	Graminieae
17. *Aneilema aequinoctiale*	Commelinaceae
18. *Apodytes dimidiata*	Icacinaceae
19. *Araucaria canninghamii*	Icacinaceae
20. *Aristida adoensis*	Aristideae
21. *Asparagus africana*	Liliaceae
22. *Asparagus falcatus*	Liliaceae
23. *Asparagus setaceus*	Liliaceae
24. *Aspilia pleuriseta*	Compositae
25. *Asystasia schimperi*	Acanthaceae
26. *Barberia micrantha*	Acanthaceae
27. *Basella alba*	Baselaceae
28. *Becium obovata*	Labiatae
29. *Bidens pilosa*	Compositae
30. *Brachylaena huillensis*	Compositae
31. *Bridelia micrantha*	Euphorbiaceae
32. *Bulbostylis densa*	Cyperaceae
33. *Cadaba farinosa*	Capparaceae
34. *Caesalpinia volkensii*	Caesalpiniaceae
35. *Caesalpinie depecataia*	Capa raceae
36. *Callistemon speciosa*	Myrtaceae
37. *Calodendrum capense*	Rutaceae
38. *Calpuneria aurea*	Calpurnea
39. *Canthium keniense*	Rubiaceae
40. *Carissa edulis*	Apocynaceae
41. *Cassipourea gulumelea*	Rhizophoraceae
42. *Cassipourea malosana*	Rhizophoraceae
43. *Casuarina equisetifolia*	Casuarinaceae
44. *Celtis africana*	Ulmaceae
45. *Centella asiatica*	Umbeliferae

46.	*Chaetachme aristata*	Ulmaceae
47.	*Chamaecrista mimosoides*	Caesalpiniaceae
48.	*Chenopodium opulifolium*	Chenopochiaceae
49.	*Chionanthus battiscombei*	Oleaceae
50.	*Chloris virgata*	Gramineae
51.	*Cialinsoga parvifolia*	Gramineae
52.	*Cinaphalium declinatum*	Compositae
53.	*Cineraria grandiflora*	Compositae
54.	*Clausena anisata*	Rutaceae
55.	*Clematis brachiata*	Ramnaculaceae
56.	*Clematis hirsuta*	Ranunculaceae
57.	*Cleone monophylla*	Capparaceae
58.	*Combretum Sp.*	Combretacea
59.	*Comelina africana*	Commelinaceae
60.	*Commelina benghalensis*	Commelinaceae
61.	*Commelina repens*	Commelinaceae
62.	*Conyza banariensis*	Compositae
63.	*Conyza salularis (floribunda)*	Compositae
64.	*Conyza striata*	Compositae
65.	*Corchorus trilocularis*	Tiliaceae
66.	*Cordia africana*	Bignoniaceae
67.	*Craibia brownii*	Papilionaceae
68.	*Crassophalium marnii*	Compositae
69.	*Crotalaria agatiflora*	Papilionaceae
70.	*Crotalaria goodiaeformis*	Papilionaceae
71.	*Croton aliens*	Euphorbiaceae
72.	*Croton dichogamus*	Euphorbiaceae
73.	*Croton megalocarpus*	Euphorbiaceae
74.	*Cuppressus lusitanica*	Cuprecaceae
75.	*Cussonia holstii*	Araliaceae
76.	*Cussonia spicata*	Araliaceae
77.	*Cymbopogon caesisus*	Gramineae
78.	*Cynacium altinifolius*	Gramineae
79.	*Cynodon dactylon*	Gramineae
80.	*Cynotis sp.*	Commelinaceae
81.	*Cyperus blysmoides*	Cyperaceae
82.	*Cyperus hemisphaericus*	Cyperaceae
83.	*Cyperus papysrus*	Cyperaceae
84.	*Cyphostemma kilimandscharia*	Vitaceae
85.	*Datura stramonium*	Solanaceae
86.	*Diospyros abyssinica*	Ebenaceae
87.	*Dichondra repens*	Convolvulaceae
88.	*Digitaria scalarum*	Gramineae
89.	*Dionanthus battiscomberi*	
90.	*Diospyros abyssinica*	Ebenaceae
91.	*Discorea schimperi*	Dioscoraceae
92.	*Dolichos formosus*	Papilionaceae
93.	*Dombeya burgessiae*	Sterculiaceae
94.	*Dovyalis caffra*	Flacourtiaceae
95.	*Drymaria cordata*	Caryophyllaceae

96.	*Drypetes gerrardii*	Euphorbiaceae
97.	*Dyschoriste radicans*	Acanthaceae
98.	*Ehretia cymosa*	Boraginaceae
99.	*Elaeodendron buchananii - Red slash - (Mutanga kiki)*	Celastraceae
100.	*Emilia coccinea*	Compositae
101.	*Eragrostis exasperata*	Gramineae
102.	*Eragrostis heteromera*	Gramineae
103.	*Eragrostis lasiantha*	Gramineae
104.	*Eragrostis pynostachys*	Gramineae
105.	*Eragrostis racemosa*	Gramineae
106.	*Eragrostis tenuifolia*	Gramineae
107.	*Eryobotrya japonica*	Rosaceae
108.	*Erythrina tomentosa*	Papilionaceae
109.	*Erythrococca bongensis*	Euphorbiaceae
110.	*Eucalyptus camaldulensis*	Myrtaceae
111.	*Eucalyptus saligna*	Myrtaceae
112.	*Euclea divinorum*	Ebenaceae
113.	*Euclea sp.*	Ebenaceae
114.	*Eragrostis cilianensis*	Gramineae
115.	*Euphorbia crotonoides*	Euphorbiaceae
116.	*Euphorbia tirucali*	Euphorbiaceae
117.	*Fagalopsis angolensis*	Rutaceae
118.	*Ficus natalensis*	Moraceae
119.	*Ficus thonningii*	Moraceae
120.	*Fimbristylis densa*	Cyperaceae
121.	*Fimbristylis humilis*	Cyperaceae
122.	*Fuerstia africana*	Labiatae
123.	*Galinsoga ciliata*	Compositae
124.	*Galinsoga parvifora*	Compositae
125.	*Geranium arabicum*	Geraniaceae
126.	*Gnidia subcordata*	Thymeleaceae
127.	*Grevillea robusta*	Thymeleaceae
128.	*Grewia similis*	Tiliaceae
129.	*Gutenbergia cordifolia*	Compositae
130.	*Gycine wightii*	Papilionaceae
131.	*Helinus mystacinus*	Rhamnaceae
132.	*Heteromopha trifoliata*	Celastraceae
133.	*Hibiscus calyphyllus*	Malvaceae
134.	*Hibiscus fuscus*	Malvaceae
135.	*Hipocratea goetzei*	Celastraceae
136.	*Hypoestes forskalei*	Acanthaceae
137.	*Indigofera arrecta*	Papilionaceae
138.	*Indigofera spicata*	Papilionaceae
139.	*Indigofera tanganyikensis*	Papilionaceae
140.	*Jacaranda mimosifolia*	Bignoniaceae
141.	*Jasminum fluminense*	Oleaceae
142.	*Justicia matammensis*	Acanthaceae
143.	*Kalanchoe lanceolata*	Crassulaceae
144.	*Lantana camara*	Verbenaceae
145.	*Latana trifolia*	Verbenaceae

146. *Launea cornuta*	Compositae
147. *Leonotis mollissina*	Labitae
148. *Leonotis neptaefolia*	Labitae
149. *Leucaena leucocephala*	Leguminosae
150. *Leucas mollis*	Labitae
151. *Ligustrum lucida*	
152. *Lippia javanica*	Verbenaceae
153. *Mangifera Indica*	Sapotaceae
154. *Manilkara discolor*	Sapotaceae
155. *Margaritaria discoidea*	Euphorbiaceae
156. *Markhamia lutea*	Bignomiaceae
157. *Maytenus heterophylla*	Celastraceae
158. *Maytenus undata*	Celestraceae
159. *Melhania ovata*	Compositae
160. *Microglossa pyrifolia*	Compositae
161. *Mimusops kumel -- milk latex*	Sapotaceae
162. *Murdannia simplex*	Commelinaceae
163. *Musa domestica*	Musaceae
164. *Mystroxylon aethiopicum*	Celastraceae
165. *Nesaea lythroides*	Lythraceae
166. *Newtonia buchananii*	Mimosaceae
167. *Ochna insculpta*	Ochnaceae
168. *Ochna ovata*	Ochnaceae
169. *Ocimum kilimandscharica*	Labiatae
170. *Ocimum Sp*	Labiatae
171. *Ocimun kenyensis*	Labiatae
172. *Olea capensis*	Oleaceae
173. *Olea europaea subs.africana*	Oleaceae
174. *Olinia rotchiana*	Oliniaceae
175. *Oplismenus compactus*	Gramineae
176. *Osyris lanceolata*	Santalaceae
177. *Oxalis cormiculata*	Oxalidaceae
178. *Panicum paeoides*	Gramineae
179. *Panicum maximum*	Gramineae
180. *Passiflora eichleriana*	Passifloraceae
181. *Pavetta glaveoleus*	Rubiaceae
182. *Pavonia patens*	Malvaceae
183. *Pavonia urens*	Malvaceae
184. *Pellaea adiantoides*	Adiantaceae
185. *Pennisetum catabensis*	Gramineae
186. *Pennisetum purpureum*	Gramineae
187. *Pentas lanceolata*	Rubiaceae
188. *Persea americana*	Anacardiaceae
189. *Phyllaranthus amarus*	Eurphobiaceae
190. *Pinus patula*	Pinaceae
191. *Plectranthus barbatus*	Lebiatae
192. *Podocarpus falcatus*	Podocarpaceae
193.. *Polygonum senegalense*	Polygonaceae
194. *Portulaca oleracea*	Portulacaceae
195. *Portulaca quadrifida*	Portulacaceae

196. *Psiadia punctulata*	Compositae
197. *Psidium guajava*	Myrtaceae
198. *Pterolobium stellatum*	Caesalpiniaceae
199. *Rawsonia lucida*	Flacourtiaceae
200. *Rhamnus staddo*	Rhamnaceae
201. *Rhamphicarpa montana*	Scrophulariaceae
202. *Rhamphicarpa recurva*	Scrophulariaceae
203. *Rhoiscissus revoilii*	Vitaceae
204. *Rhus natalensis*	Anacardiaceae
205. *Rhynchosia minima*	Papilionaceae
206. *Schoenoxiphium lehmanii*	Cyperaceae
207. *Schrebera alata (Termite attached)*	Oleaceae
208. *Sckhuria pinnata*	Compositae
209. *Scolopia zeyalanica*	Rhamnaceae
210. *Scutia myrtina*	Compositae
211. *Secamone punctulata*	Compositae
212. *Senecio lyratus*	Caesalpiniaceae
213. *Senna didymobotra*	Compositae
214. *Sesbania sesban*	Gramineae
215. *Setaria plicatilis*	Gramineae
216. *Setaria sphacelalata*	Malvaceae
217. *Sida rhombifolia*	Malvaceae
218. *Sida schimperiana*	Malvaceae
219. *Sida tenuicarpa*	Malvaceae
220. *Sida ternata*	Solanaceae
221. *Solamum indica*	Compositae
222. *Solanecio angulatus*	Solanaceae
223. *Solanum incanum*	Solanaceae
224. *Solanum mauritianum*	Bignoniaceae
225. *Spathodea campanulata*	Compositae
226. *Sphaeranthus suaveolenus*	Compositae
227. *Spiranthus mauritiana*	Gramineae
228. *Sporobolus pyramidalis*	Sterculiaceae
229. *Sterculia acetifolia*	Gramineae
230. *Stipa dregeana -(tough stem)*	Logamaceae
231. *Strychnos henningsii*	Euphorbiaceae
232. *Suregada procera*	Euphorbiaceae
233. *Synadenium compactum*	Mrytaceae
234. *Syzgium guinaense*	Compositae
235. *Tagetes minuta*	Compositae
236. *Tarchonanthus comphoratus*	Rutaceae
237. *Teclea simplicifolia*	Rutaceae
238. *Teclea trichocarpa*	Bignoniaceae
239. *Tecoma stans*	Papilinoideae
240. *Tephrosia hildebrandtii*	Gramineae
241. *Themeda triandra*	Acanthaceae
242. *Thunbergia alata*	Compositae
243. *Tichonia diversifolia*	Labiatae
244. *Tinnea aethiopica*	Compositae
245. *Tithonia diversifolia*	

246. *Toddalia asiatica*	Rutaceae
247. *Tragia brevipes*	Euphorbiaceae
248. *Trema orientalis*	Ulmaceae
249. *Tribulus terrestris*	Ramindaceae
250. *Trimeria glandifolia*	Flacourtiaceae
251. *Triumfetta rhomboidea*	Tiliaceae
252. *Turraea mombasana*	Meliaceae
253. *Typerrhenia rufa*	Gramineae
254. *Uvaria scheffleri*	Annonaceae
255. *Vangueria infausta*	Rubiaceae
256. *Verbena bonariensis*	Verbenaceae
257. *Vernomia holstii*	Compositae
258. *Vernonia brachycalyx*	Compositae
259. *Vernonia galamensis*	Compositae
260. *Vernonia hindii*	Compositae
261. *Vigna vexillata*	Papilionaceae
262. *Vitex keniensis*	Verbanaceae
263. *Warburgia ugandensis*	Cannalaceae
264. *Zaleya pentandra*	Zygophyllacea
265. *Zanthoxylum usambarense*	Rutaceae
266. *Zea mais*	Gramineae
267. *Zehneria scabra*	Cucurbitaceae

Source: This Study on EIA

9.5

LIST OF BIRDS VERY FREQUENT IN NAIROBI NATIONAL PARK FOREST

9.5 LIST OF BIRDS VERY FREQUENT IN NAIROBI NATIONAL PARK FOREST

1. Abyssinian White-eye (*Zosterops abyssinicus*)
2. African Citril (*S.citinelloides*)
3. African Paradise Flycatcher (*Terpsiphone virdis*)
4. African Pied Wagtail (*Motacilla aguimp*)
5. African White-backed Vulture (*Gyps africanus*)
6. Amethyst Sunbird (*N. amethystina*)
7. Baglafecht Weaver (*Ploceus baglafecht*)
8. Barn Swallow (*H. rustica*)
9. Black Kite (*Milvus migrans*)
10. Black Saw-wing (*P. holomelas*)
11. Black-backed Puffback (*Dryoscopus cubla*)
12. Black-headed Heron (*A.melanocephala*)
13. Black-headed Oriole (*O. larvatus*)
14. Bronze Mannikin (*L. cucullata*)
15. Bronze Sunbird (*N. kilimensis*)
16. Cattle Egret (*Bubulcus ibis*)
17. Chin-spot Batis (*Batis molitor*)
18. Cinnamon-chested Bee-eater (*M.oreobates*)
19. Collared Sunbird (*Anthreptes collaris*)
20. Common Bulbul *(Pycnontus barbatus*)
21. Common Fiscal (*L.collaris*)
22. Common Ostrich (*Struthio camelus*)
23. Crowned Plover (*V. coronatus*)
24. Egyptian Goose (*Alopchen aegyptius*)
25. Grassland Pipit (*Anthus cinnamomeus*)
26. Grey-backed Camaroptera (*Camaroptera brachyura*)
27. Grey-headed Sparrow (*P. griseus*)
28. Hadada Ibis *(Bostrychia hagedash*)
29. Hamerkop *(Scopus umbretta)*
30. Helmeted Guineafowl (*Numida meleagris*)
31. Holub's Golden Weaver (*P. xanthops*)
32. Lesser Striped Swallow (*H. abyssinica*)
33. Little Swift (*A. affinis*)
34. Marabou Stork (*Leptoptilos crumeniferus*)
35. Pied Crow (*Corvus albus*)
36. Red-billed Firefinch *(Lagonosticta senegala*)
37. Red-cheeked Cordon-bleu (*Uraeginthus bengalus*)
38. Red-eyed Dove (*Streptopelia semitorquata*)
39. Rock Martin (*H. fuligula*)
40. Rufous Sparrow (*P. rufocinctus)*
41. Rufous-naped Lark (*M. africana*)
42. Ruppell's Robin-Chat (*C.semirufa*)
43. Sacred Ibis (*Threskiornis aethiopicus*)
44. Silvery-cheeked Hornbill (*B. brevis*)
45. Singing Cisticola (*Cisticola cantans*)

46. Speckled Mousebird *(Colius striatus)*
47. Streaky Seedeater (*S. striolatus*)
48. Superb Starling (*L. superbus*)
49. Tawny-flanked Prinia (*Prinia aubflava*)
50. Tropical Boubou (*Laniarius aethiopicus*)
51. Variable Sunbird (*N. venusta*)
52. White-bellied Tit (*Parus albiventris*)
53. White-eyed Slaty Flycatcher (*Melaenornis fischeri*)
54. White-headed (*Lybius leucocephalus*)
55. Willow Warbler (*Phylloscopus trochilus*)
56. Winding Cisticola (*C. galactotes*)
57. Yellow-breasted Apalis (*Apalis flavida*)
58. Yellow-necked Spurfowl (*F. leucoscepus*)
59. Yellow-rumped Tinkerbird (*P. bilineatus*)
60. Yellow-throated Longclaw (*Macronyx croceus*)

Source: Harvey, 1997.

