8.1.2 Detailed Improvement Plan

(1) Water Supply System Improvement Project

1) Objectives of project

Objectives of the action plan on water supply system improvement projects are not only to improve the existing water supply system by the target year of 2010, but also to establish a levy system and help the creation of sustainable and sound living environment.

2) Evaluation of present condition in eight UUSs

LWSC supplies water partially to the settlements except for Chazanga. Service level of LWSC, such as ratio of service area and unit water supply, is terribly low. The existing water supply conditions and on-going/planned water supply projects in eight UUSs are summarized and evaluated below.

Evaluation and Priority Setting for Water Supply Improvement in Eight UUSs

UUS	Peoples' desire	Present Service Area Ratio & condition	Unit Water Supply	Status of Plans/Projects	Number of Beneficiaries	Priority Ranking
Bauleni	High	60 % by LWSC with free of charge (Zones 1 to 7) low-pressure/ leakage	9.6 lpcd	In place by JICA (Zones 8&13), Plan exist by PoCMUS (Zones 9,10,11&12)	45,000	2
Chainda	Low	100 % by LWSC	18.4 lpcd	In place by World Vision	17,000	-
Chazanga	Medium	None, Shallow wells & Dug wells	Unknown	Plan exist by CARE PROSPECT	29,000	-
Chibolya	High	25 % by LWSC	Unknown	In place by JICA & CARE PROSPECT	25,000	-
Freedom	High	30 % by LWSC	9.3 lpcd	No	9,000	2
Kalikiliki	High	20 % by LWSC with free of charge	Unknown	No	8,000	3
Ng'ombe	High	30 % by LWSC poor-water quantity	1.2 lpcd	No	30,000	1
Old Kanyama	High	10 % by HUZA & LWSC	Unknown	Plan exist by CARE PROSPECT	57,000	-

(Remarks) 1: First Priority, 2: Second Priority, 3: Third Priority, -: Planned/on-going projects exist

From the results of an evaluated survey, it is clear that the service level of water supply in the four UUSs of Bauleni, Freedom, Kalikiliki and Ng'ombe is extremely poor at present and will become dire in the future. The water

supply system improvement projects in these UUSs are selected and planned as described below.

3) Basic plan

(a) Basic idea

To formulate the improvement plan for the water supply system in the four UUSs, the following items were considered carefully;

i) water needs and requirement for the water supply system of the residents,
ii) capacity of community organization for executing and sustaining the project,
iii) willingness and ability to pay water levies,
iv) urgency to designate the short-term project to be achieved by 2005,
v) necessity to cover the whole area at each UUS by 2005,
vi) safe and stable water supply at all UUS by 2010 as a final goal,
vii) introduction of levy system into Bauleni and Kalikiliki water supply system run by LWSC,
viii) physical characteristics of target UUSs such as topographic and hydro-geological conditions,
ix) integration of the existing LWSC's water system with the community based system to be managed by RDC,
x) scale merit of the projects and ease of O&M, and
xi) standard of LWSC.

As the four UUSs are categorized as a sub urban residential area, the development plan identifies isolation from the existing network of LWSC's water supply system. Environmental aspects and integration with existing infrastructure are essential requirements for this plan. Basic plan was formulated according to the following process.

(b) Social conditions

Under this study, an interview survey on living environment in the area was conducted during 1999. This included water supply and sewerage situation, road condition, flood/inundation condition and the resident's opinion on resettlement. In the targeted four settlements, the result of the survey indicates that water supply improvement is the priority need for infrastructure development. Based on the results of the interview survey, social conditions in the area are summarized below:

Social Conditions of Four UUSs

	Bauleni	Freedom	Kalikiliki	Ng'ombe
Area (ha)	128	43	61	91
Population	45,000	9,000	8,000	30,000
Population Density (persons/ha)	351	209	131	329
Average family size (persons/family)	6	-	8	6
Average house hold income (K/month)	75,000	100,000	50,000	95,000
Classification of main income source	Wage earner	Wage earner	Wage earner	Wage earner
Main water source	LWSC	LWSC	LWSC	LWSC
Satisfaction to present water supply condition	Leakage & low pressure	Lack of water & low pressure	Lack of water	Lack of water
Average water consumption (lpcd)*	9.6	9.3	-	1.2
Willingness to pay water charge	Yes	Yes	Yes	Yes
Function of RDC	Yes	Non	Yes	Yes
Awareness of environmental issues	Lack of safe drinking water			

(Note) *: LWSC' data, -: No data (1999)

(c) Physical conditions

There are no detailed topographic and land register maps of the area because it has developed informally. Almost all of Lusaka is flat with an elevation that varies from 1200 m to 1300 m above mean sea level.

Bauleni is located in the southeastern part of the city. The elevation varies from 1280.0 m to 1286.5 m above mean sea level. The area slopes down to the south west with incline of 1.1%. Kalikiliki, which varies from 1260 m to 1282 m with incline of 4.4%, adjoins the new town of Mutendere. Freedom with an elevation of 1300 m is located to the south of Lusaka near the boundary of Kafue province. Ng'ombe is located to the north close to the Great North road. The elevation varies from 1214 m to 1250 m above mean sea level. Average slope incline is about 2.6% in this area from west to east.

According to the report on environmental appraisal by CARE PROSPECT, Lusaka is underlain by very ancient sedimentary rocks which exhibit considerable litho-structural complexity. There are some prominent faults, many of them related to a dominant NW-SE (Northern West-Southern East) trend, much folding and associated steep dips as shown in Figure 8.1.11. The recognized geological sequence comprises of Lusaka Dolomite, Cheta Formation, and Chunga Formation.

The Lusaka Dolomite is lying to the south and the Cheta and Chunga Formations to the north of the Lusaka city. The major aquifers which are able to provide groundwater supplies are the carbonate rocks, primarily the Lusaka Dolomite. Bauleni, Kalikiliki and Freedom are underlain by the carbonate rocks of the Lusaka Dolomite. The schists and quartzites of the Cheta and Chunga Formations that form minor aquifers underlie Ng'ombe.

(d) Present water supply and use

LWSC supplies water to Bauleni, Freedom and Ng'ombe by means of the satellite system, and to Kalikiliki with the network system, but its service area cannot cover the whole area of each settlement due to limited capacity of the water sources. LWSC charges households a fixed amount for water supply by having tap attendants, except in Bauleni and Kalikiliki where a payment system has not yet been implemented.

HUZA also set up water supply for the training center and the communal school in Bauleni. Bauleni clinic has a borehole which is out of order at present due to failure of construction work.

Based on the data of LWSC, the average daily water consumption in the area is estimated at less than 10 lpcd; however, the potential water demand of residents is presumed to be more than 20 lpcd as the average daily water consumption.

(e) Service level of LWSC water supply

The water supply in the four settlements is provided partially by LWSC. Within the four settlements, residents receive an unreliable and intermittent supply of water from LWSC, which is often of insufficient pressure to meet total demand. Most residents show their willingness to pay LWSC the existing tariff for water if the supply is adequate. The existing service levels are summarized as follows:

Present LWSC Services for Four UUSs

	Bauleni	Freedom	Kalikiliki	Ng'ombe
Served area/Total area (ha)	77/128	13/43	12/61	27/91
Ratio of served area (%)	60	30	20	30
Allowable water consumption (lpcd)	9.6	9.3	n.a.	1.2

(f) Water Demand Projection

Future unit water consumption per capita is proposed as 20 lpcd for the present, 30 lpcd for the year 2005 and 40 lpcd for the year 2010, considering the examination of the present condition and information from LWSC. Based on the forecasted population and unit water consumption, water demand projection of four unplanned urban settlements is determined as shown in Table 8.1.2.

According to the strategic plan 1999-2003 of LWSC, the target unaccounted for water (UFW) in the future is 15%. Water requirement, therefore, shall be estimated assuming that the ratio of water losses is 15%, even in the new constructed area. Water requirements to four unplanned urban areas including Bauleni Clinic are summarized at each five years below.

Water Demand

		Present	2005	2010
Water demand (m^3/d)	Bauleni (LWSC area)	620	830	1,060
	Bauleni Clinic	7	9	11
	Freedom	210	230	250
	Kalikiliki	180	280	370
	Ng'ombe	690	1,100	1,630
Estimated Population	Bauleni (LWSC area)	27,000	36,000	46,000
	Freedom	9,000	10,000	11,000
	Kalikiliki	8,000	12,000	16,000
	Ng'ombe	30,000	48,000	71,000

(g) Target level and Basic Plan of water supply improvement

The results of the field inspection and surveys on the existing conditions of water supply assessed consciousness of residents in terms of infrastructure development levels as mentioned above. Target levels and basic plan of water supply are proposed below:

	Target Service Level and Basic plan
Bauleni (LWSC area)	- Augment of water supply up to 20 lpcd of minimum demand and meet the future demand of 40 lpcd by 2010 - Reduction of UFW by 15% - Securing the minimum residual water pressure of 5m - Rehabilitation of existing water supply facilities - O&M is to be conducted by RDC
Bauleni Clinic	- Urgent water supply development for normal clinic function - Construction of new borehole and elevated tank
Freedom	- Served area is to be 100% of the area with minimum demand of 20 lpcd and water supply is strengthened to meet the future demand of 40 lpcd by 2010 - Securing the minimum residual water pressure of 5m - Water supply to be established under auspices of RDC/committee
Kalikiliki	- Served area is to be 100% of the area with minimum demand of 20 lpcd and water supply is strengthened to meet the future demand of 40 lpcd by 2010 - Water supply to be established under auspices of RDC/committee
Ng'ombe	- Served area is to be 100% of the area with minimum demand of 20 lpcd for urgent and future demand of 40 lpcd - Securing of water supply to meet water demand of residents according to increase population - Water supply to be established under auspices of RDC/committee

4) Detailed plan by settlements

Layout plans for water supply system improvement at Bauleni, Freedom, Kalikiliki and Ng'ombe are illustrated as shown in Figures 8.1.12, 8.1.13, 8.1.14 and 8.1.15 respectively. The required water supply improvement plan is described below.

(a) Improvement plan concept

The following concepts and policies are determined in order to implement the projects for the improvement of water supply systems:

- Target year of infrastructure improvement is 2010,
- Adoption of the existing boundary and area of each zone at settlements,
- Adoption of the existing land use, population and population density,
- Community participation approach to implementation,
- RDC responsible for community mobilization,
- Consideration of future development plans by LCC.

(b) Plan framework

The development plan of the projects are formulated according the following framework:

Plan Framework

Description	Bauleni	Freedom	Kalikiliki	Ng'ombe
Served Area (ha)/ Zones	77	43	61	91
Zones	Zones 1 to 7	Whole area	Zones 1 to 5	Zones 1 to 11
Served Population in 2010	46,000	11,000	16,000	71,000
Designed Unit Water Consumption (lpcd)	40	40	40	40
Water Demand (m^3/d)	1,060	250	370	1,630
Water Source (Borehole)	Existing/New	Existing/New	New	Existing/New
Design Water Yield at Borehole (l/sec)	> 10	> 10	> 10	> 10
Number of Public Tap Stand (unit)	50	15	20	55
Number of Individual Connections	36	-	20	-
Minimum Residual Water Height (m)	5	5	5	5
Served Population per Water Point	400	400	400	400
Length of Distribution Pipeline (km)	15	5	10	20

Main water supply facilities to be constructed are summarized below:

Main Water Supply Facilities

Description (unit)	Bauleni	Clinic	Freedom	Kalikiliki	Ng'ombe
Number of Boreholes (unit)	2*	1	2*	1	3*
Depth of Borehole (m)	60 to 80				
Submersible pump (l/minute)	600	15	400	600	800
Lift pipe: GSP (m)	50 to 70				
Operation room with electric power & chlorination facilities (unit)	1	1	1	1	1
Boundary wall with height of 2m (Length: m)	240	-	160	160	160
Transmission pipe: GSP (km)	1.0	-	0.5	1.0	3.0
Number of Elevated Tanks (unit)	1	1	2	1	1
Capacity of Elevated Tanks (m^3/unit)	150	6	50	100	150
Height of Elevated Tank (m)	15	5	10	5	15
Distribution pipeline: PVC (km)	8	0.1	6	8	10
Number of Public Tap Stand (unit)	50	-	15	20	55
Main water meter (unit)	1	1	2	1	2
Users water meter (unit)	86	-	15	40	55

(Note) *: Necessary number of boreholes including existing boreholes

(c) Water source

The main source of drinking water to be supplied will be deep wells to be newly developed at each settlement. Well depth is estimated to be from 60

m to 80 m approximately, judging from the previous data of boreholes in the City. Well diameter will be 150 mm, 200 mm or 300 mm. Suction level ranges from 50 m to 70 m. Pumping rate is estimated at 36 m^3/h on average. A submersible motor pump is set in the boreholes. Boreholes are located within each settlement except for Ng'ombe. The borehole for Ng'ombe is located near to the Great East Road since the abstraction capacity is predicted to be less than 1.5 m^3/h at northern area of the Great East Road.

(d) Treatment and distribution

Groundwater is pumped up to a service reservoir and chlorinated before delivery to residents through a pipeline with the satellite system. Water quality standard prepared by World Health Organization (WHO) is applicable for development of water supply system in the City. Public-faucet system is adopted for water supply except where individual house connections already exist. One water point (public tap stand) is located at each 200 persons of population served. There are two taps per water point. The pipeline consists of polyvinyl chloride pipe (PVC), polyethylene pipe (PEP) and galvanized steel pipe (GSP).

(e) Design water supply

Unit water consumption per capita is recommended to be 20 lpcd for the present, 30 lpcd for the year of 2005 and 40 lpcd for the year of 2010, considering the examination of the present condition and information from LWSC. Water requirement, therefore, shall be estimated assuming the ratio of water losses is 15% even in the new constructed area. Peak hourly flow factor is taken as 1.6.

(f) Design criteria for distribution system

The minimum residual water height in the distribution main system under peak hourly flow condition is 15 m. The maximum pressure under zero flow condition is to be 60 m. At the end of public tap stand, the minimum residual water height is 5 m in distribution sub main.

(g) Operation and maintenance:

RDC at each settlement shall operate and maintain the main facilities in cooperation with a water supply committee to be organized by RDC instead of LWSC. The specific arrangement for each settlement will be based on ABO capacities and other circumstances.

(h) Water charge collection

Tap attendants will be selected from the community. Roles and responsibility, conditions of service, and basis of their work (paid or voluntary labor) will be determined based on the results of research and community consultations.

(i) Community center for levy collection window/room

JST proposes that the water levy collection window/room be built in order to conduct the money collection safely. Monthly or weekly basis contract ticket/card will be sold at the room. Daily basis levy that tap attendants receive from households will be collected in community center before bank deposit.

Community center will be developed by facilitation of meeting rooms in addition to levy room. Meeting rooms can be utilized for RDC and subcommittee meetings as well as for community training. LCC site office is attached to the center and sub-health center (health post) can be established in the center as explained 8.1.2 (3).

Necessary floor area of the center will be approximately 130 m^2.

5) Implementation body

The water supply system improvement project is implemented by LCC in cooperation with LWSC and RDC. O&M is conducted based on community-managed system by the water committee under the initiative of RDC. Major roles to be played by the LCC and RDC during implementation of the project are recommended below.

Defined Roles and Responsibilities

Pre-construction Stage	
RDC	➢ Organize the water committee and determine its roles ➢ Participate and assist meetings and workshops held by LCC and LWSC ➢ Cooperate with LCC and LWSC ➢ Confirm residents' willingness to pay and determine water fee ➢ Select and identify public tap locations ➢ Select tap attendants and technicians for O&M ➢ Allot residents' tasks based on the community participation, such as pipe installation work and public tap stand construction
LCC	➢ Secure finance and select an executing agency for implementation of the project ➢ Collaborate with related agencies (LWSC and ZESCO), NGOs (PoCMUS and HUZA) and private sectors in developing and sustaining the water supply system improvement ➢ Certify implementation of the project ➢ Conduct health and hygienic education/campaign ➢ Support RDC for establishment the water committee ➢ Consult and approve a plan and designs in conjunction with LWSC
Construction Stage	
RDC	➢ Act on the community participation concretely ➢ Provide working space and lots for construction of facilities ➢ Supervise and monitor residents' activities ➢ Receive technical transfer for construction works and O&M ➢ Participate a commissioning test to be conducted by the executing agency ➢ Receive all the facilities from the executing agency
LCC	➢ Supervise construction works done by the executing agency and RDC ➢ Arrange and issue approvals required for the works (land acquisition, work space, right to use of electricity, groundwater and roads, etc.) ➢ Arrange compensation to residents if necessary ➢ Prepare and execute training/education programs for O&M in cooperation with LWSC/the executing agency ➢ Classify the ownership of facilities
O&M Stage	
RDC	➢ Supervise O&M conducted by the water committee ➢ Supervise the water levy collection done by the committee ➢ Bank and manage the collection fee ➢ Monitor and evaluate the project in cooperation with LCC and LWSC ➢ Administer the as-built drawings and manual books ➢ Prepare monthly/annual reports on activities of the water committee
LCC	➢ Supervise and support RDC's activities from viewpoints of technical, environmental, institutional and financial aspects ➢ Monitor and evaluate the project

6) Implementation schedule

Three projects of Bauleni clinic, Freedom and Ng'ombe are proposed as the short-term projects for water supply system improvement in consideration of the urgency. The water supply system improvement for Bauleni will be the long-term projects, since Bauleni is served by LWSC presently. Further settlements of Bauleni is required to settle the existing double standards of financial management between the area served by LWSC free of charge and the area managed by RDC with water charge.

The short-term projects are proposed to be implemented by 2005, and the long-term projects to be implemented by 2010 according to the basic policy.

7) Expected impacts

The project indicates positive impacts to social environment due to safe and stable water supply. The following impacts are expected:

- Improved health and hygiene conditions at the settlements,
- Decreased the water born diseases,
- Improved hygiene behavior of residents,
- Promoted community-based businesses and employment,
- Created sustainable and sound living environment at the settlements.

8) Role of RDCs in community-managed water improvement projects

When communities are expected to operate and maintain their water supply systems, they require a lot of on-going support from implementing agencies and local authorities. Running a successful water supply scheme requires similar skills to running a business—technical, managerial and public relations are all essential. Some of the necessary skills will be available in the community, while others will require development through training and on-the-job support.

Community institutions such as the RDC and its subcommittees are likely to require strengthening, and participation in project activities will likely be the main avenue of skill development. Capacity building exercises must be practically oriented and pitched at the appropriate level to be effective. Training should be carried out in the community and exchange visits to similar projects tend to be highly useful.

Where there is a strong need for access to safe water, communities are typically very willing to participate in project activities and contribute labor and other resources. However, once construction ends and O&M responsibilities are turned over to the community, the true capacity of the leaders and extent of "ownership" will be tested. It is during these first months of operation that support is critical.

The current involvement of RDCs and water committees in water supply O&M and financial management varies from settlement to settlement. LWSC has used RDCs in many settlements to collect water levies and oversee tap attendants and the overall water supply operation. They have not had good success with this approach as a result of many factors including 1) lack of effective monitoring and support system, 2) inadequate and

unreliable water supply affecting residents' willingness to pay, and 3) mismanagement of funds by RDCs.

The international NGO CARE PROSPECT is in the process of implementing several large water supply schemes in Lusaka settlements including Chipata, Chibolya and Kanyama. While they take a highly participatory approach, they also recognize that the scale and technology is such that they are actually developing small town water schemes, which need to be managed accordingly. CARE PROSPECT is still experimenting with various management models in which the community retains varying degrees of responsibility, but each of the models they propose includes a board of trustees including representatives from the NGOs, LCC, LWSC, and community who effectively manage the scheme.

The CARE PROSPECT models are quite elaborate in the sense that they thoroughly address legal, financial, technical and social considerations and lay out exhaustive financial procedures. The schemes are not run by community volunteers, but by paid workers who are managed by professional advisers. Once people are hired for O&M, whether from inside or outside the community, it is important to meet statutory obligations (minimum wage, pension entitlements, etc.) and standard welfare demands such as funeral grants, medical fees and advances. In order to sustain such a hired workforce, the scheme must be well budgeted with fairly accurate projections of revenue (payment rates) and costs.

ABOs at all levels are integrally involved through the numerous checks and balances that are in place within the community. Under the trustees models, the RDC receives a set percentage of revenue for the roles and responsibilities they carry out.

Considering the experiences of LWSC and CARE PROSPECT, it is essential to closely examine the feasibility of RDCs operating and managing water supply schemes that up to tens of thousands of people will depend on daily. There is no one formula that will work for all communities. Some of the main factors to consider in determining the most appropriate role for the RDC include:

- Targeted area in a community (Entire Community or selected zones, etc.)
- Diversity (Examine cultural, ethnic/tribal, political background, etc.)
- Income level (Examine affordability for cost recovery - Are most of beneficiaries low income or poorest of the poor?)

- Scale of the water scheme (Appropriate size to handle by community, i.e. big or intermediate & small water system?)
- Institutional building - Status of the ABO structure, i.e. whether the ABO structure exists, or if so, how effectively the levels of zone Development Committee, Forum of Zone Representatives, and Resident Development Committee are working for the community-managed projects.
- Past/present experience of the RDC and its subcommittees in handling water project operation and management including fund raising and income generation.

It is also critical that all stakeholders (implementing agency, local authorities, community leaders and residents) are clear about decisions made on the roles of the community in both project implementation and O&M and if they will be carried out on a voluntary or paid basis. What is decided in theory may not work in practice, so many decisions may have to be re-examined once the scheme is up and running and the financial situation is better known. Similar to a business, it will take time for a water scheme to be profitable. Work carried out on a volunteer or commission basis at the beginning may eventually turn into a paid position. Pros and cons of "volunteer" and "business" models are shown in the table below.

