REPUBLIC OF KENYA

MINISTRY OF LANDS AND SETTLEMENT

PHYSICAL PLANNING HANDBOOK

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INTRODUCTION

This handbook provides guidelines for the preparation and implementation of physical development plans. It is meant for use by physical planners, land administrators, local authorities and other relevant personnel and institutions responsible for guiding and controlling the use and development of land in Kenya.
The objectives of this handbook include provision of understanding and uniformity in the following planning, development control and development co-ordination tasks:

- Preparation of physical development plans for both rural and urban areas, (chapter one);
- Provision of equitable levels of socio-economic facilities and services, (chapter two);
- Consideration of development applications, (chapter three); and
- Development co-ordination (chapter four).

The handbook should be treated largely as a reference in the preparation of local and regional physical development plans; guidance of the use and development of land; and administration procedures involved thereto. This is due to our dynamic environment, diverse physical and socio-economic conditions and political changes.

Many thanks to all the stakeholders. We derived valuable information. Their comments and suggestions have gone along way in improving the content of the handbook. We would like to mention in particular the Kenya Airports Authority, Ministry of Health and the Surveys department of the Ministry of Lands and Settlement.

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CHAPTER ONE

LOCAL AND REGIONAL PHYSICAL DEVELOPMENT PLANS.

1.1 REGIONAL PHYSICAL DEVELOPMENT PLANS.

1.1.1 Functions.

a) Interpret national and regional physical development policies in terms appropriate to district resource potentials and development opportunities, priorities and constraints.

b) Identify service and growth centres together with an appropriate transport network to facilitate movement of people to and from the centres.

c) Provide a policy framework for guiding and controlling the use and development of land by, say, fixing space for different uses, e.g. urban, agriculture, recreation, afforestation, conservation, etc.

d) Provide a framework for integration and co-ordination of physical and socio-economic facilities and services.

e) Provide a framework for programming and prioritising district development projects.

1.1.2 Subject Matter

(a) Spatial Analysis

The physical factors studied include relief and drainage; areas prone to diseases (tick-borne, tsetse flies, cholera areas etc); administrative and resource boundaries (locations, national parks, game reserves, forest areas, etc); and any cultural/ethnic constraints (trust land reserves, ethnic hostilities, etc). These factors are analysed and described in relation to problems they represent to various development sectors.

(b) Physio-Economic Analysis.

The Study here includes analysis of income distributions; settlement patterns, extent and distribution of various land uses and location of infrastructural facilities and services such as schools, health, water, dam, cattle dips etc. These factors are described in terms of intensity of their usage and/or potentiality and plotted on maps as appropriate.

(c) **Socio-Economic Analysis**

These include study of population characteristics and needs in relation to resource potentials and opportunities, existing land use intensities and levels of infrastructural facilities and services. From the analysis future land use demands and their land requirements; infrastructure facilities and services demands and their locational

requirements together with broad policy measures to guide and control the use and development of land are determined.

(d) **Plan Presentation.**

The above analyses are presented as a set of written statements and/or maps describing and/or indicating action areas, programs for implementation and executing agencies. Phasing of proposed programs should be included in the actions. Table 2.8 shows guidelines for the location of infrastructural facilities at various levels of service and growth centres.

1.2 LONG TERM URBAN DEVELOPMENT PLANS.

1.2.1 Functions.

a. Interpret national and regional policies in terms appropriate to the urban area and its hinterland.

b. Articulate the Government and local authority aims for the area together with the strategies, policies and general proposals that are intended to achieve these aims.

c. Provide a framework for detailed policies and proposals for subsequent short-term plans for the area.

d. Indicate action areas for immediate development or re-development.

e. Provide a long term basis for development control

f. Provide a co-ordinated basis upon which various implementing agencies can develop their individual programs of work which they have executive responsibility.

g. Show amount of land sufficient enough to accommodate growth of an urban area over a period of 20 to 30 years.

h. Outline the communication network to serve the area over the same period.

1.2.2 Subject Matter

The format of a long-term urban development plan consists of written statements and development models. The written statements should be organized preferably in number paragraphs in the following order.

(a) Introduction

- A brief mention of the history of the town, i.e. when it started, by whom and why;

- Main problems of the town, e.g. housing, employment, traffic, pollution, tenure, lack of services, bad terrain or soil, etc. all based on a preliminary reconnaissance of the town;
- Opportunities of the town, e.g. tourism, fishing, mining, manufacturing etc.;
- A statement of the main objectives of the plan to alleviate the town problems and to maximize utility of any specific opportunities or natural resources.

(b) **Physical Background**

- General statements on the terrain, slope and topography, soils and climate together with illustrations using maps, charts, graphs etc., to show what areas are physical suitable for development;
- Existing land uses, and development potentials; pattern of development, land tenure together with cadastral outlay of all development.

In outlining the physical background the final resu8lt should be a sieve map of the physical constraints or thresholds to development and existing land uses.

(c) Population and Economic Base

- Population growth, migration, density and distribution, age and sex structure, household sizes and rates of household formation;

- Employment and incomes including where people go to work and what trend and problems there are in relation to services;
- Agricultural potential of the urban region showing various agricultural activities and the process as well as problems of transforming this agricultural land into urban use;
- Peri-urban squatter settlements and problems they pose;
- Potential, distribution and size of service centres within and outside urban boundary together with evaluation of urban boundary extension;
- Evaluation of importance such factors as commerce and tourism within extended areas of the township administration; and

- Housing occupancy rates, accommodation densities, housing requirements, type of residential areas and industrial sites should form a chapter of their own if much more details are required. Other study aspects that may form own chapters include education, schools, recreational areas and public purpose land uses.

(d) Communication and Services

- Historical pattern and condition of communication networks such as roads, footpaths, cycle ways, railway lines, depots, water ways, docks, etc., and
- Historical patterns and conditions of water and sewerage networks including planned programs.

(e) Power and Telephone Lines:

These are analyzed with respect to their way leaves requirements.

(f) Land Use Projection Tables:

This will include a master, table showing the relationship of existing population and land uses to realistic projections.

The Development Model indicates chosen development possibilities in map form showing land use designation and distribution alongside a clear transport and communication network.

1.3 SHORT TERM PLANS

1.3.1 Types and Functions

(a) Action Area Plans for comprehensive planning of areas selected for intensive development, which is to commence within a specified period.

(b) Subject Plans for detailed treatment of a particular planning aspect, e.g. residential, transportation, water supply, etc., in part or all of the long-term plan.

(c) Advisory or Zoning Plans indicating permitted subdivision, use and/or development density.

(d) Part Development Plans (PDP) indicating precise sites for immediate implementation of specific projects or for land alienation purposes.

1.3.2 Subject Matter

In the preparation of short term plans, an assessment is made of immediate land or facility requirement to accommodate required population needs for the first five years, preferably corresponding with national economic plans period. The most important use is land for residential purposes. This is determined by analysis of housing shortage, available land and future land requirements. Provision for other land uses may be made in proportion to land reserved for residential purposes. However, where there are specific projects in the pipeline then land may be appropriately reserved.

The most important requirement for short term plans is the details to guide immediate development proposals; Land use proposals and the communication network should spell out relevant details and harmony for the efficient functioning of the given urban system.

1.4 RENEWAL OR REDEVELOPMENT PLANS

1.4.1 Functions

(a) Provide a broad land use framework illustrating a coordinated policy of renewal and guiding both public and private redevelopment activities.

(b) Provide a pattern of road and traffic networks designed to improve vehicular acce4ss and parking space and also facilities segregation of vehicles and pedestrians.

(c) Provide a basis for determining development applications on extension of leases, extension of users and change of users.

1.4.2 Subject Matter

(a) Land Use Patterns:

The analysis here should come out with policy measures and land use proposals to facilitate: -

- Conservation of areas whose historic, architectural, property or commercial values are relatively high;
- Improvement or general upgrading of areas whose existing conditions are desirable; and
- Comprehensive or cumulative redevelopment of areas whose conditions are undesirable.

(b) Traffic Systems

The analysis here should come out with policy measures and proposals for: -

- Safe pedestrian movement;
- Easy access to buildings;
- Efficient circulation of traffic with business;
- Convenient and ample public car parks; and
- Efficient road links, amongst others.

(c) Phasing:

The above proposals should be programmed and phased appropriately, unless they can be achieved within the short term.

CHAPTER TWO

PLANNING PRINCIPLES AND STANDARDS

2.1 RESIDENTIAL AREAS

2.1.1 Estates:

An estate is a spatial planning unit, which is adequately provided for in terms of basic community facilities bordered by principle through roads and has an identity. The service centre which forms the focal point of the estate satisfies the minimum walking distance from the perimeter. The population of the estate should be able to support the services within the physical entity. It is recommended that an estate shall have 100 households on the average.

2.1.2 Land Allocation:

Residential areas are seen as integral parts of the overall built-up area (dwelling plots) together with day-to-day services, recreation and communication network. Table 2.1 gives the percentage allocation of land in various residential estates. They may be used as a guide in planning for residential estates and reasonable variations may be permitted depending on local conditions.

Table 2.1 AVERAGE OBSERVED LAND USE ALLOCATIONS IN RESIDENTIAL NEIGHBOURHOOD DEVELOPMENT

NUMBER	LANDUSE	PERCENTAGE OF DEVELOPED AREA		
		HIGH DENSITY	MEDIUM DENSITY	LOW DENSITY
1.	Dwelling plots	40-60	64-74	80-90
2.	Recreation	21-29	7-16	__
3.	Community Facilities	5-20	9-10	0.1-1
4.	Roads and Streets	4-15 1-7	6-7 3-4	8-8.8 0-2.2

Sources E.L Menezes, Technical Paper LU NO. 12, Land Use Standards.

2.1.3 **Density of Development**

In recommending gross residential densities care should be taken that they create in spatial and functional meaning an independent system of the built-up area (both multi-family and one family dwelling units) well provided with day-to-day services, recreation and communication network. For the purpose of controlling the intensity of development Table 2.2 gives a range of densities that can be adopted. These may be varied depending on the type of waste disposal, availability of piped water, and the level of building technology to be applied.

Table 2.2 **RECOMMENDED DENSITIES FOR RESIDENTIAL DEVELOPMENT**

TYPE OF DWELLING	NO. OF DWELLING PER HECTARE	SPACE ALLOCATION PER DWELLING (MSQUARED)
BUNGALOW DETACHED		
(i) Low density	10	1000
(ii) Medium density	16	500
(iii) High density	35	285
SEMI DETACHED AND ROW HOUSING		
(i) Low density	20	417
(ii) Medium density	32	333
(iii) High density	70	250
MULTI – FAMILY DWELLINGS		
(i) Low density	50	200
(ii) Medium density	60	167.6
(iii) High density	70	142.8
(iv) Special Density	133	75

2.1.4 **Site Planning**

The following controls should be observed: -

(a) Plot Frontage:

All plots on which residential buildings are to be erected should have proper and sufficient frontage to a street, such a street not being a sanitary lane or passage. The recommended minimum frontages of residential plots are given in Table 2.3.

Table 2.3

RECOMMENDED MINIMUM PLOT FRONTAGE BY TYPE OF HOUSING

TYPE OF RESIDENTIAL DEVELOPMENT	MINIMUM FRONTAGE IN METRES		
	DETACHED%	SEMI DETACHED%	ROW HOUSING%
1. Slum rehabilitation and upgrading schemes	70	75	75
2. Low cost housing	70	75	75
3. Normal housing development	60	60	70

(b) Plot Areas (Sizes):

The minimum plot size should, generally, be determined by the user, type of waste disposal, availability of water and the level of building technology applied. Another important factor of significance is the type of housing in the given scheme whether consisting of row housing detached or semi-detached units. As a guide Table 2.4 gives the recommended minimum plot sizes in the different cases of types of residential development. These may be varied depending of the level and adequacy of the above mentioned factors and recommended plot coverage.