9.6
RUAI AREA OVERALL FLORA CHECKLIST

9.6 RUAI AREA OVERALL FLORA CHECKLIST

Species	Family
1. *Abutilon mauritianum (SH)*	Malvaceae
2. *Acacia drepanolobium (SH)*	Mimosaceae
3. *Acacia kirkii (T)*	Mimosaceae
4. *Acacia mellifera (T)*	Mimosaceae
5. *Acacia stuhlmanii (SH)*	Mimosaceae
6. *Acalypha fruticosa (H)*	Euphorbiaceae
7. *Achyranthes aspera (H)*	Agavaceae
8. *Agave sisalana*	Agavaceae
9. *Ajuga remota (H)*	Labiatae
10. *Aloe latifolia (Herb)*	Alocaceae
11. *Amaranthus hybridus*	Amaranthaceae
12. *Amaranthus oleracea (H)*	Amaranthaceae
13. *Apilia slurisela*	Compositae
14. *Asparagus africana(Cr)*	Liliaceae
15. *Aspilia mossambicensis (SH)*	Compositae
16. *Aspilia pluriseta (SH)*	Compositae
17. *Balanites aegyptiaca (T)*	Balanitaceae
18. *Bothriocloa insculpta (G)*	Gramineae
19. *Brachiara brizalla (G)*	Gramineae
20. *Cadaba farinosa (SH)**	Capparaceae
21. *Chrophytum sp.*	Liliaceae
22. *Clitoria ternatae (CL)*	Papilionaceae
23. *Commelina africana (Creeper)*	Commelinaceae
24. *Commelina benghlensis (H)*	Commelinaceae
25. *Comphocarpus seminulatus (CL)*	
26. *Corchorus tricha (H)*	Toliaceae
27. *Crotalaria brevidens (H)*	Papilionaceae
28. *Cucumis aculeatus (Cr)*	Cucurbitaceae
29. *Cymbogon caesius (G)*	Gramineae
30. *Cynodon dactylon (G)*	Gramineae
31. *Cyperus distans (Sedge)*	Cyperaceae
32. *Cyperus gioli (sedge)*	Cyperaceae
33. *Cyperus kilimandscharia (G)*	Cyperaceae
34. *Cyperus meranguensis (Sedge)*	Cyperaceae
35. *Cyphostemma nieriense (CL)*	Vitaceae
36. *Digitaria macroblephara (G)*	Gramineae
37. *Digitaria milanjiana (G)*	Gramineae
38. *Digitaria scalarum**	Gramineae
39. *Dolichos formosus (Cr)*	Papilionaceae
40. *Dovyalis caffra (SH)*	Flacourtiaceae
41. *Echinocloa happloclada (G)*	Gramineae
42. *Eragrostis stemmifolia*	Gramineae
43. *Euphorbia cotonfolia**	Euphorbiaceae
44. *Euphorbia sp.*	Euphorbiaceae
45. *Flueggia virosa**	Euphorbiaceae

46.	*Glycine wightii**	Papilionaceae
47.	*Gutenbergia calycina (H)*	Compositae
48.	*Gutenbergia cordifolia**	Compositae
49.	*Harpachnea schimperi**	Gramineae
50.	*Hibiscus aponeurus (SH)*	Malvaceae
51.	*Hibiscus flavifolius (H)*	Malvaceae
52.	*Indigofera nairobensis (Creeper)*	Papilionaceae
53.	*Ischaemum afra (G)*	Gramineae
54.	*Lantana camara (SH)*	Verbenaceae
55.	*Microglossia pyrifolia (SH)*	Compositae
56.	*Nicotiana glanca (SH)*	Solanaceae
57.	*Ocimum kenyensis (H)*	Labiatae
58.	*Ocimum kilimandscharica (H)*	Labiatae
59.	*Opuntia vulgaris (SH)*	Cactaceae
60.	*Ornothogalum longibracteatum (H)*	
61.	*Orthosiphon pavifolia (H)*	Labiatae
62.	*Panicum maximum (G)*	Gramineae
63.	*Pavonia patens*	Malvaceae
64.	*Pellaea adiantoides (F)*	Adiantaceae
65.	*Pennisetum menzianum (G)*	Gramineae
66.	*Pentasia Ouranogne (H)*	Rubiaceae
67.	*Pergularia daemia (CL)*	Asclepiadaceae
68.	*Phyllanthus manderaspatensis*	Euphorbiaceae
69.	*Polygala stenophylla (H)*	Polygalaceae
70.	*Portulacca oleracea (H)*	Portulacaceae
71.	*Rhus natalensis (SH)*	Anacardiaceae
72.	*Rhynchosia minima (Cr)*	Papilionaceae
73.	*Ricinus communis (T)*	
74.	*Ruellia patula (SH)*	Acanthaceae
75.	*Sckhuria pinnata (H)*	Compositae
76.	*Senecio diversifolius*	Compositae
77.	*Senna didymobotrya (SH)*	Caesalpiniacea
78.	*Setaria incrasta (G)*	Gramineae
79.	*Setaria sphacelata (G)*	Gramineae
80.	*Sida rhombifolia*	Gramineae
81.	*Solanum arundo (SH)*	Solanaceae
82.	*Solanum incanum (H)*	Solanaceae
83.	*Sphaeranthus suaveolens (H)*	Compositae
84.	*Sphorobolus pyramidalis*	Gramineae
85.	*Sporobolus pellicidus (G)*	Gramineae
86.	*Tetrapogon lintonii (G)*	Gramineae
87.	*Themeda triandra (G)*	Gramineae
88.	*Tithonia diversifolia (SH)*	Compositae
89.	*Tragia sp. (H)*	Euphorbiaceae
90.	*Triumfetta rhomboidea (H)*	Tiliacea
91.	*Triumfetta flavescens*	Tiliacea
92.	*Withania somnifera (SH)*	Solanaceae

Legend:

*	Found on the private land
SH	Shrub
H	Herb
G	Grass
F	Fern
Cr	Creeper
CL	Climber
T	Tree

9.7

SOCIAL ENVIRONMENTAL AND PUBLIC AWARENESS SURVEY DATA

Table 1 Per cent Distribution of Respondents by Age group, Sex, and Marital Status

Age Group	HIGH INCOM	MIDDLE INCOME	LOW INCOME	SLUMS	RUAI	NGONG	Total	Row%	N
<20 Yrs	0.0	20.0	20.0	20.0	0.0	40.0	100.0	1.3	5
20-29	2.0	18.2	33.3	17.2	14.1	15.2	100.0	26.0	99
30-39	9.6	26.7	21.5	13.3	14.8	14.1	100.0	35.4	135
40-49	14.4	24.4	23.3	14.4	15.6	7.9	100.0	23.6	90
50-59	23.1	28.2	12.8	17.9	7.7	10.3	100.0	10.2	39
60+ Yrs	38.5	7.7	7.7	23.1	0.0	23.0	100.0	3.4	13
Percent	11	23.4	23.6	15.5	13.4	13.1	100.0		
N	42	89	90	59	51	50	381	100	381
Age Group									
<20 Yrs	0.0	1.1	1.1	1.7	0.0	4.0			
20-29	4.8	20.2	36.7	28.8	27.5	30.0			
30-39	31.0	40.4	32.2	30.5	39.2	38.0			
40-49	31.0	24.7	23.3	22.0	27.5	14.0			
50-59	21.4	12.4	5.6	11.9	5.8	8.0			
60+ Yrs	11.8	1.2	1.1	5.1	0.0	6.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N	42	89	90	59	51	50			
Sex of respondent									
Male	11.4	21.5	22.8	16.4	16.5	11.4	100.0	41.5	158
Female	10.8	24.7	24.2	14.8	11.2	14.3	100.0	58.5	223
								100.0	381
Sex of respondent									
Male	42.9	38.2	40.0	44.1	51.0	36.0			
Female	57.1	61.8	60.0	55.9	49.0	64.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Marital Status									
Married	11.4	24.4	24.1	14.4	13.3	12.4	100	78.5	299
Single	7.6	19.7	24.2	16.6	15.2	16.7	100	17.3	66
Widowed	14.3	28.5	0	42.9	0	14.3	100	1.8	7
Divorced	22.2	11.1	22.2	22.2	11.2	11.1	100	2.4	9
								100	381
Marital Status									
Married	81.0	82.0	80.0	72.9	78.4	74.0			
Single	11.8	14.6	17.8	18.6	19.6	22.0			
Widowed	2.4	2.2	0.0	5.1	0.0	2.0			
Divorced	4.8	1.2	2.2	3.4	2.0	2.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
n=381	42	89	90	59	51	50			
Mean Number of Children	2.2	3.3	2.9	3.8	2.4	3.2			

Table 2 Percent Distribution of Respondents by Religion, Ethnicity and Education

Religion	HIGH	MIDDLE	LOW	SLUMS	RUAI	NGONG	Total	Row%	
Christian	8.1	24.8	24.8	14.7	14.1	13.5	100.0	91.1	347
Islam	15.8	15.8	15.8	36.8	5.3	10.5	100.0	5.0	19
Hindu	83.3	0.0	0.0	16.7	0.0	0.0	100.0	1.6	6
Other	75.0	0.0	25.0	0.0	0.0	0.0	100.0	1.0	4
None	60.0	0.0	0.0	0.0	20.0	20.0	100.0	1.3	5
								100.0	381
Religion									
Christian	66.7	96.6	95.6	86.4	96.0	94.0			
Islam	7.1	3.4	3.3	11.9	2.0	4.0			
Hindu	11.9	0.0	0.0	1.7	0.0	0.0			
Other	7.2	0.0	1.1	0.0	0.0	0.0			
None	7.1	0.0	0.0	0.0	2.0	2.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Ethnicity									
Kikuyu	2.6	27.7	19.4	11.6	22.6	16.1	100.0	40.7	155
Luhya	1.9	26.4	43.4	15.1	1.9	11.3	100.0	13.9	53
Kamba	4.8	16.7	16.7	23.8	26.1	11.9	100.0	11.0	42
Luo	1.9	28.9	36.5	21.2	3.8	7.7	100.0	13.6	52
Kisii	0.0	12.5	43.7	18.8	0.0	25.0	100.0	4.2	16
Masai	33.3	0.0	0.0	0.0	0.0	66.7	100.0	0.8	3
Miji Kenda	12.5	50.0	25.0	0.0	0.0	12.5	100.0	2.1	8
European	100.0	0.0	0.0	0.0	0.0	0.0	100.0	3.8	14
Somali	0.0	0.0	14.3	85.7	0.0	0.0	100.0	1.8	7
Asian	88.9	0.0	0.0	0.0	11.1	0.0	100.0	2.2	9
Others	45.5	18.3	4.5	13.6	4.5	13.6	100.0	5.8	22
								99.9	381
Ethnicity									
Kikuyu	9.5	48.3	33.3	30.5	68.6	50.0			
Luhya	2.4	15.7	25.6	13.6	2.0	12.0			
Kamba	4.8	7.9	7.8	16.9	21.6	10.0			
Luo	2.4	16.9	21.1	18.6	3.9	8.0			
Kisii	0.0	2.2	7.8	5.1	0.0	8.0			
Masai	2.4	0.0	0.0	0.0	0.0	4.0			
Miji Kenda	2.4	4.5	2.2	0.0	0.0	2.0			
European	33.3	0.0	0.0	0.0	0.0	0.0			
Somali	0.0	0.0	1.1	10.2	0.0	0.0			
Asian	19.0	0.0	0.0	0.0	1.9	0.0			
Others	23.8	4.5	1.1	5.1	2.0	6.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Education of Respondent									
None	9.5	4.8	9.5	47.6	4.8	23.8	100.0	5.5	21
Primary	1.9	7.4	32.4	35.2	11.1	12.0	100.0	28.3	108
Secondary	3.8	31.6	30.8	8.3	14.3	11.2	100.0	34.9	133
Post Sec	27.7	31.9	10.1	0.0	16.0	14.3	100.0	31.2	119
								99.9	381

Table 3 Percent Distribution of Respondents by Education, and Nature of Employment									
Education	**HIGH**	**MIDDLE**	**LOW**	**SLUMS**	**RUAI**	**NGONG**	**Total**	**Row%**	**N**
of Respondent									
None	4.7	1.1	2.2	16.9	2.0	10.0			
Primary	4.8	9.0	38.9	64.5	23.5	26.0			
Secondary	11.9	47.2	45.6	18.6	37.2	30.0			
Post Sec	78.6	42.7	13.3	0.0	37.3	34.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Is Respondent Self Employed?									
Yes	13.2	23.0	24.3	23.0	8.6	7.9	100.0	39.9	152
No	9.6	23.6	23.1	10.5	16.6	16.6	100.0	60.1	229
								100.0	381
Is Respondent Self Employed?									
Yes	47.6	39.9	41.1	59.3	25.5	24.0			
No	52.4	60.7	58.9	40.7	74.5	76.0			
Total	100.0	100.6	100.0	100.0	100.0	100.0			
N	42	89	90	59	51	50			
If Self Employed Type of Business									
Not stated	0.0	50.0	0.0	0.0	50.0	0.0	100.0	1.3	2
Sawmiller	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.7	1
Doctor/Dentist	66.7	33.3	0.0	0.0	0.0	0.0	100.0	2.0	3
Marketing/Salesman	36.4	9.1	0.0	0.0	54.5	0.0	100.0	7.1	11
Consultant	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.7	1
Artist	50.0	0.0	0.0	50.0	0.0	0.0	100.0	1.3	2
Computer Engineer	42.9	42.9	14.2	0.0	0.0	0.0	100.0	4.6	7
Shopkeeper	4.8	25.0	34.6	29.8	3.8	2.0	100.0	68.4	104
Real Estate	11.2	22.2	0.0	33.3	0.0	33.3	100.0	5.9	9
Teacher	20.0	0.0	0.0	0.0	0.0	80.0	100.0	3.3	5
Farmers	33.3	33.3	0.0	0.0	0.0	33.3	99.9	2.0	3
Contractor	0.0	0.0	0.0	0.0	100.0	0.0	100.0	0.7	1
Lawyer	0.0	0.0	0.0	0.0	0.0	100.0	100.0	0.7	1
Not applicable	0.0	0.0	0.0	0.0	0.0	100.0	100.0	1.3	2
								100.0	152
If Self Employed Type of Business									
Not stated	0.0	2.9	0.0	0.0	7.7	0.0			
Sawmiller	5.0	0.0	0.0	0.0	0.0	0.0			
Doctor/Dentist	10.0	2.9	0.0	0.0	0.0	0.0			
Marketing/Salesman	20.0	2.9	0.0	0.0	46.2	0.0			
Consultant	5.0	0.0	0.0	0.0	0.0	0.0			
Artist	5.0	0.0	0.0	2.9	0.0	0.0			
Computer Engineer	15.0	8.6	2.7	0.0	0.0	0.0			
Shopkeeper	25.0	74.2	97.3	88.6	30.7	16.7			
Real Estate	5.0	5.6	0.0	8.5	0.0	25.0			
Teacher	5.0	0.0	0.0	0.0	0.0	33.3			
Farmers	5.0	2.9	0.0	0.0	0.0	8.3			
Contractor	0.0	0.0	0.0	0.0	7.7	0.0			
Lawyer	0.0	0.0	0.0	0.0	7.7	0.0			
Not applicable	0.0	0.0	0.0	0.0	0.0	16.7			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N	20	35	37	35	13	12	152		

Table 4 **Main source of Income and Nature of Employment**

If not self employed Who is Employer									
Not Stated	25.0	7.1	39.3	7.1	21.4	0.0	99.9	12.2	28
Public service	1.3	19.2	23.1	0.0	24.4	32.0	100.0	34.1	78
Company	29.0	45.2	12.9	3.2	9.7	0.0	100.0	13.5	31
Private Firm	1.8	29.8	28.1	15.7	12.3	12.3	100.0	24.9	57
NGO	75.0	0.0	0.0	0.0	25.0	0.0	100.0	1.7	4
Unemployed	3.7	22.2	11.1	40.7	7.4	14.8	99.9	11.8	27
Others	0.0	0.0	25.0	25.0	0.0	50.0	100.0	1.7	4
								99.9	229
If not self employed Who is Employer									
Not Stated	31.8	3.7	20.8	8.3	15.8	0.0			
Public service	4.5	27.8	34.0	0.0	50.0	65.8			
Company	40.9	25.9	7.5	4.2	7.9	0.0			
Private Firm	4.5	31.5	30.1	37.5	18.4	18.4			
NGO	13.7	0.0	0.0	0.0	2.6	0.0			
Unemployed	4.5	11.1	5.7	45.8	5.3	10.5			
Others	0.0	0.0	1.9	4.2	0.0	5.3			
Total	99.9	100.0	100.0	100.0	100.0	100.0			
N	22	54	53	24	38	38			
Nature of Employment									
Not Applicable	14.3	14.3	25.0	21.4	14.3	10.7	100.0	24.5	56
Secretary	12.5	56.2	6.3	0.0	12.5	12.5	100.0	7.0	16
Administrator	12.5	50.0	12.5	0.0	25.0	0.0	100.0	3.5	8
Manager	58.3	33.3	0.0	8.3	0.0	0.0	99.9	5.2	12
Teacher	13.3	20.0	20.0	6.7	13.3	26.7	100.0	6.6	15
Clerk	0.0	19.0	42.9	0.0	33.3	4.8	100.0	9.2	21
Other	2.2	14.3	26.4	11.0	18.6	27.5	100.0	39.7	91
Accountant	0.0	85.7	14.3	0.0	0.0	0.0	100.0	3.1	7
Nurse	0.0	100.0	0.0	0.0	0.0	0.0	100.0	1.2	3
								100	229
Nature of Employment									
Not Applicable	36.4	14.8	26.4	50.0	21.1	15.7			
Secretary	9.1	16.6	1.9	0.0	5.3	5.3			
Administrator	4.5	7.4	1.9	0.0	5.3	0.0			
Manager	31.8	7.4	0.0	4.2	0.0	0.0			
Teacher	9.1	5.6	5.7	4.2	5.3	10.6			
Clerk	0.0	7.4	17.0	0.0	18.4	2.6			
Other	9.1	24.1	45.2	41.6	44.6	65.8			
Accountant	0.0	11.1	1.9	0.0	0.0	0.0			
Nurse	0.0	5.6	0.0	0.0	0.0	0.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N	22	54	53	24	38	38	229		
Main source of Income									
Employment	9.3	24.9	24.4	6.2	17.1	18.1	100.0	50.7	193
Business	15.0	20.9	26.1	22.9	10.5	4.6	100.0	40.2	153
Other Sources	2.9	25.7	8.6	34.2	5.7	22.9	100.0	9.1	35
								100.0	381

Table 5 Percent Distribution of Responedents by Monthly Income ,Expenditure Food and Rent

Main Source of Income									
Employment	42.8	53.9	52.2	20.3	64.7	70.0			
Business	54.8	36.0	44.4	59.4	31.4	14.0			
Other Sources	2.4	10.1	3.4	20.3	3.9	16.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Monthly Income									
Not stated	12.5	20.8	16.6	29.2	4.2	16.7	100.0	6.3	24
< Ks 5,000	0.0	8.3	32.6	29.9	11.1	18.1	100.0	37.8	144
Ks 5000-10000	0.0	22.9	31.3	7.3	25.0	13.5	100.0	25.2	96
Ks10001-20000	7.4	51.8	13.0	3.7	11.1	13.0	100.0	14.2	54
Over Ks 20000	55.6	34.9	3.2	0.0	6.3	0.0	100.0	16.5	63
								100.0	381
Monthly Income									
Not stated	7.2	5.6	4.4	11.9	2.0	8.0			
< Ks 5,000	0.0	13.5	52.2	72.8	31.4	52.0			
Ks 5000-10000	0.0	24.7	33.3	11.9	47.0	26.0			
Ks10001-20000	9.5	31.5	7.8	3.4	11.8	14.0			
Over Ks 20000	83.3	24.7	2.3	0.0	7.8	0.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Monthly Expenditure on Food									
<Ks2000	2.1	6.2	32.0	34.0	8.2	17.5	100.0	25.5	97
Ks2000-5000	6.3	18.1	27.8	13.2	19.4	15.2	100.0	37.8	144
Over Ks 5000	22.8	39.7	14.0	4.4	11.0	8.1	100.0	35.7	136
Not stated	0.0	75.0	0.0	25.0	0.0	0.0	100.0	1.0	4
								100.0	381
Monthly Expenditure on Food									
<Ks2000	4.8	6.7	34.4	55.9	15.7	34.0			
Ks2000-5000	21.4	29.2	44.4	32.2	54.9	44.0			
Over Ks 5000	73.8	60.7	21.2	10.2	29.4	22.0			
Not stated	0.0	3.4	0.0	1.7	0.0	0.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Monthly Expenditure on Rent									
Not Applicable	15.4	20.8	13.8	8.5	20.0	21.5	100.0	34.1	130
<Ks2000	0.0	7.3	38.4	31.1	11.3	11.9	100.0	39.6	151
Ks 2000-5000	2.4	47.6	31.0	2.4	9.5	7.1	100.0	11.0	42
Over Ks 5000	36.3	53.4	1.7	0.0	6.9	1.7	100.0	15.2	58
								99.9	381