Community-managed Water Schemes

Community volunteer model		**Trustees business model**	
Pros	**Cons**	**Pros**	**Cons**
▪ possibility for wider sharing of responsibilities and benefits ▪ promotes self-help spirit ▪ empowers	▪ difficult in diverse communities ▪ demands on time and workload ▪ operations affected by turnover of leaders ▪ accountability	▪ greater stability (less turnover of workers, etc.) ▪ better access to professional advisers ▪ responsibilities and liabilities shared by many	▪ difficult to implement with small schemes (no economies of scale) ▪ tariffs may have to be increased to cover costs

Whatever management structure is selected for O&M, community research and capacity building will need to be carried out in order to develop sustainable community managed water supplies. Participatory research and training methodologies should be used as much as possible. The table below outlines typical issues and activities according to stage in the project cycle:

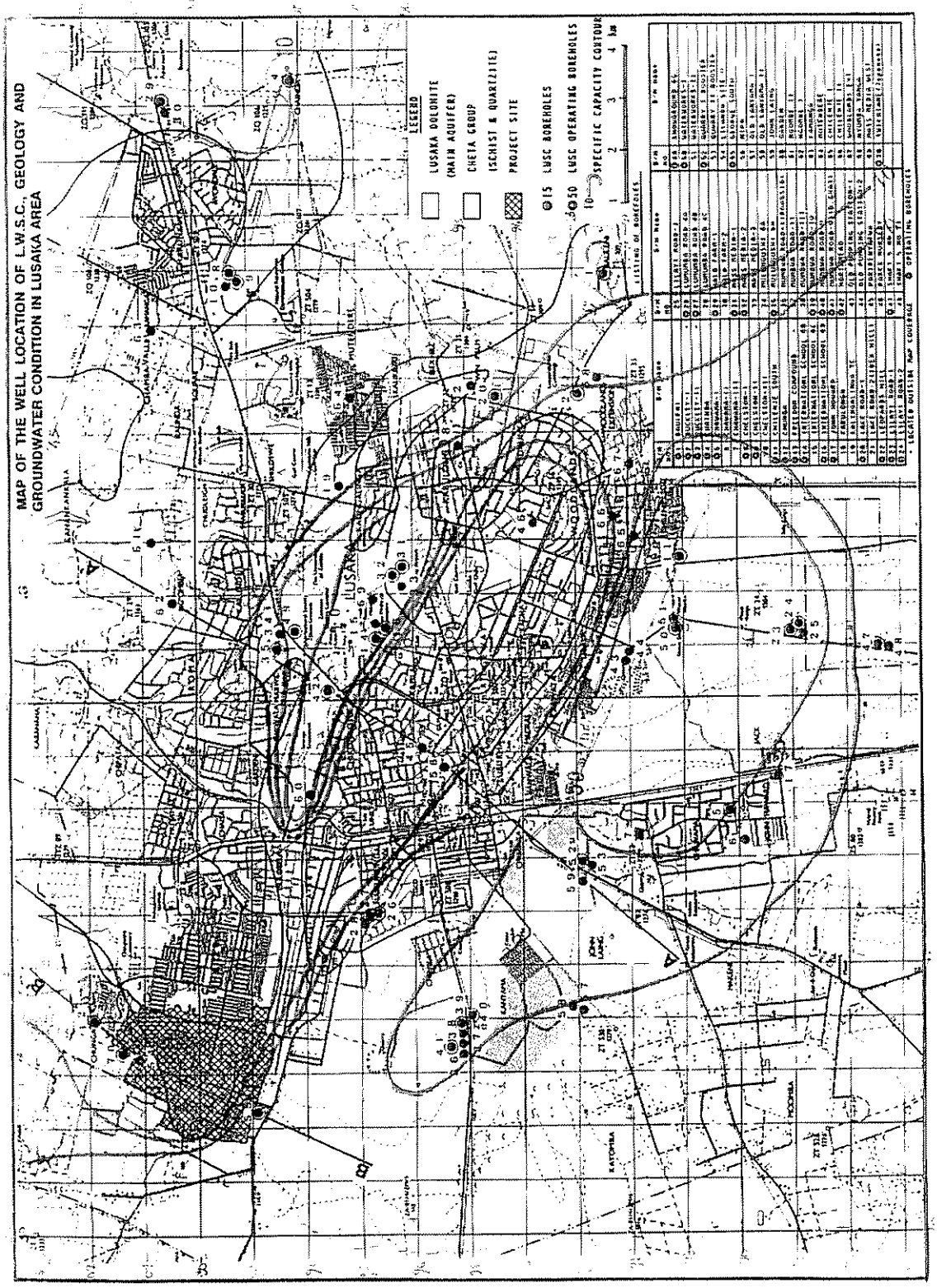
Necessary Community Research and Capacity Building

Project stage	Community research	Community capacity building
Planning & design	▪ Community needs assessment & problems analysis ▪ Strengths and weaknesses of ABO structure ▪ Training needs assessment ▪ Baseline survey (household and community level) ▪ Determining the most appropriate technology	▪ Communication skills ▪ Research skills ▪ Leadership skills ▪ Monitoring and evaluation ▪ Participatory development
Implementation	▪ Project monitoring including construction, community participation and sensitization processes ▪ Start-up requirements for O&M such as user cards, record books, receipts, etc. ▪ Most appropriate management structure ▪ Financial sustainability	▪ O&M ▪ Financial management ▪ Human resources management ▪ General management skills such as decision-making, problem-solving, public relations
Evaluation	▪ Project process & impact	▪ Evaluation methodology
Initial period of O&M	▪ Post project survey ▪ Satisfaction of users, operators ▪ Financial sustainability	▪ On-the-job support to Water Committee, operators, managers, accountants, etc. ▪ (Any gaps in individual and institutional capacity building)

In addition to community research and capacity building, many other issues will require examination in order for the project to progress as planned and water scheme to be sustainable. Some of these include:

- the appropriate roles and responsibilities of local authorities in the project and following implementation
- capacity building of local authority
- training providers and their capacities
- legal issues such as ownership of infrastructure, liabilities, and workers rights
- office space for scheme management and revenue collection
- safeguarding equipment and funds
- banking procedures
- financial sustainability of the project
- seed money for start-up costs and capital replacement fund

A flexible time frame is also advisable where full community participation is being promoted. Especially in communities with large populations or where community institutions are not yet well established, sensitization can take time. However, it is very important that a large section of the community is aware of the project and what is expected of them.



(Source: LWSC)

The Study on Environmental Improvement of Unplanned Urban Settlements in Lusaka in the Republic of Zambia	**Figure 8.1.11**
Japan International Cooperation Agency	**Hydro-geological Map in Lusaka**

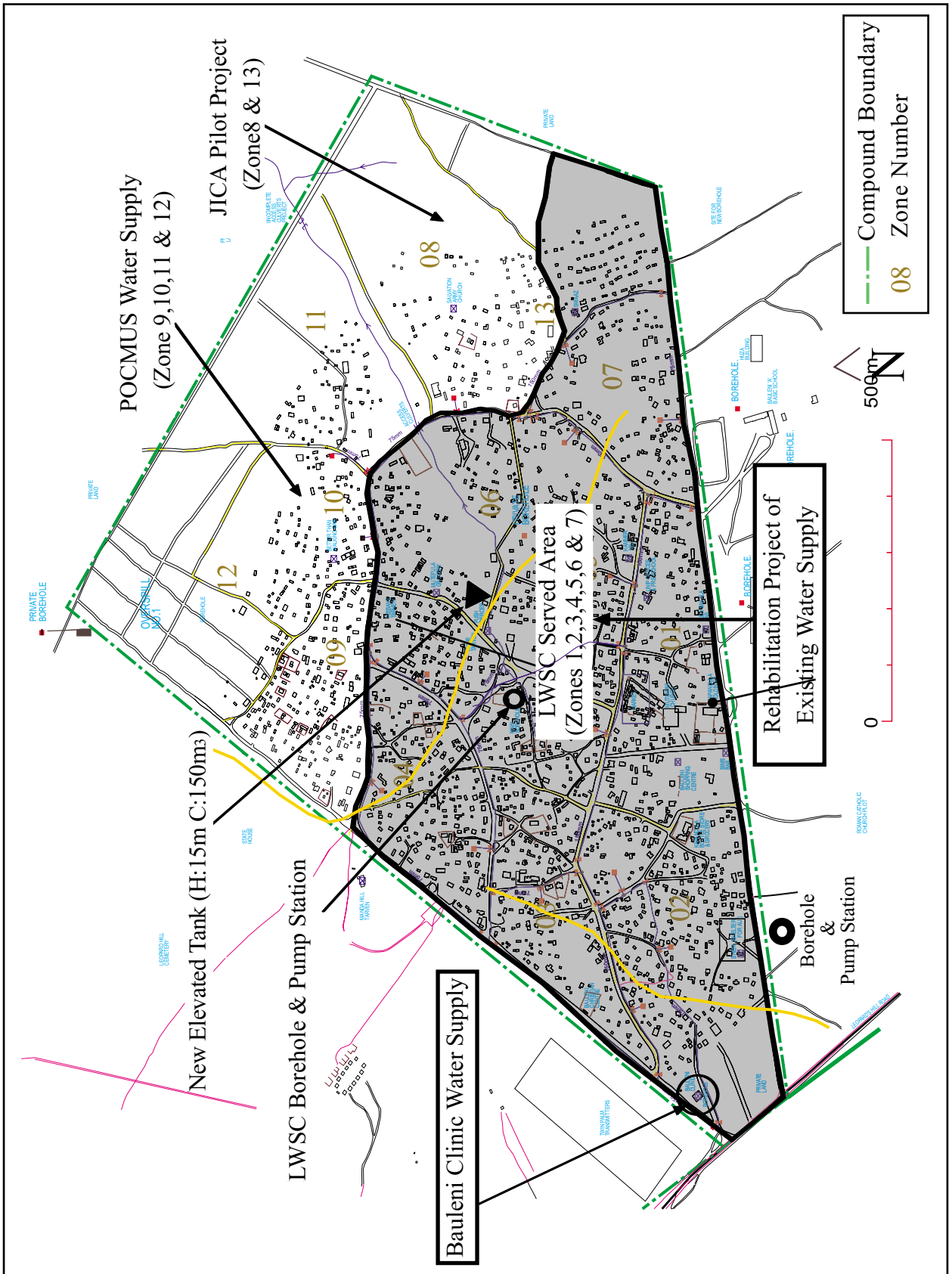


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Figure 8.1.12
Bauleni Water Supply System Improvement Plan

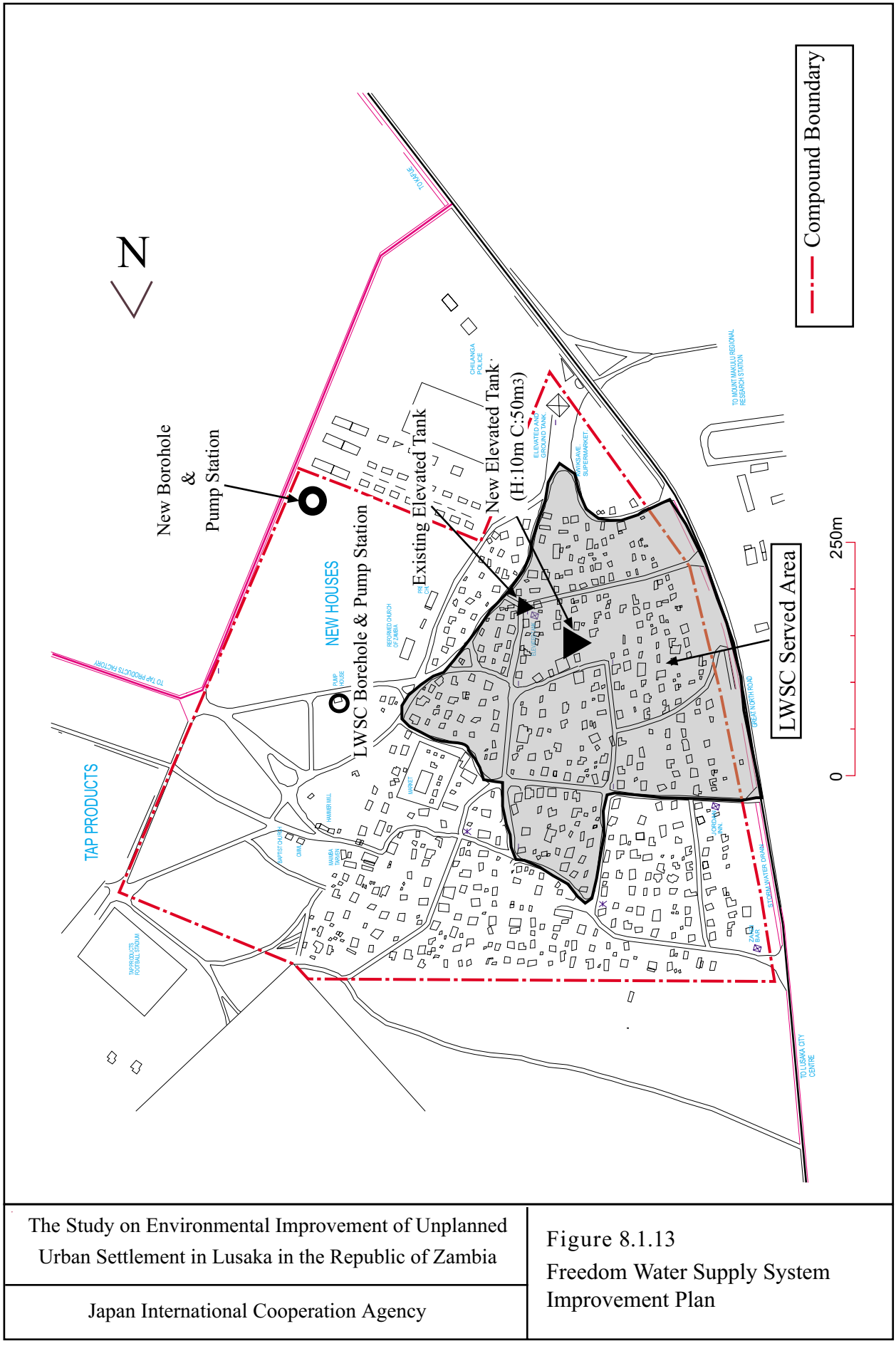

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Figure 8.1.13
Freedom Water Supply System Improvement Plan

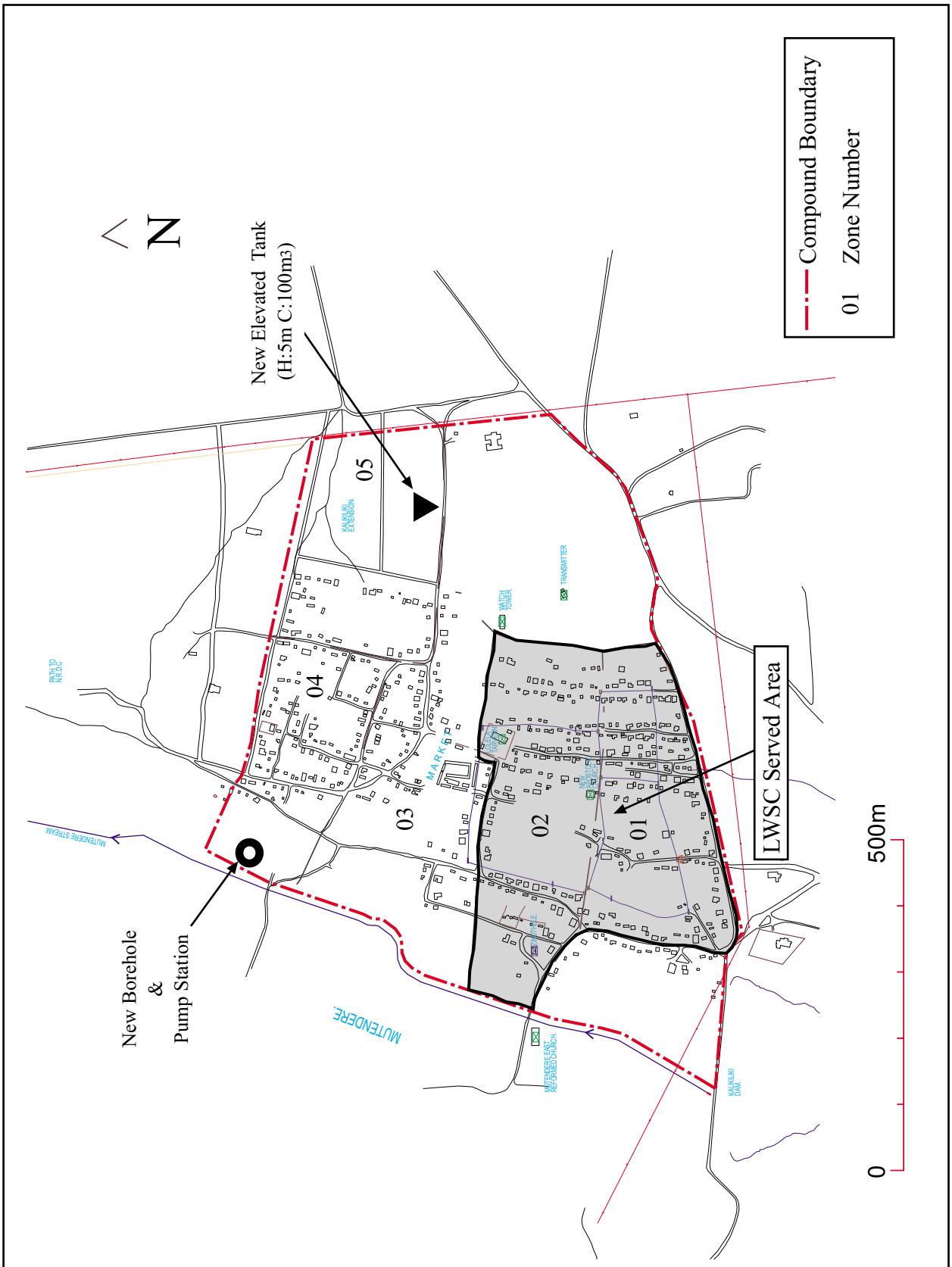

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Figure 8.1.14
Kalikiliki Water Supply System Improvement Plan

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Figure 8.1.15
Ng'ombe Water Supply System Improvement Plan

Table 8.1.2 Water Demand Projection of 4 Unplanned Urban Settlements

	Area	1999			2005			2010		
	(ha)	Population	Water Demand (m3/d)	Water Supply (m3/d)	Population	Water Demand (m3/d)	Water Supply (m3/d)	Population	Water Demand (m3/d)	Water Supply (m3/d)
1 Bauleni	128	45,000	900	1,040	59,000	1,180	1,360	73,000	1,460	1,680
LWSC's area	77	27,000	540	620	36,000	720	830	46,000	920	1,060
Clinic		600	6	7	780	8	9	960	10	11
2 Freedom	43	9,000	180	210	10,000	200	230	11,000	220	250
3 Kalikiliki	61	8,000	160	180	12,000	240	280	16,000	320	370
4 N'gombe	91	30,000	600	690	48,000	960	1,100	71,000	1,420	1,630

(Remarks) Unit water supply is determined below:
- 20 lcpd for the year of 1999
- 30 lcpd for the year of 2005
- 40 lcpd for the year of 2010

(2) Road Improvement Project

Objectives of the action area plan for road improvements in UUSs are to prepare the road improvement master plan for eight UUSs. Community capacity building method is also studied for sustainable road maintenance.

The existing road and drainage conditions and on-going/planned road and drainage improvement projects in eight UUS are summarised below.

Summary of Road and Drainage Conditions and Projects in Eight UUSs

Settlement	Past road projects	On-going projects (2000)	Planned projects	Conditions observed by JST
Bauleni	PUSH (1990-94)	None	Access road will be improved by JICA (Phase II).	Poor
Chainda	PUSH (from 1999	PUSH	None	Fair*
Chazanga		None	None	Poor
Chibolya		None	None	Poor
Freedom		None	None	Poor
Kalikiliki	PUSH (1991-94)	None	None	Poor
Ng'ombe		JICA Pilot Project	Access road will be improved by JICA	Poor
Old Kanyama	1.PUSH (1991-93) 2.CARE-PUSH (from 1994) 3.Access road was improved by JICA	None	None	Poor

JICA = Japanese Grant Aid Project for Improvement and Maintenance of Lusaka City Roads (Phase I & II).

Note:* The access road to Chainda is already tarmac and internal roads in UUS were already improved by Food for Work program of PUSH

Observation revealed that the existing road conditions in seven of the eight UUSs (Bauleni, Chazanga, Chibolya, Freedom, Kalikiliki, Ng'ombe, and Old Kanyama) are poor and will continue to deteriorate. Therefore, road and drainage improvement projects are recommended for improvement of living environment.

The road and drainage improvement projects in seven UUSs were selected and planned as described below.

Evaluation Criteria (Selection criteria for target compounds)

The criteria of selection of the priority of the target compounds are shown as follows;

① Necessity: priority needs for road improvement as rated by community leaders
② Importance: population of the compound and expected traffic volume
③ Development ease: surface and drainage condition, road reserve, etc.

④ Urgency: existence of other JST pilot projects

The results of the priority selection of road and drainage improvement is shown below.

- Chainda is recognised as having road improvements that are almost completed.
- The other seven UUSs road and drainage are selected as the project of action area plan.
- The trunk road in UUS shall be improved in the action area plan, while the feeder road in UUS are left for the community participatory work such as Food for Work program by PUSH.

Selection of the Priority of Improvement of Road and Drainage in Eight UUSs

UUS	Necessity		Importance						Development Easiness						Urgency		Total Rate and Priority	
	Priority Needs/ RDC		Popu-lation		Traffic Volume		Improve-ment of Road Network		Surface Condition		Drainage Condition		Road Reserve		Other Project			
Bauleni	-	1	45,000	3	Medium	3	important	3	Poor	3	Poor	3	adequate	3	Pilot project (water supply)/ Grant Aid Road Project	3	22	Long -term
Chainda	-	1	17,000	1	Low	1	necessary	1	Fair	1	Fair	1	adequate	3		1	10	-
Chazanga	No.3	5	29,000	1	Low	1	important	3	Very poor	5	Poor	3	Narrow	1		1	20	Long -term
Chibolya	No.5	2	25,000	1	Medium	3	important	3	Very poor	5	Very Poor	5	Narrow	1	Pilot project (water/ CS)	3	23	Long -term
Freedom	No.3	5	9,000	1	Low	1	important	3	Very poor	5	Poor	3	Narrow	1		1	20	Long -term
Kalikiliki	No.3	5	8,000	1	Low	1	important	3	Very poor	5	Poor	3	Narrow	1		1	20	Long -term
Ng'ombe	No.3	5	30,000	3	High	5	Urgent	5	Very poor	5	Poor	3	Narrow	1	Pilot project (road)/Grant Aid Road Project	3	30	Long -term
Old Kanyama	No.4	3	57,000	3	High	5	important	3	Very poor	5	Very Poor	5	Narrow	1		1	26	Long -term

Road length for proposed road improvements are shown below.

Length of Proposed Road Improvements

	Short Term	Long Term
Bauleni	—	L=6,450m
Chainda	—	—
Chazanga	—	L=1,950m
Chibolya	—	L=2,880m
Freedom	—	L=1,100m
Kalikiliki	—	L=1,330m
Ng'ombe	—	L=3,900m
Old Kanyama	—	L=5,250m

1) Basic plan

(a) Basic policy

The formulation of the improvement plan for road and drainage in the seven UUSs considers the following items:

i) To review the results of the interview/existing condition survey and understand the road and drainage system needs of the residents, and then to confirm the requirements of the road and drainage system,
ii) To evaluate the capability of community organizations for executing and sustaining the project (technical, fundraising, leadership capacities),
iii) To classify the projects as urgent short-term project to be achieved by 2005 or long-term project to be achieved by 2010.
iv) To consider the efficiency of the projects from the viewpoint of economic scale and ease of O&M, and
v) To adopt the design standard of LCC.

(b) Target level and basic plan of road and drainage improvement

The formulation of the improvement plan for road and drainage in unplanned urban settlements considers the following items;

① Number of lanes

Two-lane carriageway should be installed for smooth passing of vehicles.

② Carriageway pavement type

Gravel pavement is suitable for community-managed roads from the viewpoint of maintenance and cost. The pavement surface should be covered by crusher-run to reduce dust. An appropriate shoulder should be installed on both sides for pedestrians.