Table 2.4

RECOMMENDED MINIMUM PLOT SIZES FOR DIFFERENT HOUSING SCHEMES

TYPE OF HOUSING	MINIMUM PLOT SIZES IN SQUARE METRES		
	DETACHED	SEMI DETACHED	ROW HOUSING
1. Slum rehabilitation and upgrading schemes	223.2	148.8	111.6
2. Low cost housing	334.8	223.2	167.4
3. Normal housing development	465	309.7	232.5

(c) Plot Coverages:

Plot coverage as applied to a building means the portion of horizontal area of the site of the building permitted to be built. The essence of fixing plot coverages is to ensure a healthy environment and allow for expansion and improvement of infrastructural facilities and social amenities. The minimum plot coverage recommended are shown in Table 2.5

MINIMUM PLOT COVERADE RECOMMENDED

TYPE OF RESIDENTIAL DEVELOPMENT	MAXIMUM PERCENTAGE PLOTS COVERAGE		
	DETACHED HOUSING	SEMI DETACHED	ROW HOUSING
1. Slum rehabilitation upgrading	50	65	65
2. Low cost housing	50	60	65
3. Normal housing	40	50	60

(d) **Building lines (set back lines):**

The principle value of building lines is either to achieve a visual effect or reserve a certain access of area of ground. It is not necessary to set uniform lines, they maybe flexibly drawn to produce spatial coherence and variegated character. In prime locations, it maybe necessary to set minimum as well as maximum line. The minimum distance of a house or an ancillary structure from the plot line (boundary line) may be indicated as shown in table 2.6.

Table 2.6 **MINIMUM SETBACK OF DWELLING FROM PLOT LINES**

TYPE OF RESIDENTIAL DEVELOPMENT	MINIMUM SET-BACK IN METRES		
	FRONT	SIDE	REAR
1. Slum rehabilitation and upgrading schemes	2.5	1.5	3
2. Low cost housing	3	1.5	4.5
3. Normal housing	4.5	3	6

(e) **Distance Between Buildings**:

(i) The distance between any two dwellings, front to front, across a street, walk or common area shall be not less than 2 times the total height of the taller buildings.

(ii) Street Width:

It is recommended that the width of streets or access lane in a residential area be determined by the number of dwelling units or plots to be served. The minimum street width for given number of plots may be indicated as shown in table 2.7. It is further recommended that the street network be hierarchical so that in the future urban areas will have a high rise urban morphology even in residential areas

Table 2.7 **MINIMUM STREET WIDTH PER GIVEN NUMBER OF PLOTS**

NUMBER OF PLOTS	STREET WIDTH
1 -20	9m
21 -50	12m

(iii) **Dead-end Streets (Culs-de-sac):**

A dead-end street should be aligned such that it shall give access to not more than 8 to 10 residential plots. It should not exceed 60m in length and shall have a turning radius of at least 15m – at the inner end.

2.2 INDUSTRY

2.1.5 Major Industrial Areas:

(a) Location and Special Requirements:

These areas provide suitable accommodation for the following types of industry; heavy and manufacturing, and noxious industries with large waste; large scale and users industrial plants; industries requiring excellent national/ international communication network; and industries requiring close links with other firms e.g. those firms which produce component parts for the same product or those involved in separate stages of the same industrial process. Accessibility to labour, communication routes, and ample supplies of power and water and sewage disposal facilities are of prime importance. Separation from residential areas through buffer zones is essential.

(b) **Land Requirements:**

In selecting an area for location of major industries in Growth Centres, a site must be provided which is neither too small to inhibit the location of industries requiring large areas, not too large to increase the possibilities of congestion. The total site area for a major industrial area would therefore probably lie between 500-1200 acres for a town with a population of 200,000 and 5000,000. It will provide between

20,000 and 50,000 jobs, based on an average industrial density of 40 workers per acre.

(c) Environmental Impact Assessment (EIA)

Environment Impact Assessment (EIA) refers to critical examination of the effects of a project on the environment before its implementation. Impact describes any negative and positive environmental influences caused by a project.

EIA is applied on the principle that the effect on the environment of the project needs to be established before it is implemented.

The basic assumption is that if a proper EIA is carried out, then the safety of the environment can be properly managed during the project's implementation, commissioning, operation, and decommissioning.

- **Project**

  A project is defined as a specific set of human activities in a particular location and time frame and intended to achieve an objective(s)

- **Environment**

  The term "environment" is used in its broadest possible sense to embrace not only physical and biological systems, but also socio-economic systems and their inter-relationships.

Objectives of EIA

The general objective of an EIA is to ensure that environmental impacts are accounted for by all decision makers throughout the entire life-cycle of all projects and activities including planning, designing, implementing, operating, and decommissioning.

Specific Objectives of EIA

- To identify the significant impacts of a project on the environment.

- To predict the size of the changes occurring in the environment as a result of the development.

- To evaluate the relative importance of the impacts of alternative plans.

- To propose mitigation measures for the significant negative impacts of the project on the environment.
- To generate baseline data for monitoring and evaluation of the application of mitigation measures during the implementation, operation, and decommissioning of the project.
- To present information on the impact of alternative development project plans.

- To present results of EIA in such a way they can guide policy makers, planners, stakeholders, and government agencies to help them understand the implications of project proposals and make the necessary decisions.

EIA PROCESS

- **The process of EIA requires a number of steps, including:**

1. Identify and examine alternative development plans, including demand forecasts, type of activities, processes, locations, and mitigating measures;

2. Identify significant impacts requiring investigation;
3. Predict the size of changes occurring in the environment as a result of development;

4. Evaluate the relative importance of the impacts of alternative development plans;

5. Compare alternatives; and

6. Present information on the impacts of all project options.

Identification of Significant Impacts

There are two steps in identifying significant impacts, namely:

1. Identification of all possible impacts of a development and its alternatives; and

2. Selection of those impacts which are significant to decision making on the best alternative, and which therefore require investigation in the EIA.

2.2.2 Light Industrial Areas/Jua Kali

(a) Locational Requirements:

Light Industrial areas/estates cater for types of industries that are compatible with residential areas. They provide favourable locations for Labour intensive industries e.g. workshops, large laundries; dry cleansing depots, printing; packaging; food industries; light assembly furniture makers etc. These estates would be scattered throughout residential areas, approximately one estate per 30,000 population. They should be located on the major internal routes of the township with separated access from residential feeder roads.

(b) Land Requirements:

The probable total area of each estate would range from 10-50 hectares, which would be sufficient to cater for 1500-7500 workers at a density of 60 workers per acre. An area of 10-20 small firms without creating congestion in the residential areas. An area of 50 hectares would allow large firms to locate in addition. Anything beyond 50 hectares would begin to create major conflicts and incompatibilities with the surrounding residential areas.

(c) Controls

Strong controls must be exercised if surrounding areas are not to suffer or deteriorate. It is suggested that a public authority retains the title to the land and leases it to private firms. In this way there would be stronger controls than town planning regulations alone. Buffers could be created between these estates and homes such as major internal roads, shopping and commercial centres, community buildings and

school etc. this grouping of facilities would save journeys and could be mutually beneficial.

2.2.3 **Workshop Areas:**

These cater for types of activities existing in a relatively uncontrolled way, close to retail activities primarily in low income residential areas e.g. repair workshops, carpenters, small tin smiths, re-use industries etc. As these workshops are also retail outlets, their location is more sensitive to the market than raw materials.

2.2.4 **Land Allocation:**

The planned industrial area should have proper relations to residential, commercial and recreational areas as an integral part of the overall urban development plan. Overall total land reserved for industry should form 8% of the total area planned. A ratio of 1:3 should be maintained for light and heavy industry. The percentage allocation of land in an industrial area/estate may be as suggested below, depending upon the type of industries and the extent of the industrial area/estate.

(a) Workshops ……. 50-55%
(b) Organised open space ……. 10-15%
(c) Utilities, services of facilities ……. 20-25%
(d) Roads, parking lots ……. 15-20%
(e) Others ……. 5-10%

2.2.5 **Site Planning**

(1) **Plot Areas and Coverages:**

The essence of fixing minimum plot areas is to prevent over-crowding, to ensure adequate light and ventilation and to facilitate easy movement of people, vehicles and goods. It is suggested that no industrial unit other than a service industry be allowed to allocate on a site less than **0.5 Acre**. The actual amount to plot size will depend on the type of industry, number of workers to be employed, and densities and plot coverages. It is also suggested that plot coverages should not exceed **75 percent** to allow for sufficient scope for circulation, utilities, services and facilities.

(iii) Building Lines

The objective of fixing building lines in industrial areas is to mitigate the effects of noise, industrial fumes, odour, dust, vibration, fire, heat, glare and other hazards. The following are the recommended setback lines from

centre-lines of roads to the property lines. These refer to sites devoted to only manufacturing industries and not to service industries.

(a) Major Communication routes (Highways) ……25m. to 31m.
(b) Spine Roads (Major roads) ……18m. to 21m.
(c) Collector roads ……. 15m. to 18m.
(d) Access streets …….. 12m. to 15m.

In exercise of the powers of the legislative supplement no. 43 legal notice 135 section 12 (1) where a provision has not been made for an access road then the building line should be **6m.** deep. Where an access road has been provided the building line may be **3m.** shallow.

2.2.6 **Road Reserves:**

Wide roads in industrial areas are suggested to provide for easy movement of people and heavy trucks, storm water drainage, conveyance of industrial effluents, laying out of sub-systems like water mains, electrical cables, gas mains etc. and for curb-parking, where necessary. The following widths of carriageways are suggested:

(a) Major Communication routes (Highways)…….13.5m. to 16m.
(b) Spine roads (Major roads) ……11.5m. to 13.5m.
(c) Collector Roads ……. 9m. to 11.5m
(d) Access streets …… 7m to 8.5m

The road reserves for the above suggested carriageways should take into account provisions for storm water drainage, conveyance of industrial effluents, water mains, footpaths and curb parking, where necessary. The following road reserves are therefore recommended:

(a) Major communication routes (Highways) …….60m.
(b) Spine road (major roads) ……25m.
(c) Collector roads …….18m
(d) Access streets ……. 15m
(e) Service lanes …… 6m.

2.2.7 PETROL SERVICE STATION PLANNING

(The Handbook adopts recommendations of the Nairobi City Council Town Planning Committee made on 9.5.2000)

Plot Size

(a) The plot size of petroleum retail business should be pegged on the category of the business. That is either petrol filling station or petrol service station.

(b) A petrol filling station should be of a minimum size of **0.08 hectares.**

(c) A petrol service without convenient stores/shops should have a minimum plot size of **0.15 hectares**

(d) A petrol service station with convenient stores/shops should be of a minimum size of a minimum size of **0.2 hectares**

Mixed Materials

(a) Within the petroleum retail precincts, other permissible user shall be limited to restaurants, bars and convenient shops only.

(b) No discotheques shall be allowed

(c) The auxiliary development should not comprise the principal user. In this regard, the principal user is to take 75% of the plot while the other permissible users will take the remaining 25% excluding their parking space.

(d) Separate sanitary facilities for staff and customers should be provided.

Building Materials

Developers should adhere to building material as stipulated in the building code and hence use of inflammable materials is not permissible.

Access

(a) No petrol stations should be sited opposite each other along two-way traffic corridor.

(b) Acceleration and deceleration lanes to be a minimum of 100 metres long each for dual carriage ways and minimum of 30 metres long each of two-way roads. Figure 2.1 gives an illustration of how the petrol station should be sited.

(c) Access to adjoining properties from feeder roads only

(d) Separate extended public access of not less than 15 metres to the nearest pump and 3 metres wide pavement for public access from service front for vehicular/pedestrian segregation.

Parking

Every petrol service station with a convenient shop/stores etc, shall provide one car parking space for every 4m square floor space of the shop/stores.