Table 6 **Percent Distribution by ownership of house and type of house**

Monthly Expenditure on Rent	HIGH	MIDDLE	LOW	SLUMS	RUAI	NGONG	Total	Row%	N
Not Applicable	47.6	30.3	20.0	18.6	51.0	56.0			
<Ks2000	0.0	12.4	64.4	79.7	33.4	36.0			
Ks 2000-5000	2.4	22.5	14.4	1.7	7.8	6.0			
Over Ks 5000	50.0	34.8	1.1	0.0	7.8	2.0			
Total	100.0	100.0	99.9	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Monthly Expenditure on Fees									
Not Applicable	12.8	20.8	18.4	18.4	15.2	14.4	100.0	32.8	125
<Ks2000	2.7	8.2	38.2	24.5	14.5	11.9	100.0	28.9	110
Ks 2000-5000	7.4	31.5	22.2	14.8	16.7	7.4	100.0	14.2	54
Over Ks 5000	20.7	40.2	14.1	1.1	7.6	16.3	100.0	24.1	92
								100.0	381
Monthly Expenditure on Fees									
Not Applicable	38.1	29.2	25.6	39.0	37.3	36.0			
<Ks2000	7.2	10.1	46.7	45.8	31.4	26.0			
Ks 2000-5000	9.5	19.1	13.3	13.6	17.6	8.0			
Over Ks 5000	45.2	41.6	14.4	1.6	13.7	30.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Ownership of House									
Yes	17.9	21.4	6.2	16.1	24.1	14.3	100.0	29.4	112
No	8.2	24.2	30.9	15.2	8.9	12.6	100.0	70.6	269
								100.0	381
Ownership of House									
Yes	47.6	27.0	7.8	30.5	52.9	32.0			
No	52.4	73.0	92.2	69.5	47.1	68.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Type of House									
Temporary	2.5	2.5	19.2	45.8	14.2	15.8	100.0	31.5	120
Permanent	14.9	33.0	25.7	1.5	13.0	11.9	100.0	68.5	261
								100.0	381
Type of House									
Temporary	7.1	3.4	25.6	93.2	33.3	38.0			
Permanent	92.9	96.6	74.4	6.8	66.7	62.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			

Table 7 Percent Distribution of Respondents by Number of Rooms/bedrooms									
Number of Rooms	HIGH	MIDDLE	LOW	SLUMS	RUAI	NGONG	Total	Row%	N
1 room	0.8	6.1	41.2	35.1	8.4	8.4	100.0	34.4	131
1 Bedroom	1.3	18.4	30.3	6.6	17.1	26.3	100.0	19.9	76
2 Bedrooms	6.5	48.1	10.4	5.2	19.5	10.3	100.0	20.2	77
3 Bedrooms	15.7	47.1	2.0	5.9	15.7	13.6	100.0	13.4	51
4 & above Bedrooms	58.7	13.0	8.7	2.2	8.7	8.7	100.0	12.1	46
								100.0	381
Number of Rooms									
1 room	2.4	9.0	60.0	78.0	21.6	22.0			
1 Bedroom	2.4	15.7	25.6	8.5	25.5	40.0			
2 Bedrooms	11.9	41.6	8.9	6.8	29.4	16.0			
3 Bedrooms	19.0	27.0	1.1	5.1	15.7	14.0			
4 & above Bedrooms	64.3	6.7	4.4	1.6	7.8	8.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N	42	89	90	59	51	50	381		
Rent per month									
Ks 0-200	15.9	16.6	13.2	10.6	18.5	25.2	100.0	39.7	151
Ks201-500	0.0	0.0	24.3	54.1	13.5	8.1	100.0	9.7	37
Ks 501-1000	0.0	11.8	35.3	35.3	9.8	7.8	100.0	13.4	51
Ks1000-1500	0.0	9.1	66.7	9.1	12.1	3.0	100.0	8.7	33
Ks1501-2000	0.0	12.0	64.0	0.0	24.0	0.0	100.0	6.6	25
Ks2001-5000	3.0	57.6	12.1	6.1	9.1	12.1	100.0	8.7	33
Ks5001 &above	32.0	66.0	2.0	0.0	0.0	0.0	100.0	13.2	50
								100.0	380
Rent per month									
Ks 0-200	58.5	28.1	22.2	27.1	54.9	76.0			
Ks201-500	0.0	0.0	10.0	33.9	9.8	6.0			
Ks 501-1000	0.0	6.7	20.0	30.5	9.8	8.0			
Ks1000-1500	0.0	3.4	24.4	5.1	7.8	2.0			
Ks1501-2000	0.0	3.4	17.8	0.0	11.8	0.0			
Ks2001-5000	2.4	21.3	4.4	3.4	5.9	8.0			
Ks50001 &above	39.0	37.1	1.1	0.0	0.0	0.0			
Total	99.9	100.0	99.9	100.0	100.0	100.0			
N	41	89	90	59	51	50			
House Materials									
Paper	15.8	21.1	0.0	42.1	10.5	10.5	100.0	5.0	19
Timber	2.1	6.3	25.0	18.8	18.8	29.2	100.2	12.6	48
Poles and Mud	1.9	1.9	20.4	64.8	0.0	11.1	100.1	14.2	54
Stones	14.9	32.7	26.6	0.8	13.7	11.3	100.0	65.1	248
Iron Sheets	0.0	0.0	8.3	41.7	50.0	0.0	100.0	3.1	12
								100.0	381
House Materials									
Paper	7.1	4.5	0.0	13.6	3.9	4.0			
Timber	2.4	3.4	13.3	15.3	17.6	28.0			
Poles and Mud	2.4	1.1	12.3	59.3	0.0	12.0			
Stones	88.1	91.0	73.3	3.3	66.7	56.0			
Iron Sheets	0.0	0.0	1.1	8.5	11.8	0.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Type of Roof								100	379
Corrugated Iron	0.9	20.1	28.6	20.5	14.5	15.4	100.0	61.7	234
Bricks	14.8	34.6	19.8	0.0	18.5	12.3	100.0	21.4	81
Tiles	66.7	23.8	2.3	2.4	2.4	2.4	100.0	11.1	42
Other	0.0	13.6	27.3	45.5	4.5	9.1	100.0	5.8	22

Table 8 **Percent Distribution of Respondents by Roof type and Other Household Assets**

Type of Roof	HIGH	MIDDLE	LOW	SLUMS	RUAI	NGONG	Total	Row%	N
Corrugated Iron	4.8	53.4	74.4	81.4	66.7	73.5			
Bricks	28.5	31.8	17.8	0.0	29.3	20.4			
Tiles	66.7	11.4	1.1	1.7	2.0	2.0			
Other	0.0	3.4	6.7	16.9	2.0	4.1			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50	381.0		
Shower									
Yes	20.9	40.8	14.3	2.6	10.7	10.7	100.0	51.4	196
No	0.5	4.9	33.5	29.2	16.2	15.7	100.0	48.6	185
								100.0	381
Shower									
Yes	97.6	89.9	31.1	8.5	41.2	42.0			
No	2.4	10.1	68.9	91.5	58.8	58.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Bath									
Yes	30.7	35.0	12.4	0.7	12.4	8.8	100.0	36.0	137
No	0.0	16.8	29.9	23.8	13.9	15.6	100.0	64.0	244
								100.0	381
Bath									
Yes	100.0	53.9	18.9	1.7	33.3	24.0			
No	0.0	46.1	81.1	98.3	66.7	76.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Toilet									
Yes	15.1	31.7	21.2	5.4	12.2	14.4	100.0	73.0	278
No	0.0	1.0	30.1	42.7	16.5	9.7	100.0	27.0	103
								100.0	381
Toilet									
Yes	100.0	98.9	65.6	25.4	66.7	80.0			
No	0.0	1.1	34.4	74.6	33.3	20.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Washbasin									
Yes	19.1	33.6	17.3	8.2	10.9	10.9	100.0	57.7	220
No	0.0	9.3	32.3	25.5	16.8	16.1	100.0	42.3	161
								100.0	381
Washbasin									
Yes	100.0	83.1	42.2	30.5	47.1	48.0			
No	0.0	16.9	57.8	69.5	52.9	52.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Household Assets									
Radio									
Yes	12.7	27.5	23.2	10.8	13.4	12.4	100.0	82.4	314
No	3.0	4.5	25.5	37.3	13.3	16.4	100.0	17.6	67
								100.0	381

Table 9 Ownership of Household Assets TV Bicycle Radio and Telephone

	HIGH	MIDDLE	LOW	SLUMS	RUAI	NGONG	Total	Row%	N
Radio									
Yes	95.2	96.6	81.1	57.6	82.4	78.0			
No	4.8	3.4	18.9	42.4	17.6	22.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Television									
Yes	20.8	38.6	16.2	3.6	11.7	9.1	100.0	51.7	197
No	0.5	7.1	31.5	28.3	15.2	17.4	100.0	48.3	184
								100.0	381
Television									
Yes	97.6	85.4	35.6	11.9	45.1	36.0			
No	2.4	14.6	64.4	88.1	54.9	64.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Bicycle									
Yes	37.7	30.4	14.5	3.0	7.2	7.2	100.0	18.1	69
No	5.1	21.8	25.6	18.4	14.7	14.4	100.0	81.9	312
								100.0	381
Bicycle									
Yes	61.9	23.6	11.1	3.4	9.8	10.0			
No	38.1	76.4	88.9	96.6	90.2	90.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Car									
Yes	43.1	41.1	4.2	1.1	6.3	4.2	100.0	24.9	95
No	0.3	17.5	30.1	20.3	15.7	16.1	100.0	75.1	286
								100.0	381
Car									
Yes	97.6	43.8	4.4	1.7	11.8	8.0			
No	2.4	56.2	95.6	98.3	88.2	92.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Telephone									
Yes	43.5	45.6	4.3	1.1	2.2	3.3	100.0	24.1	92
No	0.7	16.3	29.7	20.0	17.0	16.3	100.0	75.9	289
								100.0	381
Telephone									
Yes	95.2	47.2	4.4	1.7	3.9	6.0			
No	4.8	52.8	95.6	98.3	96.1	94.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N	42	89	90	59	51	50			
Rent Respondent is Willing to pay									
Not applicable	20.9	19.4	10.4	7.5	23.9	17.9	100.0	17.6	67
<Ks 1000	0.0	6.8	34.9	33.6	8.9	15.8	100.0	38.3	146
Ks 1000-5000	1.1	41.1	28.4	5.3	12.5	11.6	100.0	24.9	95
Over Ks 5000	41.0	42.6	8.2	0.0	1.6	6.6	100.0	16.0	61
Not stated	16.7	8.3	0.0	0.0	75.0	0.0	100.0	3.1	12
								99.9	381

Table 10 Percent Dsitribution of Respondents by Health status									
Rent Respondent is Willing to pay	**HIGH**	**MIDDLE**	**LOW**	**SLUMS**	**RUAI**	**NGONG**	**Total**	**Row%**	**N**
Not applicable	33.3	14.6	7.8	8.4	31.4	24.0			
<Ks 1000	0.0	11.3	56.6	83.1	25.5	46.0			
Ks 1000-5000	2.4	43.8	30.0	8.5	23.5	22.0			
Over Ks 5000	59.5	29.2	5.6	0.0	2.0	8.0			
Not stated	4.8	1.1	0.0	0.0	17.6	0.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Health status									
Health Facility Visits									
By Respondent									
None	13.0	25.4	22.7	13.5	10.8	14.6	100.0	48.6	185
Once	9.1	28.8	21.2	18.2	4.5	18.2	100.0	17.3	66
Twice	18.9	16.2	24.4	16.2	16.2	8.1	100.0	9.7	37
More than twice	5.4	18.2	26.9	17.2	23.7	8.6	100.0	24.4	93
								100.0	381
Health status									
Health Facility Visits									
By Respondent									
None	57.1	52.8	46.7	42.4	39.2	54.0			
Once	14.3	21.3	15.5	20.3	5.9	24.0			
Twice	16.7	6.7	10.0	10.2	11.8	6.0			
More than twice	11.9	19.2	27.8	27.1	43.1	16.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Diagnosed Illness of Respondent									
Not applicable	12.6	25.9	21.5	13.7	11.5	14.8	100.0	47.8	182
Malaria/Fever	6.2	21.6	28.9	17.5	15.5	10.3	100.0	25.5	97
Diarrhoea/vomiting	0.0	0.0	30.8	38.4	7.7	23.1	100.0	3.4	13
ARI/Cold/cough	12.5	28.1	21.8	6.3	25.0	6.3	100.0	8.4	32
Typhoid	0.0	0.0	25.0	25.0	25.0	25.0	100.0	2.1	8
Others	16.7	25.0	20.8	16.7	8.3	12.5	100.0	12.6	48
Not stated	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.3	1
								100.1	381
Diagnosed Illness of Respondent									
Not applicable	54.8	52.8	43.3	42.4	41.2	54.0			
Malaria/Fever	14.3	23.6	31.1	28.8	29.4	20.0			
Diarrhoea/vomiting	0.0	0.0	4.4	8.5	2.0	6.0			
ARI/Cold/cough	9.5	10.1	7.8	3.4	15.7	4.0			
Typhoid	0.0	0.0	2.2	3.4	3.9	4.0			
Others	19.0	13.5	11.2	13.5	7.8	12.0			
Not stated	2.4	0.0	0.0	0.0	0.0	0.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Health visits by children								100	381
None	15.1	23.3	22.7	15.7	9.8	13.4	100.0	45.1	172
Once	7.0	16.3	39.5	11.6	7.0	18.6	100.0	11.3	43
Twice	11.6	23.3	23.3	16.3	2.2	23.3	100.0	11.3	43
More than twice	6.5	26.0	19.5	16.3	24.4	7.3	100.0	32.3	123

Table 11 Health visits by children	Percent Distribution of Respondents by Health Status of children HIGH	MIDDLE	LOW	SLUMS	RUAI	NGONG	Total	Row%	N
None	61.9	44.9	43.3	45.8	33.3	46.0			
Once	7.2	7.9	18.9	8.5	5.9	16.0			
Twice	11.9	11.2	11.1	11.8	2.0	20.0			
More than twice	19.0	36.0	26.7	33.9	58.8	18.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Diagnosed Illness of Children									
Not applicable	14.0	22.7	23.3	15.6	11.0	13.4	100.0	45.1	172
Malaria/Fever	6.9	24.5	21.6	20.6	12.7	13.7	100.0	26.8	102
Diarrhoea/vomiting	0.0	11.8	29.4	29.4	11.8	17.6	100.0	4.5	17
ARI/Cold/cough	12.7	30.1	17.5	3.2	23.8	12.7	100.0	16.5	63
Typhoid	12.5	12.5	37.5	12.5	12.5	12.5	100.0	2.1	8
Others	5.6	16.7	50.0	16.6	5.5	5.6	100.0	4.7	18
Not stated	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.3	1
								100.0	381
Diagnosed Illness of Children									
Not applicable	57.1	43.8	44.4	45.8	37.3	46.0			
Malaria/Fever	16.7	28.2	24.5	35.6	25.5	28.0			
Diarrhoea/vomiting	0.0	2.2	5.6	8.5	3.8	6.0			
ARI/Cold/cough	19.0	21.3	12.2	3.4	29.4	16.0			
Typhoid	2.4	1.1	3.3	1.7	2.0	2.0			
Others	2.4	3.4	10.0	5.0	2.0	2.0			
Not stated	2.4	0.0	0.0	0.0	0.0	0.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Health Facility Visits By Others									
None	10.5	22.0	25.0	15.7	12.8	14.0	100.0	90.3	344
Once	26.7	53.3	13.3	0.0	0.0	6.7	100.0	3.9	15
Twice	16.7	16.7	0.0	16.7	33.2	16.7	100.0	1.6	6
More than twice	6.3	25.0	12.4	25.0	31.3	0.0	100.0	4.2	16
								100	381
Health Facility Visits By Others									
None	85.7	85.4	95.6	91.5	86.3	96.0			
Once	9.5	9.0	2.2	0.0	0.0	2.0			
Twice	2.4	1.1	0.0	1.7	3.9	2.0			
More than twice	2.4	4.5	2.2	6.8	9.8	0.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Diagnosed Illness of Others									
Not applicable	10.1	22.6	24.7	16.1	12.2	14.3	100.0	88.2	336
Malaria/Fever	12.5	12.5	16.7	16.7	41.6	0.0	100.0	6.3	24
Diarrhoea/vomiting	0.0	100.0	0.0	0.0	0.0	0.0	100.0	0.3	1
ARI/Cold/cough	14.3	42.9	28.5	0.0	0.0	14.3	100.0	1.8	7
Typhoid	0.0	100.0	0.0	0.0	0.0	0.0	100.0	0.3	1
Others	20.0	50.0	10.0	10.0	0.0	10.0	100.0	2.6	10
Not stated	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.5	2
								100.0	381

Table 12 Distribution of Water sources and Sewage Disposal Methods

	HIGH	MIDDLE	LOW	SLUMS	RUAI	NGONG	Total	Row%	N
Diagnosed Illness of Others									
Not applicable	81.0	85.4	92.2	91.5	80.4	96.0			
Malaria/Fever	7.1	3.4	4.4	6.8	19.6	0.0			
Diarrhoea/vomiting	0.0	1.1	0.0	0.0	0.0	0.0			
ARI/Cold/cough	2.3	3.4	2.2	0.0	0.0	2.0			
Typhoid	0.0	1.1	0.0	0.0	0.0	0.0			
Others	4.8	5.6	1.2	1.7	0.0	2.0			
Not stated	4.8	0.0	0.0	0.0	0.0	0.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Water Source									
Household Tap	16.6	39.9	24.7	4.5	9.4	4.9	100.0	58.5	223
Public tap	0.0	0.0	36.6	47.3	0.0	16.1	100.0	24.4	93
River	0.0	0.0	0.0	0.0	75.0	25.0	100.0	1.0	4
Wells/borehole	9.3	0.0	1.9	0.0	48.1	40.7	100.0	14.2	54
Dam/Lake	0.0	0.0	0.0	0.0	0.0	100.0	100.0	0.3	1
Others	0.0	0.0	0.0	83.3	16.7	0.0	100.0	1.6	6
								100.0	381
Water Source									
Household Tap	88.1	100.0	61.1	16.9	41.2	22.0			
Public tap	0.0	0.0	37.8	74.6	0	30.0			
River	0.0	0.0	0.0	0.0	5.8	2.0			
Wells/borehole	11.9	0.0	1.1	0.0	51.0	44.0			
Dam/Lake	0.0	0.0	0.0	0.0	0.0	2.0			
Others	0.0	0.0	0.0	8.5	2.0	0.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Sewage Disposal Methods									
NCC sewer	8.2	45.4	34.4	0.5	6.0	5.5	100.0	48.0	183
Septic Tank	57.4	12.8	6.4	4.2	4.3	14.9	100.0	12.3	47
Pit latrine	0.0	0.0	13.7	27.4	31.5	27.4	100.0	30.7	117
Open ground	0.0	0.0	21.9	71.9	3.1	3.1	100.0	8.4	32
Others	0.0	0.0	50.0	50.0	0.0	0.0	100.0	0.5	2
								99.9	381
Sewage Disposal Methods									
NCC sewer	35.7	93.3	70.0	1.7	21.6	20.0			
Septic Tank	64.3	6.7	3.3	3.4	3.9	14.0			
Pit latrine	0.0	0.0	17.8	54.2	72.5	64.0			
Open ground	0.0	0.0	7.8	39.0	2.0	2.0			
Others	0.0	0.0	1.1	1.7	0.0	0.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			