③ Drainage facility

Drainage facilities should be installed on both sides. Open drains are suitable for easy maintenance by the community. Drainage should be installed up to the existing outlet.

④ House compensation and relocation of public utilities

LCC needs to cooperate by giving residents a new plot for house compensation and relocating public utilities. It is important to provide adequate opportunity for all stakeholders (LCC, donor, community leaders and displaced residents) to reach consensus on matters related to relocation and compensation.

2) Detailed plan by compound

Layout plan of road and drainage improvement in Bauleni, Chazanga, Chibolya, Freedom, Kalikiliki, Ng'ombe, and Old Kanyama are illustrated in Figures 8.1.16 to 8.1.22. The required road and drainage improvement plan is described below.

(a) Improvement plan concept

The following concepts and policies are determined in order to implement the projects for the improvement of road and drainage.

- Target year of infrastructure improvement is 2010,
- Rehabilitation of existing road,
- Implementation of the projects based on community participation,
- RDCs leading community participation activities.

(b) Implementation Detail

- Ng'ombe (see Figure 8.1.16)

Access road from Libala Road to Ng'ombe will be improved by Japanese Grant Aid Project for Improvement and Maintenance of Lusaka City Roads (Phase II).

The eastern part of Ng'ombe Ring road is proposed for improvement, which should be implemented in close association with the newly established Roads Committee.

In addition, the pilot project road width of 4m makes it difficult for heavy goods vehicles to pass around other vehicles and pedestrians. The increased volume of traffic contributes to the problem. Therefore, it is proposed to implement a one-way road system in Ng'ombe.

Western part of ring road and the road located east side of the pilot project road will be improved at the long-term stage.

- Bauleni (see Figure 8.1.17)

Access road from Leopards Hill Road to Prince Takamado School will be improved by Japanese Grant Aid Project for Improvement and Maintenance of Lusaka City Roads (Phase II)

Outer and Inner Ring Roads of Bauleni will be improved at the long-term stage.

- Chazanga (see Figure 8.1.18)

Access road from Great North Road to Chazanga Market will be improved at the long-term stage.

- Chibolya (see Figure 8.1.19)

Access road from Ben Bella Road to Los Angels Road, the road located in southern boundary of Chibolya, and the road connecting both roads will be improved at the long-term stage. Road should be designed to raise the road surface elevation due to the poor drainage condition and rocky basement. It is also necessary to install a new outlet connected to the existing natural stream because this area has no drainage outlet.

- Freedom (see Figure 8.1.20)

Access road from Kafue Road to Freedom Market and another main road located in the northern part of Freedom will be improved at the long-term stage. The existing road reserve is so narrow that it is necessary to provide new plots for house compensation. Drainages will connect to the existing outlet along Kafue Road.

- Kalikiliki (see Figure 8.1.21)

Access road from Mutendere to Kalikiliki market and another access road from Ibex Hill to Kalikiliki will be improved at the long-term stage. The existing road reserve is so narrow that it is necessary to provide new plots for house compensation.

- Old Kanyama (see Figure 8.1.22)

Main roads will be improved at the long-term stage.

It is also necessary to install a new outlet connected to the existing natural stream, because this area has no drainage outlet. Proposed road surface should be embanked due to the rocky geology.

(c) Operation and maintenance

RDC at each settlement shall operate and maintain the road and drainage in cooperation with a roads sub-committee to be organized by RDC. These groups will determine the most appropriate methods of raising maintenance funds, mobilizing residents, and acquiring necessary tools and materials.

(d) Recommended roles and responsibilities of RDC

Project planning and implementation period:

- Collaboration with LCC, donor and engineering contractor,
- Establishment of road committee and determination of roles,
- Sensitization and mobilization of residents regarding participation of project activities and expectation for community management.
- Free provision of working space and site office space to a contractor,
- Reaching community consensus regarding relocation and compensation issues
- Arranging for necessary technical transfer for O&M for road and drainage from LCC and the contractor,

Following completion of construction works:

- Monitoring and evaluation of the projects in cooperation of LCC,
- Mobilizing necessary resources for maintenance (funds, tools, materials, labor)
- Preparation of annual reports on activities of the road committee including revenues and expenditures.

(e) Recommended roles and responsibilities of LCC

- Close collaboration with the donor, contractor and RDC,
- Certification of the implementation of the projects,
- Facilitating required approvals for construction works, such as land acquisition, securing of work space, plot allocation for displaced residents, etc.,
- Arrangement of compensation to residents,
- Consulting and approval of the basic and detailed designs for road and drainage improvement,
- Supporting work for establishment of the road committees and their activities,
- Preparation and execution of training/education programmes for O&M of road and drainage in cooperation with a contractor,
- Supervision of the implementation works with RDC.

3) Community research and capacity building in community-managed road improvement projects

Although roads are a central component of community development, communities rarely consider them a priority. For this reason it can be

difficult to mobilize households to contribute labor and other resources to road projects, particularly when there are other priority needs that are not being met. Although improved access to transport has a positive impact on most households, the extent varies depending on mode and frequency of travel. Anyway, a road falling into disrepair will not inconvenience people in the same way as a water supply scheme that fails to function. Therefore, as organizations implementing community managed road projects have discovered, it is important that road projects not be implemented on their own, but also address a range of needs at both the household and community level.

Where communities are expected to generate income and maintain roads and drainages, they will require a lot of on-going support from implementing agencies and local authorities. They will require technical, entrepreneurship and leadership skills. Some of the necessary skills will be available in the community, while others will require development through training and on-the-job support.

Community institutions such as the RDC and its subcommittees are likely to require strengthening; however, participation in project activities will likely be the main avenue of skills development. Capacity building exercises must be practically oriented and pitched at the appropriate level to be effective. Training should be carried out in the community and exchange visits to similar projects tend to be highly useful.

Communities can normally be mobilized for construction work and are readily willing to participate in training programs and workshops. However, once construction ends and the community is made responsible for O&M, revenue collection and financial management, the true capacity of the community will be tested. It is during these first months of operation that on-going support is critical.

Table below presents a summary of research and capacity building that need to be carried out at the community level in order to develop sustainable community managed roads and inculcate a sense of ownership among the community. Participatory research methodology should be used as much as possible.

Social Research and Community Capacity Building

Project stage	Community research/action	Community capacity building
Planning & design	▪ Community needs assessment & problems analysis ▪ Strengths and weaknesses of ABO structure ▪ Training needs assessment ▪ Baseline survey ▪ Skills available ▪ Relocation issues ▪ Most appropriate technology and design	▪ Communication skills ▪ Research skills ▪ Leadership skills ▪ Monitoring and evaluation ▪ Participatory development ▪ General management skills such as decision-making, problem-solving
Implementation	▪ Project monitoring including construction, community participation and sensitization processes ▪ Start-up requirements for O&M such as tools and storage shed. ▪ Financial sustainability	▪ O&M ▪ Financial management ▪ Human resources management
Evaluation	▪ Project process ▪ Project impact ▪ Degree to which needs and goals were met	▪ Evaluation methodology
Initial period of O&M	▪ Post project survey ▪ Follow-up on problems and unexpected impacts ▪ Financial sustainability	▪ On-the-job support to Road Committee in carrying out expected roles ▪ (Any gaps in individual and institutional capacity building)

In addition to community research and capacity building, many other issues will require examination in order for the project to progress as planned and road improvements to be sustainable. Some of these include:

- the appropriate roles and responsibilities of local authorities in the project and following implementation
- capacity building of local authority
- training providers and their capacities
- materials and tools management
- financial matters and financial sustainability of the project
- incentives for people and community organizations
- relocation of households encroaching on the area of the road
- compensation for displaced families

A flexible time frame is also advisable where full community participation is being promoted. Especially in communities with large populations or where community institutions are not yet well established, sensitization can take time. However, it is very important for people to be aware of the project and what is expected of the community.

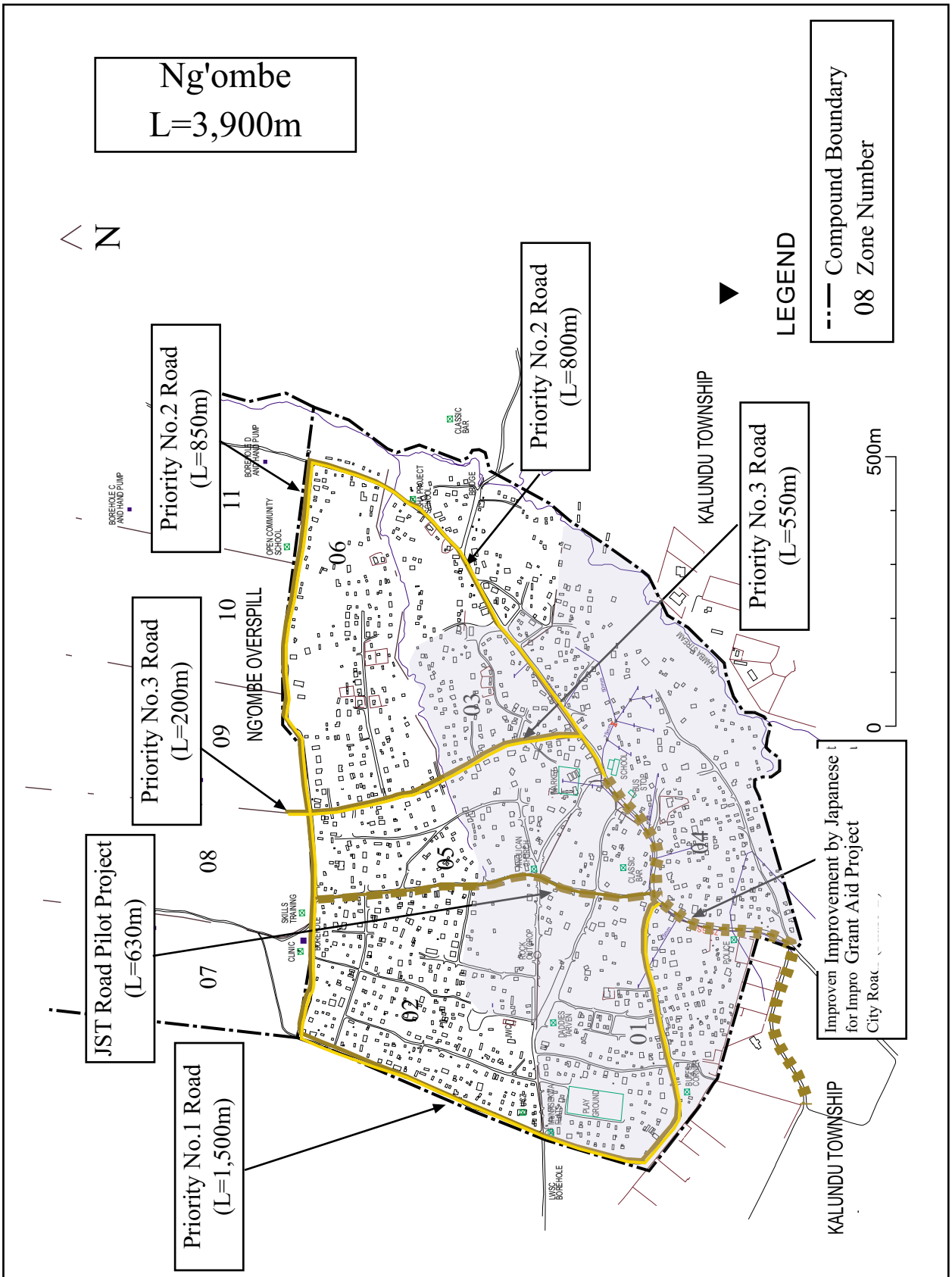

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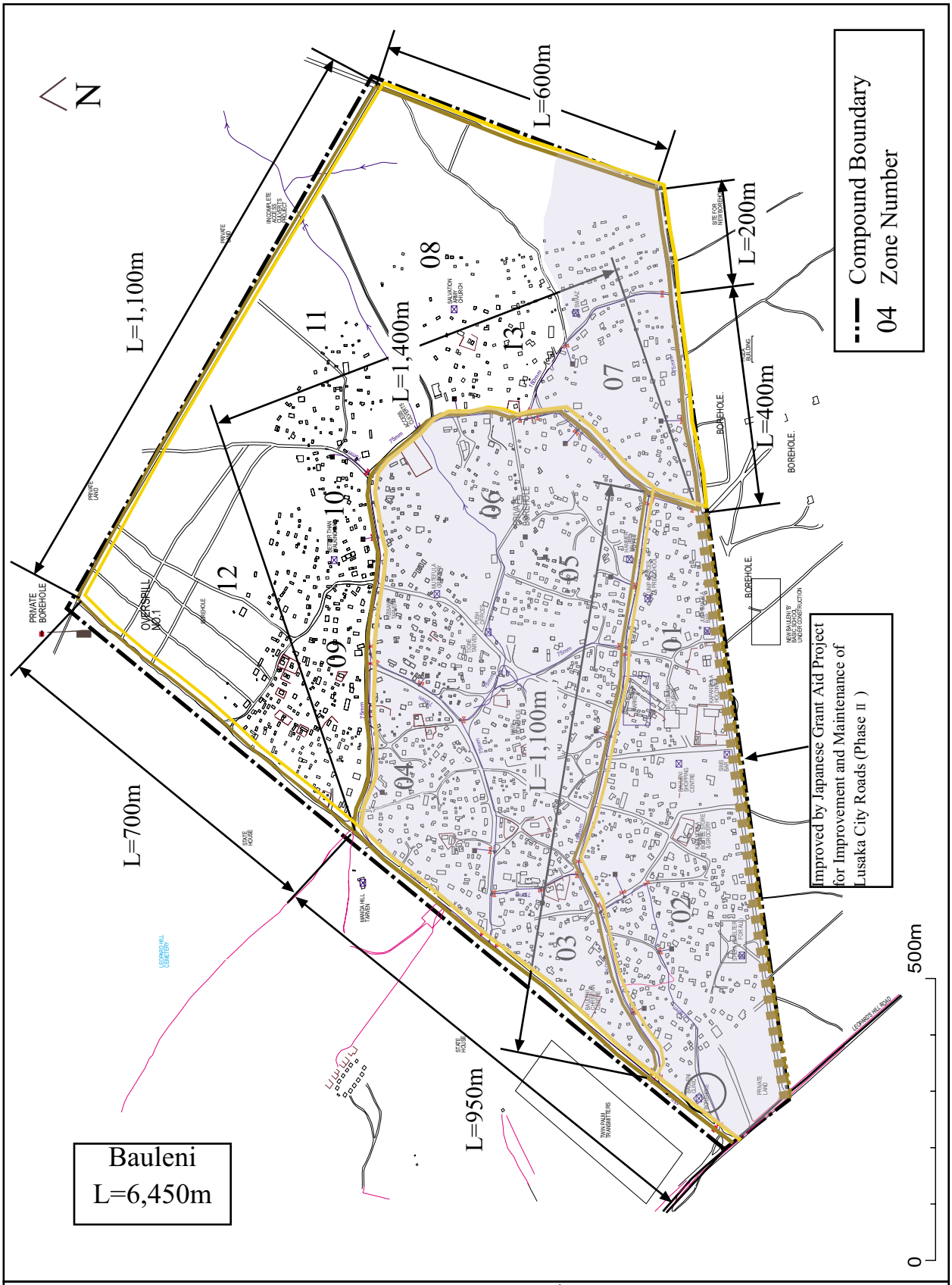
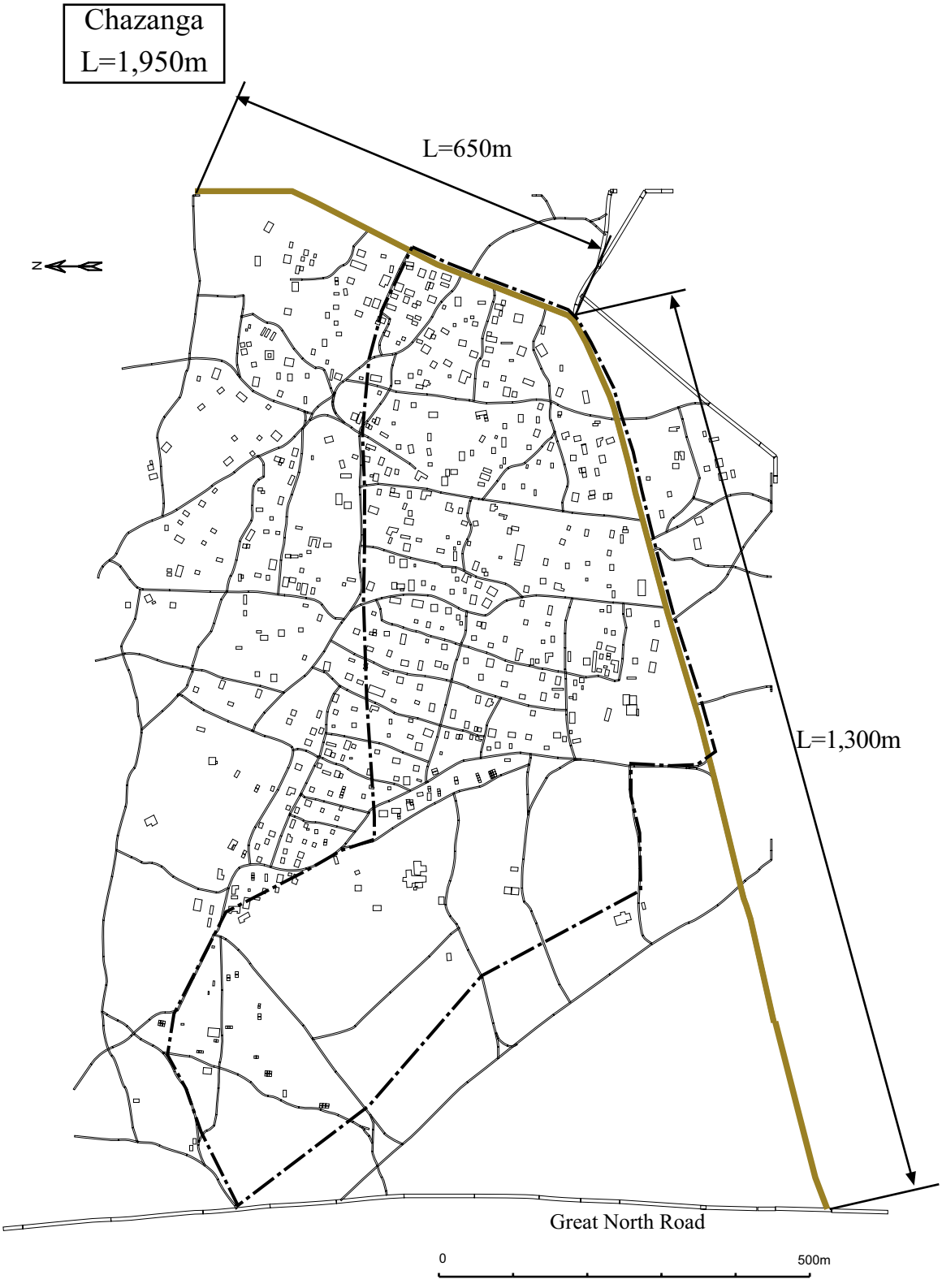
Figure 8.1.16
Road and Drainage Improvement Plan of Ng'ombe



The Study on Environmental Improvement of Unplanned Urban Settlement in Lusaka in the Republic of Zambia	Figure 8.1.17 Road and Drainage Improvement Plan of Bauleni
Japan International Cooperation Agency	



The Study on Environmental Improvement of Unplanned Urban Settlement in Lusaka in the Republic of Zambia	Figure 8.1.18 Road and Drainage Improvement Plan of Chazanga
Japan International Cooperation Agency	