Environmental Standards

(a) To maintain high environmental standards to safeguard safety and health.
(b) No petroleum fumes or products should escape to the air, water, public drains and /or adjacent property.
(c) Contaminated oil and wastewater from wash bays and service bays should go through an interceptor prior to discharge into public drain.
(d) High standards of cleanliness should be maintained within the petrol filling or service station at all times.

Safety Measures

(a) To ensure safety within the premises, mandatory annual staff training and fire fighting
(a) Fire Aid kits in all stations and within easy reach.
(b) Fire extinguishers mandatory in all stations

Intervals between stations

The distance between stations shall be determined by the traffic volume on given corridors.

Figure 2.1 SITING OF PETROL SERVICE STATIONS

2.3 COMMERCIAL SERVICES

2.3.1 TOWN CENTRE

The town centre offers commercial and other related services that are used by the population of the town or urban area as a whole and also inhabitants of its hinterland. The most important requirements for a town centre are geographical centrality, accessibility to vehicles and pedestrians, ample parking space and high four different degrees of completeness in separating pedestrians from vehicles in a town centre:-

(a) remove through traffic by constructing a by-pass or relief road;

(b) interrupt continuity of streets within the centre by bollards or other means;

(c) remove vehicles from street and provide vehicular access and parking at rear of buildings;

(d) provide vertical separation of vehicles and pedestrians by constructing roads and pedestrians ways at different levels.

It is desirable that an area with heavier traffic volume should be converted into pedestrian area. However, numerous varieties of compromises are possible. It may, for example, be practicable to convert the shopping area itself into a pedestrian precinct. The provision of sufficient parking space within town centres is one of the most difficult planning problems. For large towns where a majority of the population own vehicles it is almost impossible to provide a central area parking at one level due to amount of space required that might be in excess of space occupied by commercial buildings. The alternative here is to encourage storeyed parking buildings. However the minimum plot size should be **0.025 hectares.**

2.3.2 Local Centres

Local centres are designated to serve a catchment population of 3500 – 5000 or 15,000. The type and number of services required for high income and low-income suburban or rural areas include the following:-

(iv) **Adjacent and Interdependent Activities**

These include:-

- market category B or C or D
- charcoal dump
- Primary school at 3500 catchment

A pedestrian shopper in the area should be provided with a market arrangement at 3500 population – 5000 include:-

- 2– 3 general shops
- 1 – 2 draper/clothes/tailors shops
- 1 butcher
- 1 bar
- telephone booths

For a catchment population of 15,000 provide the following additional facilities:

- subpost office with 1-2 telephone booths.
- draper/clothes shop.
- general shop/store.

(ii) **Parking Area**

Allow 10-2- parking spaces for 3500-5000-catchment population and approximately 45-6- spaces for 15,000 catchment in low-income suburban areas.

(iv) **Adjacent and Interdependent Activities**

These include:-

- Charcoal dump
- Market category A, B, or C.
- Kiosks
- Primary school
- Health centre with family planning service (15,000 catchment)
- Youth polytechnic centres (15,000 catchment).
- Secondary school (15,000 catchment).

For rural areas, we note that a 5,000 catchment population is analogous to designated local centre and 15,000 catchment population to a designated market centre. Accordingly the above facilities should be provided in designated local and market centres in rural areas.

2.3.3 **Intermediate Centre**

An Intermediate Centre is designated to serve a population of 15,000-50,000 people. It is analogous to designated rural centres in rural areas.

(i) **Type of Shops**

Approximately 20-30 shops and include:-

- 4--5 general shops
- 2-3 butchers

- 1-2 fruit /vegetable/flower shops (suburban areas)
- drapers/tailors shops
- 1-2 stationery /book/toy/ news agents
- 1-2 bakeries/cafes
- 1-2 bars
- 1 post office
- Banks (suburban areas)
- Petrol stations with separate access (suburban areas)
- 3-4 telephone booths
- 1-2 hairdresser/barber shops
- Commercial offices – either above shops or in separate buildings (suburban areas)

(ii) Adjacent and Intermediate Activities

These include:-

- Market categories A B C and D with workshops
- Charcoal dump
- Industrial estate
- Secondary school
- Health centre
- Social hall and community centre.

2.3.4 **Major Centre**

These centres are designed to serve a catchment population of 100,000-150,000. They are analogous to designated urban centres in rural areas and offer a full range of services usually associated with a town. As a guide to assessing land requirements, the following services and facilities might be required :-

- 50-60 shops of general convenience goods
- 4-5 major supermarkets or departmental stores dealing in specialist and luxury goods.
- 4-5 banks
- Major post office
- 1 minor post office
- Major post office
- Commercial offices
- Branch library
- Cinema halls

- Fire station
- Assembly hall
- Police station
- Sports and recreation centre
- 1-2 restaurants/hotels
- Small cafes and bars near bus station
- Bus station
- Hospital

2.3.5 Market Categories

Category A

Fenced area of land with central refuse collection point. Requires **0.05-0.2 hectare**. per 2000 low-income population in suburban areas.

(b) **Category B**

Fenced area of land with central refuse disposal point, central water point and water point and water closet. Requires **0.2-0.25 hectares.**

(c) **Category C**

Walled area of land. Grouped refuse collection points, hardstanding plots, central water points and water closets. Hardstanding surface, fixed stalls and divisions. Requires **0.2-0.28 hectare**

(e) Category D:

Walled area of land. Grouped refuse collection points, grouped water points and water closets. Hardstanding surface, fixed stalls and divisions.

Requires **0.2-0.28 hectare**

(f) Category E:

Covered market. **0.25-0.3 hectare.**

2.4 EDUCATIONAL FACILITES

2.4.1 Nursery schools:

Nursery Schools fall into 3 categories according to age groups they serve:

(i) **Day Care Centres**: - where infants between the ages of 1 day to 2 years are accorded the basic childcare.

(ii) **Kindergartens:** - where children between 2-5 years are oganised into play groups and taught object lessons.

(iii) **Nursery/Pre-Primary Schools**: - establishment of preparatory schooling at which children between 5-6 years are taught prior to joining primary school education. These institutions may be attached to existing primary schools.

(a) **Demand for Kindergartens and pre-primary schools**

On the basis of 40-70% demand for nursery schools and given that children between 2-6 years represent 14.8% of the total population in the country, then one school of 150-260 children will be required for a population of 2500.

(b) Distribution of Nursery Schools:

It is desirable that a pre-primary school is attached to every primary school. These schools will therefore follow the same distribution pattern as primary school at 3500 catchment population. In addition, a kindergarten independent of primary school, should be provided for 2500 catchment population.

(c) Land Requirements:

By their nature young children like playing in scattered groups and adequate land is needed to cater for their needs. An additional area of 0.15-0.25 hectare should be attached to every primary school at 3500 catchment population. Similar amount of area land is required for every 2,500 people in low-income areas and 3500 people in high-income areas

(d) Locational Requirements:

Nursery schools should be located within and integral to residential areas. Ideally, they should be located on major pedestrian routs so that the catchment pedestrian population should not cross major roads. At recommended densities for low-income housing, the nearest school would be within easy walking distance the 250-300 metres. In high –medium class areas, facilities should be available for dropping

and picking up children by car without obstruction on the main vehicular flows on feeder roads. Ideally nursery schools should not front roads.

2.4.2 PRIMARY SCHOOLS:

(a) **Demand for Primary schools**:

A primary school is an establishment providing basic education covering a period of eight years for children age between 6-13 years inclusive. Allowing for 100% demand for primary schools education and taking a pupil enrolment of 40 per class for a three-streamed school from class 1 – 8 i.e. 960 pupils per primary schools maximum, then one school would be required for a population of 3,500.

(b) **Distribution:**

The distribution of primary schools in urban areas on the basis of 100% demand should take into account the urban area's catchment population. This is so because pupils are known to move from surrounding rural areas into urban areas for school places. Allowing therefore for 12.5% pupil population from the surrounding areas, it is recommended that primary schools be provided on the basis of school/population ration of 1:3500 in urban areas and 1:4000 in rural areas.

(c) **Land requirements:**

The idea here is to provide the neighbourhoods with adequate land for primary schools with the future requirements being taken into account. It is suggested that an area of at least **3.25 ha**. Should be set aside, for every 3,500 population in urban areas and 4000 population in rural areas. However, reasonable variation may be made depending on recreational needs of the pupils. The 3.25 ha. Include an area of about **0.25 ha** for a nursery school. To economize on land and reduce on distance that pupils have to walk form one place to the other within the schools compound, it is suggested that tuition blocks, libraries and offices should be accommodated in well designed storeyed buildings wherever possible.

(e) Locational Requirements:

Primary schools require locations within residential areas related to principle pedestrian networks. At gross densities of 50 persons per hectare and above, each primary school should be within easy walking distance of 250-300 metres. At gross densities of below 50 persons per hectare, pupils will probably be taken to schools by car and faculties for safe collection and parking should be available.

2.4.3 SECONDARY/TECHNICAL SCHOOLS:

Secondary schools provide education for a period of four years to children who have completed standard eight in Primary School. Secondary school age of statistical purposes is taken to be from 14-17 years inclusive and this age group accounts for approximately 10% of the total population in Kenya.

(a) **Demand and Distribution of Secondary Schools**:

The demand for secondary schools education in Kenya ranges between 20% and 100%. On the basis of an average demand of 60% and taking into account that 10% of the population are secondary schools age then 1 school of 480 pupils would be required for a population of 8000. The distribution of secondary schools should therefore be on the basis of school/population ration of 1:8000.

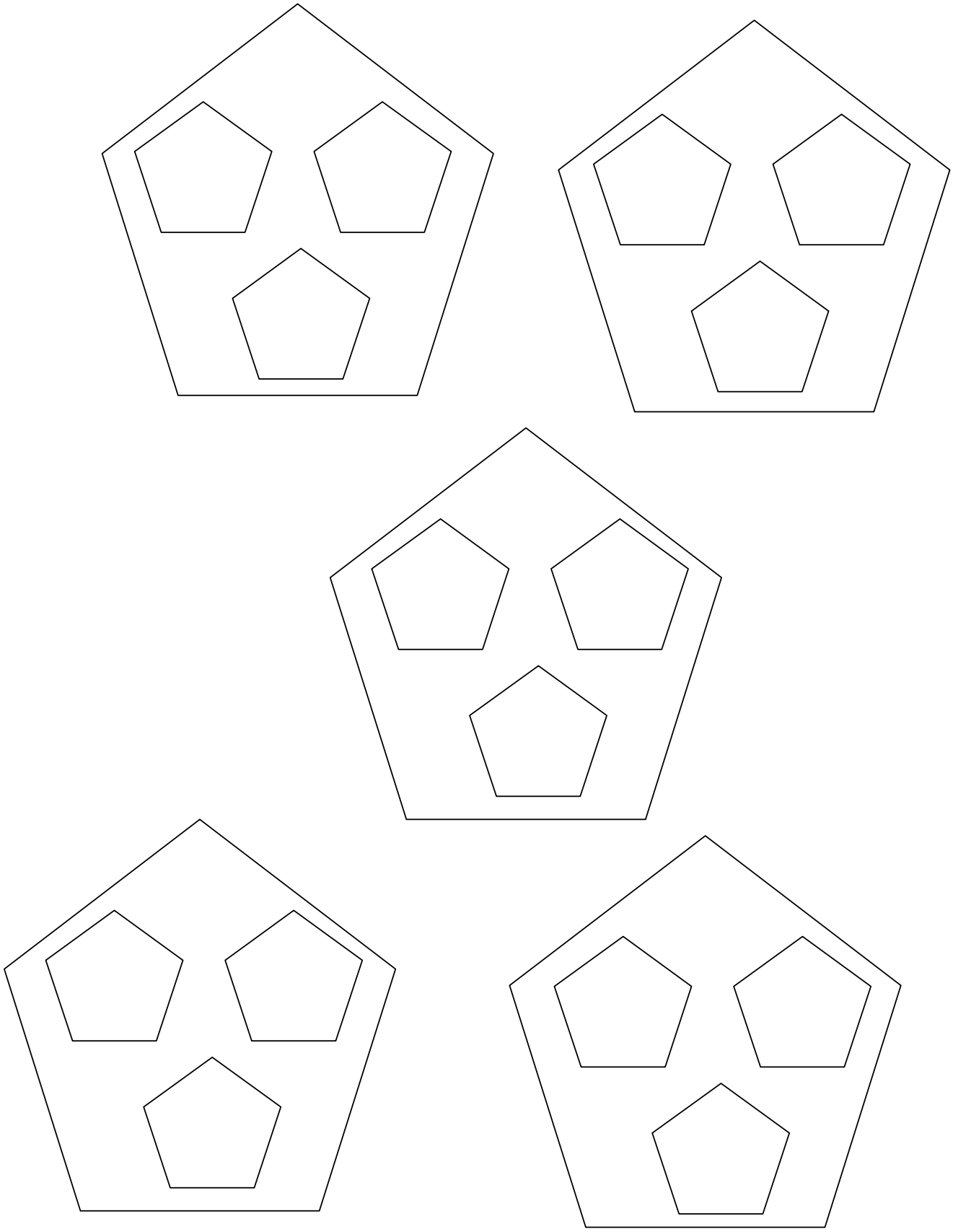
(b) **Land Requirements**:

Unlike a primary school, a secondary school needs more land for laboratories (chemistry, physics and biology), workshops, and assembly hall and playground for varied games. The land provided should therefore be used economically so as to leave room for future expansion. Storeyed buildings should therefore be encouraged, wherever necessary, for classes, offices and dormitories. This will help save a lot of land.

(c) Locational Requirements:

Secondary schools require location within residential areas related to principle pedestrian networks. At gross densities of 50 persons per hectare and above, each secondary school should be within an easy walking distance i.e. relative to pupils' ages of 500 – 600 metres. At gross densities lower than 50 persons per hectare pupils will probably be taken to school by car or by public transport and facilities for safe collection and parking should be available. It is necessary that planning applications for educational institutions should include details of all relevant information to facilitate the determination of amount of acreage they require. it also requires that after land for educational facilities has been allocated drawings of site layout plans be submitted to relevant authorities for approval to avoid haphazard development. In all cases educational institutions should be integrated with major open spaces whenever possible so as to encourage the sharing of the open spaces and playgrounds with members of the public. See further justifications for space requirements for various educational facilities

Figure 2.1



2.4.2 SPACE REQUIREMENTS FOR EDUCATIONAL FACILITIES

A NURSERY SCHOOL

(a) Nursery School Concept:

- Classes 1-4 plus administration
- 25 children per class
- Age Group 2-6years
- Mixed School
- Circulation space per pupil of 2.46m²

(b) Basic Outdoor Playing Facilities

- Soft play areas (grass)
- Sand pit
- Swing/seesaw
- Circulation space

(c) Space requirements

(i) Single Stream (100 Pupils)

Recreation and Circulation

* Soft play area (grass)	246.00m²
• Swing/seesaw	28.60m²
• Sand pit	28.60m²
• 10% circulation space	24.60m²

Accommodation

* Kitchen	9.10m²
* Office/store	10.20m²
* 4 classrooms @ 55.10m	220.40m²
* Sanitation block	15.30m²
* Parking	104.92m²
Total	**687.72m²**

Therefore minimum area for a single stream is approximately 0.10 Ha. or 0.25 acre.

(ii) Double Stream (200 pupils)

• Single stream	687.72m²
• 4 classrooms	220.40m²

• Staffroom	6.83m²
• Sanitation Block	15.30m²
• Outdoor facilities	553.90m²
Total	**1,484.15m²**

Therefore minimum area for a double stream is approximately 0.15 Ha

(iii)Triple stream (300 pupils)

* Double stream	1,484.15m²
* 4 classrooms	220.40m²
* Sanitation Block	15.30m²
* Outdoor facilities	553.90m²
	2,273.75m²

Therefore minimum area required for a triple stream is approximately **0.23 Ha.**

Where sleeping facility is proposed on the plot, then it would be necessary to increase the plot size relative to the ratio applicable in the area to accommodate the building and circulation space.

(iv) Day Care Centres (Based on 9 pupils playgroup concept and age group 1 day to 2 years.)

* Residential (Medium income)	136.61m²
* Residential circulation space	253.64m²
* 1 classroom	13.66m²
* Reception area	2.28m²
* Kitchen	5.46m²
* Sanitation	5.01m²
* Play area of 2.48m per pupil	22.32m²
* Access/parking area	62.75m²
	501.73m²

Therefore minimum are required is **0.05 Ha.**

B PRIMARY SCHOOL

(a) Primary School Concept

- Classes 1 – 8 plus administration
- 40 students per class
- age group 6 – 13 years
- Co-educational facility
- Circulation space per pupil of 6 m²

(b) Basic Outdoor Sports Facilities

- Soccer field (medium)
- Netball
- Athletic track (cricket)
- Swimming
- Hockey field
- Gymnasium
- Tennis Court etc….

(c) Space Requirements

(i) Single stream (320 pupils)

Accommodation

• Administration	200m²
• 8 classrooms	448m²
• 1 laboratory	135m²
• 1 homescience block	168m²
• Sanitation block	40m²
• 1 workshop	170m²
• 1 Library	190m²
• Assembly Hall	656m²

Recreation and Circulation

• Circulation @ 6m per pupil	1920m²
• 1 Soccer field 80 x 100	8000m²

• 1 netball field	255m²
Total	**12,182m²**

Therefore minimum area required for single stream is **1.2 Ha.**

(ii) Double Stream (640 pupils)

• Minimum single stream	12,000m²
• Circulation space	1,920m²
• Netball	255m²
• Swimming pool	135m²
• Gymnasium	255m²
• Hockey pitch	5,060m²
• 1 laboratory	135m²
• Workshop	170m²
• Sanitation block	40m²
Total	19,970m²

Therefore minimum area required for a double stream is **2.0 hectares.**

Note : Classroom not included due to storey concept.

(iii) Triple Stream (960 pupils)

• Double stream	19,970m²
• Plus 8 classrooms	448m²
• Circulation space	1,920m²
• Soccer pitch/athletic track	800m²
• Netball	135m²
• Tennis court	140m²
Total	**31,253m²**

Notes:

1. The above minimum averages assume an average of 40 pupils per class and that the classes will be from standard 1 to 8. to the above acreages **add 0.4 – 0.8 ha.** for agricultural demonstration plot.
2. it should be noted that since all schools expand, even if a school will start as a single stream initially, it should be allocated the minimum **3.9 ha.** so as to forestall the problem of land shortage in case there is need for expansion.
3. The maximum number of children is limited to **960** in order to avoid the risk of congestion in using facilities like playgrounds, libraries and classes. Each school should therefore be developed to a 3 stream capacity.
4. In case members of the teaching staff have to be accommodated on the compound, then an additional land of **0.8 ha**. should be allocated for the purpose of housing. The houses should be **flats** wherever appropriate to economize on space.
5. If a boarding school, then **0.4 ha**. should be added to cater fore every 200 students in terms of dinning halls together with dormitories, preferably storey buildings.

C SECONDARY/TECHNICAL SCHOOL

(a) Secondary School Concept

- Administration, classrooms, hall, library, laboratories, workshops, canteen, car park, staff-quarters sanitation etc.
- 40 students per class, form I to VI
- co-educational facilities with equal number of boys and girls.
- Age group 14 – 17 years inclusive.
- Circulation space per pupil of 6m²
- Playfields.

(b) Space Requirements

(a) Single stream (160) pupils

Recreation and circulation

- Maximum size of soccer field with cricket and athletic track (95 X 180) 17,100m²
- Medium size practice soccer/hockey field equal (dual use (90 x 100) 9,000m²
- Netball (18 x 33) 594m²

• Tennis Court (22x 24)		528m²
• Swimming pool (20 x 25)		500m²
• Gymnasium (33 x 36)		1,188m²
• Circulation (6 x 160)		960m²
Accommodation		
• 4 classrooms		224m²
• 3 laboratories @ 343.8m²		1,031.4m²
• Art and crafts block, domestic science		281.3m²
• Workshop		281.3m²
• Library		781.3m²
• Administration		199.6m²
• Assembly Hall		1,093.8m²
• Sanitation Block		67.2m²
	Total	**33,829.9m²**

Therefore minimum area required for single stream mixed secondary school form I-IV is **3.4 hectares.**

(ii) **Double stream (320 pupils)**

• Minimum single stream	33,829.9m²
• Netball	528.0m²
• Circulation	960.0m²
• Sanitation	67.2m²
	35,385.1m²

Therefore minimum area required for double stream mixed secondary school form I – IV is 3.5 hectares.

Note: Additional classrooms are not included due to storey concept.

(iii) **Triple stream (480 pupils)**

• Minimum double stream	35,385.1m²
• Foot-ball field	9,900.0m²

• Circulation	960.0m²
• Classrooms	224.0m²
	45,469.1m²

Therefore minimum area required for triple stream mixed secondary school is **4.5 hectares.**

Notes:

1. At schools where the teaching of agricultural courses is to be provided additional land estimated at 10% of the above minimum space requirements will have to be provided.
2. Where schools by virtue of their geographical siting, the stipulated minimum space requirements cannot be met., share use of sports facilities should be encouraged so long as such sharing does not adversely affect required area and the net benefits derived by each of the sharing schools.
3. In case members of the teaching and subordinate staff have to be accommodated at the compound, then an additional land of bout 2.5 acres should be allocated for the purpose of housing. In such cases, for the purpose of economy, vertical development concept will have to be encouraged.
4. If a boarding school, then 1 acre should be added for every 200 pupils in terms of dining halls together with dormitories, preferably storey buildings.
5. The minimum acreages proposed above assume an average of 40 students per class and that the classes will be from form I to IV. Since all schools expand, even if a school will start a single stream initially, it should be allocated at least 6.9 hectares so as to forestall the problem of land shortage in case there is need for expansion.
6. Maximum size of school is limited to 480 pupils to avoid risk of congestion in using facilities like playgrounds, libraries and classes. Each school should therefore be developed to a three stream capacity.

2.5 RECREATIONAL AREAS:

2.5.1 DEMAND FOR RECREATIONAL FACILITIES

There are several socio economic factors among the urban population that suggest a real need for a generous provision of green spaces within the urban environment. These include:

(a) New urban population

The majority of adult population in urban areas are migrants from rural areas and show a strong attachment to the land. The rural environment has been a formative influence in their lives.

(b) Low earnings

The majority of the population lack money for all but their basic needs. They are therefore essentially pedestrian and their recreation must be found within walking distance to their homes. They cannot afford much living space and tend to live in cramped overcrowded conditions. Some relief is necessary from the pressure generated by overcrowding.

© Population Structure

Majority of the population in major urban areas are under 25 years. Open spaces are therefore necessary for their health physical and psychological development. Overcrowded living conditions, lack variety in the environment and lack of opportunities for independent play and exploration during the early years of children tend to inhibit their intellectual development. It is therefore essential to provide opportunities for children to play in safe attractive and stimulating surroundings within the residential areas.

(c) Limitations on Public Expenditure

Public funds are limited and this could result in poverty of the man made environment. A sensible landscaping policy could be one of the cheapest and most effective way of counteracting eyesores in the manmade environment; producing an urban environment in which it is attractive to live and work and providing areas of inexpensive recreational opportunity.

2.5.2 RECREATION IN REGIONAL CONTEXT

Recreation at this level is related mainly to car owner, weekend tripper or tourists. The urban population and to some extent local opulation uses it primarily at weekends or during holidays.