Table 13 **Percent Distribution of Respondents by Main type of Pollution and Garbage Disposal method**

Main Type of Pollution	HIGH	MIDDLE	LOW	SLUMS	RUAI	NGONG	Total	Row%	N
Air	5.4	18.9	34.3	21.6	16.2	3.6	100.0	29.1	111
Water	6.4	22.4	22.4	15.2	11.2	22.4	100.0	32.8	125
Noise	18.5	27.8	18.5	5.6	18.5	11.1	100.0	14.2	54
Other	5.8	40.4	23.1	19.2	11.5	0.0	100.0	13.6	52
None	38.5	10.2	5.1	7.7	7.7	30.8	100.0	10.2	39
								99.9	381
Main Type of Pollution									
Air	14.3	23.6	42.2	40.7	35.3	8.0			
Water	19.1	31.5	31.1	32.2	27.5	56.0			
Noise	23.8	16.9	11.1	5.1	19.6	12.0			
Other	7.1	23.6	13.3	16.9	11.8	0.0			
None	35.7	4.4	2.3	5.1	5.8	24.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Garbage disposal Methods									
NCC collection	4.1	49.0	12.2	6.1	20.4	8.2	100.0	12.9	49
Burning	10.3	13.0	6.5	5.2	37.7	27.3	100.0	20.2	77
Recycling	50.0	25.0	0.0	0.0	25.0	0.0	100.0	1.0	4
Compositing	20.7	3.4	3.4	0.0	24.2	48.3	100.0	7.6	29
Dumping open Groun	0.0	11.0	47.7	31.6	2.6	7.1	100.0	40.7	155
Other	0.0	68.2	18.2	13.6	0.0	0.0	100.0	5.8	22
Private collector	53.3	46.7	0.0	0.0	0.0	0.0	100.0	11.8	45
								100.0	381
Garbage disposal Methods									
NCC collection	4.8	27.0	6.7	5.1	19.6	8.0			
Burning	19.0	11.2	5.6	6.8	56.9	42.0			
Recycling	4.8	1.1	0.0	0.0	2.0	0.0			
Compositing	14.3	1.1	1.1	0.0	13.7	28.0			
Dumping open Groun	0.0	19.1	82.2	83.1	7.8	22.0			
Other	0.0	16.9	4.4	5.0	0.0	0.0			
Private collector	57.1	23.6	0.0	0.0	0.0	0.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Knowledge of Garbage Sites									
Yes	6.6	22.7	26.8	17.7	17.6	8.6	100.0	52.0	198
No	15.8	24.0	20.2	13.2	8.8	18.0	100.0	48.0	183
								100.0	381
Knowledge of Garbage Sites									
Yes	31.0	50.6	58.9	59.3	68.6	34.0			
No	69.0	49.4	41.1	40.7	31.4	66.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			

Table 14 **Percent Distribution of Respondents by Knowledge of Garbage Sites**

	HIGH	MIDDLE	LOW	SLUMS	RUAI	NGONG	Total	Row%	N
Sites Known in Nairobi									
Don't Know	17.0	24.2	19.8	13.2	8.2	17.6	100.0	47.8	182
Dandora	3.0	27.1	27.8	10.5	21.8	9.8	100.0	34.9	133
Kayaba/Mukuru	0.0	6.7	6.6	80.0	0.0	6.7	100.0	3.9	15
Eastleigh	0.0	0.0	16.7	33.3	33.3	16.7	100.0	1.6	6
Others	15.6	17.8	33.3	15.6	11.0	6.7	100.0	11.8	45
								100.0	381
Sites Known in Nairobi									
Don't Know	73.8	49.4	40.0	40.7	29.4	64.0			
Dandora	9.5	40.4	41.1	23.7	56.9	26.0			
Kayaba/Mukuru	0.0	1.2	1.1	20.3	0.0	2.0			
Eastleigh	0.0	0.0	1.1	3.4	3.9	2.0			
Others	16.7	9.0	16.7	11.9	9.8	6.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Necessity of garbage disposal Site									
Not important	17.6	8.9	20.6	38.2	8.8	5.9	100.0	8.9	34
Important	5.0	15.0	26.0	22.0	14.0	18.0	100.0	26.2	100
Very important	12.6	28.7	23.1	9.7	13.8	12.1	100.0	64.8	247
								99.9	381
Necessity of garbage disposal Site									
Not important	14.3	3.3	7.8	22.0	5.8	4.0			
Important	11.9	16.9	28.9	37.3	27.5	36.0			
Very important	73.8	79.8	63.3	40.7	66.7	60.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=381	42	89	90	59	51	50			
Should a site be delineated for garbage disposal									
Yes	11.0	24.3	23.8	14.5	13.6	12.8	100.0	90.6	345
No	11.1	13.9	22.2	25.0	11.1	16.7	100.0	9.4	36
								100	381
Should a site be delineated for garbage disposal									
Yes	90.5	94.4	91.1	84.7	92.2	88.0			
No	9.5	5.6	8.9	15.3	7.8	12.0			
	100.0	100.0	100.0	100.0	100.0	100.0			
	42	89	90	59	51	50	381		

Table 15 Percent Distribution of Respondents by Extent of Environmental Degradation in Nairobi

Cost of Garbage Disposal per year	HIGH	MIDDLE	LOW	SLUMS	RUAI	NGONG	Total	Row%	N
Nothing	3.7	10.8	29.5	21.3	16.0	18.7	100.0	70.4	268
Less than Ks 500	26.7	51.1	11.1	4.4	6.7	0.0	100.0	11.8	45
Ks 500- 1000	24.1	44.8	17.3	0.0	13.8	0.0	100.0	7.6	29
Over Ks 1000	33.3	61.5	2.6	0.0	2.6	0.0	100.0	10.2	39
								100	381
Cost of Garbage Disposal per year									
Nothing	23.8	32.6	87.7	96.6	84.3	100.0			
Less than Ks 500	28.5	25.8	5.6	3.4	5.9	0.0			
Ks 500- 1000	16.7	14.6	5.6	0.0	7.8	0.0			
Over Ks 1000	31.0	27.0	1.1	0.0	2.0	0.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N	42	89	90	59	51	50	381		
Extent of environmental degradation in NBI									
Very much	11.1	23.9	24.0	15.7	13.8	11.5	100.0	80.3	305
Much	12.7	20.6	20.7	14.3	12.7	19.0	100.0	16.6	63
Very little	0.0	37.5	37.5	0.0	0.0	25.0	100.0	2	8
None	0.0	0.0	25.0	50.0	0.0	25.0	100.0	1.1	4
								100	380
Extent of environmental degradation in NBI									
Very much	81.0	82.0	81.1	81.4	84.0	70.0			
Much	19.0	14.6	14.4	15.3	16.0	24.0			
Very little	0.0	3.4	3.3	0.0	0.0	4.0			
None	0.0	0.0	1.2	3.3	0.0	2.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N	42	89	90	59	51	50	381		
Status of sanitation in Nairobi									
Good	14.3	7.1	14.3	7.1	35.8	21.4	100.0	3.7	14
Fair	8.8	19.8	18.7	17.6	16.5	18.6	100.0	23.9	91
Poor	11.7	25.5	25.9	15.0	10.9	11.0	100.0	72.1	274
Very poor	0.0	0.0	0.0	100.0	0.0	0.0	100.0	0.3	1
								100	380
Status of sanitation in Nairobi									
Good	4.8	1.1	2.2	1.7	10.0	6.0			
Fair	19.0	20.2	18.9	27.1	30.0	34.0			
Poor	76.2	78.7	78.9	69.5	60.0	60.0			
Very poor	0.0	0.0	0	1.7	0.0	0.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N	42	89	90	59	50	50	380		
Sanitation status in Estate									
Good	30.8	29.0	4.7	4.7	12.1	18.7	100.0	28.2	107
Fair	6.0	29.9	23.1	2.6	21.4	17.0	100.0	30.8	117
Poor	1.4	15.4	39.2	34.2	2.8	7.0	100.0	37.6	143
Very poor	0.0	7.7	15.4	15.4	61.5	0.0	100.0	3.4	13
								100	380

Table 16	Percent Distribution of Sanitation Status in Estate								
	HIGH	MIDDLE	LOW	SLUMS	RUAI	NGONG	Total	Row%	N
Sanitation status in Estate									
Good	78.6	34.8	5.6	8.5	26.0	40.0			
Fair	16.6	39.3	30.0	5.1	50.0	40.0			
Poor	4.8	24.7	62.2	83.1	8.0	20.0			
Very poor	0.0	1.2	2.2	3.3	16.0	0.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N	42	89	90	59	50	50	380		
Proposals to improve sanitation in Estate									
Drainage Maintenan	0.0	29.3	34.1	17.1	10.6	8.9	100.0	32.4	123
Private collection	6.7	33.3	30.0	10.0	6.7	13.3	100.0	7.9	30
Awareness on Sanit	7.8	6.3	32.8	9.4	21.8	21.9	100.0	16.8	64
NCC Bin Provision	17.4	30.4	21.7	17.4	8.8	4.3	100.0	6.1	23
Not stated	25.0	27.0	6.2	16.7	18.8	6.3	100.0	12.6	48
Rubbish Pit	50.0	0.0	16.7	16.6	16.7	0.0	100.0	1.6	6
No Proposal	22.5	26.8	12.7	7.0	12.7	18.3	100.0	18.7	71
Construct latrine	0.0	0.0	0.0	73.3	0.0	26.7	100.0	3.9	15
								100.0	380
Proposals to improve sanitation in estate									
Drainage Maintenan	0.0	40.4	46.7	35.6	26.0	22.0			
Private collection	4.8	11.2	10.0	5.1	4.0	8.0			
Awareness on Sanit	11.9	4.6	23.3	10.2	28.0	28.0			
NCC Bin Provision	9.5	7.9	5.6	6.8	4.0	2.0			
Not stated	28.6	14.6	3.3	13.6	18.0	6.0			
Rubbish Pit	7.1	0.0	1.1	1.7	2.0	0.0			
No Proposal	38.1	21.3	10.0	8.5	18.0	26.0			
Construct latrine	0.0	0.0	0.0	18.5	0.0	8.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N	42	89	90	59	50	50	380		
Aware of solid waste Management in NBI									
Yes	8.8	26.5	23.1	12.4	12.4	16.8	100.0	30.0	114
No	12.0	22.2	23.7	16.9	13.5	11.7	100.0	70.0	266
								100.0	380
Aware of solid waste Management in NBI									
Yes	23.8	33.7	30.0	23.7	28.0	38.0			
No	76.2	66.3	70.0	76.3	72.0	62.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N	42	89	90	59	50	50			
Willingness to pay if NCC improves servc									
Yes	9.9	24.6	26.9	13.5	14.8	10.3	100	58.7	223
No	12.7	21.7	19.1	18.5	10.8	17.2	100	41.3	157
Willingness to pay if NCC improves servc								100	380
Yes	52.4	61.8	66.7	50.8	66.0	46.0			
No	47.6	38.2	33.3	49.2	34.0	54.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N	42	89	90	59	50	50	380		

Table 17 Willingness to Pay and Advice on Disposal Methods

	HIGH	MIDDLE	LOW	SLUMS	RUAI	NGONG	Total	Row%	N
If yes how much ?									
Zero	11.5	19.2	19.3	30.8	19.2	0.0	100	11.8	26
Ks 1-49	3.1	6.3	50.0	15.6	12.5	12.5	100	14.5	32
Ks 50-99	0.0	25.0	54.2	4.2	4.2	12.4	100	10.9	24
Ks 100-299	3.3	30.4	22.9	15.2	14.1	14.1	100	41.5	92
Ks 300-499	0.0	7.7	15.4	7.7	53.8	15.4	100	5.9	13
Ks 500 +	44.3	38.2	8.8	2.9	2.9	2.9	100	15.4	34
								100	221
If yes how much ?									
Zero	13.6	9.1	8.3	26.7	16.1	0.0			
Ks 1-49	4.5	3.6	26.7	16.7	12.9	17.4			
Ks 50-99	0.0	10.9	21.7	3.3	3.2	13.0			
Ks 100-299	13.6	50.9	35.0	46.7	41.9	56.5			
Ks 300-499	0.0	1.9	3.3	3.3	22.6	8.7			
Ks 500 +	68.3	23.6	5.0	3.3	3.3	4.4			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N	22	55	60	30	31	23			
IF No Reasons									
Not stated	0.0	8.7	17.4	34.8	13.0	26.1	100.0	14.6	23
Paying service charg	13.6	34.8	18.2	6.1	21.2	6.1	100.0	42.0	66
NCC mismanagt	27.5	20.0	27.5	7.5	0.0	17.5	100.0	25.5	40
No income	0.0	3.6	10.7	50.0	35.7	0.0	100.0	17.8	28
								99.9	157
IF No Reasons									
Not stated	0.0	5.9	13.3	13.3	27.6	17.6	22.2		
Paying service charg	45.0	67.6	40.0	40.0	13.8	82.4	14.8		
NCC mismanagt	55.0	23.5	36.7	36.7	10.3	0.0	25.9		
No income	0.0	3.0	10.0	10.0	48.3	0.0	37.1		
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0		
N	20	34	30	29	17	27	157		
Ever advised on methods of domestic waste disposal?									
Yes	13.6	15.3	15.3	18.6	18.6	18.6	100.0	15.5	59
No	10.6	24.9	25.2	15.0	12.1	12.2	100.0	84.5	321
								100	380
Ever advised on methods of domestic waste disposal?									
Yes	19.0	10.1	10.0	18.6	22.0	22.0			
No	81.0	89.9	90.0	81.4	78.0	78.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N	42	89	90	59	50	50	380		
If yes who advises									
Not stated	12.5	12.5	25.0	37.5	0.0	12.5	100.0	13.6	8
Collection REP	25.9	14.8	18.5	7.4	29.7	3.7	100.0	45.8	27
Others	0.0	66.7	16.7	16.6	0.0	0.0	100.0	10.2	6
Health Officers	0.0	0.0	20.0	60.0	0.0	20.0	100.0	8.4	5
Teacher	0.0	0.0	0.0	15.4	23.1	61.5	100.0	22.0	13
								100.0	59

Table 18	Awareness of Health Hazards Associated with poor Disposal Methods								
	HIGH	MIDDLE	LOW	SLUMS	RUAI	NGONG	Total	Row%	N
If yes who advises									
Not stated	12.5	11.1	22.2	27.3	0.0	9.1			
Collection REP	87.5	44.4	55.6	18.2	72.7	9.1			
Others	0.0	44.5	11.1	9.1	0.0	0.0			
Health Officers	0.0	0.0	11.1	27.3	0.0	9.1			
Teacher	0.0	0.0	0.0	18.1	27.3	72.7			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N	8	9	9	11	11	11			
Aware of health health hazards due to poor disposal									
Yes	11.4	23.0	23.5	15.2	13.3	13.6	100.0	94.8	361
No	5.0	30.0	25.0	20.0	15.0	5.0	100.0	5.2	20
									381
Aware of health health hazards due to poor disposal									
Yes	97.6	93.3	94.4	93.2	94.1	98.0			
No	2.4	6.7	5.6	6.8	5.9	2.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N	42	89	90	59	51	50	381		
Knowledge of Health hazards									
Food poisoning	0.0	0.0	0.0	53.1	0.0	46.9	100.0	8.9	32
Typhoid	8.9	25.0	26.8	7.1	23.3	8.9	100.0	15.5	56
Cholera	12.4	23.1	31.4	6.6	20.7	5.8	100.0	33.5	121
Malaria	12.8	20.5	26.9	12.8	3.8	23.2	100.0	21.6	78
Dysentry	15.2	27.3	12.1	39.4	0.0	6	100.0	9.1	33
Respiratory Infection	0.0	28.6	28.6	28.6	0.0	14.2	100.0	1.9	7
Not stated	23.1	30.8	7.7	7.7	23.1	7.6	100.0	3.6	13
Others	14.3	47.6	19.0	0.0	19.1	0	100.0	5.8	21
							N	99.9	361
Health hazards Known									
Food poisoning	0.0	0.0	0.0	30.9	0.0	30.6			
Typhoid	12.2	16.9	17.6	7.3	27.1	10.2			
Cholera	36.6	33.8	44.7	14.5	52.1	14.3			
Malaria	24.4	19.3	24.7	18.2	6.3	36.7			
Dysentry	12.2	10.8	4.7	23.6	0.0	4.1			
Respiratory Infection	0.0	2.4	2.4	3.6	0.0	2.0			
Not stated	7.3	4.8	1.2	1.9	6.3	2.1			
Others	7.3	12.0	4.7	0.0	8.2	0.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N	41	83	85	55	48	49	361		

Table 19 Suggested Actions to keep surrounding clean and clean up days

	HIGH	MIDDLE	LOW	SLUMS	RUAI	NGONG	Total	Row%	N
Suggested Actions to keep surrounding Clean									
Not stated	18.5	20.4	14.8	22.2	18.5	5.6	100.0	14.2	54
Regular Clean ups	7.7	23.1	28.6	20.9	8.7	11.0	100.0	23.9	91
Form Associations	15.8	34.2	23.7	7.9	13.1	5.3	100.0	10.0	38
Safe disposal metho.	4.0	22.7	32.0	6.7	14.6	20.0	100.0	19.7	75
Creating awareness	4.8	23.8	21.4	14.3	23.8	11.9	100.0	11.0	42
Recycling	42.9	14.3	28.5	0.0	0.0	14.3	100.0	1.8	7
None	18.9	24.5	20.8	7.5	13.2	15.1	100.0	13.9	53
Construct latrines	0.0	0.0	0.0	80.0	0.0	20.0	100.0	2.6	10
Personal Cleanliness	9.1	27.3	9.1	18.2	0.0	36.3	100.0	2.9	11
								100	381
Suggested Actions to keep surrounding Clean									
Not stated	23.8	12.4	8.9	20.3	19.6	6.0			
Regular Clean ups	16.7	23.6	28.9	32.2	15.7	20.0			
Form Associations	14.3	14.6	10.0	5.1	9.8	4.0			
Safe disposal metho.	7.1	19.1	26.7	8.5	21.6	30.0			
Creating awareness	4.8	11.2	10.0	10.2	19.6	10.0			
Recycling	7.1	1.2	2.2	0.0	0.0	2.0			
None	23.8	14.6	12.2	6.8	13.7	16.0			
Construct latrines	0.0	0.0	0.0	13.6	0.0	4.0			
Personal cleanliness	2.4	3.3	1.1	3.3	0.0	8.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N	42	89	90	59	51	50			
Are clean up days held in your area?									
Yes	2.2	37.8	24.4	22.2	0.0	13.4	100.0	11.8	45
No	11.1	21.8	24.4	14.2	15.2	13.3	100.0	82.9	316
Don't Know	30.0	15.0	10.0	20.0	15.0	10.0	100.0	5.2	20
								99.9	381
Are clean up days held in your area?									
Yes	2.4	19.1	12.2	16.9	0.0	12.0			
No	83.3	77.5	85.6	76.3	94.1	84.0			
Don't Know	14.3	3.4	2.2	6.8	5.9	4.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N	42	89	90	59	51	50			
If yes do you participate ?									
Yes	0.0	31.6	5.3	42.1	0.0	21.0	100.0	42.2	19
No	3.9	49.0	19.6	3.9	15.6	8.0	100.0	57.8	26
								100.0	45
If yes do you participate									
Yes	0.0	35.3	9.1	80.0	0	66.7			
No	100.0	64.7	90.9	20.0	0	33.3			
Total	100.0	100.0	100.0	100.0	0	100.0			
N	1	17	11	10	0	6	45		