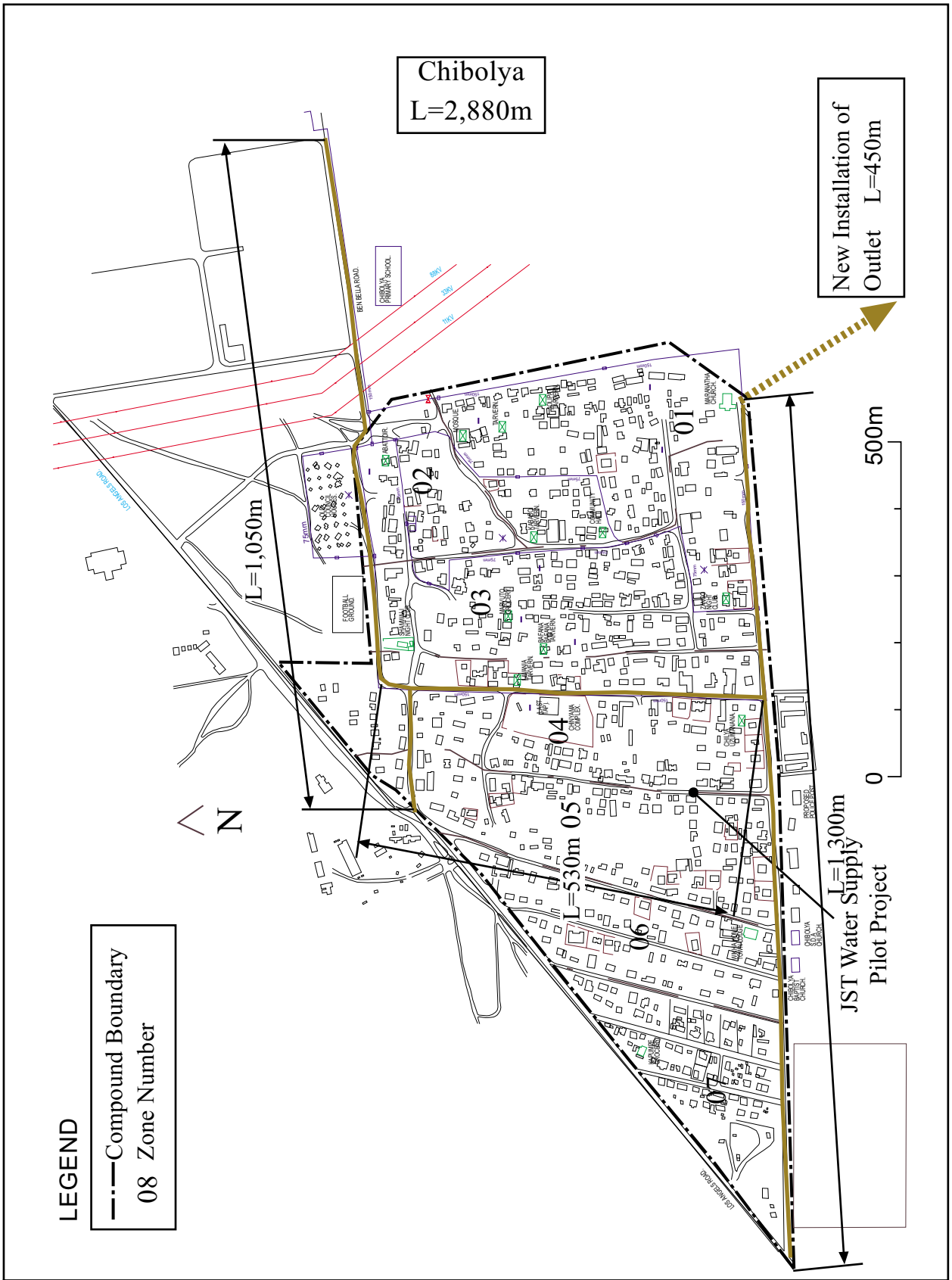


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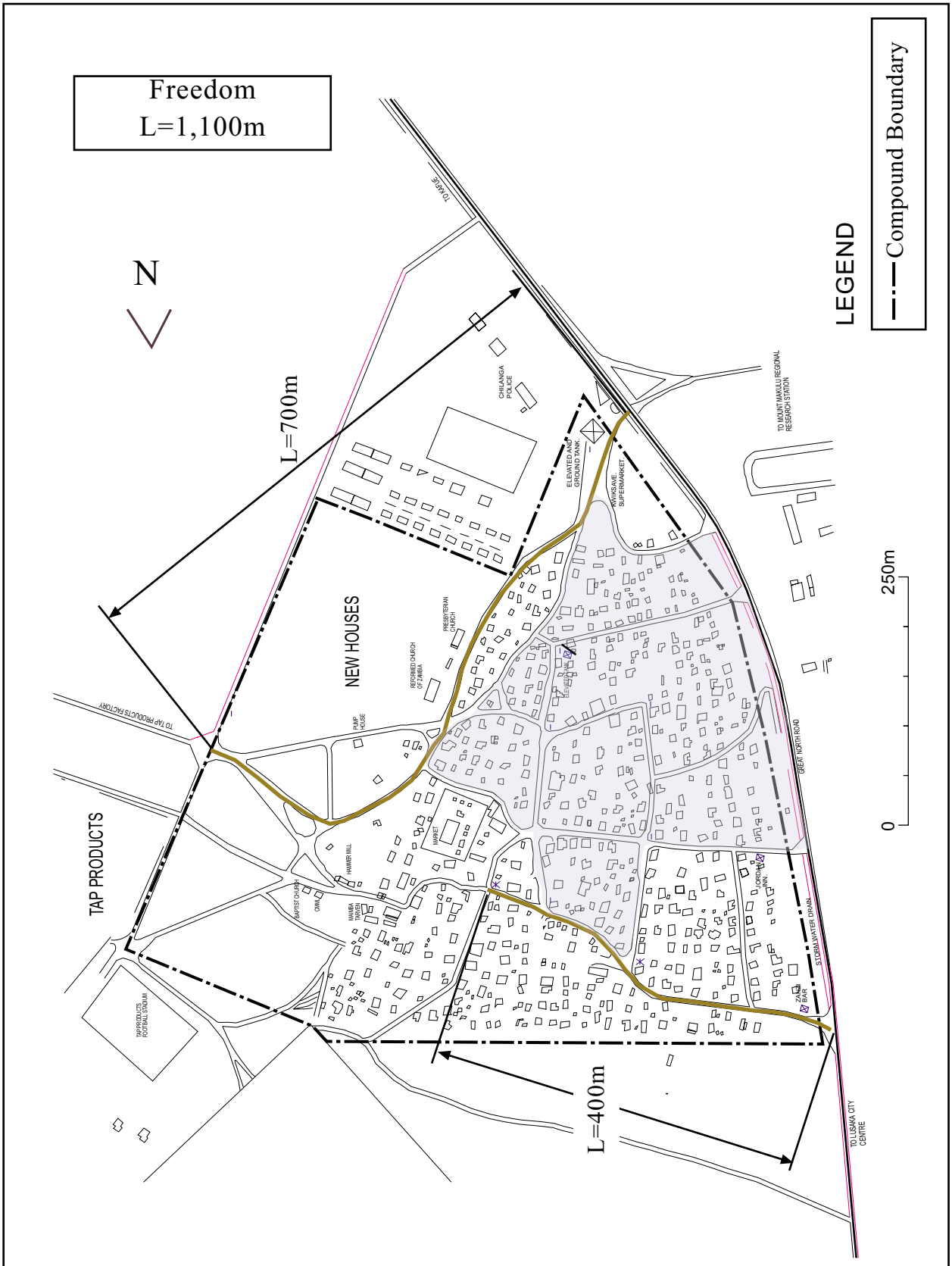
Figure 8.1.19
Road and Drainage Improvement Plan of Chibolya



The Study on Environmental Improvement of Unplanned Urban Settlement in Lusaka in the Republic of Zambia	Figure 8.1.20 Road and Drainage Improvement Plan of Freedom
Japan International Cooperation Agency	

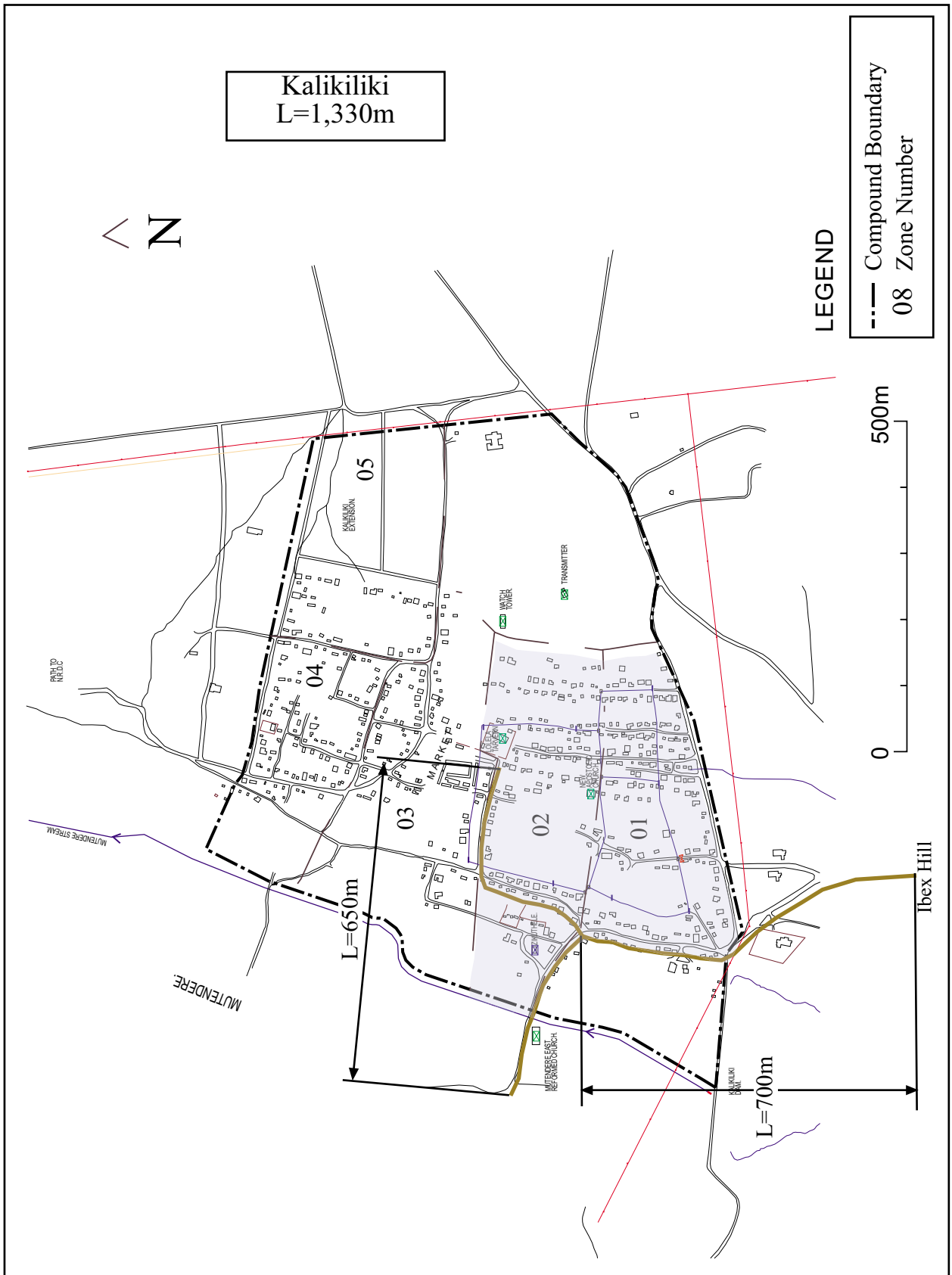


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Figure 8.1.21
Road and Drainage Improvement Plan of Kalikiliki

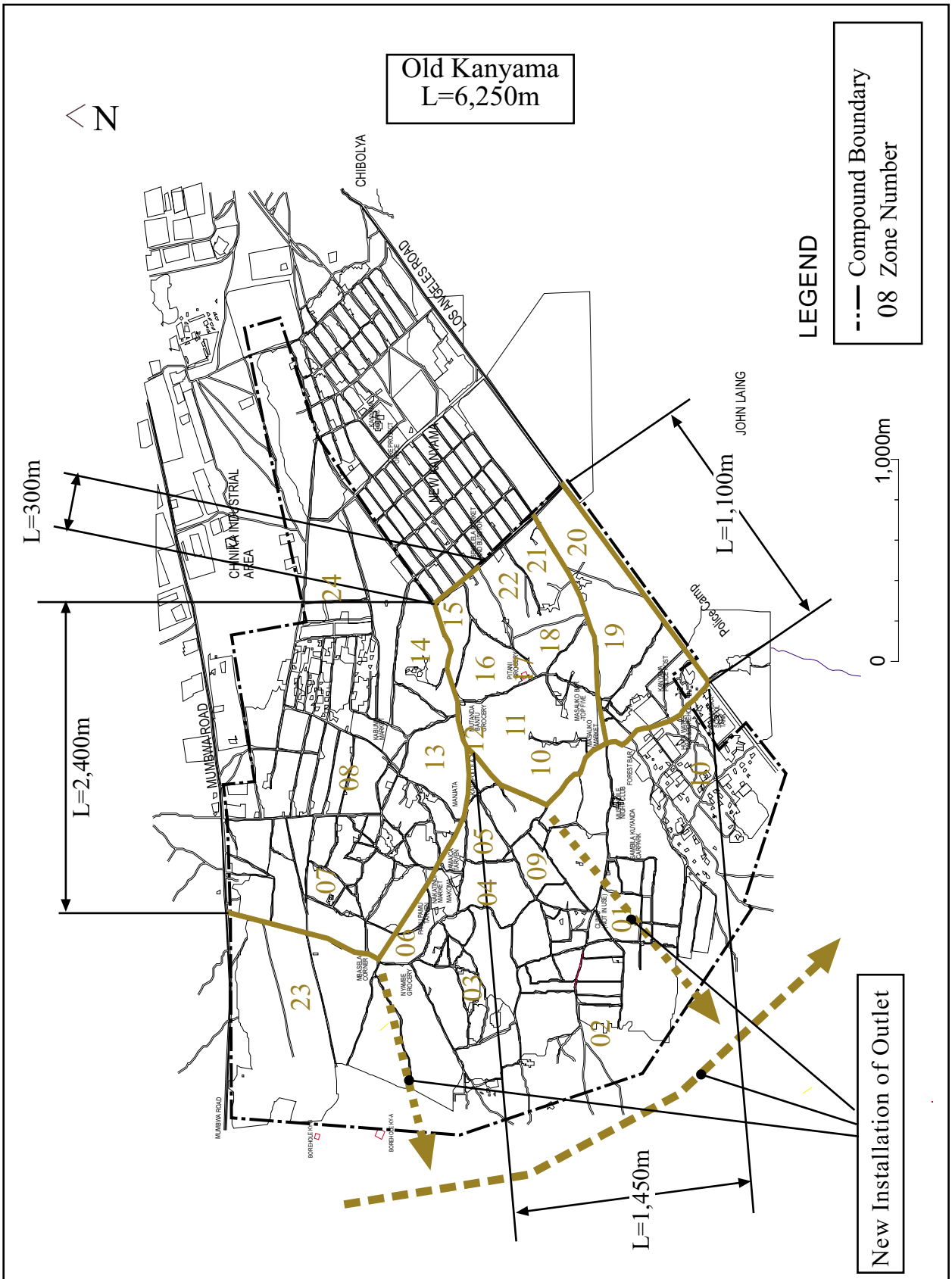

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Figure 8.1.22
Road and Drainage Improvement Plan of Old Kanyama

(3) Health and Sanitation Improvement Project

1) Community-based health and hygiene education project

a. Objectives

The objectives of this project are:

- To widen knowledge and understanding of health and hygiene issues in the community through promoting participatory health and hygiene education approach, that includes household visits, drama performances etc.
- To empower people in the community to effectively improve their environmental sanitation conditions and health and hygiene practices by erecting barriers to prevent the transmission of disease agents

b. Description of Project

The pilot study results proved that there is presently a strong demand for, and appreciation of, awareness raising and health education activities within the community. It is important that health and hygiene promotion targets are based on current knowledge combined with the priorities and concerns identified by the community themselves. We should not also assume new knowledge leads to changed practices overnight; health and hygiene education takes time. Thus, the initial promotion should be built upon simple, attractive alternatives to a few common high-risk practice behaviours, and then it should be developed further.

The use of trained community members to train others is a fundamental principle of community participation in health matters. However, those volunteer health workers must not be totally relied upon, since there is a risk of overloading the community and the health volunteers, therefore there need to be close links with relevant stakeholders such as health centre staffs (EHTs, Public Health Nurses), RDC, schools and NGOs. Also periodical monitoring and supervision by health centre is crucial to the sustainability of volunteer based health education activities.

From the pilot study, we learnt that priority role of supervising health volunteers should fall under the health centre, not RDC since the health centre is professional organization in area of health. We should also not inordinately increase new health volunteers; rather it is more effective and sustainable to strengthen the capacity of existing health volunteer organizations (such as NHC, CHWs), which are in line with district policy

on volunteer health workers. It is also important that supervisory bodies such as RDC and Health Centre should conduct CBO coordination meeting regularly to exchange information among different ABOs working in the area so that they can work collaboratively and effectively.

The following table shows current situation and priorities in this component.

Priorities for Community-based Health and Hygiene Education

Area	Health centre	Existing NHC	Existing RDC-HC	Other community based volunteers	Training needs	Water project completion	Pri-ority	NGO working in the area
Bauleni	Yes (Small size, MCH only)	Yes, active working closely with the clinic	Yes active Health educators trained by JST	Peer Educators (drama group)	1) Training of NHC 2) Upgrading existing health educators to CHW	2010	3	None
Chainda	Yes (Medium size, MCH only)	Yes, not very active	NO	CBHP (community based healthcare provider) only covers HIV/TB	1) Training of NHC 2) Refresher course for CBHP	Already in use	2	World Vision
Chazanga	NO	NO	NO	NO	1) Training of CHW 2) Formation & training of NHC	2003	1	CARE PROSPECT (planning)
Chibolya	NO	Yes, a few are active	Yes (HEs trained by JST)	5 CHPs (community Health Promoters) from each zone	Not necessary	2001	×	CARE PROSPECT
Freedom	NO	NO	NO	NO	1) Training of CHW 2) Formation & training of NHC	2007	1	
Kalikiliki	NO	NO	NO	NO	1) Training of CHW 2) Formation & training of NHC	2007	1	
Ng'ombe	Yes (Medium, MCH only)	Yes: just formed, not trained	Yes, not very active	CHW already trained by an SCDP/JICA PHC	1) Training for NHCs 2) Refresh training for CHWs	2004	3	
Old Kanyama	Yes (1st referral)	Yes, active under clinic	No	CHW, CHP trained by DHMT/JICA PHC	Not necessary	2001	×	CARE PROSPECT

(1): First Priority (2): Second Priority (3): Third Priority X: No need

c. Implementation body

The subcontractor (NGO) with good experience in the community health in collaboration with health officers such as EHT, public health nurses and nutrition officers will play key role to back up actual work implemented by the community. The following table and figure describe roles and

responsibilities of various stakeholders in the project. A Venn diagram also indicates relationship among various stakeholders involved in the project.

Defined Roles and Responsibilities of Stakeholders

NHC	➢ Identify health problems in the community, seek information on a monthly basis and conduct survey if necessary ➢ Plan community based health education activities ➢ Identify (together with RDC and Health Centre) supporting agencies and appropriate individuals to work as CHW. ➢ Collaborate with Health Centre, RDC, and CHW ➢ Monitor and Evaluate (M&E) the projects with assistance and supervision by the health centre and RDC
CHW: Community health workers to be trained in this component	➢ Sensitise the community regarding health and hygiene issues ➢ Support health centre staff to conduct under-five outreach clinic ➢ Implement outreach education (door-to-door, community meetings, promotional drama performances) to train others ➢ Monitor and Evaluate (M&E) the projects with assistance and supervision by the health centre and RDC
RDC	➢ Coordinate among health centre, the NGO and the NHC ➢ Support NHC (together with Health Centre) to identify appropriate individuals to work as CHW
LCC (site officer)	➢ Identify health problems in the community ➢ Monitor and Evaluate (M&E) the projects and the work done by RDC
EHTs	➢ Supervise/monitor NHC/CHWs' implementation work ➢ Collaborate with the other stakeholders and reporting to the health centre and DHMT ➢ Assist NGO to conduct training for CHW/NHC
Health Centre Staff (public health nurses)	➢ Supervise/monitor the work of NHC/CHW ➢ Collaborate with the other stakeholders and reporting to the Site Officer/CDO (under LCC) in catchments area. ➢ Assist NGO to conduct training for CHW/NHC
DHMT	➢ Collaborate with, health centres, EHTs and LCC. ➢ Supervise and monitor with the LCC-DPH on the implementation works and training works on health education programs
NGO	➢ Give technical assistance ➢ Design training program and IEC materials ➢ Conduct training for trainers (CHW /NHC training) ➢ M&E
Donor	➢ Funding, supervision, M&E

Primary and Secondary Roles of Each Stakeholder

		NHC/CHW	RDC	EHT	LCC (site oficer)	Health Center (DHMT)	NGO	Donor
PLAN	1.Identify Problem/Assess Needs	•••••	•••••	•••••	•••••	•••••		•••••
	2.Identify Supporting Agencies	•••••	•••••	•••••	•••••	•••••		•••••
	3.Analyse Problem and Plan for solution	•••••	•••••	•••••	•••••	•••••	•••••	
DO	4.Placical Training	•••••		•••••		•••••	•••••	
	5.Implementation of Health and Hygiene education (School Health Services)	•••••	•••••	•••••		•••••	•••••	
SEE	6.Monitoring	•••••	•••••	•••••	•••••	•••••	•••••	••••••
	7.Evaluation	•••••	•••••	•••••	•••••	•••••	•••••	••••••
SUSTAIN	8.Institutional Capacity	•••••	•••••	•••••	•••••	•••••		

Primary Roles ▬▬ Secondary Roles •••••

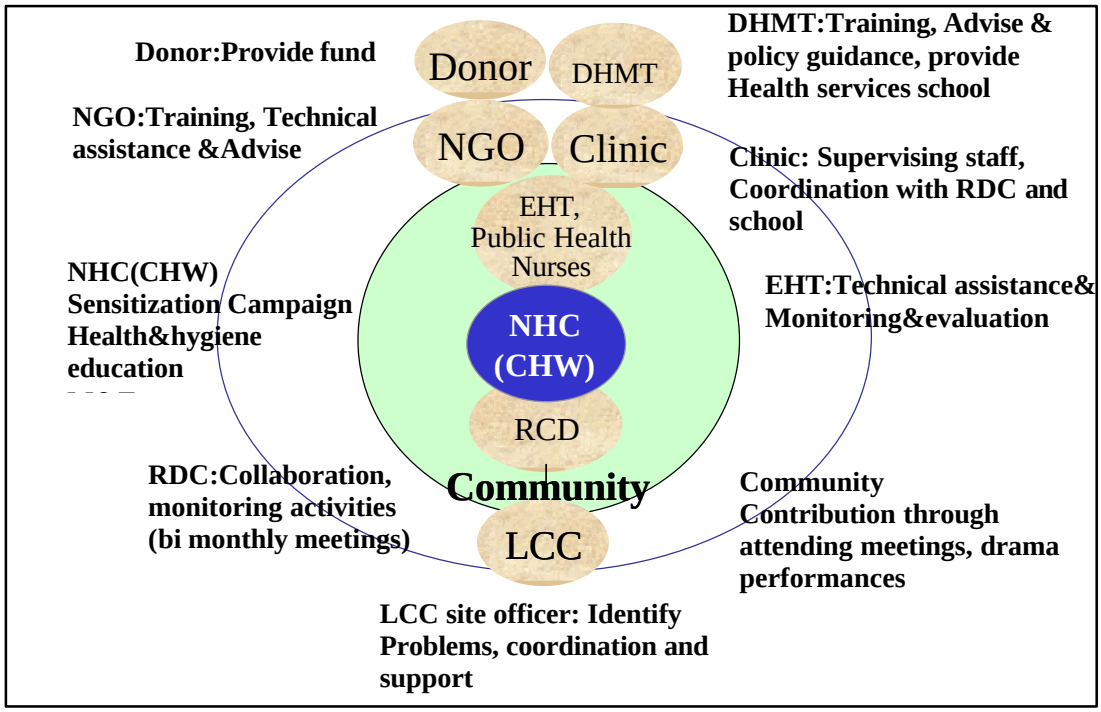


Figure 8.1.23 Venn Diagram of Stakeholders

d. Expected Impacts

Indicators for impacts expected to be seen at the end of the projects are as follows:

- Community can demonstrate health and hygiene behaviour changes such as;

- Improved hand washing behaviour and treatment of drinking water
- Separation and reduction of solid waste
- Improvements in hygienic standards of latrine
- Decrease incidence of under five malnutrition and/or under nutrition

- Decrease in the number of health centre registrations of preventative diseases (diarrhoea etc.)
- NHC/CHW continue working actively in facilitation for Health and Hygiene Promotion in the community even after project is completed

2) School-based health and hygiene education/services and rehabilitation of sanitary facilities project

a. Objectives

Schools are stimulating learning environment for children and this environment initiate changes. If sanitary facilities in schools are available, children can act as models, and teachers can function as their role models. Schools can also influence communities through outreach activities, because through their students, schools are in touch with a large proportion of the households in a community. The main objective of this project are listed as follows:

- To empower students, parents and teachers to effectively improve environmental sanitation conditions within and surrounding the school and improve health and hygiene practices by erecting barriers to prevent the transmission of disease agents
- To widen knowledge and understanding of health and hygiene issues among students
- To promote participatory health and hygiene education approach through mobilizing the school and community
- To improve health condition of children through providing basic school health services (deworming, health examination etc) and also through improvement of school environmental health facilities.

b. Description of the project

In school health and hygiene programs, we need to improve both hardware component (total package of sanitary conditions and facilities available in and around the school and provide school health services) and software (activities aiming to promote conditions at school and practices of school staff and children that help to prevent water and sanitation-related diseases).

In the Pilot Study, JST mainly focused on improvement of the software component of school-based health project, but not the hardware improvement. We recognized that hardware improvement is equally important as software, and vice versa. In addition to that, the pilot study proved positive impacts through involving community school teachers (not JST school, but other school) as one of SHCC (school health coordination committee) members who actively worked as a catalyst between school health activities in the public and the community school. In this regard, school-based health and hygiene education shall be carried out not only in two existing public schools but also in community schools to be developed by the project.