The recreation areas here include:-

(a) areas of natural scenic beauty in the urban region:

(b) ridges in the urban region that have been tree lined;

(c) water courses with demarcated riparian reserves: and forest and

(d) Forest and nature conservation areas.

The above areas need to be identified in the urban region, gazetted and developed or conserved as nature conservation and/or recreational areas. They should be provided with public access and catered for recreation use by providing car-parking spaces, picnics sites and refuse disposal at beauty spots. Tourism and recreational developments to be stimulated in the above areas should be compatible with surrounding land use patterns, cultural values of the local population and not injurious to the natural attraction of the area.

Other potential regional recreational areas include:-

(a) well maintained road reserves that have been tree lined: and

(b) Well maintained rural settlement land use patterns with clearly demarcated cadastral boundaries.

2.5.3 RECREATION IN THE URBAN AREAS:

These include such facilities as major open spaces (parks and buffer zones), stadia, sports complexes, theatre, cinemas, restaurants, etc. These demand the market of a total urban population including local and foreign tourists. It is not possible to fix standards for open spaces at the urban level as these essentially develop from opportunities in the environment.

(a) Major Parks:

Although each park will have its own special character as determined by its topography, historical associations and immediate surroundings, it should however be able to provide a wide range of recreational opportunities from among the following:-

(i) areas of visual relief screened from surroundings:

(ii) areas for setting in quietly with scented gardens, colour gardens, flower and shrub displays, small enclosures, etc:

(iii) areas for walking through such as quiet paths, shades avenues:

(iv) areas for botanical collections and exhibitions;

(v) areas for open air exhibitions of sculpture, paintings, photography, etc;

(vi) areas of flat expanse which encourage ball games, running about and exercising in addition to providing space for displays, fairs, shows, etc;

(vii) areas for organized sports such as cricket, tennis courts, etc;

(viii) arena for open air display of traditional dancing, plays, concerts, shows, mass meeting, etc;

(ix) developed artificial lakes and pools ornamentals, boating, fishing, collection of water plants and water fowls, etc; and

(x) children play groups.

(b) Buffer Zones:

These include 10-30 metres green belts on either side or urban ring roads and bypasses and green belts created to prevent pollution between conflicting and non compatible land uses, for example between industrial and residential areas and between main roads and residential, industrial and commercial areas. These open spaces should be landscaped with some of the recreational opportunities listed above and be provided with refuse disposal.

(c) Major Sports Complex:

Large areas should be set aside for intensive sporting activities. The activities would include; yatching Marina, athletic tracks, enters , indoor games, hardcourts, swimming pools, golf and putting ranges- with spectator facilities, catering establishments etc. they should be well served by public transport.

(d) **Entertainment:**

Facilities such as theatres, cinemas, restaurants, nightclubs will develop primarily in the central areas and subsidiary enters. These will probably increase proportionally as the urban area grows in scale.

(e) **Library – Art Galleries Museums**:

Expenditure on these facilities will grow proportionally as the urban area grows in scale and can support a demand for them. Increase in education should increase the demand for these facilities and they should be closely incorporated into the curricular activities of education institutions.

(f) **Sports and Social Clubs**:

These are primarily private clubs which provide facilities for various sports or games e.g. golf, tennis, squash, swimming etc., together with club houses for social and cultural exchange.

2.5.4 RECREATION IN ESTATES/COMMUNITY LEVEL:

(a) Parks:

Distribution:

There should be a small area of recreational space within walking distance of all areas with a residential density above 50 persons per hectare. It would probably be 1-2 hectares per 10,000 populations in areas above 50 persons per hectare.

Location:

For this area to be used most effectively it should be closely related to the following facilities within the urban area: - community centres and social halls, health centre, local shops, primary and secondary schools. It may also be used as a landscaping buffer between major roads and the housing areas and between industrial areas and housing.

Facilities:

Besides ornamental landscaping features the part should include 1-2 playing fields and children's equipped playgrounds. In some parks there may be hard courts, in others there may be adventure playgrounds or other special features.

(c) Social Halls and Community Centres:

Distribution:

The demand for these facilities will probably be around 1 to 20,000 Population catchment. Land needs approximately **0.25 hectares** to be located in positions along main pedestrian routes not isolated and away from main lines of pedestrian movement.

(d) Play areas for small children and their mothers start immediately outside the Indoor housing areas. There must be areas adjacent to each house that are safe for play and do not conflict with vehicular traffic

(e) Landscaping devices such as screen mounds, hollows, trees and bushes, low walls etc. should be provided in children playgrounds.

2.5.5 RECREATION ALONG ROAD RESERVES

In planning for open spaces due considerations should be given to the patterns of roads designs, and also to their relation to open spaces. Open spaces with road reserve frontages should be avoided as much as possible to reduce construction cost to the Government. In certain instances these could be planned in such a way that they are opposite plots intended for private alienation so that the Government can share costs of road construction with the private developers.

2.6 PUBLIC PURPOSES

2.6.1 HEALTH SERVICES

(a) Distribution:

Health services are deployed by the central government through a network of provincial, district and sub-district hospitals. At local government/authority level we have heath centres, sub-centres and dispensaries. Kenyatta National Hospital is the central referral and teaching centre.

Church missions, industrial health units and private institutions and individuals also provide a variety of health services. However, these have tended to concentrate in a few urban centres with appropriate infrastructural base. Their development has rendered health services to be geographically, socially and economically accessible to the rich.

(b) **Location and Land Requirements**

The preferred location for health services should be easily accessible by an ambulance and be provided with basic infrastructural services. Dependent on the level of health service, it is necessary to reserve adequate land for future expansion and for public cemeteries. The latter should be conveniently located relative to the health facility, major open spaces and other compatible public utilities. It is recommended that applications for health facilities should be accompanied with details of site requirements to facilitate reservation of adequate land. However a minimum of the land requirements derived from empirical observations are made as follows:

- National referral hospital 20 hectares
- Provincial hospital 8 hectares
- District hospital 8 hectares
- Subdistrict hospital 4 hectares
- Health center 3 hectares
- Subhealth centre 2 hectares
- Nursing Homes 0.4 hectares
- Veterinary clinic 0.1 hectares

2.6.2 ADMINISTRATIVE AREAS

These are areas/zones where public buildings/offices are sited for the purposes of administering public matters and rendering services to the general public. Other facilities provided within the administrative areas include:- banks, parking, maintenance depot, entertainment, postal services, baby care units, clinics and caretakers apartment.

(a) **Classification**

The public buildings/offices may be broadly classified on the services they render. They may therefore be categorized as follows:

- Professional e.g. lawyers, engineers, architects, planners, etc.;
- Commercial – insurance, import/export firms, utility undertakers, manufacturing firms, etc.;
- Civic offices:- central government; local authorities, parastatals, trade unions, political party offices, etc.

Locational Factors

Generally administrative offices are considered as part of town centre activity. The nature of some of these offices may require that they be sited away from the administrative zones, e.g. professional, manufacturing and utility undertakers offices. This is because of the need to interact closely with members of the general public or their unique space requirements.

For the town centre based offices their location and siting need to satisfy the following basic factors:-

- Geographical centrality
- Spatial compactness
- Public parking
- Accessibility

2.6.3 LAW AND ORDER

These include: -

- Administrative Use
- Police stations
- Law courts
- Prisons

(a) **Administrative Centres**

They include D.O.'s offices, Chief's camps. They are all district centre activities. Minimum land requirements for the various offices for use by the administration are:

- National **40 hectares**
- Provincial **20 hectares**
- District **20 hectares**
- Division **10 hectares**
- Sublocational **1 hectares**
- Chief's camp **0.4 hectares**
- Subchief's **0.2 hectares**
- Town Halls **1.2 hectares**
- County Halls **1.2 hectares**

(b) Police Stations

The locations of police stations depend on their functional requirements. If their administrative function is dominant they may locate in district centres but generally they may locate in district centres but generally they should locate within residential neighbourhoods. There may also be need to provide police stations within large commercial/industrial areas and large institutions.

Space requirements should take into account residential, remand facilities, administrative facilities at different levels, parking and open spaces for recreation and for future expansion. Proposed space requirements for the various levels of stations are:

- Police stations **5 acres**
- Police post **2.0 hectares**

  Patrol base **0.2 hectares**

(c) **Law Courts**

These are town district centre activities and their location depends on their level of service. Proposed minimum space requirements at various levels of court services are:

- Higher court **2 hectares**
- Lower court **1 hectares**
- District Magistrates Court **0.5 acres**

(d) **Prisons/Remand Homes**

Prisons are big land consumers and therefore not suited for location in urban areas. They should be located on the urban fringes particularly in areas where urban expansion would not be unnecessarily curtailed. A minimum of **8.0 hectares** should be reserved for this user. Juvenile homes are also considered and a minimum of **2.0 hectares** proposed.

2.6.4 **COMMUNITY CENTRES**

As the name denotes these are community facilities and therefore an integral part of residential neighbourhood. They include social halls, libraries and cultural museums. The size and level of the activity depends on the catchment population. The dominant use is recreation although they accommodate a small element of administrative offices. The site for a community centre must be readily accessible to the whole area it has to serve, and should if in any way possible, be in close association with the sports centre and public swimming pool, if such exist. A minimum of **1.0 hectare** is proposed

2.6.4.1 **RELIGIOUS INSTITUTIONS**

They include churches, mosques, temples and shrines. Although they are essentially places of worship they also comprise premises for other socio-cultural facilities such as schools and dispensaries. Hence when planning for them provision must be given for their possible future expansion. Due to the increased use of the church compounds during weekdays as education or health facilities, it is important to locate them within the residential neighbourhoods. Some exclusive churches need to be provided on the central business district fringes while a mosque and temple may be located within the central business district to cater for the business community. A minimum of **0.1 hectares** space provision is adequate

2.6.4.2 **FIRE STATIONS**

For high-risk areas - there is need for accessibility to major road network. Land required is **0.4 hectares** minimum to include station, staff accommodation and drilling area. A small fire station would require 1 fire engine and at least 30 staff members to cover a population of between 50,000 – 100,000 depending on degree of fire risk.

2.6.4.3 **LIBRARY**

The site for a library should be chosen to give the maximum of quiet but at the same time it should be conveniently situated in relation to the population it is to serve. Good light and ample surrounding air space are essential and consequently sites congested by surrounding buildings should be avoided if possible. **0.4 hectares** should be provided for this facility.

2.6.4.4 **POST OFFICE**

Full postal facilities should be provided in any designated rural centre or estate which serves a resident population of about 2,000 – 10,000 and rural population of 40,000 people. While a market centre that is designed to serve approximately 15,000 rural people and a resident population of less than 2,000 people should have a sub-post – office**. 0.1 hectares** are adequate for a post office.

(g) Category D:

Walled area of land. Grouped refuse collection points, grouped water points and water closets. Hardstanding surface, fixed stalls and divisions.

Requires **0.2-0.28 hectare**

(h) Category E:

Covered market. **0.25-0.3 hectare.**

GUIDELINES FOR THE LOCATION OF INFRASTRUCTURAL FACILITIES AT VARIOUS LEVELS OF CENTRES						
Level of Centers	Administrative Services	Civic Services	Communication Services	Educational Services	Health Services	Recreational and other Social Services
Principal Town National capital	Government Ministries High Court National Police Headquarter		International Airport International Bus Services	University Teacher training College (secondary level) Technical college	Hospital (national standard)	
Principal Town Municipalities	Provincial Administration Resident Magistrates Court	Fire Station	Served by International/National trunk road Head post office facilities Telephone (automatic exchange) Regional bus services Airfield	Teacher training college (Primary level) Technical School (secondary level)	Hospital (Provincial Standard)	Museum / art center

Other Urban Centres	District Administration District Court Divisional Police Headquarter		Served by National trunk primary road Airstrip	Secondary school Technical school (primary level)	Hospital (district standard)	Stadium Public Library Recreational Park Cinema Show ground
Rural Centres	Divisional Administration Police Station	Sewerage Disposal Grid Water Supply Electricity	Served by primary /secondary road Departmental post office	Secondary school Youth Polytechnic	Health Centre (Maternity unit)	Mobile Library Service Sports Field Social Hall Mobile Cinema
Market and Local Centres	Locational and Sublocational Administration Police Post	Public Water Supply	Served by secondary/minor road telephone (manual exchange) sub post office Airstrip (only remote areas) Local bus services	Secondary School Primary School Nursery School	Dispensary Family Planning Service	

Notes: 1. Private sector facilities, e.g. commercial and industrial undertakings, will be located in service centres according to the economic development potential.