Table 20 Organization of Clean up Days and Reasons for not Participating

	HIGH	MIDDLE	LOW	SLUMS	RUAI	NGONG	Total	Row%	N
Who organises clean up days									
Not stated	16.7	66.7	16.6	0.0	0.0	0.0	100.0	13.3	6
Housing Department	0.0	20.0	70.0	10.0	0.0	0.0	100.0	22.2	10
Estate Management	0.0	23.5	17.6	35.3	0.0	23.6	100.0	37.8	17
Others	0.0	66.7	0.0	11.1	0.0	22.2	100.0	20.0	9
Don't Know	0.0	33.3	0.0	66.7	0.0	0.0	100.0	6.7	3
								100	45
Who organises clean up days									
Not stated	100.0	23.5	9.1	0.0	0.0	0.0			
Housing Department	0.0	11.8	63.6	10.0	0.0	0.0			
Estate Management	0.0	23.5	27.3	60.0	0.0	66.7			
Others	0.0	35.3	0.0	10.0	0.0	33.3			
Don't Know	0.0	5.9	0.0	20.0	0.0	0.0			
Total	100.0	100.0	100.0	100.0	0.0	100.0			
N	1	17	11	10	0	6			
Reasons for not Participating in clean up days									
Not applicable	11.0	21.8	23.4	14.6	15.6	13.6	100.0	97.5	308
Not stated	0.0	28.6	71.4	0.0	0.0	0.0	100.0	2.2	7
Not interested	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.3	1
								100.0	316
Reasons for not Participating in clean up days									
Not applicable	97.1	97.1	93.5	100.0	100.0	100.0			
Not stated	0.0	2.9	6.5	0.0	0.0	0.0			
Not interested	2.9	0.0	0.0	0.0	0.0	0.0			
Total	100.0	100.0	100.0	100.0	100.0	100.0			
N=316	35	69	77	45	48	42			

SOLID WASTE MANAGEMENT PROJECT
QUESTIONNAIRE FOR COLLECTING DATA ON SOCIO ENVIRONMENTAL ASPECTS AND PUBLIC AWARENESS SURVEY FOR ENVIRONMENTAL IMPACT ASSESSMENT (EIA) PROJECT

Name of Estates _____

CBS Cluster No. _____

1 Family Details

(a) How old are you? _____

Does not know _____

(b) Sex M ☐ F ☐

(c) Marital Status

Married ☐

Single ☐

Widowed ☐

Divorced ☐

(d) Children

How many children do you have _____

(e) Age of children

Under 5 years ☐

Between 5 - 9 years ☐

Between 10-14 years ☐

Over 15 years ☐

2. Level of Education

No school ☐

Primary ☐

Secondary ☐

Post secondary ☐

3 Religious Affliation

Specify your Religion _____

4. What is your ethnic group? _____

5. Occupation of the Respondent

Are you :

Self Employed

Yes ☐

NO ☐

If self employed,
What business are you in ?

specify _____

If not self employed, who is your employer? _____

specify nature of employment _____

6. Income of Respondent

a) What is your monthly income?

Less than Kshs 5,000 ☐

Kshs 5,000 - Kshs 10,000 ☐

Kshs 10,001 - Kshs 20,000 ☐

Over Kshs 20,000 ☐

b) **What is the main source of your income**

Employment ☐

Business ☐

Other Specify _____

c) What is your annual expenditure on the following per month:

	Kshs Less than 2,000	Kshs 2,000-5,000	Over Kshs 5,000
School Fees	☐	☐	☐
Food	☐	☐	☐
Rent	☐	☐	☐

d) **Please indicate amount of money you are willing to spend on housing per month**

Less than Ksh 1,000 ☐

Between Kshs 1,000 - 5,000 ☐

Over Kshs 5,000 ☐

(7) <u>Housing Conditions</u>

(a) Size of house

1 room ☐

1 bedroom ☐

2 bedrooms ☐

3 bedrooms ☐

Over 3 bedrooms ☐

(b) **Facilities/properties in the house**

Do you have any of the following

- Radio ☐
- TV ☐
- Telephone ☐
- Car ☐
- Bicycles ☐

(c) **Permanence of the structure**

Temporary ☐

Permanent ☐

(d) **Materials constructing the house**

Paper ☐

Timber ☐

Poles and mud ☐

Stones ☐

(e) **Type of Roof**

Corrugated iron sheets ☐

Bricks ☐

Other specify _____

(d) Ownership of dwelling

- Do you own the house Yes ☐ NO ☐

- How much rent do you pay per month _____

(8) <u>Health Conditions and Sanitation</u>

Does your house have a	Yes	NO
Shower	☐	☐
Bath	☐	☐
Wash basins	☐	☐
Toilets	☐	☐

(9) <u>How many times have you or any member of you household visited a hospital/dispensary over the last year?</u>

	Self	Children	Others
None	☐	☐	☐
Once	☐	☐	☐
Twice	☐	☐	☐
Over two times	☐	☐	☐

(10) When you visited the hospital which illiness was diagnosed ?

Specify (i) Self _____

(ii) Children _____

(iii) Others _____

(11) What is the source of water for your household use?

Household tap (NCC direct piped supply) ☐

Public tap (NCC Kiosk) ☐

River ☐

Well/Brorehole ☐

Lake/dam ☐

Other (specify) _____

(12) Sewage Disposal Methods

How is your sewage disposed off?

- Connected to Nairobi City Council Sewer ☐
- Septic tank ☐
- Pit latrine ☐
- Open ground ☐

Other (specify) _____

(13) Pollution

What in your view is the most distressing in your neighbourhood?

Air pollution ☐

Water pollution ☐

Noise ☐

Other (specify) _____

(14) Awareness

(a) How do you dispose of your garbage

(i) City council collection ☐

(ii) Burning ☐

(iii) Recycling ☐

(iv) Compositing ☐

(v) Dumping ☐

(iii) Any other way?

Specify _____

(b) Do you know of any garbage disposal site in Nairobi?

Yes ☐

No ☐

(c) If yes, state which one?

Specify _____

(d) Necessity

How important is garbage disposal site

Not important ☐

Important ☐

Very important ☐

(e) Do you think a site should be delineated for garbage disposal

Yes ☐

NO ☐

(f) How much does it cost you to dispose of your garbage per year?

Nothing ☐

Less than Kshs. 500 ☐

500 Kshs - 1000 p.a ☐

Over Kshs 1000 p.a ☐

(15) Environmental degradation of Nairobi

What do you think is the extent of environmental degradation in Nairobi

V ery much ☐

Much ☐

Very little ☐

None ☐

(16) Importance of sanitary improvements

(a) What is the status of sanitation in Nairobi?

Good ☐

Fair ☐

Poor ☐

(b What is the status of sanitation in your estate?

Good ☐

Fair ☐

Bad ☐

(c) What proposals do you have for improving the status of sanitation in your estate

Specify _____

(17) Willingness to participate

(a) Are you aware of Solid Waste Management in Nairobi.

Yes ☐

NO ☐

(b) If Nairobi City Council were to provide improved services to keep your neghbourhood clean, would you be willing to pay for the improved service

Yes ☐

NO ☐

If yes, how much in total would you be willing to pay per month? Kshs.

_____

If no, give reasons why you would not be willing to pay?

_____

_____

(18) Have you ever been advised on methods of disposal of domestic waste?

Yes ☐ No ☐

If Yes by whom _____

(19) Are you aware of the health hazards to you or to members of your household if domestic waste is not properly and promptly disposed off?

Yes ☐ No ☐

If yes, do you know of some of the health hazards (please name some of the hazards)

_____

(20) What more do you think you could do to keep your surroundings clean?

Explain _____

(21) Are clean up days held in your area

Yes ☐

No ☐

I dont know ☐

If yes, do you participate in the exercise (clean up)

Yes ☐

No ☐

Who organises them _____

If no, why dont you participate

Explain _____

(22) Comments

(a) By interviewee/ Respondent

_____

_____

_____

(b) By Interviewer

_____

_____

_____

(c) By Supervisor

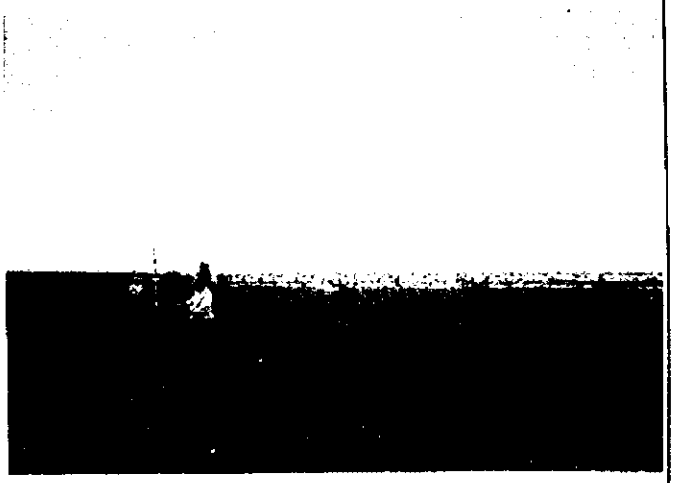
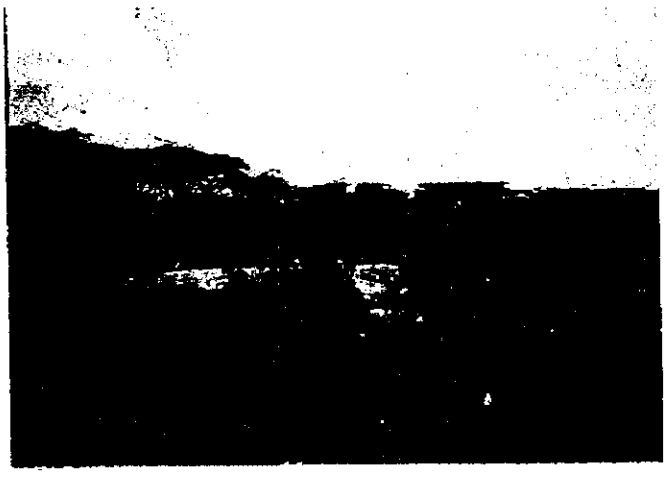
_____

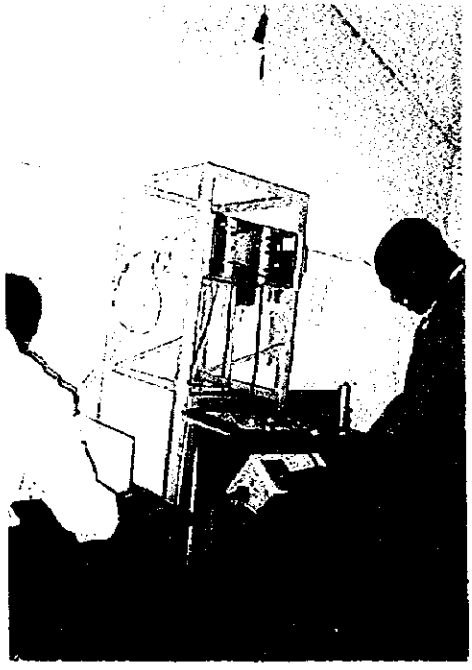
_____

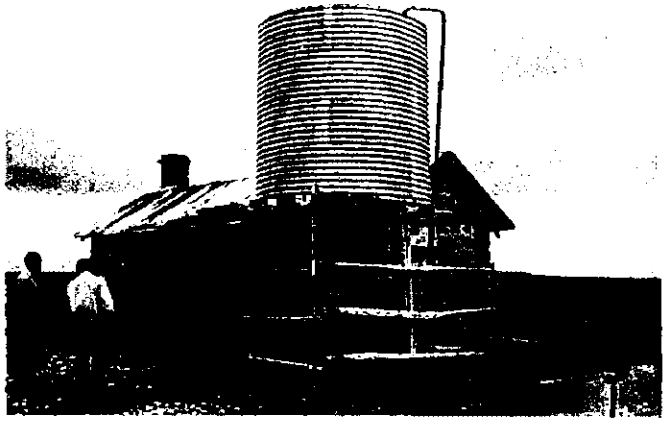
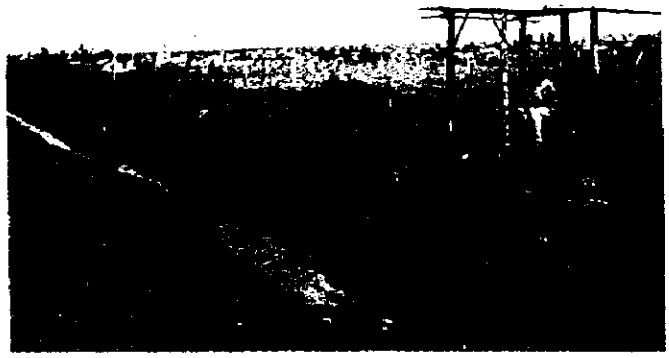
_____

9.8
PHOTOGRAPHS

9.8.1 Ruai Candidate Site Survey

Ruai EIA Study Area	Flora & Fauna Survey
	
The Study Area showing grassland with scattered acacia	Identification of species in the Study Area
Flora & Fauna Survey	**Soil Pollution Survey**
	
The Study Area showing riverine vegetation with trees depleted on the NCC side (right side of Nairobi River)	Samples taken from around the primary pond at Dandora Sewage Works

Sludge Sampling	Soil Analysis
	
Samples taken from the centre of the primary pond at Dandora Sewage Works	Analysis conducted at the Institute of Nuclear Science, University of Nairobi
River Sampling	**Drinking Water Sampling**
	
Nairobi River water sampling (upstream of the candidate site). The high water level is due to the phenomenon El Nino	Samples taken from NCC water supply system

Groundwater Sampling	Noise & Traffic Survey
	
Samples taken from a deep well which serves for domestic purposes and for cattle	Survey conducted on Kangundo Road
Noise & Traffic Survey	**Offensive Odour Survey**
	
Survey conducted on Access Road to the candidate disposal site	Measuring NH_3 at Dandora Sewage Works

9.8.2 Ngong Candidate Site Survey

Ngong Forest Candidate site	Flora & Fauna Survey
	
The consist of approximately 33.2 ha comprising of 0.8 ha of indigenous forest, 25.4 ha of eucalyptus and 7.0 ha of grassland.	Identification of species in the forest
Flora & Fauna Survey	**Flora & Fauna Survey**
	
Ecotone vegetation at Ngong Road Forest Glade	*Brachylaena huillensis*. This is one of the principal trees overutilised nationally

Flora & Fauna Survey	Beekeeping centre
	
Goats grazing in the forest	Beehives at the Beekeeping centre
River Sampling	**Drinking Water Sampling**
	
Mutoine River water sampling (upstream of the candidate site)	Samples taken from NCC water supply system (Mutego Community Pipe)

Groundwater Sampling	Noise & Traffic Survey
	
Samples taken from a private well - Lenana (Ngando)	Survey conducted on Ngong Road
Noise & Traffic Survey	**Analysis of Water**
	
Survey conducted on Access Road	Analysis conducted at Jomo Kenyatta University

9.9
TRAFFIC ASSESSMENT DATA

9.9 TRAFFIC ASSESSMENT DATA

1. Ngong Area

(a) Collection ratio & number of daily trucks on roads

Assuming that 45 % of vehicles will be deployed to the Ngong site, then the daily number of trucks on the road for different rates of collection is presented in the table below:

Cases	1998		2008	
	Trucks	% collection	Trucks	% collection
Case A	257	60	714	100
Case B	171	40	428	60

(b) Analysis of Ngong and Access Roads at Ngong Forest Area

(i) Current Traffic Condition

	Small	Medium	Large	Total (daily average)
Ngong Road	6503	3067	539	10109
Access	336	111	24	471

(ii) Predicted Traffic on Ngong and Access Roads

	Year	Number of Vehicles Introduced by this Project	Total Vehicles in the Roads	
			Ngong	Access
Case A	1998	257	10366	728
	2008	714	10823*	1185 *
Case B	1998	171	10280	642
	2008	428	10537*	899 *

The traffic do not include those vehicles that correspond to a continued growth of the area from 1998 to 2008.

(iii) Ngong Road Design Capacity

Size	Small/medium	Large	Total
Daily Average	3685	365	4050

(iv) Conclusion

The current level of the traffic on Ngong Road is about 2.5 times of the road capacity design and this condition make it sensible for any

increasing in the number of vehicles, therefore, impact of high significance is predicted on this road for the two cases. As regard to access road, impact of high significance is predicted on it for the two cases studied considering its current structure.

2. Ruai Area

During the EIA it has been demostrated that the candidate at Ngong Forest Area is not suitable for landfill site construction, therefore, Ruai Area is selected to receive all the garbage of the city with the incorporation of a transfer station. Collection of garbage shall be practiced by two methods: (1) direct transportation through trucks when collection area is near to the disposal site, (2) indirect transportation to the site through places to the disposal site Collection trucks will drop the garbage into the transfer station from where trailers will transport it to the disposal site at Ruai.

(a) Collection ratio & number of daily trucks on roads

The daily number of trucks on the road for different rates of collection is presented in the table below:

Cases	1998			2008		
	Trucks	Trailers	% collection	Trucks	Trailers	% collection
Case A	216	130	60	714	360	100
Case B	108	50	40	336	140	60

(b) Analysis of Kangundo and Access Roads at Ruai Area

(i) Current Traffic Condition

	Small	Medium	Large	Total (daily average)
Kangundo Road	539	566	352	1457
Access	131	151	64	346

(ii) Predicted Traffic on Kangundo and Access Roads

	Year	Number of Vehicles Introduced by this Project	Total Vehicles in the Roads	
			Kangundo	Access
Case A	1998	346	1803	692
	2008	1074	2531*	1420 *
Case B	1998	158	1615	504
	2008	476	1933*	822 *

* The traffic do not include those vehicles that correspond to a continued growth of the area from 1998 to 2008.

(iii) Kangundo Road Design Capacity

Size	Small/medium	Large	Total
Daily Average	1330	570	1900

(iv) Conclusion

For the Case A the project will introduce 346 vehicles by 1998 and 1074 vehicles by 2008 on Kangundo road bringing the total traffic to 1803 and 2531. Consequently the impact will be low on this road at the beginning of the project and moderate at the final stage taking into account the road design capacity. On the other hand, the access road will be loaded with double to the current level by 1998 and more than 4 times by 2008 and considering its structure impact of high significance is predicted on it.
For the Case B the impact is predicted to be low on Kangundo Road and high on the access road for the same reason given for Case A.