The following table shows current situation and priorities in this component.

Priority Setting for School Based Health and Hygiene Education and Rehabilitation of Environmental Health Facilities (EHF)

Area	Target School	Number of students (teachers)	Sanitation Problem	Water problem	SH activities in place	PTA support	Priority ranking
Bauleni	Bauleni Basic School	1400 (30)	80% broken Flush toilet No VIP	2 taps (too low: no clean surroundings)	Yes (Health Education)	Middle	**1**
Bauleni	Community school	160 (6)	Not yet	Not yet	Not yet	Not yet	**3**
Chainda	Community School	160 (6)	Not yet	Not yet	Not yet	Not yet	**2**
Chazanga	Community school	160 (6)	Not yet	Not yet	Not yet	Not yet	**3**
Chibolya	Community School already in place	160 (6)	Not yet Observed	Not yet observed	Not yet started	Yes	**1**
Freedom	Community School	160 (6)	Not yet	Not yet	Not yet	Not yet	**3**
Kalikiliki	Community School	160 (6)	Not yet	Not yet	Not yet	Not yet	**3**
Ng'ombe	Ng'ombe JICA school	N/A	N/A	N/A	Planned by Japanese embassy	Yes	×
Old Kanyama	New Kanyama Government School	1800 (35)	90%Broken Flush toilets No VIP	NO	Yes (Health Education, Health checks)	Yes	**1**

(1): First Priority (2): Second Priority (3): Third Priority (4) Forth Priority (X): No need

c. Implementation body

A NGO with good experience in the school health in collaboration with DHMT, DEO and health officers from the health centres (such as EHT, nutrition officer and Public Health Nurse) will play key role to back up actual work implemented by the SHCC. The following table describes roles and responsibilities of various stakeholders in the project. A Venn diagram exhibited in the previous section also indicates relationship among various stakeholders involved in the project.

Defined Roles and Responsibilities of Stakeholders

SHCC (School Health Coordination Committee)	➢ Identify health and hygiene problems in the school and seek information on a monthly basis conduct survey if necessary ➢ Plan school- based health education activities ➢ Coordinate a network among students, teachers, PTA, health centre and RDC ➢ Sensitise the school and community regarding health and hygiene issues ➢ Implement school health education ➢ Monitor and Evaluate (M&E) the projects supervised by the health centre
School Head Mistress/Mr.	➢ Supervise/monitor/the implementation work done by SHCC ➢ Collaborate with the other stakeholders (such as RDC) and reporting to the DEO/ZCSS (Zambia Community School Secretariat)
RDC	➢ Participate monthly meetings and support work done by SHCC ➢ Support school to identify appropriate individuals to work as SHCC members
EHTs and Health Centre Staffs	➢ Inspect school environment and health status of children ➢ Provide basic school health services and technical advise ➢ Collaborate with the other stakeholders (such as RDC) and report to DHMT ➢ Assist/give technical advise to conduct training, drama, health education
DHMT	➢ Collaborate with DEO and health centres ➢ Supervise with the DEO on the implementation works and training works on school health education and school health services programs
DEO/ZCSS	➢ Collaborate with DHMT, LCC-DPH, health centres ➢ Supervise with the DHMT on the implementation works and training works on school health education and school health services programs
NGO	➢ Give technical assistance ➢ Design training program and IEC materials ➢ Conduct training for trainers (SHCC training, drama training)
Donor	➢ Funding, supervision, Monitoring & Evaluation

Primary and Secondary Roles of Each Stakeholder

		SHCC/ School	RDC	EHT	LCC (site oficer)	Health Center (DHMT)	NGO	Donor
PLAN	1.Identify Problem/Assess Needs		••••	••••	••••	••••		••••
	2.Identify Supporting Agencies		••••	••••	••••	••••		••••
	3.Analyse Problem and Plan for solution	▬▬	••••	••••			▬▬	
DO	4.Plactical Training	▬▬	••••	••••	••••	••••	▬▬	
	5.Implementation of Health and Hygiene education (School Health Services)	••••	••••				••••	
SEE	6.Monitoring	••••	••••	••••	••••	••••	••••	••••
	7.Evaluation	••••	••••	••••	••••	••••	••••	••••
SUSTAIN	8.Institutional Capacity	••••	••••	••••		••••		
	9. Management of SH facilities	••••	••••	••••		••••		
	10.Maintenance of SH facilities	••••	••••	••••		••••		

Primary Roles •••• Secondary Roles ••••

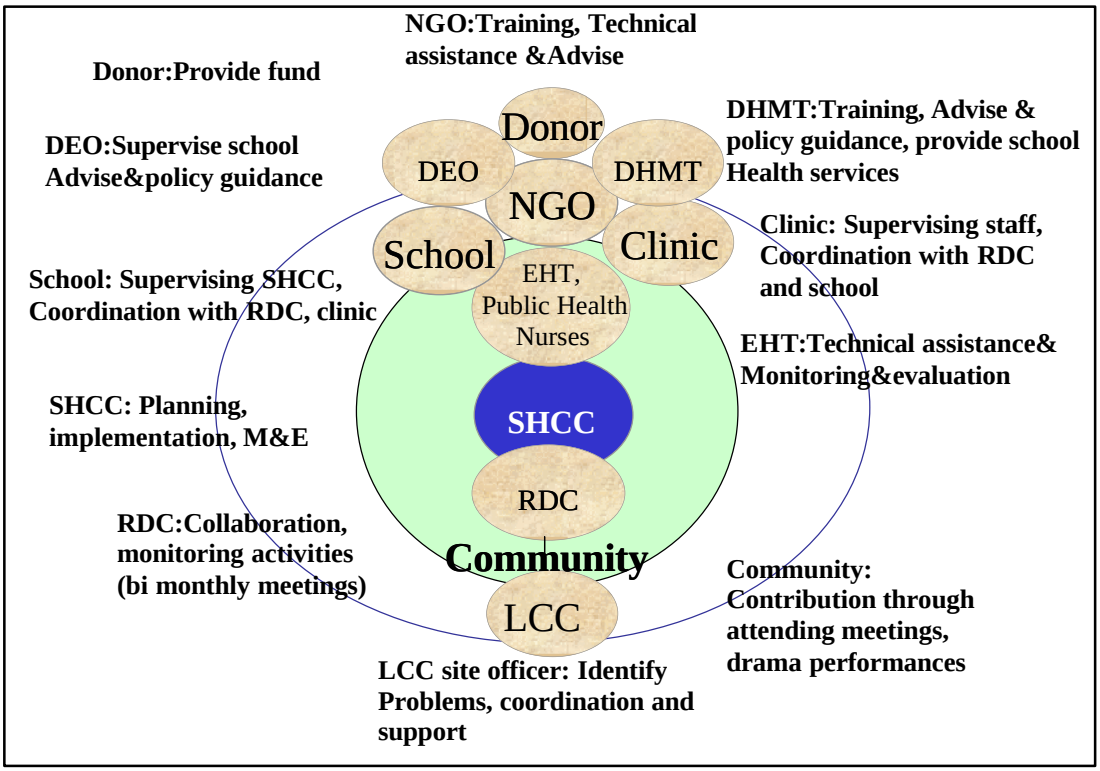


Figure 8.1.24 Venn Diagram of Stakeholders

d. Expected Impacts

Indicators for impacts expected to be seen at the end of the projects are as follows:

- For environmental health facilities improvement at school;
  - Improved number of latrines and accessibility increased
  - Garbage disposed properly at school

- Improvements in hygienic standards of latrines at school
- Cleanliness in school surrounding

- For hygiene behaviour and health condition improvement of students;
  - Children immunized, receive deworming drugs
  - Safe water handling and storage
  - Improved hand washing behaviour (washing hands after using latrines and after handling food)
- O&M cost for school-based health and sanitation improvement activities is covered by income generating activities

3) Communal (Public/Household) VIP latrine development project

a. Objectives

Sanitation is a key element of environmental health and disease prevention as it can form a barrier against many routes of fecal-oral transmission. Sanitation also provides other important perceived benefits such as enhanced privacy, convenience, environmental cleanliness and socio-economic status. Since health and hygiene education can significantly enhance the benefits of sanitation interventions and vice versa, improvement of sanitation facilities should go hand in hand with community-based health and hygiene education project.

The main objective of this project are listed as follows:

- To create demand and awareness through building safe and sanitary demonstrative communal (public) latrines and linking this to the community-based health and hygiene education activities.
- To encourage community commitment and contribution to build and maintain facilities
- To build acceptable/affordable latrines through community participation (supply of labour, cash and materials).
- To encourage income generating activities for the production of readily replicable sanitation products (such as latrine slabs, hand-washing facilities etc.)
- To improve the health and hygiene conditions in the community

b. Description of the project

The majority of latrines in the settlements are traditional ordinary pit latrines with both home (often shared by a number of households) and communal pits in existence. The pilot study proved that there is a strong demand for

safe and sanitary latrine such as VIP, than existing ordinary pit latrine. However, a particular challenge will be faced where rock outcrops at the surface makes excavation difficult and water table is high, therefore, it increases risk of contamination of the aquifer. In such places, there is a need to build pit latrines, which are up-lifted from the ground and completely lined and sealed, not perforated. Therefore, other types of improved latrines should also be considered. Latrine projects should not be conducted with a top-down approach but, rather a bottom-up approach in which the community themselves can select affordable and acceptable, but sanitary and safe latrine options. Various options of improved latrines are described in Annex 8 of the Manual for improvement of environment and living conditions in UUS, Lusaka, Zambia.

Considering that there are still quite a few numbers of shallow well users in UUS, it is important to plan this project after sufficient safe water supply is in place.

Priority Setting for Communal (Public/Household) VIP Latrine Development Project

Area	Ordinary pit latrine Coverage (*)	Shallow-well users	Renting house	Target Number of household (**)	Water supply	Priority Ranking	NGOs interested in working in the area
Bauleni	80% (ordinary)	Low	45%	4200	Master Plan	3	
Chainda	Fair (ordinary)	Low	70%	1250	Already in place	1	WORLD VISION
Chazanga	Fair (ordinary)	High	Not many	2100	Under construction	2	CARE PROSPECT
Chibolya	90% (ordinary)	Middle	80%	2500	Under construction	2	CARE PROSPECT
Freedom	Fair (ordinary)	None	75%	800	Master Plan	2	
Kalikiliki	Very little (ordinary)	Low	80%	900	Master Plan	2	
Ng'ombe	50% (ordinary pit)	High	75%	3400	Master Plan	2	
Old Kanyama	50% (ordinary pit)	Middle	80%	4100	Already in place	1	CARE PROSPECT

(1): First Priority (2): Second Priority (3): Third Priority

* Obtained by interview at health centre and to health volunteer and observation

** Cover 50% of total population, one family is 7 people, one pit shared by 2 households

c. Implementation body

A NGO with good experience in urban sanitation program in collaboration with DHMT and health officers from the health centre (namely EHT) shall play key role to back up actual work implemented by the community. The following table describes roles and responsibilities of various stakeholders in the project. A Venn diagram exhibited in this section also indicates relationship among various stakeholders involved in the project.

Defined Roles and Responsibilities of Stakeholders

LCG (Latrine Construction Group)	➢ Analyse problems and plan for solutions ➢ Create demand and Select beneficiaries for the communal (home use) VIP latrines ➢ Train and guide beneficiaries to construct VIP latrines ➢ Monitor and Evaluate (M&E) the projects with assistance and supervision by the RDC, EHT and NGO
RDC	➢ Select beneficiaries for the communal (home use) VIP latrines ➢ Supervise and support the work done by LCGs (Latrine Construction Group) ➢ Logistics management: purchase, check delivery notes for supplies (signed upon receipt of materials) and store materials ➢ Submit monthly report to health centre and EHT
EHT	➢ Supervise/monitor/the implementation work done by LCG ➢ Assist/give technical advise especially siting and construction processes
LCC-site officer	➢ Collaborate with EHT, RDC, Health Centre, and DHMT. ➢ Supervise work of RDC/LCG and collaborate with health centres ➢ Assist/give technical advise to conduct training and siting of latrines_
Health Centres	➢ Supervise work of EHT and collaborate with LCC site officers and DHMT
NGO	➢ Give technical assistance and advise ➢ Design training program and create IEC materials with community ➢ Conduct training for LCG ➢ Monitoring and Evaluation
Donor	➢ Funding, supervision, Monitoring & Evaluation

Primary and Secondary Roles of Each Stakeholder

		LCG	RDC	NHC (CHW)	EHT	LCC (site oficer)	Health Center (DHMT)	NGO	Donor
PLAN	1.Identify Problem/Assess Needs		●●●●●		●●●●	●●●●	●●●●		●●●●
	2.Identify Supporting Agencies		●●●●●		●●●●	●●●●	●●●●		●●●●
	3.Analyse Problem and Plan for solution	●●●●●	●●●●	●●●●●	●●●●	●●●●	●●●●	●●●●	
DO	4.Plactical Training and Workshop	●●●●	●●●●	●●●●	●●●●●		●●●●	●●●●	
	5.Create Demand	●●●●	●●●●	●●●●●	●●●●		●●●●		
	6.Select Beneficiaries	●●●●	●●●●●	●●●●	●●●●	●●●●		●●●●	
	7.Supply Materials	●●●●	●●●●●					●●●●	
	8.Construction	●●●●●	●●●●		●●●●			●●●●	
	9.On site Training	●●●●●	●●●●					●●●●	
SEE	10.Monitoring	●●●●●	●●●●		●●●●	●●●●	●●●●	●●●●	●●●●
	11.Evaluation	●●●●●	●●●●		●●●●	●●●●	●●●●	●●●●	●●●●
SUSTAIN	12.Maintenance and Operation	●●●●●	●●●●		●●●●				

Primary Roles ●●●●● Secondary Roles ●●●●

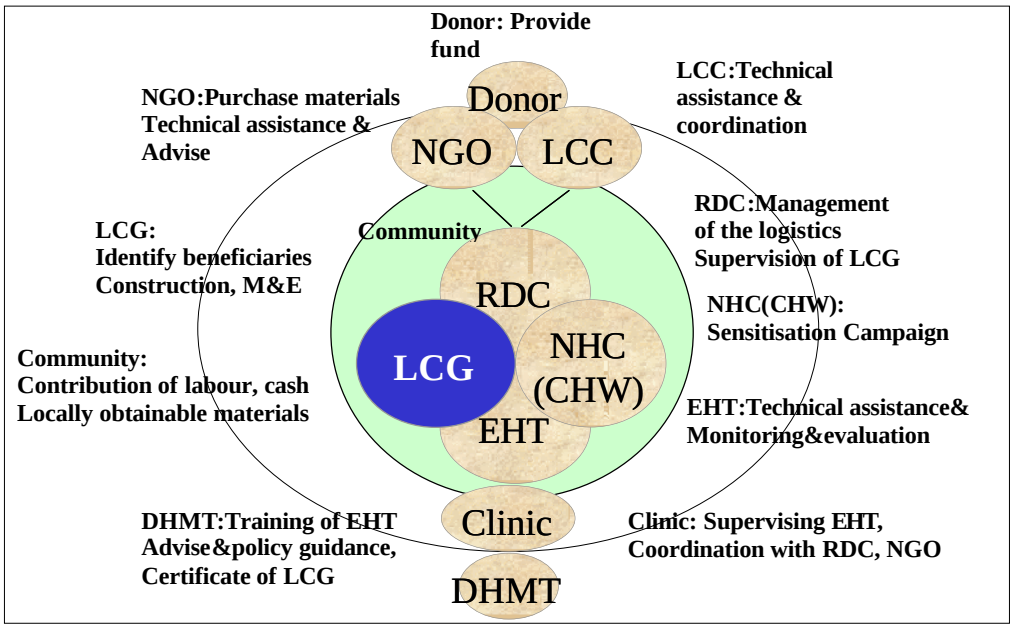


Figure 8.1.25 Venn Diagram of Stakeholders

d. Expected impacts

Indicators for impacts expected to be seen at the end of the projects are as follows:

- Improvements in hygienic standards of latrines in the community
- Reduced the number of health centre registration of diarrhoea over time
- To ensure sustainability of safe and sanitary latrines (latrines are continued to function and being used) in at least 80% of all latrines

completed

- To ensure the damage of superstructure observed/reported during the pilot period within 20% of all latrines completed

4) Rehabilitation of existing health centre and sub-health centre construction project

a. Objectives

Considering high incidence of preventable diseases such as diarrhea, cholera and Malaria, self-help developmental preventive measures, such as garbage removal and door-to-door health and hygiene education campaigns could be successfully instituted by the efforts of community based health volunteers explained in previous section. However, when it comes to curative measures, it is necessary to have service provision at the health centre by professional staff since health volunteers are not professionals. In this regard, it is necessary to consider building health centres in areas, which have no good access to health services. Not only constructing sub-health centres, but also rehabilitation of the existing health centre facilities, especially the environmental health facilities, are crucial for the health service improvement in UUS.

The main objective of this project are listed as follows:

- Improve people's access to PHC (primary health care) services such as, MCH (maternal and child health), family planning, counselling, treatment etc.
- Community based health volunteers such as NHC and CHW, who can have a base of their operation and work hand in hand and receive supervision and technical advise from clinic staff regularly
- Environmental health condition of the target health centre is improved

b. Description of the project

The following table shows current situation and priorities in this component.

Priorities for Sub-health Centre/ Health Centre Rehabilitation

Area	Current Health Facility Problems	Priority Ranking	Target Intervention items
Bauleni	No water supply	1	➢ Urgent water supply development for normal clinic function ➢ Construction of new borehole and elevated tank
Chainda	Not observed	X	
Chibolya	No health centre	2	➢ Construct sub-health centre and provide basic PHC, MCH/family planning services
Chazanga	No health centre	2	➢ Construct sub-health centre and provide basic PHC, MCH/family planning services
Freedom	No health centre	2	➢ Construct sub-health centre and provide basic PHC, MCH/family planning services
Kalikiliki	No health centre	2	➢ Construct sub-health centre and provide basic PHC, MCH/family planning services
Ng'ombe	Bad sewerage No water supply	1	➢ Urgent water supply development for normal clinic function ➢ Construction of new borecole and elevated tank ➢ Rehabilitation of sewerage system
Old Kanyama	Not observed	X	

(1): First Priority (2): Second Priority (3): Third Priority X: No need

c. Implementation Body

A NGO with good experience in urban sanitation program in collaboration with DHMT and RDC shall play a key role to support actual work implemented by the community. The following table describes roles and responsibilities of various stakeholders in the project.

Defined Roles and Responsibilities of Stakeholders

Community Group (combination of NHC/ CHW /RDC)	➢ Support NGO together with DHMT/LCC to identify appropriate individuals to work as task force members ➢ Monitor/Supervise and Evaluate (M&E) the projects with assistance and supervision by the DHMT/LCC
Community	➢ Participation and contribution (lab our and time)
Existing Health Centre in the catchments area	➢ Supervise/monitor the implementation work ➢ Collaborate with the other stakeholders and reporting to the DHMT
DHMT	➢ Collaborate with NGO, LCC-DPH and RDC ➢ Provide salary for the staff and drugs for operation of the sub-centre ➢ Supervise with the LCC-DPH on the construction works done by the community and NGO
LCC-DPH	➢ Collaborate with NGO, DHMT and RDC. ➢ Supervise the implementation works by the community and sub-contractor
NGO	➢ Give technical assistance ➢ Supervise Monitor/Evaluate implementation works
Donor	➢ Funding, supervision, M&E

d. Expected impacts

Indicators for impacts expected to be seen at the end of the projects are as follows:

- Downward trend in the number of health centre registrations of preventative diseases (such as diarrhoea) over time
- Increased number of patients treated at sub-health centre
- Community based health care volunteers (CHWs, NHCs) meet regularly and it strengthen relationship among different stakeholders
- Improved knowledge and services community people receive from health centre

(4) Income Generating Project

1) Objective

Low economic growth and poverty appear to be common problems in all urban settlements. Microfinance intervention is one of the effective measures to support poor people in terms of economic promotion/security and empowerment. Primary objectives of microfinance project are i) reduce urban poverty (i.e. economic deprivation), ii) to build the economic and micro enterprise capacities and iii) to provide necessary skills and knowledge of business and financial management.

2) Description of project

The principles of microfinance operation emphasise keeping loan sizes small, targeting women, adopting group based lending systems, mobilising small and frequent savings deposits and setting interest rates at higher levels. The process of implementation is outlined below.

Description of Project

Scope of Work	Summary
Preparation, Situation analysis	Prior to the initiation, it is necessary to examine the socio economic situation and existing organisations in the community.
Eligibility criteria set-up of beneficiaries	Some criteria must be set up such as, Target group, Business experience, Household income, Resident status, Target age, Negative record, etc.
Selection and screening beneficiaries	After criteria are established, potential beneficiaries shall be selected and screened out. Form small groups and elect leaders accordingly.
Development of work plan	Design a detailed work plan to prepare action plan which draws up a list of actors, action, responsibility and time frame.
Training	Prior to disbursement of loans, organise training that focuses on business management, saving, accounting, institutional building, gender awareness and community participation.
Conditionality setting and Disbursement of loans	Set up conditionality before on size of loan amount, grace period, interest rate, repayment period, compulsory savings, etc.
Reimbursement and monitoring	Reimbursement should be done on weekly or bi-weekly basis. Weekly meeting is prerequisite for monitoring.
Business consultation	Credit officers shall continue to provide necessary advice and consultation on business management and accounting.
Evaluation	Mid-term and final evaluation must be done.

The project shall first undertake organisational set up, i.e. beneficiary groups in collaboration with RDC and relevant subcommittee, and NGO with specific skills, knowledge and experience on microfinance operation must be involved from the initial stage.

NGO's role is crucial. It is required to manage finance, mobilise community, provide training on business/financial management, group solidarity and gender issues and monitoring on repayment and changes and impacts of beneficiaries' business and lives. Therefore, their capacities and performance are determinants for successful and sustainable financial operation and management.

The settings of loan size and repayment period must be carefully examined. For enabling operation and sustainability, loan size shall be no more than US$100 (Kwacha 400,000 as of 2000) and repayment period should be 50 weeks. Group lending systems implies social collateral, peer pressure and group responsibilities in repayment process.

In designing the Action Area Plan, it has to be recognised that microfinance is not easy to practice without experience and lesson learnt, and no one can expect to see such dramatic changes and impacts in the short run. Hence, in order to minimise any risks and failure, the feasibility of this project must be studied over time especially by reflecting the experience and results of the pilot project in Bauleni., Considering lack of financial services in community, this Study discovered that three settlements have potential to receive support.