2. To the services listed against each level of centre should be added those services listed against the centres of lower levels e.g. in most cases a rural centre will also have all services existing in market and local centres.

2.7 PUBLIC UTILITIES

2.7.1 WATER SUPPLY

(a) **Protection of Water Intakes**

A protection belt should be provided for underground water intakes comprising direct protection and indirect protection. In areas of direct protection, a belt of **10m** wide should be provided surrounding the well or group of wells and which should be fenced.
General traffic should be avoided if the distance between the wells does not exceed **50m.**
Indirect protection consists of a protection belt of a minimum **50m** wide surrounding the water intake area without any need for fencing. This belt will be widened proportionally according to the varying circumstances relevant to ground water source. And since this type of protection requires vast areas of land, it is possible to utilize the protection belt for agricultural irrigation. Provided, however, that this utilization is not used for the establishment of gardens, playgrounds or forests or in any other way which result in the pollution of water sources like septic tank, disposal grounds of animal stable.
Industrial standards should be applied for the protection of residential areas from pollution that may result from the desalination plants. The distance between these plants and the residential areas should not be less than **100m** in order to avoid the noise resulting from the pumps.
Nearly all-public water supplies are protected against bacteriological contamination by chlorinating or other processes. Water treatment plants utilizing chlorination should be at least **300m** away from residential areas.

(b) Service Reservoirs:

The provision of service reservoirs, and where necessary, elevated storage tanks is recommended for all water supply utilities. In particular, hospitals, institutions and industrial plants should be provided with separate elevated storage tanks. Minimum space requirements are **0.1 hectare**

(c) **Distribution**

The distribution system, which carries the water from the reservoirs or pumping stations to users, should consist of a network of underground pipes following,
general, the street network. Since water is under pressure, water lines can be laid up hill and down, following topography as desired. Water lines should be laid at a depth sufficient to protect against frost damage. The minimum size of pipes is usually set by fire protection requirements.

2.7.2 SEWAGE SYSTEM

(a) **Collection and Treatment works**

It is recommended that sewage collection and sewage treatment plants be considered for all settlements with a population of 3,000 or more having an urban layout. In settlements where an integrated sewage scheme is not provided provision should be made for septic tanks. Care must be taken to ensure that sewage effluent does not infiltrate ground water aquifers in a manner causing pollution of water sources. The treatment plant should be sited as far as is practicable from the boundaries of the master plan area, down wind of the prevailing wind direction. **A surrounding tree belt is desirable both as protection against blowsand and for enviromental purpose.** The land requirement for sewered areas is **75 square metres** whereas for unsewered areas is **110 square metres**.

(b) **Storm Water Drainage**

Storm sewers are used to collect and carry rain or surface water to some natural water course or body of water in such way as to prevent flooding. In a sense Storm sewers are artificial watercourses.

A system; should provide for the drainage of storm water in major residential areas where annual rainfall exceeds **200mm.** A minimum of **2 hectares** should be provided for this facility. However, in smaller districts and others of dispersed housing, no storm system needs to be provided. In dry areas where annual rainfall does not exceed **100mm.**

Provision of surface drainage in low-lying areas alongside roads and concreted areas will suffice for the flow and drainage of storm water therein.

The table below gives some provisions for Wayleaves for the facilities listed above.

FACILITY	WAYLEAVE
Drainage Wayleaves	3m – 4.5m
Anti Malarial Wayleaves	4m
Building Clearance	1.5m, 2.5m, and 7.5m
Septic Tank Clearance	6m.

2.7.3 GARBAGE COLLECTION AND DISPOSAL

Garbage disposal systems are of three kinds namely:-

(g) Garbage collection and burial;

(ii) Incineration (burning);

(iii) Collection and transportation units (Garbage Manufacture)

The following table shows the information relevant to the disposal system:-

DISPOSAL SYSTEM

Disposal.	No of inhabitants	Location	Protection Area
Garbage collection and burial	50000 in one settlement or more within a radius of 25km	Outside residential settlement	No less than 1km for urban Areas
Incineration of Hospitals and slaughter houses, garbage disposal	Same as above	Outside settlement in Industrial zones	Industrial standards adopted affective or heavy
Collection	100000 or more	Same as above	Same as above

It is proposed that garbage collection points be provided with **0.1 hectare** while dumping sites are provided with **2 hectares**

2.7.4 ELECTRICITY POWER LINES

The table below specifies recommended power line wayleave trace.

CAPACITY OF POWER LINE	WAY LEAVE
11 KV	10m
33 KV	20m
40 KV	20m
66 KV	30m
132 KV single circuit towers	50m
132 KV double circuit towers	60m

In all cases, the distance between the power line and the ground below must not be less than six (6) metres. Furthermore, high-tension lines must not be passed over buildings constructed in the path of such lines.

2.7.5 TELEPHONE

Telephone lines and cables in most cases utilize the road reserve space, except for lines branching off from the road that a wayleave has got to be provided. The Kenya Posts and Telecommunications (now Telkom and Posta) has recommended the provision of 25-35 lines per 100 inhabitants by the year 2000 based on
the international standards set by ITU. The role of a physical planner here is therefore limited only to providing adequate space or wayleave to accommodate the cables and lines. In cases were utility networks are laid outside roads or public pathways and in cases where there are natural or man-made channels passing along public roads and pathways, a path should be specified for such utilities in order to protect it against damage, loss etc. Such paths should be clearly marked on maps and visible on site and no permanent or temporary establishment may lead on the same or storage of goods thereon**. Plantation of trees with deep running roots capable of causing damage to the networks for channels should also be avoided.**

The nature of activities involved in the transmission of information via both the telephone exchange and boosters demands that an **environmental impact assessment** report be done. It is recommended that location of the telephone exchange and the boosters be done

in accordance with the requirements of the Communications Commission of Kenya and the National Radiation Board to ensure the safety of both man and the environment. Minimum space of **0.4 hectares** and **0.25 acres** may be provided for the telephone exchange and booster respectively.

2.8 TRANSPORTATION

2.8.1 RURAL ROAD NETWORKS

(a) International Trunk Roads (Class A)

These are roads linking centres of international boundaries or terminating at international ports. They are provided with a road reserve of 40 metres or 60 metres. The road reserves are provided to accommodate future road connections or changes in alignment, road carriage width or junction layouts. The minimum road of 40 metres should be adopted only when it is necessary for economic, financial or environmental resources in order to preserve valuable land resources or existing development or when provision of the desirable width would incur unreasonable high costs because of physical constraints. For dual carriage roads, it may be necessary to increase the road reserve width above recommended values.

(b) National Trunk Roads (Class B)

These are roads linking national important centres, such as municipalities and/or district headquarters. Since in most cases national trunk roads also constitute international trunk roads, similar road reserves as in (a) above are applicable.

(c) Primary Roads (Class C)

These roads connect or regional/provincial centres to each other or to higher classes roads. For regional development planning purposes it is recommended that all designated urban centres should progressively be linked by means of primary roads as a minimum. They are provided with a road reserve of 40 metres.

(b) **Secondary Roads (Class D)**

These roads link important local centres to each other or to higher classes roads. In this regard, it recommended that all designated rural centres should progressively be lined by means of secondary roads as a minimum. They provided with a road reserve width of 25 metres.

(e) **Minor Roads (Class E)**

These are roads linking local and market centres to higher classes roads. They range between 3 to 5 kilometres and are provided with a road reserve width of 20 metres.
It is necessary to increase road reserve widths for sections of the above classified roads passing in urban centres.
This is in order to allow for parking, segregation of traffic or for controlled accessibility to properties.

2.8.2 **URBAN ROAD NETWORKS**

(a) **Primary Distributors**

These are sometimes referred to as arterial, major or urban freeway roads. They form the primary toad network for an urban area as whole. All external through traffic movement to, from and within the urban area are channeled to the primary distributors, which are intended for free flow of traffic.

(b) **District Distributors**

These are also referred to as collector or minor roads. They distribute traffic within residential, industrial and central business districts of the urban area. They form the link between primary network and various neighbourhoods and localities.

(c) **Local Distributors or Feeder Roads**

These roads distribute traffic within neighbourhoods and localities. They form a link between district distributors and access roads.

(d) **Access Roads**

These roads give direct access to buildings and land within neighbourhoods and localities. They include:

(h) **Cul-de-Sac or Dead-end Streets:** meant to eliminate through traffic in a cluster of houses. Therefore, to retain their inherent advantage they should be short, normally up to a maximum of 60 metres.

(ii) **Loop Street or Crescent:** a variation of the Cul-de-Sac but eliminates the necessity of dead-end and therefore provide continuous circulation in the residential cluster and ensure easy accessibility to properties without road frontage.

(iii) **Service Lane:** this is a road parallel to main access road to buildings provided for parked loading or off-loading of goods. Service lanes should be separated/screened from the main roads using buffer zones.

2.8.3 **URBAN ROAD RESERVES**

Urban road reserves require more generous space provision because of additional street furniture and infrastructural facilities that have to be provided. In most instances, the road has to accommodate multiple functions that have to be independently provided in design. Wayleaves for trunk services such as water and sewerage, underground telephone cables and high voltage power lines, when provided along road reserves require additional provision.

Further, the role of the informal sector in job creation in urban areas has now been recognised. Most of the informal activities are footloose and heavily dependent o

passing trade. They therefore require specific provision when located within road reserves.

Because of the above reasons, the following urban road reserve widths have been recommended:

Primary Distributors

- Major communication routes **60m.**
- Important through – routes **30-36m.**

District Distributors

- Spine roads and roads in commercial or industrial areas **25m.**
- Bus routes **18m.**

- Local distributor roads with no direct vehicular access to Individual plots. **18m**

Local Distributors

- Major access road exceeding 150m in length **15m.**
- Access road not exceeding 150m in length (normal Residential street) **12m**

Access Roads

- Cul-dec-Sac or short connecting road not exceeding 60m. **9m**
- Service lanes **6m.**
- Cyclist lanes **3m**
- Footpaths **2m.**

2.8.4 **DISPLAY OF ADVERTISEMENTS**

These refer especially to billboards. Though used by producers and industrialists to highlight certain qualities and properties intended to attract the attention of potential customers; they are also responsible for obstructing motorists view, cause of road accidents and generally pollute the environment. Because of these

reasons and further to rule 26 (1) of the legal notice no. 135 of 1998, Regulations to Physical Planning Act of 1996; it is advised that:

- Advertisements should not be displayed within **30m** of the carriageway
- They should not be displayed within **30m** of junctions and roundabouts

- They should be buttressed from the road sides to avoid incidences of falling on the carriageway
- They should not be less than **3m** from the ground and not more than **6m** from the ground.
- Bill boards should have a maximum area of 6.0 square metres

2.8.4 **INFRASTRUCTURE STANDARDS**

(a) **Carriageway Widths**

The following are the recommended carriageway widths:

Trunk and Major Roads	**7.5m or more**
Commercial and Industrial streets	**7.0m or more**
Spine Roads and Bus Routes	**7.0m**
Access Roads (in residential areas)	**5.5m**
Cul-de-Sac (not exceeding 60m)	**5.0m**

The standard provision for footpaths shall be **2m wide footway** on each side of the carriageway, subject to the following relaxations:

(i) For Cul-de0sac serving less than 10 plots a single footway will suffice.