DATA BOOK 10

ECONOMIC AND FINANCIAL ASPECT

Table 10.1 Financial Projection of Master Plan; Loan 100%

Financial Projection (Kshs million; 1997 Price; 60-80-100% Collection; Loan 100%)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Cost												
Coll./Trans Cost												
Operation	0.0	0.0	500.4	492.7	489.5	490.2	749.7	791.8	839.3	890.0	1,269.9	6,513.5
Depreciation	0.0	0.0	133.6	138.9	142.7	148.2	226.3	235.4	245.0	255.4	353.2	1,878.6
Contract PSI	0.0	0.0	108.5	147.9	155.7	163.6	186.4	195.1	366.5	388.6	429.5	2,141.8
LT Loan Repayment	0.0	0.0	0.0	0.0	0.0	0.0	186.2	190.1	193.1	197.2	291.4	1,058.1
Interest	0.0	0.0	149.0	152.1	154.5	157.8	233.1	224.0	215.0	206.2	278.8	1,770.5
Total	0.0	0.0	891.5	931.6	942.4	959.7	1,581.8	1,636.5	1,859.0	1,937.4	2,622.7	13,362.6
Disposal Cost												
Operation	0.0	0.0	23.7	23.0	24.2	25.6	35.3	37.2	39.4	41.7	53.2	303.2
Depreciation	0.0	0.0	0.0	14.8	14.8	14.8	24.6	24.6	24.6	24.6	32.5	175.3
LT Loan Repayment	0.0	0.0	0.0	0.0	0.0	0.0	7.1	85.7	142.2	182.7	190.5	608.2
Interest	0.0	0.0	5.6	68.6	113.8	146.2	152.4	151.9	145.0	133.6	124.1	1,041.1
Total	0.0	0.0	29.3	106.3	152.8	186.5	219.4	299.4	351.2	382.6	400.3	2,127.8
CBAP + CWMP												
LT Loan Repayment	0.0	0.0	0.0	0.0	0.0	0.0	2.6	5.3	5.5	5.7	6.0	25.1
Interest	0.0	0.0	2.1	4.2	4.4	4.6	4.8	4.8	4.7	4.5	4.3	38.4
Total	0.0	0.0	2.1	4.2	4.4	4.6	7.4	10.1	10.2	10.2	10.3	63.5
Cost Total	0.0	0.0	922.9	1,042.1	1,099.6	1,150.8	1,808.6	1,945.9	2,220.4	2,330.2	3,033.3	15,553.9
Revenue												
Household												
NCC	0.0	0.0	521.6	529.7	533.5	541.7	872.0	918.3	976.7	1,031.7	1,492.2	7,417.3
Contract PSI	0.0	0.0	109.6	144.9	146.8	149.6	169.3	177.6	336.8	357.9	397.9	1,990.5
Commercial by NCC + Cntract PSI	0.0	0.0	61.6	67.4	69.6	71.7	110.7	114.0	134.9	140.5	189.4	959.9
Non Contract PSI	0.0	0.0	6.1	6.9	7.2	7.6	7.9	8.4	0.7	0.8	0.0	45.5
Informal Settlement	0.0	0.0	82.5	86.3	90.3	94.6	99.4	103.9	108.9	114.2	119.8	899.9
Revenue Total	0.0	0.0	781.4	835.2	847.5	865.2	1,259.4	1,322.2	1,558.0	1,645.1	2,199.3	11,313.1
Balance	0.0	0.0	-141.5	-207.0	-252.1	-285.7	-549.2	-623.7	-662.4	-685.1	-834.1	-4,240.8
Accum.	0.0	0.0	-141.5	-348.5	-600.6	-886.2	-1,435.4	-2,059.2	-2,721.6	-3,406.7	-4,240.8	

Table 10.2 Financial Projection of Master Plan: Loan 50%/Grant 50%

Financial Projection (Kshs million; 1997 Price; 60-80-100% Collection; Loan 50%/Grant 50%)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Cost												
Coll./Trans Cost												
Operation	0.0	0.0	500.4	492.7	489.5	490.2	749.7	791.8	839.3	890.0	1,269.9	6,513.5
Depreciation	0.0	0.0	133.6	138.9	142.7	148.2	226.3	235.4	245.0	255.4	353.2	1,878.6
Contract PSI	0.0	0.0	108.5	147.9	155.7	163.6	186.4	195.1	366.5	388.6	429.5	2,141.8
LT Loan Repayment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	7.1	101.3	111.4
Interest	0.0	0.0	0.0	0.0	2.4	5.7	81.0	86.8	93.0	99.4	187.2	555.5
Total	0.0	0.0	742.5	779.5	790.3	807.6	1,243.5	1,309.1	1,546.9	1,640.5	2,341.0	11,200.9
Disposal Cost												
Operation	0.0	0.0	23.7	23.0	24.2	25.6	35.3	37.2	39.4	41.7	53.2	303.2
Depreciation	0.0	0.0	0.0	14.8	14.8	14.8	24.6	24.6	24.6	24.6	32.5	175.3
LT Loan Repayment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	56.5	97.0	104.8	258.4
Interest	0.0	0.0	0.0	0.0	45.2	77.6	83.9	83.9	83.9	79.4	76.6	530.4
Total	0.0	0.0	23.7	37.8	84.2	118.0	143.8	145.7	204.3	242.6	267.2	1,267.3
CBAP + CWMP												
LT Loan Repayment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.5	0.7	1.4
Interest	0.0	0.0	0.0	0.0	0.2	0.4	0.6	0.8	1.1	1.3	1.6	6.0
Total	0.0	0.0	0.0	0.0	0.2	0.4	0.6	0.8	1.3	1.8	2.3	7.4
Cost Total	0.0	0.0	766.2	817.3	874.7	926.0	1,387.9	1,455.6	1,752.6	1,884.9	2,610.5	12,475.6
Revenue												
Household												
NCC	0.0	0.0	521.6	529.7	533.5	541.7	872.0	918.3	976.7	1,031.7	1,492.2	7,417.3
Contract PSI	0.0	0.0	109.6	144.9	146.8	149.6	169.3	177.6	336.8	357.9	397.9	1,990.5
Commercial by NCC + Cntract PSI	0.0	0.0	48.3	53.1	54.8	56.5	87.9	90.5	107.3	111.8	151.1	761.2
Non Contract PSI	0.0	0.0	4.2	6.2	6.5	6.8	7.2	7.6	0.6	0.7	0.0	39.7
Informal Settlement	0.0	0.0	82.5	86.3	90.3	94.6	99.4	103.9	108.9	114.2	119.8	899.9
Revenue Total	0.0	0.0	766.2	820.2	832.0	849.2	1,235.8	1,297.8	1,530.3	1,616.2	2,160.9	11,108.6
Balance	0.0	0.0	0.0	2.9	-42.7	-76.8	-152.1	-157.8	-222.3	-268.7	-449.6	-1,367.0
Accum.	0.0	0.0	0.0	2.9	-39.8	-116.6	-268.7	-426.5	-648.8	-917.4	-1,367.0	

Table 10.3 Financial Projection of Master Plan; Grant 100%

Financial Projection (Kshs million; 1997 Price; 60-80-100% Collection; Grant 100%)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Cost												
Coll./Trans Cost												
Operation	0.0	0.0	500.4	492.7	489.5	490.2	749.7	791.8	839.3	890.0	1,269.9	6,513.5
Depreciation	0.0	0.0	133.6	138.9	142.7	148.2	226.3	235.4	245.0	255.4	353.2	1,878.6
Contract PSI	0.0	0.0	108.5	147.9	155.7	163.6	186.4	195.1	366.5	388.6	429.5	2,141.8
Initial Investment	0.0	1,768.0	39.5	30.0	40.8	885.8	72.5	77.0	83.0	1,052.0	0.0	4,048.5
Engineering	0.0	93.9	0.0	0.0	0.0	56.4	0.0	0.0	0.0	52.6	0.0	202.9
Total	0.0	1,861.9	782.0	809.5	828.6	1,744.1	1,235.0	1,299.3	1,533.9	2,638.6	2,052.5	14,785.4
Disposal Cost												
Operation	0.0	0.0	23.7	23.0	24.2	25.6	35.3	37.2	39.4	41.7	53.2	303.2
Depreciation	0.0	0.0	0.0	14.8	14.8	14.8	24.6	24.6	24.6	24.6	32.5	175.3
Initial Investment	0.0	0.0	786.4	565.0	405.1	78.3	0.0	0.0	0.0	63.2	0.0	1,898.0
Engineering	0.0	70.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	70.5
Total	0.0	70.5	810.0	602.8	444.1	118.7	59.9	61.8	64.0	129.5	85.7	2,447.0
CBAP	0.0	23.9	23.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.8
CWMP	0.0	2.4	2.4	2.4	2.4	2.4	3.2	3.2	3.2	4.0	4.0	29.6
Cost Total	0.0	1,958.7	1,618.3	1,414.7	1,275.1	1,865.2	1,298.1	1,364.3	1,601.1	2,772.1	2,142.2	17,309.8
Revenue												
Household												
NCC	0.0	0.0	521.6	529.7	533.5	541.7	872.0	918.3	976.7	1,031.7	1,492.2	7,417.3
Contract PSI	0.0	0.0	109.6	144.9	146.8	149.6	169.3	177.6	336.8	357.9	397.9	1,990.5
Commercial by NCC + Cntract PSI	0.0	0.0	48.3	50.9	50.5	50.4	75.3	77.6	91.9	95.9	128.3	669.1
Non Contract PSI	0.0	0.0	4.2	5.5	5.7	6.0	6.4	6.7	0.5	0.6	0.0	35.7
Informal Settlement	0.0	0.0	82.5	86.3	90.3	94.6	99.4	103.9	108.9	114.2	119.8	899.9
Revenue Total	0.0	0.0	766.2	817.3	826.9	842.3	1,222.4	1,284.1	1,514.9	1,600.3	2,138.2	11,012.5
Balance (Opr., Dep. + Contract)	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Accum.	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0

Table 10.4 (1/2) FIRR, NPV and B/C of Master Plan (Household Charge: 500 Kshs/month)

Financial Projection of SWM; Loan 100%

Unit: Kshs million; 1997 Price US$1.00 = Kshs 58.8

Long-term Interest 8.0%

Average SWM Charge per Household 500 Kshs/month

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
I	Profit/Loss																	
a	Revenue																	
	1 NCC + Contract PSI																	
	Household	0.0	0.0	1,459.5	1,527.0	1,598.1	1,673.8	1,758.6	1,837.5	1,926.4	2,020.2	2,119.4	2,119.4	2,119.4	2,119.4	2,119.4	2,119.4	2,119.4
	Commercial	0.0	0.0	61.6	67.4	69.6	71.7	110.7	114.0	134.9	140.5	189.4	189.4	189.4	189.4	189.4	189.4	189.4
	2 Non Contract PSI	0.0	0.0	6.1	6.9	7.2	7.6	7.9	8.4	0.7	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	3 Informal Settlement	0.0	0.0	82.5	86.3	90.3	94.6	99.4	103.9	108.9	114.2	119.8	119.8	119.8	119.8	119.8	119.8	119.8
	Revenue Total	0.0	0.0	1,609.7	1,687.6	1,765.2	1,847.7	1,976.7	2,063.8	2,170.8	2,275.7	2,428.6	2,428.6	2,428.6	2,428.6	2,428.6	2,428.6	2,428.6
b	Operating Cost																	
	Col./Trans.	0.0	0.0	500.4	492.7	489.5	490.2	749.7	791.8	839.3	890.0	1,269.9	1,269.9	1,269.9	1,269.9	1,269.9	1,269.9	1,269.9
	Disposal Site	0.0	0.0	23.7	23.0	24.2	25.6	35.3	37.2	39.4	41.7	53.2	53.2	53.2	53.2	53.2	53.2	53.2
	Contract	0.0	0.0	108.5	147.9	155.7	163.6	186.4	195.1	366.5	388.6	429.5	429.5	429.5	429.5	429.5	429.5	429.5
	Operating Cost Total	0.0	0.0	632.6	663.6	669.4	679.4	971.5	1,024.1	1,245.2	1,320.3	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5
c	Gross Profit	0.0	0.0	977.1	1,024.0	1,095.8	1,168.3	1,005.3	1,039.7	925.6	955.5	676.1	676.1	676.1	676.1	676.1	676.1	676.1
d	Depreciation	0.0	0.0	133.6	153.7	157.5	163.0	250.9	260.0	269.6	280.0	385.7	385.7	385.7	385.7	385.7	385.7	385.7
e	Interest (Long-term)	0.0	0.0	156.7	224.9	272.7	308.5	390.4	380.7	364.7	344.3	407.2	368.6	326.8	286.5	247.6	197.2	146.9
f	Profit Post-Dep. & Int.	0.0	0.0	686.8	645.4	665.7	696.8	364.0	398.9	291.3	331.2	-116.8	-78.1	-36.4	1.8	42.8	93.2	143.5
g	Accum. P.P.D & I	0.0	0.0	686.8	1,332.2	1,997.9	2,694.7	3,058.7	3,457.6	3,748.9	4,080.1	3,963.3	3,885.2	3,848.8	3,848.6	3,891.4	3,984.6	4,128.2
II	Cash Flow																	
a	Sources (Total)																	
	Profit Post-Dep. & Int.	0.0	0.0	686.8	645.4	665.7	696.8	364.0	398.9	291.3	331.2	-116.8	-78.1	-36.4	1.8	42.8	93.2	143.5
	Depreciation	0.0	0.0	133.6	153.7	157.5	163.0	250.9	260.0	269.6	280.0	385.7	385.7	385.7	385.7	385.7	385.7	385.7
	Long-term Finance	0.0	1,958.7	852.1	597.4	448.3	1,022.9	75.7	80.2	86.2	1,171.8	4.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sources Total	0.0	1,958.7	1,672.5	1,396.6	1,271.4	1,882.6	690.6	739.1	647.1	1,783.0	272.9	307.6	347.2	387.5	428.5	478.8	529.2
b	Uses (Total)																	
	Initial Investment	0.0	1,958.7	852.1	597.4	448.3	1,022.9	75.7	80.2	86.2	1,171.8	4.0	0.0	0.0	0.0	0.0	0.0	0.0
	Replacement	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	816.5	161.3	431.3	711.9	936.8	477.5	214.8	83.0
	Salvage Value	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Repayment (Long-term)	0.0	0.0	0.0	0.0	0.0	0.0	195.9	261.1	340.8	385.7	467.9	495.5	503.5	512.1	629.3	629.7	433.9
	Uses Total	0.0	1,958.7	852.1	597.4	448.3	1,022.9	271.6	341.3	427.0	2,374.0	633.2	926.8	1,215.4	1,449.0	1,106.9	844.5	516.9
c	Net Cash Flow	0.0	0.0	820.4	799.2	823.1	859.8	419.0	377.8	220.1	-591.0	-360.3	-619.2	-868.2	-1,061.5	-678.5	-365.7	12.3
d	Accum. NCF	0.0	0.0	820.4	1,619.5	2,442.7	3,302.5	3,721.5	4,099.3	4,319.4	3,728.4	3,368.1	2,726.9	1,860.7	799.3	120.8	-244.9	-232.6
III	FIRR																	
a	Inflow																	
	Revenue Total	0.0	0.0	1,609.7	1,687.6	1,765.2	1,847.7	1,976.7	2,063.8	2,170.8	2,275.7	2,428.6	2,428.6	2,428.6	2,428.6	2,428.6	2,428.6	2,428.6
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
b	Outflow	0.0	0.0	632.6	663.6	669.4	679.4	971.5	1,024.1	1,245.2	1,320.3	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5
	Operating Cost	0.0	0.0	632.6	663.6	669.4	679.4	971.5	1,024.1	1,245.2	1,320.3	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5
	Initial Investment	0.0	1,958.7	852.1	597.4	448.3	1,022.9	75.7	80.2	86.2	1,171.8	4.0	0.0	0.0	0.0	0.0	0.0	0.0
	Replacement	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	816.5	161.3	431.3	711.9	936.8	477.5	214.8	83.0
	Salvage Value	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Outflow Total	0.0	1,958.7	1,484.8	1,261.0	1,117.7	1,702.2	1,047.2	1,104.3	1,331.4	3,308.6	1,917.8	2,183.8	2,464.4	2,689.3	2,230.1	1,967.3	1,835.5
	Net Cash Flow for FIRR	0	-1,959	125	427	648	145	930	959	839	-1,033	511	245	-36	-261	198	461	593

FIRR:	NPV:	B/C:
17.45%	503.5	1.04

Table 10.4 (2/2) FIRR, NPV and B/C of Master Plan (Household Charge: 500 Kshs/month)