Priority Ranking in Eight Settlements

	Existing financial institution	Priority ranking
Bauleni	MF (AMDA) MC(HUZA)	×
Chainda	MC (World Vision)	×
Chazanga	MC (HUZA)	×
Chibolya	None	○
Freedom	None	○
Kalikiliki	None	○
Ng'ombe	MC (HUZA)	×
Old Kanyama	MF (CARE PROSPECT)	×

Note: MF: Micro Finance MC: Micro Credit

Three settlements shall be highlighted as potential areas to receive assistance since there are no particular NGOs operating for the community. But CARE PULSE has 6 branches (Chawama, George, Mandevu, Mtendere, Kanayama,

and Chilenje) from where they extend projects by satellite operation to neighbour communities and Chibolya and Kalikiliki are included in the satellite operation. One possibility in the Action Area Plan is to incorporate with an existing financial institution to increase number of beneficiaries and strengthen the capacity of operation by inputting new seed fund. In this regard, CARE PULSE seems to be the best partner to work with as its operation is quite successful and it intends to expand its operation and increase operation up to Kwacha 20,000 in ten years' time. Freedom does not have any financial institution, so some intervention must be made by donors or NGOs.

3) Implementing agency

Microfinance practice needs strict management and discipline since it is a cash related operation. As described above, practice of microfinance should be supported by experienced NGOs. NGO plays a key role in screening beneficiaries, training, loan disbursement, reimbursement, counselling, monitoring and cash management/accounting. RDC and other subcommittee such as market committee and churches shall cooperate in identifying and screening beneficiaries and monitoring operation.

Role and Responsibilities of Stakeholders

Stakeholders	Role and Responsibilities
Beneficiary group	Formation of group, selection of leaders, reimbursement and monitoring, regular meeting,
RDC	Screening, endorsement, monitoring, coordination
Subcommittee	Screening, endorsement, coordination
NGO	Financial management, technical assistance (training, consultation), monitoring and evaluation
LCC	Technical assistance, supervision and coordination, Monitoring and Evaluation
Donor	Funding, Supervision, Monitoring & Evaluation

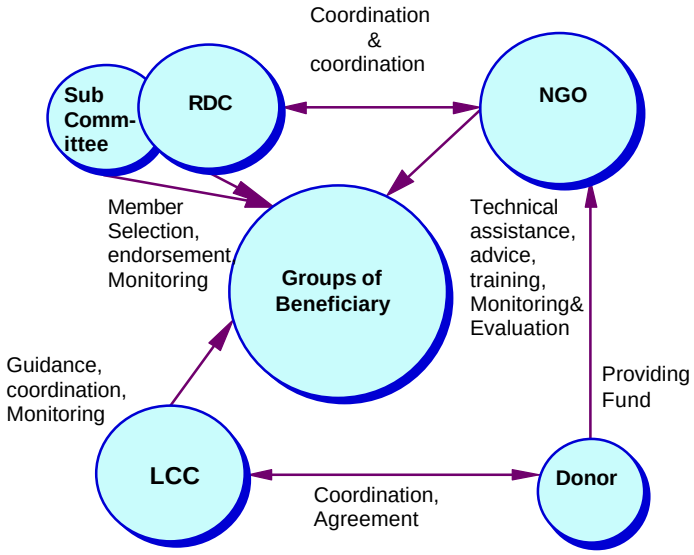


Figure 8.1.26 Stakeholders Relationships (Venn Diagram)

4) Implementation schedule

Since microfinance project should be carefully planned after clarifying the results and impacts of Bauleni project, and with close investigation of the qualifications of NGO with fund source, it shall be prepared over the long-term. The communities which have few or no financial institutions must be prioritised. So far, Freedom, Kalikiliki and Chibolya are potential communities.

The project period is 15 months which covers two months for preparation, training, disbursement, one month for grace period, and 50 weeks repayment period.

Scope of Work	M 1	M 2	M 3	M 4	M 5	M 6	M 7	M 8	M 9	M 10	M 11	M 12	M 13	M 14	M 15
Preparation, Situation analysis			Grace Period												
Eligibility criteria set-up of beneficiaries															
Selection and screening beneficiaries															
Development of work plan															
Training															
Conditionality setting and Disbursement of loans															
Reimbursement and monitoring															
Business consultation															
Evaluation															

Figure 8.1.27 Work Plan

5) Expected impacts

Microfinance primarily aims at economic promotion/security and empowerment for vulnerable groups. Significant impacts and improvement cannot be expected in the short term, however, microfinance is proved to be an effective measure for securing poor people's lives.

Following impacts can be foreseen through microfinance intervention.

- Vulnerable people can have access to formal/informal financial services
- Small enterprises in community may be promoted
- Unemployment rate can be decreased
- Expenditure pattern can be changed in the short term
- Savings system will secure poor people's lives
- Income is increased in the long term
- People can be involved in the process of decision making and have capacity to negotiate with others (more self-reliant, confidence)
- Vulnerability can be reduced, i.e. have capacity to external shocks, risks and unexpected incidence in household and society levels
- Institutional capacity shall be enhanced by group lending system
- Community can be more gender responsive.

(5) Community School Development

1) Objectives

Considering that a great number of school-aged children in settlements are out-of-school, the project aims to give more education opportunities through non-formal education, i.e. community schools for underprivileged children.

The objectives of the project are

① Build awareness in a community of the importance and value of education for out-of-school children who are underprivileged, girls, and orphans.

② Mobilise community participation and through construction process, all execution from planning, implementation, operation and management.

③ Systematise school management and running and strengthen community's capacity of self-reliance to sustain in the long run.

2) Description of Project

The process of community school development may differ depending on what status of school should be targeted. If a new school is to be built, it has to be considered to construct school building and establish organisational set-up/system of management and running. On the other hand, if the Projects is to expand and strengthen an existing community school, there is usually already organisational support (PTA) and system of school running assisted by both an NGO and the community. Generally speaking, it is easier and quicker to support the latter type of school as long as community (RDC and PTA) agree and cooperate in developing a school. The following table shows the process of school development. It is obvious that a newly established school needs many more tasks than those of an existing school.

Process of Community School Development

1. Formation of Education Committee, if necessary **(New school only)**
2. Identification and selection of children to be enrolled **(New school only)**
3. Formation of PTA **(New school only)**
4. Organising workshop for work plan, role and responsibilities, M&E, etc
5. Selection of voluntary labours (skilled & unskilled) in community
6. Selection of teachers in community **(New school only)**
7. Agreement on construction issues, design, materials, storage, etc
8. Construction of facilities
9. System establishment of managing and running school **(New school only)**
10. Teachers' training **(New school only)**
11. Opening school
12. Monitoring and Evaluation

A newly established school has to take 12 steps, while an existing school needs to do half of that. Establishing a new school depends on community capacity, particular RDC and PTA, to construct facilities and mobilise participation and school running in collaboration with the NGO. Also land availability is a critical point for school development.

Therefore, the decision has to be made by consultation with and by community (RDC, PTA and other subcommittees) before planning.

Also it has to be reminded that the most important factor in community school development is to ensure good quality education. This includes the number of pupils in a class, teachers' qualification and training, curriculum development, provision of textbooks and teaching materials. In most cases, NGOs are experts to respond to these needs, however, capacities of NGO are also limited in terms of finance and human resource, so careful plan should be made how feasible those NGOs can be involved in setting up a new school.

Identifying school availability and needs in the eight settlements, this Study maps out community school development in the Action Area Plan and gives priority as following Table. Freedom and Kalikiliki have neither public nor community school within or nearby the communities, so first priority must be given to these areas. Chazanga has the only one community school which accommodates more than 1,000 children in two classrooms and the quality of education is a serious problem. Chainda is getting a new government school by Japanese grant aid from the year 2001, but only 180 children will be enrolled, while one community school is run by World Vision in a small

room rented from a church, but this school also accommodates hundreds of children in a ramshackle building. Bauleni has two public schools and one community school run by ZOCS (Zambian Open Community School), but there is still a need for out-of-school children who cannot be enrolled in the government schools in such a high population community.

Priority Setting and Planning for Community School

	No. of Closest Public School	No. of Community School	Priority ranking	Establish new or expand existing
Bauleni	2	1	2	New
Chainda	1	1	**1**	Expanding*
Chazanga	0	1	**1**	New
Chibolya	1	4	×	N/A
Freedom	0	0	**1**	New**
Kalikiliki	0	0	**1**	New **
Ng'ombe	1	5	×	N/A
Old Kanyama	1	5	×	N/A

* World Vision is planning to rehabilitate the school. ** If land is available in those communities.

Design of school building can adopt the Micro Project standard by the Zambian government. It has two classrooms with a storage room and an office. According to the regulation of Zambian Community School Secretariat, children to accommodate in one class should not exceed more than 40 to maintain the quality control of education. Community school covers from level 1 to 4. If a two shift system is arranged, the school can arrange classes for four levels in one day.

3) Implementing agencies

As mentioned above, community school cannot be developed unless there is strong support from outside experts providing construction skills, mobilising participation, training teachers and running school. NGO with great experience will need to serve as an implementing agency in collaboration with RDC. Also technical support from LCC, MOE, ZCSS (Zambian Community School Secretariat) is necessary. Particularly, MOE and ZCSS are key organisations to assist teachers training, provide textbooks and sustainable school operation. Following Table and Figure show the key roles and responsibilities and linkage of each stakeholders.

Role and Responsibilities of Stakeholders

Stakeholders	Role and Responsibilities
Community	Participation and contribution (Labour and time) Monitoring and Evaluation
NGO	Technical assistance, Provision of construction materials and teaching materials, Teachers training, School running, Monitoring and Evaluation
LCC	Technical assistance, supervision and coordination, Monitoring and Evaluation
MOE, ZCSS	Teachers training, Providing textbooks, Guidance, Certificate
Donor	Funding, supervision, Monitoring and Evaluation

Role and Responsibilities of Stakeholders

		PTA	EC	RDC	LCC	NGO	Donor
Plan	Situation Analysis			▬▬	▬▬		•••••
	Organisational setup			•••••	•••••		
	Social Survey/CAP		•••••	•••••	•••••	•••••	
Do	Selection of pupils		•••••	•••••			
	Foramation of PTA		•••••	•••••	•••••	•••••	
	Selection of Teachers	•••••	•••••	•••••	•••••	•••••	
	Selection of Labours	•••••	•••••	•••••		•••••	
	Workshop	•••••	•••••	•••••	•••••	•••••	
	Construction	•••••	•••••	•••••	•••••	•••••	•••••
	Teacher's Training	•••••				•••••	
See	Monitoring & Evaluation	•••••	•••••	•••••	•••••	•••••	•••••
Sustain	Management & Running	•••••	•••••	•••••	•••••	•••••	

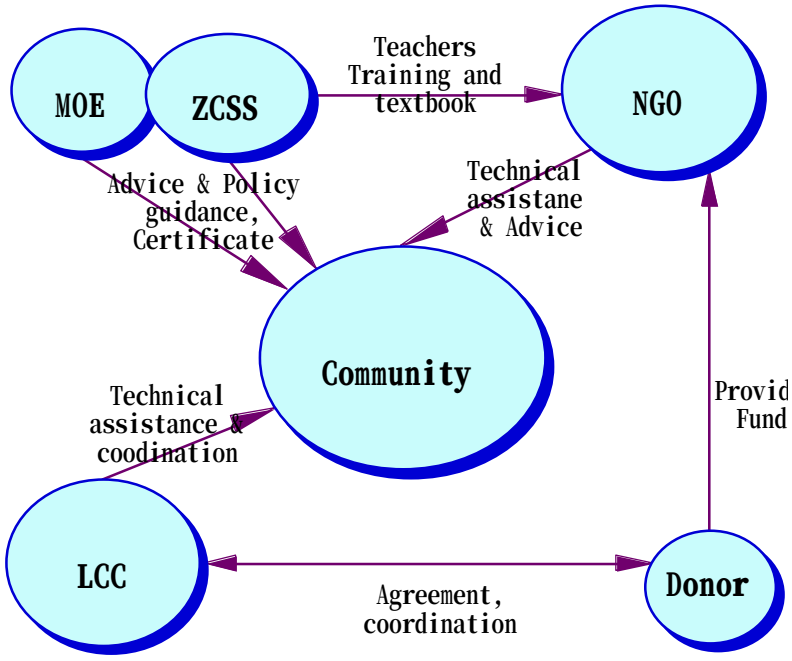


Figure 8.1.28 Stakeholders Relationships (Venn Diagram)

4) Expected impacts

Generally speaking, the impacts of developing community school can be measured in two elements; focusing on particular group of children who are not privileged in getting formal education, and strengthening capacities of community by participatory school development. However, it is difficult to expect high enrolment rate through small scale community schools that can accommodate only a handful of children compared with large scale government schools. In this regard, the nature of community school is not meant to introduce a big impact in quantitative measures, but emphasise the process of developing a school and ensuring equal rights of education for all.

Following is the expected impacts:

- Community will be aware of a great number of out-of-school children and importance of basic education.
- Out-of–school children in community will be reduced.
- Girls, orphans and underprivileged children will have opportunities to get education.
- Community shall have senses of ownership and belonging by constructing and running school through the process of participation.
- Community may have strong networking with and continuous supports from relevant agencies and the government in terms of teachers training and school running.
- Teachers will be appointed from community to make the best use of community human resource.

(6) Garbage Disposal Program

1) Objectives of program

The objectives of the garbage disposal program are:

- To introduce the method of solid waste management and business at small scale, and establish the solid waste management system at the settlements,
- To organize a committee for the solid waste management and a community entrepreneur for garbage collection under the committee,
- To introduce a waste collection levy system utilizing a multipurpose community center to be constructed in order to secure a sound and sustainable program,
- To supply adequate equipment for garbage collection and construct midden boxes and transfer stations,
- To conduct the comprehensive health and hygienic education/campaign in conjunction with related projects,
- To identify a role of LCC for the solid waste management, work out LCC's strategy in cooperation with LCC and RDCs for the global waste collection system involving private sectors, and to enhance activities of LCC,
- Finally to improve and create living environment with hygienic safety at settlements.

2) Evaluation of present condition in eight UUSs

In terms of collection services of solid waste, LCC covers less than 10% of all the areas of Lusaka because of the lack of service capacity as described in the Section 2.5. Not all settlements, therefore, get public service for waste collection. In the settlements, residents have been illegally dumping their garbage in public areas adjacent to their houses at present.

The results of the poor solid waste management causes serious outbreaks of cholera, diarrhea, malaria, dysentery, foul smells and dust, blockage of road, and water pollution in the City. Especially, the peri-urban areas with high population density, such as Chibolya and Ng'ombe, get serious incidents every year.

In Bauleni, RDC selects communal sites for garbage dumping, and residents carry their garbage by hand and dump it. These communal sites are illegal and insanitary. A few households at Chainda, Chazanga and Ng'ombe have a garbage pit at their plot. Residents have no household bins and then they dump garbage simply at the public areas.

In cooperation with NGOs, LCC intends to develop a garbage collection system with community participation inside the settlements, for instance Ng'ombe, Old Kanyama, Chibolya and Chazanga, and to transfer and dispose the collected garbage to/at the final disposal site by LCC. LCC, however, cannot afford to transfer and dispose the collected garbage at each settlement. It indicates that reinforcing the service capacity of LCC is a fundamental issue for improvement of hygienic safety and development of the garbage collection at the settlements.

The existing conditions in connection with solid waste collection are evaluated at each settlement below.

Evaluation and Priority Setting for Garbage Disposal in Eight UUSs

UUS	Peoples' desire	Present Collection	Hygienic Condition	Status of Plan/ Project	Popu-lation Density	Number of Beneficiaries	Priority Ranking
Bauleni	High	Illegal	Bad	No	351	45,000	1
Chainda	Low	Illegal	Bad	No	270	17,000	1
Chazanga	Low	Illegal	Good	Plan exist by CARE	954	29,000	-
Chibolya	Medium	Illegal	Serious	Plan exist by CARE	761	25,000	-
Freedom	Low	Illegal	Serious	No	209	9,000	2
Kalikiliki	Low	Illegal	Bad	No	131	8,000	3
Ng'ombe	Medium	Communal	Serious	In place by SLP	329	30,000	-
Old Kanyama	Low	Illegal	Serious	Plan exist by CARE	114	57,000	-

(Remarks) 1: First Priority, 2: Second Priority, 3: Third Priority, -: Planned/on-going projects exist

From the result of the evaluation of the present conditions concerning garbage disposal, the garbage disposal program in four UUSs consisting of Bauleni, Chainda, Freedom, and Kalikiliki is selected for implementation.

The implementation schedule of the garbage disposal program at each settlement shall be determined in consideration with the implementation schedules of water supply system and health/sanitation improvement projects since the garbage disposal program is correlated closely with these

projects as mention later. The programs in Chainda, Freedom and Kalikiliki are classified as short-term projects and in Bauleni as long-term projects.

3) Basic plan

Under the assumption that the solid waste management of LCC is improved in the near future, the basic plan of garbage disposal programs in selected compounds is formulated as described below.

(a) Domestic waste generation rate

Domestic waste generation rates at each 5 years were 0.3 kgpcd in 1999, and are estimated to be 0.5 kgpcd in 2005 and 0.8 kgpcd in 2010.

(b) Collection point

Garbage will be collected at each zone and a midden box is constructed as a garbage collection point.

(c) Waste storage yard and separate collection

A concrete-brick midden box is to be prepared at each zone by the collection group under the waste management committee in order to collect and store domestic waste. For separate collection, residents shall classify domestic waste into combustibles and incombustible refuse. Separated plastics, bottles, cans and metal shall be recycled. A transfer station also is provided at the location nearby the main road in order to transfer collected garbage to the final disposal site.

(d) Collection and supervising

The waste collection committee is to be organized by RDC for keeping sustainable collection system. Workers of the community entrepreneur to be employed collect storage waste from the midden boxes and move it to the transfer station under supervision of the committee.

(e) Service charge collection

The service charge is to be collected by the waste collection committee at a room of the community center. It is recommended that the service charge is collected based on the registration and ticket/card contract.

(f) Collection and transport

LCC or private collectors will collect and transport waste periodically based on request from each RDC. Collection frequency should be twice a month at least.

(g) Final disposal

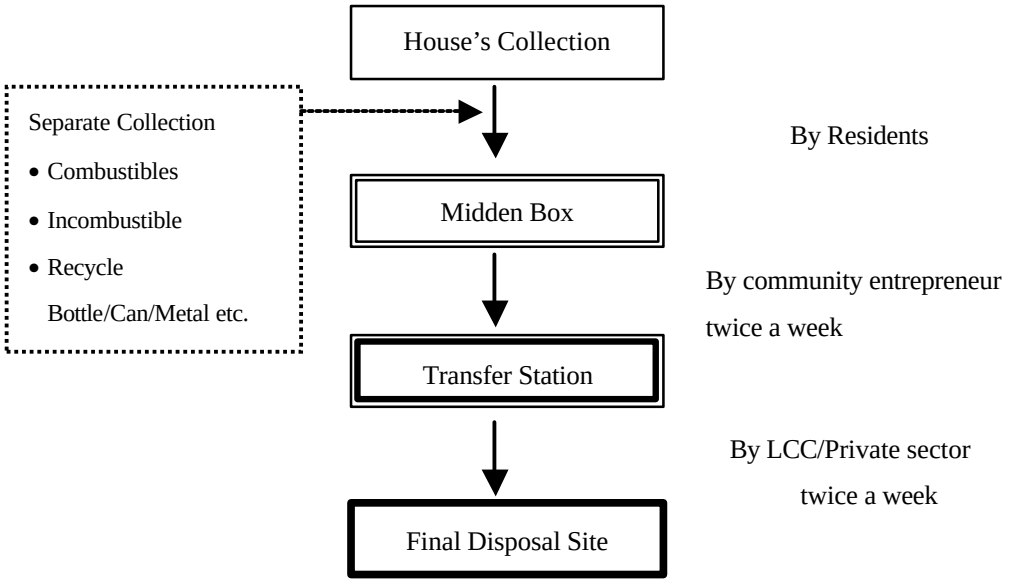
Solid waste collected by LCC or private collectors is sorted, dumped and burned at a new Kabwe disposal site. At the Kabwe final disposal site, it is recommended to adopt the sanitary landfill method and provide the sorting yard, the storage yard for waste to be recycled and a local-type incinerator made of firebrick.

(h) Awareness

The hygienic education and campaign is strengthened and the residents' needs of garbage collection and requirements are confirmed. The willingness to pay a solid waste collection fee is verified. The capability of community participation is evaluated for executing and sustaining the project.

4) Detailed plan by compounds

Garbage collection will be conducted according to the following flow.



Flow of Garbage Collection

Detailed plan are formulated as follows.

(a) Garbage generation

Garbage generation of 4 settlements is preliminarily estimated below from the assumed generation rates at each 5 years of 0.3 kgpcd in 1999, 0.5 kgpcd in 2005, and 0.8 kgpcd in 2010.

Estimate of Garbage Generation

	UUS	Present	2005	2010
Garbage Generation (m3/d)	Bauleni	35	46	57
	Chainda	13	18	23
	Freedom	7	8	9
	Kalikiliki	6	9	13
Population	Bauleni	45,000	59,000	73,000
	Chainda	17,000	23,000	29,000
	Freedom	9,000	10,000	11,000
	Kalikiliki	8,000	12,000	16,000

(b) Location and number of midden box

Locations of midden boxes are along the rural main road in 4 compounds as shown in Figures 8.1.29, 8.1.30, 8.1.31 and 8.1.32. A required size of yard is approximately 20 m^2 with height of 2 m. The numbers of midden box are estimated below.

Plan of Midden Box

	Number of Zone	Number of Midden Boxes
Bauleni	13	13
Chainda	5	6
Freedom	(Number of zone has not been decided by LCC)	6
Kalikiliki	5	5

The midden box should be equipped with a passageway for leachate treatment.

(c) Transfer station for garbage collection by LCC

A transfer station is constructed nearby the main road at each compound as shown in Figures 8.1.29, 8.1.30, 8.1.31 and 8.1.32 for transfer of the garbage at the final disposal site by LCC. The size of the transfer station is 6 m by 5 m with height of 2 m. The transfer station has a working space for the collection truck.

Garbage transfer from the midden box to the transfer station will be done on a contract basis between the community entrepreneur and each household. A large wheelbarrow designed by SLP will be utilized for the garbage transportation from the midden box.

(d) Procurement of collection equipment and tools

The following equipment are to be procured by the committee for garbage collection at each settlement.

Equipment and Tools

	Unit	Quantity
Tractor with trailer	Set	1
Wheelbarrow	Number	2
Shovel	Piece	3
Hard Broom	Piece	2
Rake	Piece	2
Rubber Gloves	Pair	5
Rubber Boots	Pair	5
Dustproof Mask	Piece	5
Overalls	Pair	5
Sacks for separate collection	L.S.	1

(e) Community center for levy collection window/room

It is proposed that the waste levy collection window/room be built in order to collect money safely. Monthly basis contract ticket/card will be sold at the room when residents resister the committee. The committee will supply sacks for separate collection to registrants.

Community center will be developed by facilitation of meeting rooms, LCC site office and health post in addition to levy window/room.

(f) Operation and Maintenance (O&M) for garbage collection at settlements

The community entrepreneur is set up under the initiative of RDC. RDC commissions the community entrepreneur to conduct the operation and maintenance of garbage collection under supervision of the committee. The community entrepreneur consists of 5 members: one representative and four staff members. They conduct the routine works for garbage collection at the midden boxes and transferring collected garbage to the transfer station.