(ii) Occasional obstructions shall nowhere reduce the footway width below **1.2m.**

Pedestrians shall be physically separated from moving vehicles by a barrier such as an upstand kerb, open drain or wide verge.

(b) **Car Parking Space**

Public parking spaces should be provided in urban areas within residential areas, industrial zones, commercial zones and social facilities, recreation and sports areas. In the central commercial and business zones, multi-storey car parking should be considered as a long-term prospect. In residential areas, where on-street parking is not practicable, public car parks should be provided.

The maximum distance between a dwelling and its associated parking area should be 50m. A standard of 15-35 square metres parking space per car is recommended. The dimensions recommended are:

(a) **Flush Parking**

5.0-5m by 2.5m for cars

10.0m by 3.3m for buses

30.0m by 4.om for trailers and trucks.

(b) Angle Parking

5.0-6.5m by 2.5m for cars

10.0m by 3.3m for buses

40.0m by 2.5m for trailers and trucks at an angle of 30 degrees.

Angle parking has an advantage of concentrating more vehicles within a given location but demand wider road reserves than flush parking.

The following are standards for car parking requirements:-

STANDARDS FOR CAR PARKING REQUIREMENTS

Usage	**One Car space for every usage**
Housing	2 houses or lodgings
Specialized market place	50 to 60sq. m of covered area
Market	30 to 50 sq. of covered area
Office and Administration	50 to 60 sq. m of covered area
Hotel	5 to 8 beds
School	(a) 0.5 classroom/secondary school and above (b) 1.0 classroom/ below secondary school level
Restaurant, Cinema and Theatre	12 seats
Mosque / churches	10 to 12 prayer space
Hospital	5 to 10 beds
Sports field	10 to 20 seats or spectators
Industrial establishment and workshops	6 to 10 workers

2.9 **AIRPORT PLANNING**

The compatibility of an airport with its environs is made possible by proper planning of the airport, control of pollution generating sources and land use planning of the area surrounding the airport. The aim is to provide the best possible conditions for the needs of the airport, community in the surrounding area and the ecology of the environment.

Airport planning must be recognized as an integral part of an area wide comprehensive planning programme. The location, size and configuration of the airport need to be coordinated with patterns of residential, industrial, commercial, agricultural and other land uses of the area, taking into account the effects of the airport on the people, flora, fauna, the atmosphere, water courses and other facets of the environment.

2.9.1 **NEED FOR LAND USE PLANNING**

There is need to control land in the vicinity of the airports in order to ensure that possible height hazards or obstructions to flight into or out of airports are minimized. Experiences on non-conforming purposes or land uses have indicated the need for control. Experiences such as :

- Uses which may cause electrical interference with radio communications and navigational aids
- Lights which might confuse pilots in the clear interpretation of aeronautical lights and
- Smoke which reduces visibility.

Land use planning in the vicinity of the airport provides for:

- Airport needs for example obstacle limitation areas future airport development
- Ensures minimal interference to the environment and the public for example by locating residential areas away from zones subject to excessive noise or other pollution, by preserving parklands etc.

2.9.2 **CONSIDERATIONS IN AIRPORT PLANNING**

A number of considerations need to be taken when planning for airports. They are:

- **Atmospheric pollution:** Emissions from aircraft and ground vehicle engines, incinerators,terminal buildings and other sources contribute to the air pollution in the vicinity of airports.

- **Flora and Fauna:** Utilization of land for airport purposes inevitably creates disturbances to flora and fauna. Airport development works frequently entails clearing and cutting back of trees and other vegetation; changes to the topography of the land and interference with watershed patterns. The airports may destroy the natural habitat and feeding grounds of wildlife and may eradicate or deplete certain flora important to the ecological balance of the area. Another important consideration is the prevalence and habits of birds in the area and the associated risk of aircraft bird strikes. Bird hazards at proposed new airports can be minimized by careful selection of the site to avoid established bird migration routes and areas naturally attractive to bird and by using the land surrounding the airport for purposes that will not attract concentrations of birds to the area.

- **Soil Erosion:** As a consequence of vegetation clearing and interference with watershed pattern, land on an airport, or within its vicinity, may be vulnerable to soil erosion by the natural elements and to a limited degree by aircraft jet blast. This can mostly be prevented by replanting. In arid areas it may be necessary to take artificial erosion protection measures such as facing of escarpments, paving of taxiway flanks and lining of drains.

- **Streams, lakes and the sea:** Contaminants may enter streams or waterways from airport drainage systems and eventually run into lakes or the sea. These contaminants originate from ground vehicles and airport washing, terminal services, aircraft servicing, pavement cleaning and airport maintenance and construction work. Particular consideration should be given to possible water pollution during construction phase. Actvities such as clearing of vegetation causes an increase in the amount of soil carried into streams. Pest control which involves the use of sprays introduces long life toxic chemicals into the water. Fuel spillage from equipment and chemicals employed in building and pavement construction work can also contribute to upset the hydrological balance of waterways in the area. Changes to the natural drainage patterns of an area may occur due to construction of an airport. This may in turn overtax certain streams and give rise to flooding. In other cases due to diversion of flow, streams may be dried up.

- **Noise:** The intensity and nature of aircraft engine noise is quite variable depending on the engine type and the nature of the operation being undertaken. Noise nuisance associated with an airport is also closely related to frequency of aircraft operations and their diurnal distribution i.e. noise at night is more a nuisance than in the daytime. High levels of noise are most undesirable.

  Noise is a particular health hazard to employees who because of their duties, are subjected to long durations of intense aircraft noise. Strict precautionary measures are necessary for these people, such as mandatory usage of acoustical protective devices. The repercussions of excessive airport noise in residential areas are primarily of a social and behavioural nature. See table no. ------- which indicates the types of uses which may be allowed within the vicinity of airports.

  Trees may be planted to screen certain areas from some airport noise. Good protection against ground run up noise might be expected from judiciously planted trees. When proposing trees to be used for the development of a sound insulating forest considerations should be given to species which:

  (a) Are suitable to the climatic conditions of the airport site

  (b) Have effective sound insulation properties (e.g. do not shed their leaves or needles grow rapidly and densely, etc

  (c) Do not generate a bird hazard and

  (d) Are easy to care for after their growth (e.g. normally healthy and not readily affected by blight or noxious insects etc.

- **Environmental Impact Assessment Studies:** Detailed study of the impact of airport development on the environment is an essential part of the assessment for any major project. Social ecological impacts should be investigated fully before work is undertaken or, in the case of a new airport, when its site is being undertaken or in the case of a new

airport, when its site is being selected. Environmental impact studies, depending on the nature of the project, take into account the following considerations:

(a) Compatibility with community including health, transport and social implications

(b) Influence on ecology including effects of pollution, preservation of flora and fauna

(c) Means of overcoming any problems

Table 2.13 Shows **TYPICAL EXAMPLES OF COMPATIBLE LAND USES AROUND AIRPORTS**

Examples of compatible land uses or developments	ZONE		
	A Unrestricted land uses and developments	B Some restrictions on land uses and developments	C Most land uses and developments not permitted
gricultural [redacted] Crop farming			
Industrial [redacted] Machine shop			
Commercial [redacted] Ware housing and shipping [redacted] - Office and banking			
Residential [redacted] - Low density housing			
Public facilities [redacted] - Schools			

Source:

Notes

(a) The length of the bar indicates where the uses might be permitted without restriction in relation to aircraft noise exposure only, and excluding other planning considerations. With respect to certain uses, e.g housing, commercial a development might be allowed in a zone of higher restriction when other planning considerations indicate a need and where suitable building techniques, sound insulation, etc., can reduce the aircraft noise exposure to an acceptable level

(b) In the special cases of activities dependent on speech communication, e.g. schools or requiring more stringent standards, e.g. certain hospital activities, additional restrictions may be required to take account of absolute noise levels as well as building construction.

(c) The zones will require to be defined against a noise exposure scale and in their application will need to take account of local and national needs.

CHAPTER THREE

DEVELOPMENT CONTROL

3.1 OBJECTIVES

The general objectives of development control include:-

(a) to ensure that implementation of physical development projects conform with physical development plan proposals and recommend enforcement actions in case of contravention's against plan proposals and/or development standards;

(b) to guard against injurious development to both man and the physical environment by carefully assessing and processing all development applications;

(c) to ensure that planning standards, regulations and procedures are up-dated from time to time in order to accommodate changes that might otherwise bring conflicts;

(d) to ensure that strong controls are exercised so that surrounding areas, particularly to industrial zones do not suffer or deteriorate as various developers carry out their activities; and

(e) To secure proper use of land and ensure that planning powers are not made to subserve other ends.

3.2 CONSIDERATION OF PLANNING APPLICATIONS

3.2.1 GENERAL CONSIDERATIONS

(a) Note whether the proposed use is suitable for the site.

(b) Note whether there is some other site more suitable for the proposed use to which it should perhaps be directed.

(c) Note whether the disposition of roads, buildings, open spaces, etc, including buildings density shown in the proposal is satisfactory.

(d) Note whether the details of the design of the building's and any landscaping are satisfactory.

(e) If none of the above considerations apply, note **what public interest or what private interest which ought to be protected by means of development control powers will be served by refusal of development proposal.**

The above considerations must be looked not only to the actual site involved but also to the surrounding land. If the consideration to (d) and (e) is negative, or to (b) is positive the

answers to succeeding considerations should not be sought until it has been decided whether the objection which has been discovered should be considered desirable.
Other necessary considerations to specific development applications are outlined below to facilitate framing of decision if refusal or conditional permission is decided upon in order that any minor objections may be dealt with in the event of appeal.

3.2.2 SPECIFIC CONSIDERATIONS

(a) HOUSING AREAS

(i) New development sites

Practical considerations for refusal of permission relate to the following issues amongst others:

- Lack of land for social facilities;
- Unacceptable levels of noise;
- Inadequate means of access;
- Excessive traffic generation to overloaded road networks;
- Insufficient sewerage and drainage services; and/ or
- Inappropriate layout or design.

(ii) Infill developments

Refusal grounds include:

- too high densities that would lead to overcrowding;
- site in question would be out of character with surrounding area;
- strain on the road system and other infrastructure services; and/or

(iii) **Non-retail commercial uses**

These include building societies, state agents, banks, insurance brokers, etc. Development proposals are objected because they might create a "dead frontage" in shopping streets thus affecting pedestrian flow and shopping efficiency.

(b) INDUSTRIAL AREAS

(i) **Super markets**

Application for super markets in industrial areas are normally objected due to conflicting pressures on:

- Road networks

- Service roads and
- Parking space.

Incase of application for change of user from industrial/warehouse to super markets, refusal grounds include

- The land should be retained for industrial use;
- A poor environment for shopping is created;
- An acceptable level of traffic would be generated.

The above applications are approved due to the following:

- The goods involved are bulky;
- The type of sales are so limited or specialized that no precedent is created;
- There is lack of suitable retail premises in nearby shopping centre;
- Retailing is already established and no harm can be discerned.

(ii) **Warehousing and change of user**

Application concerning warehousing and change of user of existing buildings to warehousing including the use of open space for storage are refused on the following grounds:

- Interference with residential amenity;
- Overloading of existing road networks; or
- Inadequate access from the highway.

© **TIPPING AND DISPOSAL OF WASTE MATERIALS**

Application concerning tipping and disposal of waste materials including extraction of minerals involve consideration of the following factors:

- Degree of visual intrusion;
- Length and duration of working;
- Highway access;
- Noise, fumes and alternative sites;
- Landscaping after use;
- Toxicity of minerals;
- Proven need.

(d) RECREATION AREAS

(i) Application for hotels, pubs, restaurants, fast food stores, discotheques, etc, are mostly determined on grounds of either local amenity or traffic.