Financial Projection of SWM; Loan 100%
Unit: Kshs million; 1997 Price

Year	18 2015	19 2016	20 2017	21 2018	22 2019	23 2020	24 2021	25 2022	26 2023	27 2024	28 2025	29 2026	30 2027	31 2028	32 2029	Total
I Profit/Loss																
a Revenue																
1 NCC + Contract PSI																
Household	2,119.4	2,119.4	2,119.4	2,119.4	2,119.4	2,119.4	2,119.4	2,119.4	2,119.4	2,119.4	2,119.4	2,119.4	2,119.4	2,119.4	2,119.4	50,427.9
Commercial	189.4	189.4	189.4	189.4	189.4	189.4	189.4	189.4	189.4	189.4	189.4	189.4	189.4	189.4	189.4	4,936.9
2 Non Contract PSI	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	45.5
3 Informal Settlement	119.8	119.8	119.8	119.8	119.8	119.8	119.8	119.8	119.8	119.8	119.8	119.8	119.8	119.8	119.8	3,415.9
Revenue Total	2,428.6	2,428.6	2,428.6	2,428.6	2,428.6	2,428.6	2,428.6	2,428.6	2,428.6	2,428.6	2,428.6	2,428.6	2,428.6	2,428.6	2,428.6	58,826.2
b Operating Cost																
Coll./Trans.	1,269.9	1,269.9	1,269.9	1,269.9	1,269.9	1,269.9	1,269.9	1,269.9	1,269.9	1,269.9	1,269.9	1,269.9	1,269.9	1,269.9	1,269.9	33,180.5
Disposal Site	53.2	53.2	53.2	53.2	53.2	53.2	53.2	53.2	53.2	53.2	53.2	53.2	53.2	53.2	53.2	1,420.6
Contract	429.5	429.5	429.5	429.5	429.5	429.5	429.5	429.5	429.5	429.5	429.5	429.5	429.5	429.5	429.5	11,160.7
Operating Cost Total	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5	45,761.8
c Gross Profit	676.1	676.1	676.1	676.1	676.1	676.1	676.1	676.1	676.1	676.1	676.1	676.1	676.1	676.1	676.1	13,064.4
d Depreciation	385.7	385.7	385.7	385.7	385.7	385.7	385.7	385.7	385.7	385.7	385.7	385.7	385.7	385.7	385.7	10,152.7
e Interest (Long-term)	112.1	84.3	61.1	41.6	30.3	19.5	9.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4,785.9
f Profit Post-Dep. & Int.	178.3	206.1	229.3	248.8	260.1	270.9	281.0	290.4	290.4	290.4	290.4	290.4	290.4	290.4	290.4	8,125.7
g Accum. P.P-D & I	4,306.4	4,512.5	4,741.8	4,990.6	5,250.7	5,521.6	5,802.5	6,092.9	6,383.3	6,673.7	6,964.1	7,254.5	7,544.9	7,835.3	8,125.7	0.0
II Cash Flow																
a Sources (Total)																
Profit Post-Dep. & Int.	178.3	206.1	229.3	248.8	260.1	270.9	281.0	290.4	290.4	290.4	290.4	290.4	290.4	290.4	290.4	8,125.7
Depreciation	385.7	385.7	385.7	385.7	385.7	385.7	385.7	385.7	385.7	385.7	385.7	385.7	385.7	385.7	385.7	10,152.7
Long-term Finance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6,297.3
Sources Total	563.9	591.8	614.9	634.4	645.8	656.5	666.6	676.0	676.1	676.1	676.1	676.1	676.1	676.1	676.1	24,575.7
b Uses (Total)																
Initial Investment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6,297.3
Replacement	1,556.7	161.3	167.8	44.0	1,000.1	740.4	415.0	486.1	1,694.5	161.3	30.0	44.0	736.6	72.5	0.0	11,145.3
Salvage Value	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1,172.6	-1,172.6
Repayment (Long-term)	348.5	288.9	244.1	141.8	134.2	126.2	117.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6,297.3
Uses Total	1,905.3	450.2	411.9	185.8	1,134.3	866.6	532.6	486.5	1,694.5	161.3	30.0	44.0	736.6	72.5	-1,172.6	22,567.4
c Net Cash Flow	-1,341.4	141.7	203.0	448.6	-488.5	-210.0	134.0	187.5	-1,018.5	514.8	646.1	632.1	-60.6	603.6	1,848.6	2,008.4
d Accum. NCF	-1,574.0	-1,432.3	-1,229.3	-780.7	-1,269.2	-1,479.2	-1,345.2	-1,157.7	-2,176.2	-1,661.3	-1,015.3	-383.2	-443.8	159.8	2,008.4	0.0
III FIRR																
a Inflow																
Revenue Total	2,428.6	2,428.6	2,428.6	2,428.6	2,428.6	2,428.6	2,428.6	2,428.6	2,428.6	2,428.6	2,428.6	2,428.6	2,428.6	2,428.6	2,428.6	58,826.2
b Outflow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Operating Cost	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5	1,752.5	45,761.8
Initial Investment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6,297.3
Replacement	1,556.7	161.3	167.8	44.0	1,000.1	740.4	415.0	486.1	1,694.5	161.3	30.0	44.0	736.6	72.5	0.0	11,145.3
Salvage Value	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1,172.6	0.0
Outflow Total	3,309.2	1,913.8	1,920.3	1,796.5	2,752.6	2,492.9	2,167.5	2,240.6	3,447.0	1,913.8	1,782.5	1,796.5	2,489.1	1,825.0	580.0	62,031.9
Net Cash Flow for FIRR	-881	515	508	632	-324	-64	261	188	-1,018	515	646	632	-61	604	1,849	6,794

Table 10.5 Sensitivity Analysis of Master Plan; Loan 100%

Financial Projection - Cost Up (Kshs million; 1997 Price; 60-80-100% Collection; Loan 100%)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Cost												
Coll./Trans Cost												
Operation	0.0	0.0	550.4	542.0	538.4	539.2	824.7	871.0	923.3	979.0	1,396.8	7,164.9
Depreciation	0.0	0.0	146.9	152.8	156.9	163.0	249.0	258.9	269.5	280.9	388.5	2,066.5
Contract PSI	0.0	0.0	108.5	147.9	155.7	163.6	186.4	195.1	366.5	388.6	429.5	2,141.8
LT Loan Repayment	0.0	0.0	0.0	0.0	0.0	0.0	204.8	209.2	212.5	216.9	320.6	1,163.9
Interest	0.0	0.0	163.8	167.3	170.0	173.6	256.5	246.5	236.5	226.8	306.7	1,947.6
Total	0.0	0.0	969.7	1,010.0	1,021.1	1,039.3	1,721.4	1,780.6	2,008.3	2,092.3	2,842.0	14,484.7
Disposal Cost												
Operation	0.0	0.0	26.1	25.2	26.6	28.1	38.8	40.9	43.3	45.8	58.5	333.5
Depreciation	0.0	0.0	0.0	16.3	16.3	16.3	27.1	27.1	27.1	27.1	35.8	192.9
LT Loan Repayment	0.0	0.0	0.0	0.0	0.0	0.0	7.8	94.3	156.4	201.0	209.6	669.0
Interest	0.0	0.0	6.2	75.4	125.1	160.8	167.7	167.0	159.5	147.0	136.5	1,145.2
Total	0.0	0.0	32.3	116.9	168.1	205.2	241.3	329.3	386.3	420.8	440.3	2,340.5
CBAP + CWMP												
LT Loan Repayment	0.0	0.0	0.0	0.0	0.0	0.0	2.6	5.3	5.5	5.7	6.0	25.1
Interest	0.0	0.0	2.1	4.2	4.4	4.6	4.8	4.8	4.7	4.5	4.3	38.4
Total	0.0	0.0	2.1	4.2	4.4	4.6	7.4	10.1	10.2	10.2	10.3	63.5
Cost Total	0.0	0.0	1,004.1	1,131.2	1,193.5	1,249.1	1,970.1	2,120.0	2,404.7	2,523.4	3,292.7	16,888.7
Revenue												
Household												
NCC	0.0	0.0	571.7	578.1	582.0	590.8	952.3	1,002.9	1,056.5	1,115.8	1,618.5	8,068.6
Contract PSI	0.0	0.0	120.1	158.2	160.2	163.1	184.9	194.0	364.3	387.1	431.6	2,163.5
Commercial by NCC + Cntract PSI	0.0	0.0	67.4	73.7	76.1	78.4	120.8	124.4	147.0	153.2	206.3	1,047.2
Non Contract PSI	0.0	0.0	6.7	7.6	8.0	8.4	8.8	9.3	0.7	0.8	0.0	50.4
Informal Settlement	0.0	0.0	82.5	86.3	90.3	94.6	99.4	103.9	108.9	114.2	119.8	899.9
Revenue Total	0.0	0.0	848.5	903.9	916.6	935.3	1,366.3	1,434.4	1,677.5	1,771.1	2,376.1	12,229.8
Balance	0.0	0.0	-155.6	-227.3	-276.9	-313.8	-603.8	-685.6	-727.3	-752.2	-916.5	-4,659.0
Accum.	0.0	0.0	-155.6	-382.9	-659.8	-973.6	-1,577.4	-2,263.0	-2,990.2	-3,742.5	-4,659.0	

Table 10.6 Sensitivity Analysis of Master Plan; Loan 50%/Grant 50%

Financial Projection - Cost Up (Kshs million; 1997 Price; 60-80-100% Collection; Loan 50%/Grant 50%)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Cost												
Coll./Trans Cost												
Operation	0.0	0.0	500.4	492.7	489.5	490.2	749.7	791.8	839.3	890.0	1,269.9	6,513.5
Depreciation	0.0	0.0	133.6	138.9	142.7	148.2	226.3	235.4	245.0	255.4	353.2	1,878.6
Contract PSI	0.0	0.0	108.5	147.9	155.7	163.6	186.4	195.1	366.5	388.6	429.5	2,141.8
LT Loan Repayment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	7.1	101.3	111.4
Interest	0.0	0.0	0.0	0.0	2.4	5.7	81.0	86.8	93.0	99.4	187.2	555.5
Total	0.0	0.0	742.5	779.5	790.3	807.6	1,243.5	1,309.1	1,546.9	1,640.5	2,341.0	11,200.9
Disposal Cost												
Operation	0.0	0.0	23.7	23.0	24.2	25.6	35.3	37.2	39.4	41.7	53.2	303.2
Depreciation	0.0	0.0	0.0	14.8	14.8	14.8	24.6	24.6	24.6	24.6	32.5	175.3
LT Loan Repayment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	56.5	97.0	104.8	258.4
Interest	0.0	0.0	0.0	0.0	45.2	77.6	83.9	83.9	83.9	79.4	76.6	530.4
Total	0.0	0.0	23.7	37.8	84.2	118.0	143.8	145.7	204.3	242.6	267.2	1,267.3
CBAP + CWMP												
LT Loan Repayment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.5	0.7	1.4
Interest	0.0	0.0	0.0	0.0	0.2	0.4	0.6	0.8	1.1	1.3	1.6	6.0
Total	0.0	0.0	0.0	0.0	0.2	0.4	0.6	0.8	1.3	1.8	2.3	7.4
Cost Total	0.0	0.0	766.2	817.3	874.7	926.0	1,387.9	1,455.6	1,752.6	1,884.9	2,610.5	12,475.6
Revenue												
Household												
NCC	0.0	0.0	521.6	529.7	533.5	541.7	872.0	918.3	976.7	1,031.7	1,492.2	7,417.3
Contract PSI	0.0	0.0	109.6	144.9	146.8	149.6	169.3	177.6	336.8	357.9	397.9	1,990.5
Commercial by NCC + Cntract PSI	0.0	0.0	48.3	53.1	54.8	56.5	87.9	90.5	107.3	111.8	151.1	761.2
Non Contract PSI	0.0	0.0	4.2	6.2	6.5	6.8	7.2	7.6	0.6	0.7	0.0	39.7
Informal Settlement	0.0	0.0	82.5	86.3	90.3	94.6	99.4	103.9	108.9	114.2	119.8	899.9
Revenue Total	0.0	0.0	766.2	820.2	832.0	849.2	1,235.8	1,297.8	1,530.3	1,616.2	2,160.9	11,108.6
Balance	0.0	0.0	0.0	2.9	-42.7	-76.8	-152.1	-157.8	-222.3	-268.7	-449.6	-1,367.0
Accum.	0.0	0.0	0.0	2.9	-39.8	-116.6	-268.7	-426.5	-648.8	-917.4	-1,367.0	

Table 10.7 Sensitivity Analysis of Master Plan; Grant 100%

Financial Projection - Cost Up (Kshs million; 1997 Price; 60-80-100% Collection; Grant 100%)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Cost												
Coll./Trans Cost												
Operation	0.0	0.0	550.4	542.0	538.4	539.2	824.7	871.0	923.3	979.0	1,396.8	7,164.9
Depreciation	0.0	0.0	146.9	152.8	156.9	163.0	249.0	258.9	269.5	280.9	388.5	2,066.5
Contract PSI	0.0	0.0	108.5	147.9	155.7	163.6	186.4	195.1	366.5	388.6	429.5	2,141.8
Initial Investment	0.0	1,944.8	43.5	33.0	44.8	974.3	79.8	84.7	91.3	1,157.2	0.0	4,453.4
Engineering	0.0	103.3	0.0	0.0	0.0	62.0	0.0	0.0	0.0	57.9	0.0	223.2
Total	0.0	2,048.1	849.3	875.7	895.9	1,902.1	1,339.9	1,409.7	1,650.6	2,863.6	2,214.8	16,049.8
Disposal Cost												
Operation	0.0	0.0	26.1	25.2	26.6	28.1	38.8	40.9	43.3	45.8	58.5	333.5
Depreciation	0.0	0.0	0.0	16.3	16.3	16.3	27.1	27.1	27.1	27.1	35.8	192.9
Initial Investment	0.0	0.0	865.0	621.5	445.6	86.1	0.0	0.0	0.0	69.5	0.0	2,087.8
Engineering	0.0	77.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	77.6
Total	0.0	77.6	891.0	663.0	488.5	130.5	65.9	68.0	70.4	142.4	94.3	2,691.7
CBAP	0.0	23.9	23.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.8
CWMP	0.0	2.4	2.4	2.4	2.4	2.4	3.2	3.2	3.2	4.0	4.0	29.6
Cost Total	0.0	2,152.0	1,766.7	1,541.1	1,386.9	2,035.1	1,408.9	1,480.9	1,724.2	3,010.0	2,313.1	18,818.9
Revenue												
Household												
NCC	0.0	0.0	571.7	578.1	582.0	590.8	952.3	1,002.9	1,056.5	1,115.8	1,618.5	8,068.6
Contract PSI	0.0	0.0	120.1	158.2	160.2	163.1	184.9	194.0	364.3	387.1	431.6	2,163.5
Commercial by NCC + Cntract PSI	0.0	0.0	52.9	55.6	55.1	55.0	82.2	84.7	99.4	103.7	139.2	727.9
Non Contract PSI	0.0	0.0	4.7	6.1	6.3	6.7	7.1	7.5	0.6	0.7	0.0	39.6
Informal Settlement	0.0	0.0	82.5	86.3	90.3	94.6	99.4	103.9	108.9	114.2	119.8	899.9
Revenue Total	0.0	0.0	831.9	884.2	894.0	910.2	1,326.0	1,393.0	1,629.7	1,721.4	2,309.1	11,899.6
Balance (Opr., Dep. + Contract)	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Accum.	0.0	0.0	-0.0	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 10.8 Financial Projection of Master Plan - Considering Inflation Factor; Loan 100%

Financial Projection - Inflation (Kshs million; 60-80-100% Collection; Loan 100%) 9% Inflation

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Cost												
Coll./Trans Cost												
Operation	0.0	0.0	648.0	695.5	753.1	822.1	1,370.5	1,577.7	1,822.9	2,107.0	3,276.8	13,073.7
Depreciation	0.0	0.0	173.0	196.1	219.5	248.5	413.8	469.1	532.2	604.6	911.3	3,768.0
Contract PSI	0.0	0.0	140.6	208.7	239.6	274.4	340.8	388.7	796.1	919.9	1,108.2	4,417.0
LT Loan Repayment	0.0	0.0	0.0	0.0	0.0	0.0	340.4	378.9	419.5	466.9	752.0	2,357.6
Interest	0.0	0.0	192.9	214.7	237.7	264.6	426.2	446.4	467.0	488.1	719.4	3,457.0
Total	0.0	0.0	1,154.5	1,315.1	1,450.0	1,609.5	2,891.6	3,260.8	4,037.6	4,586.6	6,767.7	27,073.3
Disposal Cost												
Operation	0.0	0.0	30.7	32.4	37.3	42.9	64.5	74.2	85.5	98.6	137.3	603.3
Depreciation	0.0	0.0	0.0	20.9	22.8	24.8	45.0	49.0	53.4	58.2	83.9	358.1
LT Loan Repayment	0.0	0.0	0.0	0.0	0.0	0.0	12.9	170.7	308.8	432.5	491.7	1,416.6
Interest	0.0	0.0	7.3	96.8	175.0	245.1	278.6	302.6	314.9	316.4	320.2	2,056.9
Total	0.0	0.0	38.0	150.1	235.1	312.8	401.0	596.5	762.7	905.7	1,033.0	4,434.9
CBAP + CWMP												
LT Loan Repayment	0.0	0.0	0.0	0.0	0.0	0.0	4.8	10.5	11.9	13.6	15.4	56.2
Interest	0.0	0.0	2.7	5.9	6.8	7.7	8.7	9.6	10.1	10.6	11.2	73.4
Total	0.0	0.0	2.7	5.9	6.8	7.7	13.5	20.1	22.1	24.2	26.6	129.6
Cost Total	0.0	0.0	1,195.2	1,471.1	1,691.8	1,930.1	3,306.2	3,877.4	4,822.4	5,516.5	7,827.3	31,637.9
Revenue												
Household												
NCC	0.0	0.0	675.5	747.7	820.8	908.5	1,594.0	1,829.7	2,121.3	2,442.4	3,850.4	14,990.3
Contract PSI	0.0	0.0	141.9	204.5	225.9	250.8	309.6	354.0	731.5	847.2	1,026.8	4,092.3
Commercial by NCC + Cntract PSI	0.0	0.0	79.8	95.1	107.1	120.2	202.5	227.2	292.9	332.7	488.7	1,946.2
Non Contract PSI	0.0	0.0	7.9	9.7	11.1	12.8	14.5	16.7	1.5	1.8	0.0	75.9
Informal Settlement	0.0	0.0	106.8	121.8	139.0	158.7	181.7	207.0	236.5	270.4	309.1	1,731.1
Revenue Total	0.0	0.0	1,012.0	1,178.9	1,303.9	1,451.0	2,302.2	2,634.5	3,383.7	3,894.5	5,675.0	22,835.8
Balance	0.0	0.0	-183.2	-292.2	-387.9	-479.1	-1,004.0	-1,242.9	-1,438.7	-1,622.0	-2,152.3	-8,802.1
Accum.	0	0	-183	-475	-863	-1,342	-2,346	-3,589	-5,028	-6,650	-8,802	

Table 10.9 Financial Projection of Master Plan - Considering Inflation Factor; Loan 50%/Grant 50%

Financial Projection - Inflation (Kshs million; 60-80-100% Collection; Loan 50%/Grant 50%) 9% Inflation

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Cost												
Coll./Trans Cost												
Operation	0.0	0.0	648.0	695.5	753.1	822.1	1,370.5	1,577.7	1,822.9	2,107.0	3,276.8	13,073.7
Depreciation	0.0	0.0	173.0	196.1	219.5	248.5	413.8	469.1	532.2	604.6	911.3	3,768.0
Contract PSI	0.0	0.0	140.6	208.7	239.6	274.4	340.8	388.7	796.1	919.9	1,108.2	4,417.0
LT Loan Repayment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.5	16.7	261.4	284.6
Interest	0.0	0.0	0.0	0.0	3.7	9.5	148.1	173.0	202.0	235.3	483.0	1,254.6
Total	0.0	0.0	961.6	1,100.3	1,215.9	1,354.4	2,273.2	2,608.5	3,359.7	3,883.6	6,040.7	22,798.0
Disposal Cost												
Operation	0.0	0.0	30.7	32.4	37.3	42.9	64.5	74.2	85.5	98.6	137.3	603.3
Depreciation	0.0	0.0	0.0	20.9	22.8	24.8	45.0	49.0	53.4	58.2	83.9	358.1
LT Loan Repayment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	122.7	229.7	270.5	622.9
Interest	0.0	0.0	0.0	0.0	69.5	130.2	153.3	167.1	182.2	187.9	197.8	1,087.9
Total	0.0	0.0	30.7	53.3	129.6	197.9	262.8	290.3	443.8	574.4	689.5	2,672.2
CBAP + CWMP												
LT Loan Repayment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.1	1.9	3.5
Interest	0.0	0.0	0.0	0.0	0.3	0.6	1.1	1.7	2.4	3.1	4.1	13.3
Total	0.0	0.0	0.0	0.0	0.3	0.6	1.1	1.7	2.9	4.3	6.0	16.8
Cost Total	0.0	0.0	992.2	1,153.7	1,345.8	1,552.9	2,537.1	2,900.4	3,806.4	4,462.2	6,736.2	25,487.0
Revenue												
Household												
NCC	0.0	0.0	675.5	747.7	820.8	908.5	1,594.0	1,829.7	2,121.3	2,442.4	3,850.4	14,990.3
Contract PSI	0.0	0.0	141.9	204.5	225.9	250.8	309.6	354.0	731.5	847.2	1,026.8	4,092.3
Commercial by NCC + Cntract PSI	0.0	0.0	62.5	74.9	84.4	94.8	160.7	180.3	232.9	264.6	389.8	1,545.0
Non Contract PSI	0.0	0.0	5.5	8.7	10.0	11.4	13.1	15.1	1.3	1.6	0.0	66.6
Informal Settlement	0.0	0.0	106.8	121.8	139.0	158.7	181.7	207.0	236.5	270.4	309.1	1,731.1
Revenue Total	0.0	0.0	992.2	1,157.7	1,280.1	1,424.2	2,259.1	2,586.0	3,323.6	3,826.2	5,576.1	22,425.3
Balance	0.0	0.0	-0.0	4.1	-65.7	-128.7	-278.0	-314.4	-482.8	-636.0	-1,160.1	-3,061.7
Accum.	0	0	-0	4	-62	-190	-468	-783	-1,266	-1,902	-3,062	