5) Implementation body

The garbage disposal program is implemented by LCC under the initiative of RDC since the program is formulated based on community-managed O &M system. Major roles to be played by the LCC and RDC during implementation of the program are recommended below.

Defined Roles and Responsibilities

Pre-construction Stage	
RDC	➢ Organize the committee for the solid waste management and determine roles ➢ Participate and assist meetings and workshops held by LCC ➢ Set up the community entrepreneur for garbage collection ➢ Confirm residents' willingness to pay and determine the garbage collection fee ➢ Select sites for the midden boxes and transfer station ➢ Allot residents' tasks based on the community participation
LCC	➢ Secure finance and select an executing agency for implementation of the program ➢ Collaborate with related agencies, NGOs and private sector in developing and sustaining the solid waste management ➢ Promote an effective use of privet sectors ➢ Introduce methods for the solid waste management and business at settlement ➢ Certify implementation of the program ➢ Conduct health and hygienic education/campaign ➢ Support RDC for establishment the solid waste management committee ➢ Consult and approve a plan and designs
Construction Stage	
RDC	➢ Act on the community participation concretely ➢ Provide working space and lots for construction of facilities ➢ Supervise and monitor residents' activities ➢ Receive technical transfer for construction works and O&M
LCC	➢ Supervise construction works done by the executing agency and RDC ➢ Arrange and issue approvals required for the works (land acquisition, work space, electricity and water supply, etc.) ➢ Arrange compensation to residents if necessary ➢ Prepare and execute training/education programs for O&M
O&M Stage	
RDC	➢ Supervise O&M conducted by the community entrepreneur ➢ Supervise the waste levy collection done by the committee ➢ Bank and manage the collection fee ➢ Monitor and evaluate the program in cooperation with LCC ➢ Administer the as-built drawings and manual books ➢ Prepare monthly/annual reports on activities of solid waste management
LCC	➢ Transfer the garbage collected at settlements to the final disposal site and dispose it in safety ➢ Supervise and support RDC's activities from viewpoints of technical, environmental, institutional and financial aspects ➢ Monitor and evaluate the program

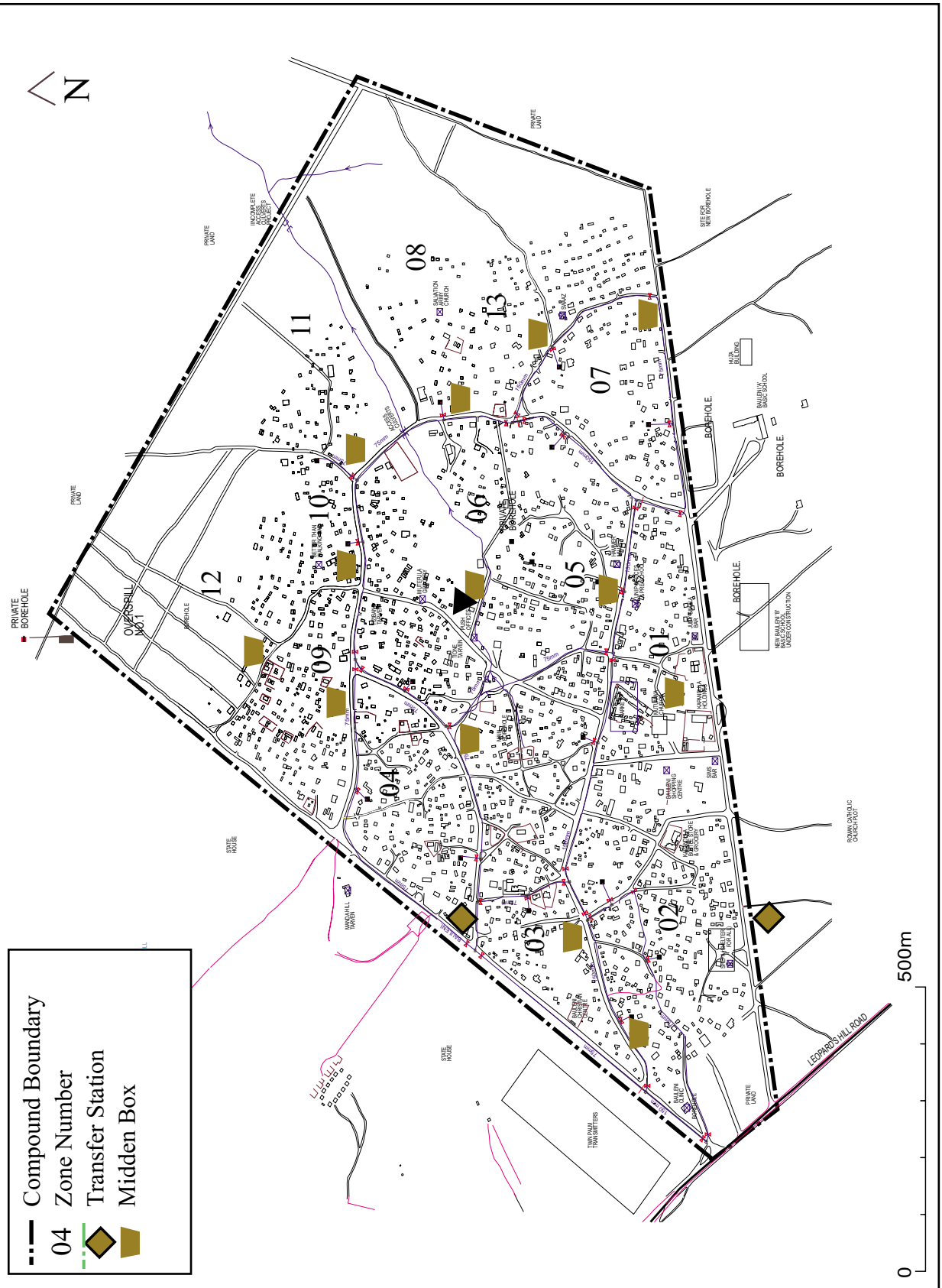
6) Expected impacts

Provided that the LCC or private collectors actually to collect and transfer garbage from the settlements and dispose of it, the following impacts are expected:

- Improved health and hygiene conditions inside settlements,
- Decreased serious outbreaks of diseases, foul smells, blockage of road and water pollution,
- Improved hygiene behavior of residents,
- Promoted community-based businesses and created employments,
- Decreased garbage volume generated at settlements and increased recycled refuse,
- Improved living environment with hygienic safety at settlements.

In the case that LCC fail to collect and transfer garbage at settlements, the following negative impacts are supposed:

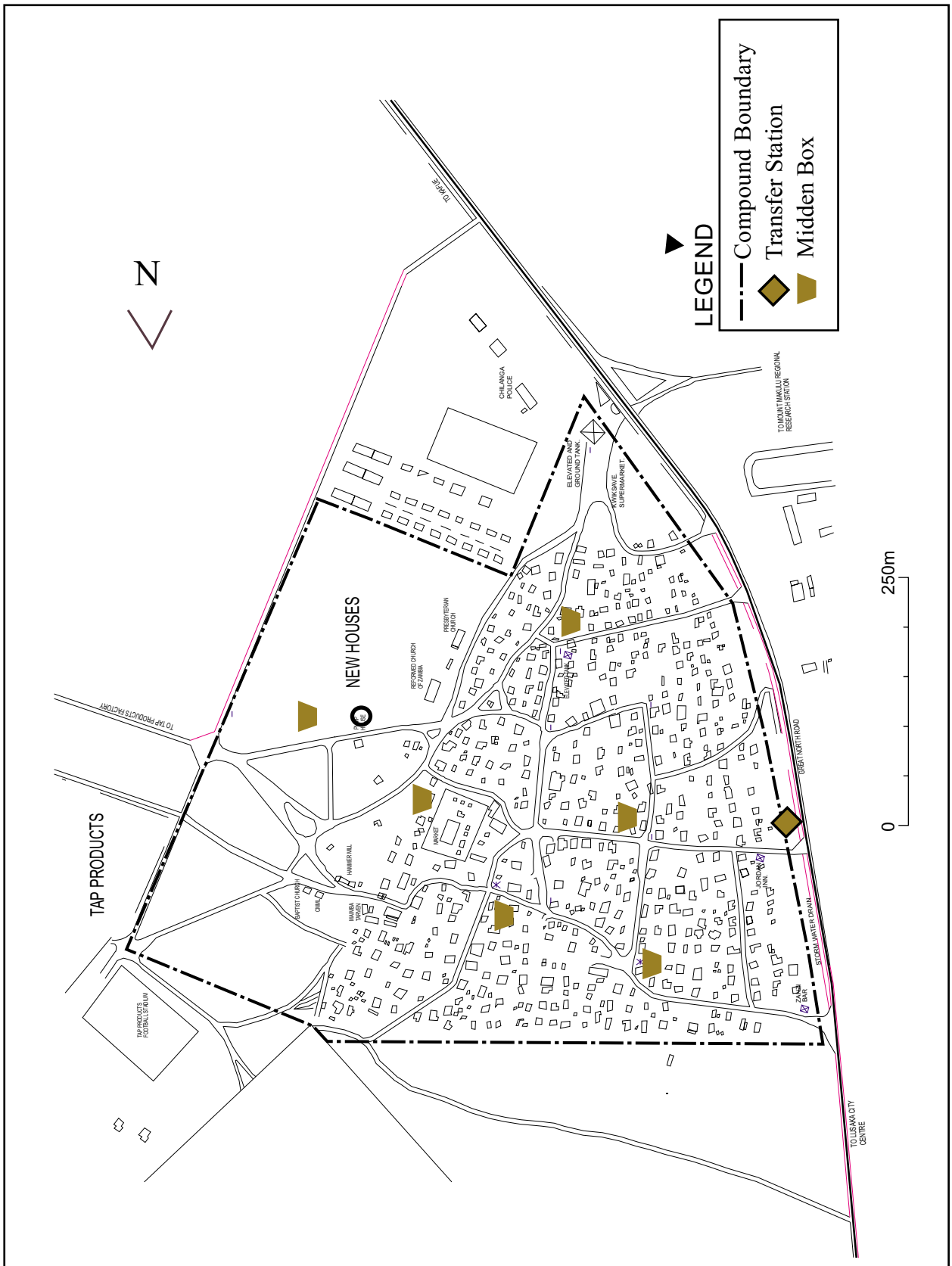
- Deteriorated health and hygiene conditions in areas surrounding midden boxes and transfer stations,
- Failed community-based businesses and discouragement of community participation,
- Increased illegal garbage dumping at public areas and deteriorated living environment at settlements.



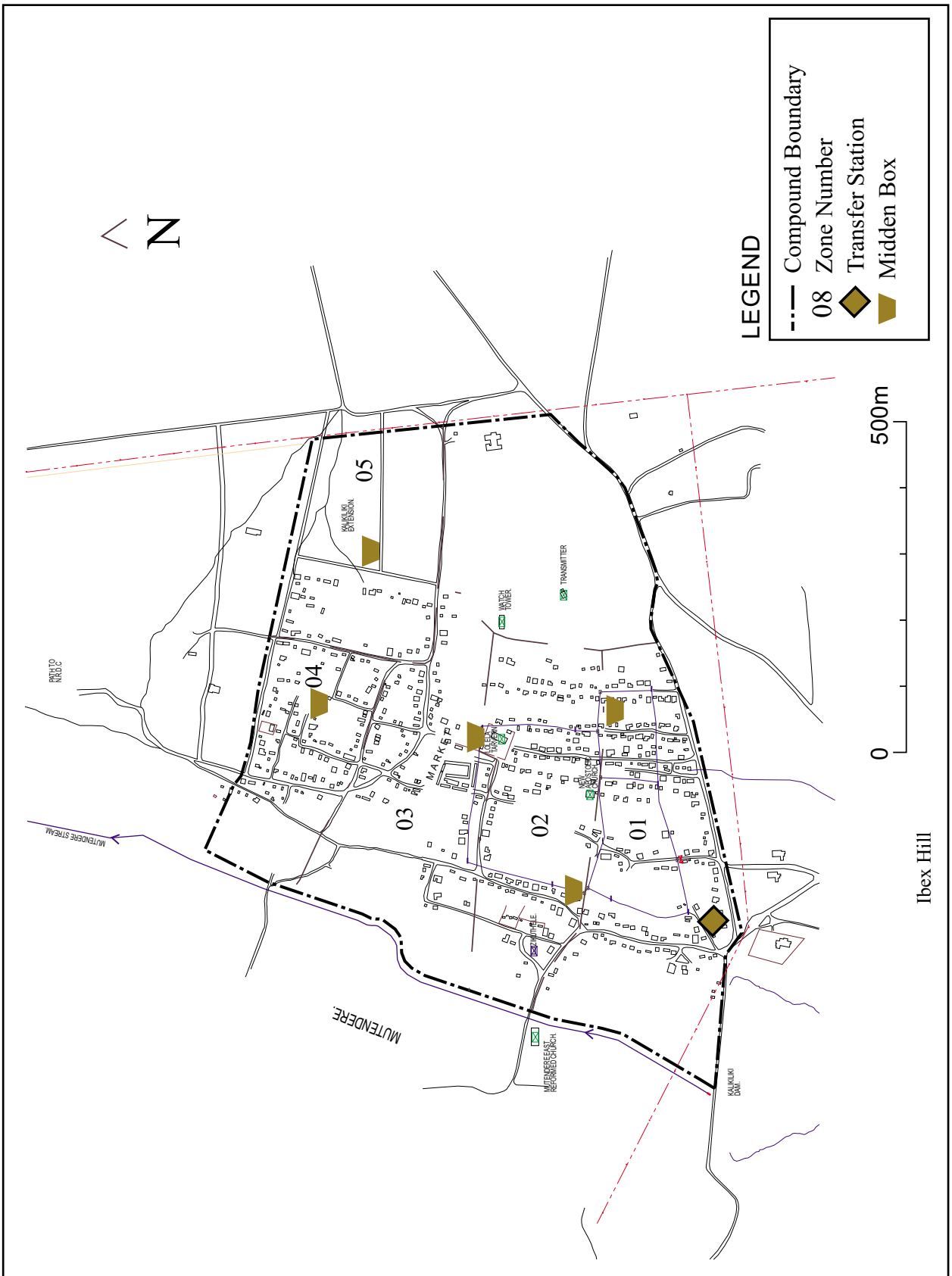
The Study on Environmental Improvement of Unplanned Urban Settlement in Lusaka in the Republic of Zambia

Japan International Cooperation Agency

Figure 8.1.29
Bauleni Garbage Disposal Plan



The Study on Environmental Improvement of Unplanned Urban Settlement in Lusaka in the Republic of Zambia	Figure 8.1.30 Freedom Garbage Disposal Plan
Japan International Cooperation Agency	



The Study on Environmental Improvement of Unplanned Urban Settlement in Lusaka in the Republic of Zambia	Figure 8.1.31 Kalikiliki Garbage Disposal Plan
Japan International Cooperation Agency	

The Study on Environmental Improvement of Unplanned Urban Settlement in Lusaka in the Republic of Zambia	Figure 8.1.32 Chainda Garbage Disposal Plan
Japan International Cooperation Agency	

8.1.3 Implementation Cost of Action Area Plan

The total development cost for the action area plans of the eight UUSs is estimated at approximately US$31.85 million. The detailed cost estimate for the implementation of the action area plan by UUS and by sector was done and summarized in the table below.

Implementation Cost of Action Area Plan

(unit: US$1,000)

Item		Water Supply System	Health/ Hygiene Education	VIP Toilet	Community School	Garbage Disposal	Community Center	Road Improv.	Income genera-tio n	Total
I	Development Cost	12,970	644	2,136	380	89	822	5,929	130	23,100
	1) Bauleni	3,724	111	382	71	30	111	1,398		5,827
	2) Chainda		105	138	82	20				345
	3) Chazanga		105	208	81		113	423		930
	4) Chibolya		37	346			113	959	41	1,496
	5) Freedom	2,236	74	98	81	20	187	238	46	2,980
	6) Kalikiliki	2,796	74	108	65	19	187	288	43	3,580
	7) Ng'ombe	4,214	101	318			111	845		5,589
	8) Old Kanyama		37	538				1,778		2,353
II	Community capacity building									834
III	Physical Contingency									337
IV	Price Contingency									488
V	Total									7,568

Note: Construction cost, engineering cost, administration cost are included in the development cost.
Cost for cap workshop and community training are inclusive in Community capacity building cost
Operation and Maintenance cost is not included.
Source: JST

8.2 Initial Environmental Examination (IEE)

8.2.1 Objectives and Procedure of IEE

(1) Objectives

An initial environmental examination (IEE) is a first-round environmental impact assessment concerning the planned projects. The IEE is conducted at an early stage of project development, and could be an effective tool to identify possible environmental impact and to guide the countermeasures to prevent the adverse impact in the first planning stage. The IEE has been carried out for the proposed projects for Action Area Plan. Major objectives of the IEE are:

- To identify possible environmental impact in case of implementation of the proposed projects based on available data/information and limited field reconnaissance, and
- To judge needs for an Environmental Impact Assessment (EIA).

(2) Procedure

A total of 46 projects are proposed in the Action Area Plan. These projects are classified in two categories related to the IEE.

① Those requiring the IEE, and
② Those not requiring the IEE

All the proposed projects have been subjected to screening to classify them into the two categories. Judgement on whether or not the IEE is required depends on the type of project, scale of development, activities involved, and environmental site conditions. As a result of the screening, 36 projects have been selected for the IEE as summarized in Table 8.2.1.

For each of the 36 projects selected for IEE, the IEE is carried out by using an environmental impact matrix, which provides a checklist of environmental effects. This IEE method follows general standard procedure adopted internationally. Further, requirements by GRZ specified by the Environmental Impact Assessment Regulations in Statutory Instrument No.28 of 1997 are also reflected. (Refer to Appendix-8)

Classification of environmental elements taken into consideration is shown below.

Environmental Elements for IEE

Class	Elements
A. Natural and Biological Environment	1. Surface Water 2. Ground Water 3. Soil Erosion 4. Topography and Geology 5. Weather / Climate 6. Animals and Plants (Wildlife habitat) 7. Coastline and Sea 8. View
B. Social Environment	9. Resettlement 10. Population distribution (Racial, Ethnic) 11. Economic Activities 12. Transportation 13. Community facilities & Services 14. Separation / Sprit of Community 15. Cultural Assets and Archaeology 16. Water and Common Rights 17. Health and Sanitary Condition 18. Waste 19. Landscape (Degradation Risk)
C. Pollution	20. Air Pollution 21. Water Pollution 22. Soil Contamination 23. Noise and Vibration 24. Ground Subsidence 25. Noxious odors

Activities of each project are divided into three phases: pre-construction phase, construction phase, and operation and maintenance phase. The procedure of the IEE is illustrated in the figure below.

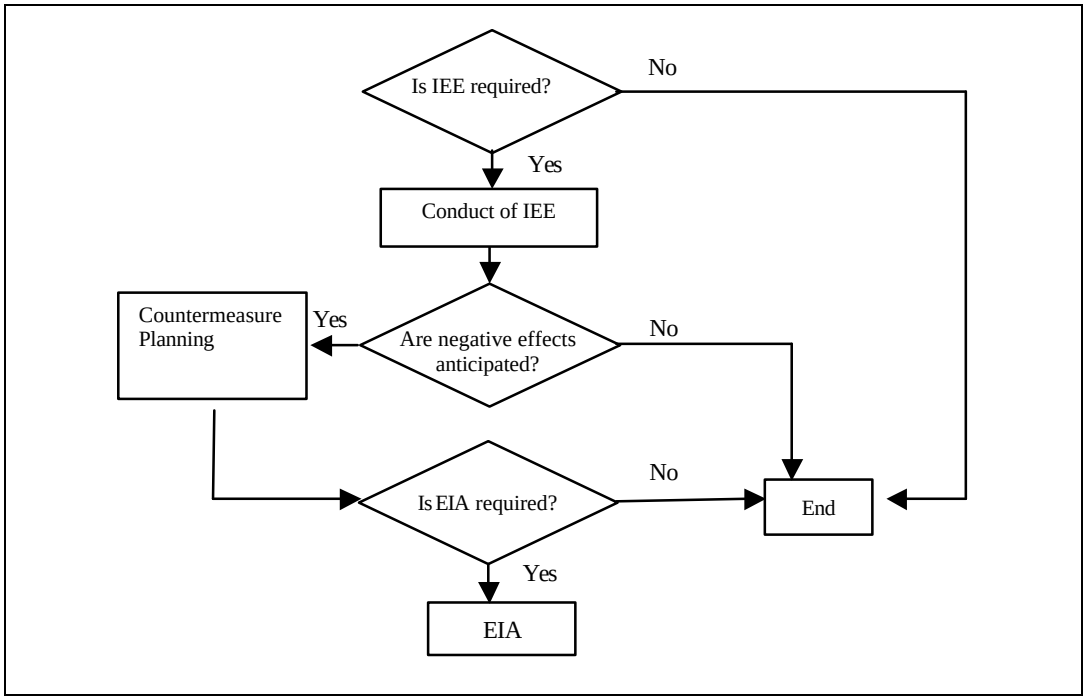


Figure 8.2.1 Procedure of Initial Environmental Examination

8.2.2 Results of IEE

Projects of water supply system improvement, road improvement, VIP toilet development, community school development, garbage disposal, and community center development were examined by the IEE procedure. Results of the IEE for each project are presented in Table 8.2.1 in the form of a possible environmental impact matrix. Health education as well as income generation projects will be excluded from the IEE examination.

IEE results and project description summaries are described in Table 8.2.2 and Table 8.2.3. IEE results show that this living environment improvement project in eight UUS of Lusaka will give significant positive impacts on natural and social environment with slight adverse impact. Therefore, it can be concluded that none of 46 projects proposed in the Action Area Plan requires EIA.