(ii) Application for sporting activities such as playing fields, golf-coursed, sports centres, stables, rifle ranges, plying clubs etc, where the use of farming land is involved are determined on the basis weighing the loss of agricultural value against recreation needs and availability of alternative sites.

3.3 ZONING

3.3.1 OBJECTIVES

Zoning is the legal regulation of the use of land. It involves segregation of parcels of land or acres of towns in a physical development plan and ascribes to them broad classifications of appropriate use for example, residential, industrial, educational, commercial, etc. The regulation aimed at protection of public health, welfare needs and safety; include provisions for the use of property and limitations upon the shape and bulk of the building that occupy the land. The zoning plan serves as a comprehensive guide for urban and regional development and is adopted and rendered effective as a legal ordinance.

3.3.2 ZONING PROCEDURES

(a) The Zone Change or Amendments

Amendments to a zoning plan occur when property owners request a change for the classification of their property from one zoning district to another for purposes of enhancing greater economic values from the use of their land. Such requests are only granted if the changes

- Conform to the general structure plan of the area and
- Are not detrimental to public facilities.

The amendments may invade changes in terminology, inclusion or deletion of certain uses, changes in standards and changes in procedure**. For an amendment of zonal change to become effective it requires public hearings and discussions.**

(b) Zoning Variance

A variance is permission granted as a relief from some specific and unusual hardship imposed by strict interpretation of a zoning ordinance. This is a means to adjust property development standards of the ordinance which, by reason of specific location, topography, shape or size, are impossible to comply with the variance therefore permits a property

owner to use his/her land at the same intensity allowed others in the same zone and does not allow uses not permitted in the zone.

(c) Conditional Use Permit

A conditional use is for the purpose of meeting a special need of the community based upon evidence that the proposed location will serve the special purpose. A conditional use therefore is not a substitute for re-zoning but is designed to meet a special situation in public interest. A conditional use only offers a degree of flexibility in adjusting to new demands within the framework of the ordinance. The ordinance should therefore clearly stipulate the circumstances and indicate areas under which conditional use permits may be granted as a protection to investors.

(d) Administrative Committees

It is desirable that each local authority should appoint an Administrative Committee for preparation, review and approval of zoning ordinances. The committees should include both public officials and laypersons for it to be effective. See chapter on development coordination for further information.

3.3.3 ZONING DISTRICTS

In the zoning plan the community is divided into districts in which the land is restricted to certain classified uses. The size, shape and location of these districts reflect the major uses indicated by the structure plan of the area. Most zoning ordinances provide for different densities of population in different districts. One residential district may permit only single family houses with a density of five families per acre whereas another district may permit multiple residential use in which density can reach hundred persons per acre. **These variations in population density must be reflected in other precise plans for the urban area since they affect the provisions of other community facilities and services.** Table 3.1 indicates permitted use classifications in different zoning districts.

USE ZONE	DWELLING HOUSE	DOUBLE DWELLING AND TERRACE	SPECIAL BLOCK OF FLATS	BLOCK OF FLATS	RESIDENTIAL BUILDINGS	PUBLIC BUILDING	PETROL FILLING STATION	BUSINESS AND COMMERCE PREMISES	SERVICE INDUSTRY	SPECIAL INDUSTRY	INDUSTRY	QUARRYING	NOXIOUS INDUSTRY
RESIDENTIAL MIN.1/25&1/2 ACRES	**P**	**P**	**SC**	**P**	**SC**	**SC**	**SC**	**SC**	**SC**	**SC**	**X**	**X**	**X**
RESIDENTIAL MIN. 1/8 ACRES	**P**	**P**	**SC**	**P**	**P**	**SC**	**SC**	**SC**	**SC**	**X**	**X**	**X**	**X**
RESIDENTIAL MIN. 1/4 ACRES	**P**	**P**	**SC**	**P**	**P**	**SC**	**SC**	**SC**	**SC**	**X**	**X**	**X**	**X**
RESIDENTIAL MIN. ½ TO ¾ ACRES	**P**	**P**	**SC**	**P**	**P**	**SC**	**X**	**SC**	**X**	**X**	**X**	**X**	**X**
RESIDENTIAL 1 ACRE AND OVER	**P**	**X**	**SC**	**X**	**SC**	**SC**	**X**	**SC**	**X**	**X**	**X**	**X**	**X**
HOTEL	**P**	**P**	**SC**	**P**	**P**	**SC**	**X**	**SC**	**X**	**X**	**X**	**X**	**X**
BUSINESS AND COMMERCIAL	**X**	**X**	**SC**	**X**	**SC**	**SC**	**SC**	**P**	**SC**	**X**	**X**	**X**	**X**
SPECIAL INDUSTRY	**X**	**X**	**X**	**X**	**X**	**SC**	**SC**	**SC**	**SC**	**P**	**X**	**X**	**X**
INDUSTRY	**X**	**X**	**X**	**X**	**X**	**SC**	**SC**	**SC**	**P**	**P**	**P**	**P**	**X**
NOXIOUS INDUSTRY	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**P**	**P**
DEFERRED	**SC**	**SC**	**SC**	**SC**	**SC**	**SC**	**SC**	**SC**	**SC**	**SC**	**SC**	**SC**	**SC**

Table 3.1 **PERMITTED USE CLASSIFICATION TABLE**

NOTES: - 1.**"P"** INDICATES PERMITTED USE IN THAT PARTICULAR ZONE

2. **"X**" INDICATES USE NOT PERMITTED IN THAT PARTICULAR ZONE

3. "**SC**" INDICATES NOT NORMALLY PERMITTED BUT DIRECTOR OF PHYSICAL PLANNING MAY GRANT SPECIAL CONSENT

3.4 ZONE CLASSIFICATION AND PLANNING COLOURS

All land uses are classified into ten groups each of which is represented by a use class code number and colours as follows:

0	**Residential**	**Brown**
1	**industrial**	**Purple**
2	**Educational**	**Orange**
3	**Recreational**	**Green**
4	**Public Purpose**	**Yellow**
5	**Commercial**	**Red**
6	**Public Utilities**	**Blue**
7	**Transportation**	**Grey**
8	**Undeveloped land**	**Pale Yellow**
9	**Agricultural**	**Pale Yellow**

The landuse zone which relates to a land use class is therefore identified by the land use class number and if necessary a sub reference number to differentiate it from other separate land use zones with the same land use class number. Various land uses are apportioned **land sizes** in accordance with the suggested percentages that have been derived from field observations carried out in ten centers of various categories. They are:

Residential	**41.5%**
Industrial	**7.8%**
Educational	**15.6%**
Recreational	**13.2%**
Public Purpose	**15.0%**
Commercial	**3.9%**
Public utilities	**3.0%**

SUBDIVISION PLANS

3.4.1 OBJECTIVES

The objectives of controlling subdivision plans include;

(a) Ensuring that resultant subplots are accessible;

(b) Ensuring that proposed population density is in accordance with available services, e.g. water, sewer, roads and drainage;

(c) Ensuring that there is planned and coordinated developments and

(d) Ensuring that proposed use(s) is /are compatible with surrounding use(s).

3.4.2 PLANNING CONSIDERATIONS

Factors considered in determining subdivision proposals include:

(b) Proposed use of subplots is in compliance with provision of an existing development plan or zoning regulations for the area;

(c) Proposed subplots are adequately accessed;

(d) Size and density of subplots are in accordance with zoning regulations for the area;

(e) Boundaries, dimensions and acreages of subplots are clearly indicated;

(f) Open spaces and social infrastructure are adequately provided;

(g) Proposed subplots are compatible with adjacent development;

(h) Favourable impact on the environment and level use of existing facilities such as roads, water and sewage disposal;

(i) Minor access roads of 9 metres reserve width provided should not be more than 100 metres long or serve atmost 20 plots;

(j) Provision of 6 metres greenbelts along ring roads and bypasses.

3.4.3 **INSERT SUBDIVISION FORMAT**

3.5 CHANGE OF USER, EXTENSIONS OF LEASE AND USER

3.5.1OBJECTIVES

3.5.2 FORMAT

Factors to be considered in the planning brief for change of user, extension of lease and extension of user should include:

- Planning policy / zoning policy
- Location factors
- Situational/ site analysis
- Neighbourhood analysis
- Infrastructural social services
- Ownership/landownership
- Size of property/user
- Physical/human analysis
- Surrounding architecture

Justifications should be made on proposals recommended on various users such as:

- Roads
- Residential
- Public purpose
- Environmental and socio economic impacts

Changes of users must be advertised by the placement of a billboard on the site for a period of 14 days. The location plan should be provided both in the billboard on the site in the advertisement circulated in the two daily newspapers recommended by the Physical Planning Act (1996) Section ----------

CHAPTER FOUR

DEVELOPMENT COORDINATION

4.1 OBJECTIVES:

The Department of Physical Planning has no executive role in the Government machinery. Ministries and various development agencies (both public and private) have the responsibility of implementing agreed policies and development programmes. This does not mean that the department has no interest in what happens after action is agreed upon or a plan approved.

Because planning is a continous process from inception to implementation of development proposals, there is an in-built necessity for interaction and co-ordination with all actors concerned with implementation of physical development projects conform to approved and/or desired development proposals for the area. In this regard the Department of Physical Planning has been co-opted in a number of development committees include the following.

4.2 DISTRICT EXECUTIVE AND DEVELOPMENT COMMITTEES:

District Physical Planners participate in these committees that oversea and co-ordinate development efforts at the District level. The role physical planners in the committees include:

(a) Assisting in the interpretation of national and regional physical development Policies into specific district development projects;

(b) Assisting in preparing action plans and programmes for development of housing Education, transportation and public purposes and utilities projects; and

(c) Advising on availability of land (including preparation of land acquisition Programmes) for various development projects.

4.3 LOCAL AUTHORITIES WORKS, HOUSING AND PLANNING COMMITTEES

These Committees are concerned with scrutinizing of planning applications and buildings plans to ensure orderly developments.

4.4 NAIROBI CITY, DISTRICT AND MUNICIPAL PHYSICAL PLANNING LIAISON COMMITTEES.

These liaison committees examine respective development applications that require wider consultation with other relevant authorities and ensure that government and local authorities planning policies concur and are followed. They are also to hear, consider and determine complaints from aggrieved parties that may be raised against planning decision, and arbitrate between conflicting development interests. They examine and ensure that professional consultancies on infrastructural services comply with physical planning requirements.

4.5 ROADS AND BUILDING LIAISONS

4.5.1 ROADS.

The department of Physical Planning Liaises with the Chief Engineer (Roads) in**:**

(a) preliminary project analysis and assessment;
(b) project planning and engineering design;
(c) construction; and
(d) Maintenance.

In this connection, the Chief Engineer appoints an officer – responsible for township roads – to liaise with the physical planner in respective areas of the Country.

4.5.2 BUILDINGS:

Before the beginning of each financial year the Chief Architect, Ministry of Public Works prepares a series of lists of building work to be carried out for the coming financial year.

These are complied in consultation with various client Ministries and arranged as project schedules for each Ministry, having first been checked for availability of funds for construction and then programmed accordingly.

The lists are then send to respective Physical Planning offices for identification of suitable sites and preparation of appropriate ‘’part development’’ or site plans for circulation and approval in the normal procedure. Prior the preparation of site plans, the planner has to be invited to participate in any site discussion and/or visit the

representative of the client Ministry and the District Commissioner of the respective area.

4.6 **PROVINCIAL MONITORING AND EVALUATION COMMITTEES:**

The Provincial Physical Planners participate in these committees that monitor and Evaluate implementation of development projects at provincial level.

4.7 **NATIONAL DEVELOPMENT PLANNING LIAISON COMMITTEE:**

The Director of Physical Planning participates in this committee that is concerned with the preparation of the Five-Year National Development Plan.