Table 10.10 Financial Projection of Master Plan - Considering Inflation Factor; Grant 100%

Financial Projection - Inflation (Kshs million; 60-80-100% Collection; Grant 100%) — 9% Inflation

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Cost												
Coll./Trans Cost												
Operation	0.0	0.0	648.0	695.5	753.1	822.1	1,370.5	1,577.7	1,822.9	2,107.0	3,276.8	13,073.7
Depreciation	0.0	0.0	173.0	196.1	219.5	248.5	413.8	469.1	532.2	604.6	911.3	3,768.0
Contract PSI	0.0	0.0	140.6	208.7	239.6	274.4	340.8	388.7	796.1	919.9	1,108.2	4,417.0
Initial Investment	0.0	2,100.6	51.2	42.3	62.7	1,485.5	132.5	153.4	180.3	2,490.5	0.0	6,698.9
Engineering	0.0	111.6	0.0	0.0	0.0	94.6	0.0	0.0	0.0	124.5	0.0	330.7
Total	0.0	2,212.1	1,012.7	1,142.7	1,274.9	2,925.0	2,257.6	2,588.9	3,331.5	6,246.5	5,296.3	28,288.3
Disposal Cost												
Operation	0.0	0.0	30.7	32.4	37.3	42.9	64.5	74.2	85.5	98.6	137.3	603.3
Depreciation	0.0	0.0	0.0	20.9	22.8	24.8	45.0	49.0	53.4	58.2	83.9	358.1
Initial Investment	0.0	0.0	1,018.4	797.6	623.3	131.3	0.0	0.0	0.0	149.6	0.0	2,720.1
Engineering	0.0	83.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	83.8
Total	0.0	83.8	1,049.0	850.9	683.3	199.0	109.5	123.2	138.9	306.5	221.2	3,765.3
CBAP	0.0	28.4	30.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	59.3
CWMP	0.0	2.9	3.1	3.4	3.7	4.0	5.8	6.4	7.0	9.5	10.3	56.0
Cost Total	0.0	2,327.2	2,095.8	1,996.9	1,962.0	3,128.1	2,373.0	2,718.4	3,477.3	6,562.5	5,527.8	32,169.0
Revenue												
Household												
NCC	0.0	0.0	675.5	747.7	820.8	908.5	1,594.0	1,829.7	2,121.3	2,442.4	3,850.4	14,990.3
Contract PSI	0.0	0.0	141.9	204.5	225.9	250.8	309.6	354.0	731.5	847.2	1,026.8	4,092.3
Commercial by NCC + Cntract PSI	0.0	0.0	62.5	71.9	77.8	84.5	137.6	154.6	199.6	227.0	331.1	1,346.6
Non Contract PSI	0.0	0.0	5.5	7.7	8.8	10.1	11.7	13.4	1.2	1.4	0.0	59.8
Informal Settlement	0.0	0.0	106.8	121.8	139.0	158.7	181.7	207.0	236.5	270.4	309.1	1,731.1
Revenue Total	0.0	0.0	992.2	1,153.7	1,272.3	1,412.7	2,234.6	2,558.6	3,290.1	3,788.4	5,517.5	22,220.1
Balance (Opr., Dep. + Contract)	0.0	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Accum.	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0

Table 10.11 Financial Projection of Master Plan -Service Level Reduction; Loan 100%

Financial Projection (Kshs million; 1997 Price; 40-50-60% Collection; Loan 100%)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Cost												
Coll./Trans Cost												
Operation	0.0	0.0	400.3	382.8	367.8	354.3	428.9	426.1	430.9	450.0	642.9	3,884.0
Depreciation	0.0	0.0	85.4	86.4	86.9	88.4	135.3	138.2	142.6	145.6	199.9	1,108.8
Contract PSI	0.0	0.0	108.5	147.9	155.7	163.6	186.4	195.1	366.5	388.6	429.5	2,141.8
LT Loan Repayment	0.0	0.0	0.0	0.0	0.0	0.0	147.0	147.8	148.2	149.4	216.2	808.8
Interest	0.0	0.0	117.6	118.3	118.6	119.6	173.0	163.0	153.7	143.8	189.7	1,297.3
Total	0.0	0.0	711.9	735.4	729.0	725.9	1,070.6	1,070.2	1,242.0	1,277.4	1,678.2	9,240.6
Disposal Cost												
Operation	0.0	0.0	10.7	16.8	17.7	18.7	23.5	24.7	26.2	27.7	33.8	199.7
Depreciation	0.0	0.0	0.0	11.1	11.1	11.1	14.8	14.8	14.8	14.8	19.1	111.8
LT Loan Repayment	0.0	0.0	0.0	0.0	0.0	0.0	7.0	82.7	139.1	179.6	182.5	591.0
Interest	0.0	0.0	5.6	66.2	111.3	143.7	146.0	145.5	138.8	127.7	116.1	1,000.9
Total	0.0	0.0	16.3	94.1	140.1	173.5	191.4	267.7	319.0	349.8	351.6	1,903.4
CBAP + CWMP												
LT Loan Repayment	0.0	0.0	0.0	0.0	0.0	0.0	2.6	5.3	5.5	5.7	6.0	25.1
Interest	0.0	0.0	2.1	4.2	4.4	4.6	4.8	4.8	4.7	4.5	4.3	38.4
Total	0.0	0.0	2.1	4.2	4.4	4.6	7.4	10.1	10.2	10.2	10.3	63.5
Cost Total	0.0	0.0	730.3	833.7	873.6	904.0	1,269.4	1,348.0	1,571.1	1,637.4	2,040.0	11,207.5
Revenue												
Household												
NCC	0.0	0.0	337.2	327.5	319.5	313.3	451.8	455.1	457.4	486.0	718.3	3,876.3
Contract PSI	0.0	0.0	145.5	186.5	185.7	185.4	185.2	187.7	347.2	366.9	410.5	2,200.5
Commercial by NCC + Cntract PSI	0.0	0.0	41.7	47.2	48.3	49.3	73.7	75.3	97.4	101.0	132.0	665.9
Non Contract PSI	0.0	0.0	5.8	8.2	8.6	9.0	8.8	9.3	0.8	0.9	0.0	51.2
Informal Settlement	0.0	0.0	82.5	86.3	90.3	94.6	99.4	103.9	108.9	114.2	119.8	899.9
Revenue Total	0.0	0.0	612.7	655.6	652.4	651.6	819.0	831.2	1,021.7	1,069.1	1,380.6	7,693.8
Balance	0.0	0.0	-117.6	-178.0	-221.2	-252.5	-450.4	-516.8	-549.5	-568.4	-659.5	-3,513.7
Accum.	0.0	0.0	-117.6	-295.6	-516.8	-769.3	-1,219.6	-1,736.4	-2,285.9	-2,854.2	-3,513.7	

Table 10.12 Financial Projection of Master Plan - Service Level Reduction; Loan 50%/Grant 50%

Financial Projection (Kshs million; 1997 Price; 40-50-60% Collection; Loan 50%/Grant 50%)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Cost												
Coll./Trans Cost												
Operation	0.0	0.0	400.3	382.8	367.8	354.3	428.9	426.1	430.9	450.0	642.9	3,884.0
Depreciation	0.0	0.0	85.4	86.4	86.9	88.4	135.3	138.2	142.6	145.6	199.9	1,108.8
Contract PSI	0.0	0.0	108.5	147.9	155.7	163.6	186.4	195.1	366.5	388.6	429.5	2,141.8
LT Loan Repayment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.6	68.4	70.4
Interest	0.0	0.0	0.0	0.0	0.3	1.3	54.7	56.5	59.1	61.0	118.7	351.5
Total	0.0	0.0	594.2	617.1	610.8	607.7	805.3	815.8	999.5	1,046.7	1,459.3	7,556.4
Disposal Cost												
Operation	0.0	0.0	10.7	16.8	17.7	18.7	23.5	24.7	26.2	27.7	33.8	199.7
Depreciation	0.0	0.0	0.0	11.1	11.1	11.1	14.8	14.8	14.8	14.8	19.1	111.8
LT Loan Repayment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	56.4	96.9	99.8	253.1
Interest	0.0	0.0	0.0	0.0	45.1	77.5	79.9	79.9	79.9	75.3	70.3	507.9
Total	0.0	0.0	10.7	27.9	74.0	107.3	118.1	119.4	177.3	214.7	223.1	1,072.5
CBAP + CWMP												
LT Loan Repayment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.5	0.7	1.4
Interest	0.0	0.0	0.0	0.0	0.2	0.4	0.6	0.8	1.1	1.3	1.6	6.0
Total	0.0	0.0	0.0	0.0	0.2	0.4	0.6	0.8	1.3	1.8	2.3	7.4
Cost Total	0.0	0.0	604.9	645.0	684.9	715.4	924.0	936.1	1,178.1	1,263.2	1,684.7	8,636.3
Revenue												
Household												
NCC	0.0	0.0	337.2	327.5	319.5	313.3	451.8	455.1	467.4	486.0	718.3	3,876.3
Contract PSI	0.0	0.0	145.5	186.5	185.7	185.4	185.2	187.7	347.2	366.9	410.5	2,200.5
Commercial by NCC + Cntract PSI	0.0	0.0	36.9	34.9	35.7	36.4	55.2	56.4	73.3	76.0	99.8	504.6
Non Contract PSI	0.0	0.0	2.8	7.0	7.4	7.8	7.6	8.0	0.6	0.7	0.0	42.0
Informal Settlement	0.0	0.0	82.5	86.3	90.3	94.6	99.4	103.9	108.9	114.2	119.8	899.9
Revenue Total	0.0	0.0	604.9	642.3	638.6	637.5	799.2	811.0	997.4	1,043.9	1,348.3	7,523.3
Balance	0.0	0.0	0.0	-2.8	-46.3	-77.9	-124.8	-125.1	-180.7	-219.3	-336.4	-1,113.1
Accum.	0.0	0.0	0.0	-2.8	-49.1	-126.9	-251.7	-376.7	-557.4	-776.7	-1,113.1	

Table 10.13 Financial Projection of Priority Projects - Service Level Reduction; Grant 100%

Financial Projection (Kshs million; 1997 Price; 40-50-60% Collection; Grant 100%)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Cost												
Coll./Trans Cost												
Operation	0.0	0.0	400.3	382.8	367.8	354.3	428.9	426.1	430.9	450.0	642.9	3,884.0
Depreciation	0.0	0.0	85.4	86.4	86.9	88.4	135.3	138.2	142.6	145.6	199.9	1,108.8
Contract PSI	0.0	0.0	108.5	147.9	155.7	163.6	186.4	195.1	366.5	388.6	429.5	2,141.8
Initial Investment	0.0	1,399.3	8.0	4.0	12.0	632.0	23.0	31.8	24.0	688.5	0.0	2,822.5
Engineering	0.0	71.2	0.0	0.0	0.0	35.5	0.0	0.0	0.0	34.4	0.0	141.1
Total	0.0	1,470.4	602.2	621.1	622.4	1,273.9	773.6	791.1	964.0	1,707.1	1,272.3	10,098.2
Disposal Cost												
Operation	0.0	0.0	10.7	16.8	17.7	18.7	23.5	24.7	26.2	27.7	33.8	199.7
Depreciation	0.0	0.0	0.0	11.1	11.1	11.1	14.8	14.8	14.8	14.8	19.1	111.8
Initial Investment	0.0	0.0	756.6	564.3	404.5	29.4	0.0	0.0	0.0	34.2	0.0	1,789.1
Engineering	0.0	70.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	70.5
Total	0.0	70.5	767.3	592.2	433.4	59.2	38.3	39.6	41.0	76.7	52.9	2,171.0
CBAP	0.0	23.9	23.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.8
CWMP	0.0	2.4	2.4	2.4	2.4	2.4	3.2	3.2	3.2	4.0	4.0	29.6
Cost Total	0.0	1,567.2	1,395.8	1,215.7	1,058.2	1,335.5	815.1	833.8	1,008.2	1,787.8	1,329.2	12,346.6
Revenue												
Household												
NCC	0.0	0.0	337.2	327.5	319.5	313.3	451.8	455.1	467.4	486.0	718.3	3,876.3
Contract PSI	0.0	0.0	145.5	186.5	185.7	185.4	185.2	187.7	347.2	366.9	410.5	2,200.5
Commercial by NCC + Cntract PSI	0.0	0.0	36.9	38.8	37.5	36.4	46.1	45.5	57.0	58.9	76.6	433.7
Non Contract PSI	0.0	0.0	2.8	5.9	6.2	6.5	6.4	6.7	0.5	0.6	0.0	35.7
Informal Settlement	0.0	0.0	82.5	86.3	90.3	94.6	99.4	103.9	108.9	114.2	119.8	899.9
Revenue Total	0.0	0.0	604.9	645.0	639.3	636.2	788.9	798.9	981.0	1,026.7	1,325.2	7,446.1
Balance (Opr., Dep. + Contract)	0.0	0.0	0.0	0.0	0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	-0.0
Accum.	0.0	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	0.0

Table 10.14 Financial Projection of Priority Projects

Financial Projection for Priority Projects (Kshs million; 1997 Price; 60-80-100% Collection)

	1998	1999	2000	2001	2002	2003	Total
Cost							
Coll./Trans Cost	0.0	0.0	250.2	492.7	489.5	490.2	1,722.6
Operation	0.0	0.0	66.8	138.9	142.7	148.2	496.5
Depreciation	0.0	0.0	54.3	147.9	155.7	163.6	521.5
Contract	0.0	0.0	1,807.5	30.0	40.8	0.0	1,878.3
Initial Investment	0.0	0.0	823.5	30.0	40.8	0.0	894.3
Vehicles	0.0	0.0	54.0	0.0	0.0	0.0	54.0
Parking Lots	0.0	0.0	900.0	0.0	0.0	0.0	900.0
Transfer Station	0.0	0.0	30.0	0.0	0.0	0.0	30.0
Workshop	0.0	93.9	0.0	0.0	0.0	0.0	93.9
Engineering	0.0	44.7	0.0	0.0	0.0	0.0	44.7
Vehicles	0.0	2.7	0.0	0.0	0.0	0.0	2.7
Parking Lots	0.0	45.0	0.0	0.0	0.0	0.0	45.0
Transfer Station	0.0	1.5	0.0	0.0	0.0	0.0	1.5
Workshop	0.0	93.9	2,178.7	809.5	828.6	801.9	4,712.8
Total							
Disposal Cost	0.0	0.0	23.7	23.0	24.2	25.6	96.4
Operation	0.0	0.0	0.0	14.8	14.8	14.8	44.4
Depreciation	0.0	0.0	667.9	227.0	0.0	0.0	894.9
Initial Investment	0.0	33.3	0.0	0.0	0.0	0.0	33.3
Engineering	0.0	33.3	691.5	264.8	39.0	40.4	1,069.0
Total	0.0	23.9	23.9	0.0	0.0	0.0	47.8
CBAP	0.0	2.4	2.4	2.4	2.4	2.4	12.0
CWMP	0.0	153.5	2,896.6	1,076.7	870.1	844.7	5,841.5
Cost Total							
Revenue							
Household	0.0	0.0	237.0	529.7	533.5	541.7	1,841.8
NCC	0.0	0.0	49.8	144.9	146.8	149.6	491.1
Contract PSI	0.0	0.0	21.9	50.9	50.5	50.4	173.8
Commercial by NCC + Cntract PSI	0.0	0.0	3.7	5.5	5.7	6.0	20.9
Non Contract PSI	0.0	0.0	82.5	86.3	90.3	94.6	353.8
Informal Settlement	0.0	0.0	394.9	817.3	826.9	842.3	2,881.4
Revenue Total	0.0	0.0	-0.0	-0.0	0.0	-0.0	-0.0
Balance (Opr., Dep. + Contract)	0.0	0.0	-0.0	-0.0	-0.0	-0.0	0.0
Accum.							

Table 10.15 Financial Projection of Priority Projects - Service Level & Initial Investment Reduction

Financial Projection for Priority Projects - Service Level & Initial Investment Reduction (Kshs million; 1997 Price; 40-50-60% Collection)

	1998	1999	2000	2001	2002	2003	Total
Cost							
Coll./Trans Cost							
Operation	0.0	0.0	178.7	341.5	326.8	314.4	1,161.4
Depreciation	0.0	0.0	27.0	55.5	56.5	59.7	198.7
Contract	0.0	0.0	54.3	147.9	155.7	163.6	521.5
Initial Investment	0.0	0.0	508.5	8.0	22.0	0.0	538.5
Vehicles	0.0	0.0	424.5	8.0	22.0	0.0	454.5
Parking Lots	0.0	0.0	54.0	0.0	0.0	0.0	54.0
Transfer Station	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Workshop	0.0	0.0	30.0	0.0	0.0	0.0	30.0
Engineering	0.0	26.9	0.0	0.0	0.0	0.0	26.9
Vehicles	0.0	22.7	0.0	0.0	0.0	0.0	22.7
Parking Lots	0.0	2.7	0.0	0.0	0.0	0.0	2.7
Transfer Station	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Workshop	0.0	1.5	0.0	0.0	0.0	0.0	1.5
Total	0.0	26.9	768.5	552.8	561.0	537.7	2,447.0
Disposal Cost							
Operation	0.0	0.0	10.7	16.8	17.7	18.7	63.8
Depreciation	0.0	0.0	0.0	11.1	11.1	11.1	33.4
Initial Investment	0.0	0.0	402.1	227.0	0.0	0.0	629.1
Engineering	0.0	23.2	0.0	0.0	0.0	0.0	23.2
Total	0.0	23.2	412.8	254.9	28.8	29.8	749.5
CBAP	0.0	23.9	23.9	0.0	0.0	0.0	47.8
CWMP	0.0	2.4	2.4	2.4	2.4	2.4	12.0
Cost Total	0.0	76.4	1,207.6	810.1	592.2	569.9	3,256.2
Revenue							
Household							
NCC	0.0	0.0	120.7	284.7	277.5	273.2	956.1
Contract PSI	0.0	0.0	52.0	162.1	161.3	161.6	537.0
Commercial by NCC + Cntract PSI	0.0	0.0	13.2	33.7	32.6	31.7	111.2
Non Contract PSI	0.0	0.0	2.2	5.8	6.1	6.4	20.5
Informal Settlement	0.0	0.0	82.5	86.3	90.3	94.6	353.8
Revenue Total	0.0	0.0	270.7	572.7	567.8	567.5	1,978.7
Balance (Opr., Dep. + Contract)	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0
Accum.	0.0	0.0	-0.0	-0.0	-0.0	-0.0	0.0