Table 8.2.1 Projects/ Classification for IEE

1. Water supply system improvement project

No.	Project / Program Title	IEE is required	No IEE is required	Remarks
1-1	Bauleni Water	○		
1-2	Freedom Water	○		
1-3	Kalikiliki Water	○		
1-4	Ng'onbe Water	○		

2. Road improvement project

No.	Project / Program Title	IEE is required	No IEE is required	Remarks
2-1	Bauleni Road	○		
2-2	Chazanga Rlad	○		
2-3	Chiblya Road	○		
2-4	Freedom Road	○		
2-5	Kalikiliki Rlad	○		
2-6	Ng'oMbe Road	○		
2-7	Old Kanyama Road	○		

3. Health and sanitatiln improvement education program

No.	Project / Program Title	IEE is required	No IEE is required	Remarks
3-1	Bauleni community health education		○	No environmental impact will be expected throuout the program.
3-2	Chainda community health education		○	
3-3	Chazanga community health education		○	
3-4	Freedom community health education		○	
3-5	Kalikiliki community health education		○	
3-6	Ng'onbe community health education		○	
3-7	Old Kanyama basic school sanitary education		○	

4. VIP toilet development program

No.	Project / Program Title	IEE is required	No IEE is required	Remarks
4-1	Bauleni latrine	○		
4-2	Chainda latrine	○		
4-3	Chazanga latrine	○		
4-4	Chibolya latrine	○		
4-5	Freedom latrine	○		
4-6	Kalikiliki latrine	○		
4-7	Ng'onbe latrine	○		
4-8	Old Kanyama latrine	○		
4-9	Bauleni school latrine	○		
4-10	Old Kanyama school latrine	○		

5. Income generating program

No.	Project / Program Title	IEE is required	No IEE is required	Remarks
5-1	Chibolya income generation		○	No environmental impact will be expected throuout the program.
5-2	Freedom income generation		○	
5-3	Kalikiliki income generation		○	

6. Community school development project

No.	Project / Program Title	IEE is required	No IEE is required	Remarks
6-1	Bauleni community school	○		
6-2	Chainda community school improvement	○		
6-3	Chazanga community school	○		
6-4	Freedom community school	○		
6-5	Kalikiliki community school	○		

7. Garbage disposal program

No.	Project / Program Title	IEE is required	No IEE is required	Remarks
7-1	Bauleni garbage	○		
7-2	Freedom garbage	○		
7-3	Kalikiliki garbage	○		

8. Health center development / management

No.	Project / Program Title	IEE is required	No IEE is required	Remarks
8-1	Bauleni health center water	○		
8-2	Chibolya sub-health center	○		
8-3	Chazanga sub-health center	○		
8-4	Freedom sub-health center	○		
8-5	Kalikiliki sub-health center	○		
8-6	Ng'onbe health center sewerage	○		
8-7	N'gombe health center water	○		

Table 8.2.2 Assessment of Possible Environmental Impact for IEE (1/5)

		Natural and Biological Environment										Social Environment										Pollution							
	Environmental Impact +A Significant positive — A Significant negative +B Moderate positive — B Moderate negative +C Marginal positive — C Marginal negative ? Unknown	Surface Water	Groundwater	Soil Erosion	Topography and Geology	Weather / Crimates	Animal and Plants (Wildlife habitat)	Coastline and Sea	View	Resettlement	Population distribution (Racial, Ethnic)	Economic Activities	Transportation	Community facilities & Services	Separation / Sprit of Community	Cultural Assets and Archaeology	Water and Common Rights	Health and Sanitary Condition	waste	Landscape	Air Pollution	Water Pllution	Soil Contamination	Noise and Vibration	Ground Subsidence	Noxious odors
1-1	Pre-construction	-C	-C	-C	-C	-C	-C		-C	-C			-C			-C	-C		-C	-C	-C	-C	-C	-C	-C	-C
	Bauleni Water Construction	-C	-C	-C	-C	-C	-C		-C		+B	+A	-C	+A	+A			+A	-C							
	O&M																									
1-2	Pre-construction	-C	-C	-C	-C	-C	-C		-C	-C			-C			-C	-C		-C	-C	-C	-C	-C	-C	-C	-C
	Freedom Water Construction	-C	-C	-C	-C	-C	-C		-C		+B	+A	-C	+A	+A			+A	-C							
	O&M																									
1-3	Pre-construction	-C	-C	-C	-C	-C	-C		-C	-C			-C			-C	-C		-C	-C	-C	-C	-C	-C	-C	-C
	Kalikiliki Water Construction	-C	-C	-C	-C	-C	-C		-C		+B	+A	-C	+A	+A			+A	-C							
	O&M																									
1-4	Pre-construction	-C	-C	-C	-C	-C	-C		-C	-C			-C			-C	-C		-C	-C	-C	-C	-C	-C	-C	-C
	Ng'onbe Water Construction	-C	-C	-C	-C	-C	-C		-C		+B	+A	-C	+A	+A			+A	-C							
	O&M																									
2-1	Pre-construction	-C		-C						-C			-C			-C	-C					-C	-C	-C		
	Bauleni Road Construction												-C													
	O&M	+B		+B								+B	+A					+B								
2-2	Pre-construction	-C		-C						-C			-C			-C	-C					-C	-C	-C		
	Chazanga Rlad Construction												-C													
	O&M	+B		+B								+B	+A					+B								
2-3	Pre-construction	-C		-C						-C			-C			-C	-C					-C	-C	-C		
	Chiblya Road Construction												-C													
	O&M	+B		+B								+B	+A					+B								
2-4	Pre-construction	-C		-C						-C			-C	-C								-C	-C	-C		
	Freedom Road Construction									-C			-C	-C												
	O&M	+B		+B								+B	+A	-C				+B								

Table 8.2.2 Assessment of Possible Environmental Impact for IEE (2/5)

		Natural and Biological Environment										Social Environment										Pollution							
	Environmental Impact +A Significant positive — A Significant negative +B Moderate positive — B Moderate negative +C Marginal positive — C Marginal negative ? Unknown	Surface Water	Groundwater	Soil Erosion	Topography and Geology	Weather / Crimates	Animal and Plants (Wildlife habitat)	Coastline and Sea	View	Resettlement	Population distribution (Racial, Ethnic)	Economic Activities	Transportation	Community facilities & Services	Separation / Sprit of Community	Cultural Assets and Archaeology	Water and Common Rights	Health and Sanitary Condition	waste	Landscape	Air Pollution	Water Pllution	Soil Contamination	Noise and Vibration	Ground Subsidence	Noxious odors
2-5	Kalikiliki Rlad	-C		-C						-C			-C	-C							-C			-C			-C
		+B		+B						-C		+B	+A	-C				+B									
2-6	NgtoMbe Road	-C		-C						-C			-C	-C							-C			-C			-C
		+B		+B						-C		+B	+A	-C				+B									
2-7	Old Kanyama Road	-C		-C									-C					-C			-C			-C			-C
		+B		+B								+B	+A	+A				+B									
4-1	Bauleni latrine											+A									-C			-C			-C
												+B						+A			+B						
4-2	Chainda latrine											+A									-C			-C			-C
												+B		+A				+A			+B						
4-3	Chazanga latrine											+A									-C			-C			-C
												+B		+A				+A			+B						
4-4	Chibolya latrine											+A									-C			-C			-C
												+B		+A				+A			+B						
4-5	Freedom latrine											+A									-C			-C			-C
												+B		+A				+A			+B						

Table 8.2.2 Assessment of Possible Environmental Impact for IEE (3/5)

		Natural and Biological Environment										Social Environment										Pollution									
		Surface Water	Groundwater	Soil Erosion	Topography and Geology	Weather / Crimates	Animal and Plants (Wildlife habitat)	Coastline and Sea	View	Resettlement	Population distribution (Racial, Ethnic)	Economic Activities	Transportation	Community facilities & Services	Separation / Sprit of Community	Cultural Assets and Archaeology	Water and Common Rights	Health and Sanitary Condition	waste	Landscape	Air Pollution	Water Pllution	Soil Contamination	Noise and Vibration	Ground Subsidence	Noxious odors
Environmental Impact +A Significant positive — A Significant negative +B Moderate positive — B Moderate negative +C Marginal positive — C Marginal negative ? Unknown																														
4-6	Kalikiliki latrine											+A +B		+A				+A		+B			-C			-C				-C
	Pre-construction																													
	Construction																													
	O&M																													
4-7	Ng'onbe latrine											+A +B		+A				+A		+B			-C			-C				-C
	Pre-construction																													
	Construction																													
	O&M																													
4-8	Old Kanyama latrine											+A +B		+A				+A		+B						-C				-C
	Pre-construction																													
	Construction																													
	O&M																													
4-9	Bauleni school latrine											+A +B		+A				+A		+B				-C						+A
	Pre-construction																													
	Construction																													
	O&M																													
4-10	Old Kanyama school latrine											+A +B		+A				+A		+B				-C						+A
	Pre-construction																													
	Construction																													
	O&M																													
6-1	Bauleni School	+B											+B						+B -C	-C -C			-C	-C +B						
	Pre-construction																													
	Construction	+B																												
	O&M	+B																												
6-2	Chainda School												+B						+B -C	-C -C	-C		-C	-C +B						
	Pre-construction																													
	Construction																													
	O&M																													
6-3	Chazanga School												+B						+B -C	-C -C	-C		-C	-C +B						
	Pre-construction																													
	Construction																													
	O&M																													

Table 8.2.2 Assessment of Possible Environmental Impact for IEE (4/5)

		Environmental Impact +A Significant positive — A Significant negative +B Moderate positive — B Moderate negative +C Marginal positive — C Marginal negative ? Unknown	Natural and Biological Environment										Social Environment										Pollution						
			Surface Water	Groundwater	Soil Erosion	Topography and Geology	Weather / Crimates	Animal and Plants (Wildlife habitat)	Coastline and Sea	View	Resettlement	Population distribution (Racial, Ethnic)	Economic Activities	Transportation	Community facilities & Services	Separation / Sprit of Community	Cultural Assets and Archaeology	Water and Common Rights	Health and Sanitary Condition	waste	Landscape	Air Pollution	Water Pllution	Soil Contamination	Noise and Vibration	Ground Subsidence	Noxious odors
6-4	Freedom School	Pre-construction																									
		Construction												+B						+B	-C				-C		
		O&M																		-C	-C			+B			
6-5	Kalikiliki School	Pre-construction																									
		Construction												+B						+B	-C				-C		
		O&M																		-C	-C			+B			
7-1	Bauleni Garbage	Pre-construction									-C						-C					-C	-C				-C
		Construction	-C	-C	-C	-C	-C	-C				+B	+A	-C	+A					-C							
		O&M														+A			A+	+A	-C						
7-2	Freedom Gabage	Pre-construction									-C						-C					-C	-C				-C
		Construction	-C	-C	-C	-C	-C	-C				+B	+A	-C	+A					-C							
		O&M														+A			+A	+A	-C						
7-3	Kalikiliki Gabage	Pre-construction									-C						-C					-C	-C				-C
		Construction	-C	-C	-C	-C	-C	-C				+B	+A	-C	+A					-C							
		O&M														+A			+A	+A	-C						
8-1	Bauleni health center water	Pre-construction								-C													-C				-C
		Construction										B+		-C						-C				-C			
		O&M													+A	+A			+A	-C							
8-2	Chibolya sub-health center	Pre-construction								-C															-C		-C
		Construction		-C																				-C			
		O&M													+A	+A	+A		+A	-C							
8-3	Chazanga sub-health center	Pre-construction								-C															-C		-C
		Construction	-C	-C											+A	+A	+A		+A	-C							
		O&M																									

Table 8.2.2 Assessment of Possible Environmental Impact for IEE (5/5)

		Natural and Biological Environment										Social Environment												Pollution							
	Environmental Impact +A Significant positive — A Significant negative +B Moderate positive — B Moderate negative +C Marginal positive — C Marginal negative ? Unknown	Surface Water	Groundwater	Soil Erosion	Topography and Geology	Weather / Crimates	Animal and Plants (Wildlife habitat)	Coastline and Sea	View	Resettlement	Population distribution (Racial, Ethnic)	Economic Activities	Transportation	Community facilities & Services	Separation / Sprit of Community	Cultural Assets and Archaeology	Water and Common Rights	Health and Sanitary Condition	waste	Landscape	Air Pollution	Water Pllution	Soil Contamination	Noise and Vibration	Ground Subsidence	Noxious odors
8-4	Freedom sub-health center		-C						-C					+A	+A	+A		+A	-C			-C				-C
	Pre-construction																										
	Construction													+A	+A	+A		+A	-C			-C				-C
	O&M																										
8-5	Kalikiliki sub-health center		-C						-C					+A	+A	+A		+A	-C			-C				-C
	Pre-construction																										
	Construction													+A				+A	+B				+A				
	O&M																										
8-6	Ng'onbe health center sewerage	-C +A																									
	Pre-construction																										
	Construction													+A				+A	-C			-C				-C
	O&M																										
8-7	N'gombe health center water		-C						-C		B+	A+	-C		+A	+A		+A	-C			-C				-C
	Pre-construction																										
	Construction																										
	O&M																										

Table 8.2.3 Result of Initial Environmental Examination (IEE) (1/6)

	Project / Program Title **Water Supply System Improvement Project**
Location Settlement: Bauleni Freedom Kalikiliki N'gombe Zone: 1 to 7 Whole area 1 to 5 1 to 6	
Project / Program Description Target of the Project is construction and operation of the water supply system including a borehole, elevated tanks, pipeline and tap stands. Project activities are as follows: Pre-construction Stage - Land acquisition. Construction Stage - Construction of the water supply facilities, - Transportation of construction materials, - Excavation works for pipeline - Operation of heavy equipment. Operation and Maintenance Stage - Usage of disinfectant - Discharge of wastewater at tap stands - Monitoring of water quality	**Site Description** Bauleni: Residential area with high density belonging to the rural area Freedom: Residential area with high density belonging to the rural area Kalikiliki: Residential area with high density belonging to the urban area N'gombe Residential area with high density belonging to the urban area
Environmental Impact Evaluation Environmental impacts of the Project are evaluated below: Pre-construction Stage - There is no impact to land acquisition since facilities are constructed at reserved area of the government. Construction Stage - Exploiting groundwater is some negative impact since the exploitation over potential of groundwater influences the existing wells in surrounding area. - Increasing traffic volume, air pollution, noise and vibration levels by transportation of materials. - Obstructing traffic by excavation works. - Increasing air pollution, noise and vibration levels by operation of heavy equipment. Operation and Maintenance Stage - The project has positive impact to social environment due to safe and stable water supply. - Disinfector for chlorination is hazardous. - Increasing wastewater at taps corresponding to increasing water supply.	
Environmental Recommendation Counter-measures against negative impact are recommended below: - Potential of groundwater shall be examined and reviewed appropriately. - Pumping test and water quality test shall be carried out. - Traffic control shall be conducted during construction stage. - Soaking facilities shall be constructed at each tap stand for discharge of wastewater. - Manual book for O&M of facilities shall be provided. - On-the job training and commissioning test shall be conducted properly.	

Table 8.2.3 Result of Initial Environmental Examination (IEE) (2/6)

	Project / Program Title **Road and Drainage Improvement Project**						
Location	Bauleni	Chazanga	Chibolya	Freedom	Kalikiliki	Ng'ombe	Old Kanyama
Zone	Whole area	Whole area	2 to 7	Whole area	1 to 2	Whole area	3 to 23

Project / Program Description

Target of Project is Construction and operation of Road and Drainage.

Project Activities

Pre-construction Phase
- Land acquisition, house compensation and relocation of public utilities

Construction Phase
- Transportation of construction materials
- Construction of open drainage(stone pitching) and pipe culvert
- Construction of new outlet to connect to existing outlet
- Grading and gravel paving

Operation and Maintenance Phase
- Pot hole patching
- Cleaning of open drainage and outlet

Site Description

Bauleni : Agricultural area hilly topography

Chazanga: Agricultural area

Chibolya:Urban area,flat,rocky

Freedom: Suburb of Lusaka city

Kalikiliki: Slightly hilly topography

Ng'ombe: Hilly topography

Old Kanyama: Urban area

Environmental Impact Evaluation

Target of IEE is pilot projects.

Pre-construction Phase
- -Provision of new plot for house compensation

Construction Phase
- Increasing traffic volume, noise and vibration levels by transportation of construction
- Increasing air pollution and noise by operation of heavy equipment

Operation and Maintenance Phase
- Increasing traffic volume by minibus and heavy goods vehicles

Environmental Recommendation

Periodic and routine maintenance must be done by community.

If project proponent does not manage the maintenance, the following impacts will occur:
- Flooding by lack of cleaning of open drainage
- Increasing disease caused by outbreak of cholera and malaria
- Deterioration of road surface

Table 8.2.3 Result of Initial Environmental Examination (IEE) (3/6)

	Project / Program Title **Communal (public/household) VIP Latrine Project**
Location Settlement: Bauleni, Chainda, Chazanga, Chibolya, Freedom, Kalikiliki, N'gombe, Old Kanyama Zone: Whole area and schools in Bauleni Middle School and New Kanyama Middle School	
Project / Program Description Target of the Project is to raise awareness among communities and help them construct and maintain safe and sanitary VIP latrines. Project activities are as follows: Pre-construction Stage - Data collection, analysis, sensitization Construction Stage - Procurement/Storage of construction materials - Construction of VIP - Supply of equipments for construction Operation and Maintenance Stage (a) Cleaning, maintaining of latrines (b) Emptying of latrines	**Site Description** Bauleni: Chazanga: Freedom: Kalikiliki: Ng'ombe: Residential area with high density belonging to the rural area Chainda: Residential area with medium density belonging to rural area Chibolya: Old Kanyama: Residential area with high density belonging to the urban area
Environmental Impact Evaluation Environmental impacts of the Program are evaluated below: Pre-construction Stage - There Is No Environmental Impact Construction Stage - There is no negative environmental impact during construction stage - economic activities (producing construction materials such as slabs, bricks) will promote and therefore have positive economic impact Operation and Maintenance Stage - Possibility of soil contamination because liquid waste percolates into surrounding soil while solid waste settles as sludge to the bottom - Generating odor from the pit and emptying the sludge may have negative impact - The project gives positive impact to residents to improve sanitary and health conditions	
Environmental Recommendation Counter-measures against negative impact are recommended below: - For areas where water table is high, proportion of cement used for bricks to line the pit should be high or completely seal or cover the pit with concrete - Hygienic education and campaign shall be conducted to make sure operation and maintenance as well as appropriate method to use constructed latrines. - Make sure the constant maintenance is done by the community themselves through inspection done by health center staff such as EHT (environmental health technicians)	

Table 8.2.3 Result of Initial Environmental Examination (IEE) (4/6)

	Project / Program Title **Community School Development**
Location Settlement: Bauleni, Chainda, Chazanga, Freedom, Kalikiliki, Zone: Not yet specified	
Project / Program Description Target of the Project is to develop non-formal education by constructing facilities of community school. Project activities are as follows: <u>Pre-construction Stage</u> - Data collection, analysis, sensitization, community mobilisation <u>Construction Stage</u> - Procurement/Storage of construction materials - Construction of school building, VIP toilets, water pipe (borehole) - Supply of equipments for construction <u>Operation and Maintenance Stage</u> - Cleaning of school facilities - Prevent any vandalism and theft	**Site Description** Bauleni: Chazanga: Freedom: Residential area with high density belonging to rural area Chainda: Residential area with medium density belonging to rural area Kalikiliki: Residential area with high density belonging to rural area
Environmental Impact Evaluation Environmental impacts of the Program are evaluated below: <u>Pre-construction Stage</u> UISITION <u>Construction Stage</u> - There will be noise pollution during construction period - There will be air pollution if land needs to be adjusted in the rocky area (rock needs to be burnt out to cruch). <u>Operation and Maintenance Stage</u> - There will be noise pollution by children's movement and voices. - Children may litter rubbish in schools and surrounding areas.	
Environmental Recommendation Counter-measures against negative impact are recommended below: - In case of land adjustment in rocky areas, old tires should not be used to smash rocks as toxic gas emits, so firewood should be burnt instead. - There is a need for education of solid waste to students in relation with school health/hygiene education. - PTA and students must make efforts to clean up premise and toilets/water taps on daily basis, so management system must be established before schools open.	

Table 8.2.3 Result of Initial Environmental Examination (IEE) (5/6)

	Project / Program Title **Garbage Disposal Program**
Location Settlement: Bauleni Freedom Kalikiliki Zone: 1 to 13 Whole area 1 to 5	
Project / Program Description Target of the Project is construction and operation of facilities for the garbage disposal program including midden boxes and transfer stations. Project activities are as follows: Pre-construction Stage - Land acquisition. Construction Stage - Construction of midden boxes and transfer stations, - Transportation of construction materials, - Supply of equipments for collection. Operation and Maintenance Stage - Collection and transportation of garbage by tractors/carts.	**Site Description** Bauleni: Residential area with high density belonging to the rural area Freedom: Residential area with high density belonging to the rural area Kalikiliki: Residential area with high density belonging to the urban area
Environmental Impact Evaluation Environmental impacts of the Program are evaluated below: Pre-construction Stage - There is no impact to LAND acquisition since facilities are constructed at reserved area of the Government. Construction Stage - Increasing traffic volume, air pollution, noise and vibration levels by transportation of materials. Operation and Maintenance Stage - Increasing traffic volume by garbage collection vehicles. - Generating odor from midden boxes, transfer stations and garbage collection vehicles. - The Program gives positive impact to residents if garbage collection is managed properly since hygienic condition is improved by garbage disposal.	
Environmental Recommendation Counter-measures against negative impact are recommended below: - Traffic control shall be conducted during construction stage and O&M stage. - Location of transfer stations shall be far from residential area. - Hygienic education and campaign shall be conducted. - On-the job training and commissioning test shall be conducted properly. - Management of garbage collection shall be planned well and conducted appropriately. - Monitoring of garbage collection shall be carried out. - Capability of solid waste disposal system of LCC shall be reinforced as soon as possible.	

Table 8.2.3 Result of Initial Environmental Examination (IEE) (6/6)

	Project / Program Title: Sub-health Center Construction and Existing Health Center Rehabilitation Project
Location Settlement: Bauleni, Chibolya, Chazanga, Freedom, Kalikiliki, N'gombe Facility: Existing Health Centers (Bauleni and N'gombe) and Sub-health centers to be built	
Project / Program Description Target of the Project is construction and rehabilitation of new sub-health centers (four settlements) and existing health centers (Bauleni and N'gombe only) and operation of facilities for the primary health care services such as MCH (maternal and child health), FP (family planning). For Bauleni HC, rehabilitation is mainly the water supply system and sewerage system at N'gombe HC. Project activities are as follows: <u>Pre-construction Stage</u> - Land acquisition - Community mobilization <u>Construction Stage</u> - Construction of sub-health centers - Rehabilitation of existing health centers - Transportation of construction materials, - Supply of equipments for collection. <u>Operation and Maintenance Stage</u> - Collection and transportation of garbage by tractors/carts.	**Site Description** Bauleni: Residential area with high density belonging to the rural area. Only health center for 50,000 or more population and borehole is broken N'gombe: Residential area with high density belonging to the rural area. One health center, which was, builds poorly and has no good drainage system. Chazanga: Freedom: Residential area with high density belonging to the rural area and there is no clinic Chibolya: Kalikiliki: Residential area with high density belonging to the urban area and there is no clinic
Environmental Impact Evaluation Environmental impacts of the Program are evaluated below: <u>Pre-construction Stage</u> - There is no impact to land acquisition since facilities will be constructed at reserved area of the Government. <u>Construction Stage</u> - Exploiting groundwater is some negative impact since the exploitation over potential of groundwater influences the existing wells in surrounding area. - Increasing traffic volume, noise and vibration levels by transportation of materials. - Obstructing traffic by excavation works. - Increasing air pollution, noise and vibration levels by operation of heavy equipment. <u>Operation and Maintenance Stage</u> - The Project has positive impact to social environment through provision of health care services as well as improving sewerage system and providing safe and stable water necessary for its continuous operation - There is a slight risk of water pollution or contamination of soil due to hazardous waste come out from the health center if sewerage system is not properly established	
Environmental Recommendation Counter-measures against negative impact are recommended below: - Training for health center staff for management of hazardous waste shall be planned well and conducted appropriately. - Proper sewerage system should be established at the sub-health center and tested at rainy season	