# MEDIUM DENSITY HOUSING IN PIETERMARITZBURG : A PRODUCT OF THE TOWN PLANNING SCHEME REGULATIONS

## TOWARDS A NEW UNDERSTANDING

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# CONTENTS

## PART THREE : TESTING THE GOAL STATEMENT, PRESENTATION OF FINDINGS AND FORMULATION OF PROPOSALS

**APPENDICES** **PAGE**

PAGE

**TABLES**

**FIGURES** **PAGE**

## PART ONE : FORMULATION OF GOAL STATEMENT

### 1. INTRODUCTION

#### 1.1 The Context of this Thesis

The South African urban process is a blend of "first" and "third world" elements together with their associated opportunities and challenges.

As in the rest of the developed and developing countries, the quest for better living standards on the urban fringe of towns and cities has been greatly facilitated by the development of the various transportation modes and their extended transport networks.

As this outward expansion has gathered momentum, the resulting low density suburban developments have given rise to what is termed urban sprawl.

The more recent depressed economic climate of South Africa has added further impetus to this urban growth trend as more and more persons migrate to the cities in search of employment.

City planners and administrators have not been successful in their efforts to halt or even slow this rampant trend on a meaningful scale to date.

Consequently, the growth in the demand for more land on which these migrants to our towns and cities must be accommodated is inevitable.

As more residential development occurs on the urban fringe, the problem of bridging the ever increasing distance between the home and places of work, culture and leisure is aggravated.

The cost, inconvenience and detrimental effects of this urban sprawl are not restricted to commuters. Local and other authorities too, are being confronted with greater physical responsibilities and financial burdens, since they must provide and maintain extensive road systems, extended service infrastructure, wider ranging public transport facilities and the like, within areas of relatively low residential density and in a climate of increasing economic austerity within the "New" South Africa.

The explosive horizontal growth of low density suburbia is creating problems of a social nature never envisaged by the late nineteenth and early twentieth century housing reformers. Our attempts to overcome these problems need not be limited to containing sprawl with its high material and social costs, we should seek to reverse this trend towards lower housing densities.

This Thesis submits that the solution of these problems is not to be found in the promulgation of negative, controlling legislation governing development within towns and cities.

Rather, if legislation must be promulgated then it should be positive in that it enables and encourages appropriate land use and densification.

If we are to achieve this end, then both the substance of our legislation and the procedural regulations contained therein require urgent updating to both bring the content in line with the market related needs of our society, and to build sufficient clarity and flexibility into their procedural regulations so as to allow them to be effectively and timeously interpreted and implemented.

Moreover, this author suggests that there exists a general limitation within existing Town Planning Legislation within the KwaZulu-Natal Province, in that schemes do not adopt a "definitive, goal-orientated approach". Instead our legislation contains regulations and provisions that are often vague in their purpose and crude in their application. This author alleges that central to this malaise, lies a gross misunderstanding of the term "density" both within the content of the existing Town Planning regulations and by those who both prepare and administer them.

Much has been said and written on the subject of density and the early and mid 1970's saw the convening of a series of conferences and symposia to address the question of increased residential densities as a means of combatting urban sprawl. (Natal Town and Regional Planning Commission, 1973).

Now, fifteen to twenty years on, it is pertinent to ask whether there has been sufficient progress in the drive to stem the tide of urban sprawl? What progress has been made in the field of increased residential development intensity or what has been termed by the KwaZulu-Natal Provincial planners as "Medium Density Housing"? And more particularly, what progress has been made toward a clearer understanding of the term "Density"?

It is unfortunately apparent that the move to higher residential unit densities has in many cases been thwarted by those very authorities who are having to pay the price of urban sprawl. Concerns that higher densities result in reduced amenity and property values have resulted in "the baby being thrown out with the bath water". Largely, because insufficient guidelines, checks and balances were built into both the substance and the procedural elements of the appraisal system as contained within the existing Town Planning regulations.

The principle instrument of land use and development regulation within our towns and cities is the Town Planning Scheme.

A Town Planning Scheme identifies and defines zones for various categories of land use and sets out regulations/guidelines which govern the use of land, including development intensity and the like, which in turn govern the development of land within a town or city.

An example of such categories of land use in the residential context are the Special Residential, Intermediate Residential and General Residential zones. Each zone is defined according to two principle sets of criteria, namely:

i) the type of land uses both permitted and prohibited within such zone, and

ii) an appropriate statement or criteria regulating the extent or intensity to which land uses may be developed within the zone.

An example of the former, may be a detached "Dwelling House", or a "Semi-detached House", or "Medium Density Housing", while an example of the latter includes the floor area ratio, coverage, height in storeys above ground level and the maximum allowable number of dwelling units, per unit area, within such a zone. (Pietermaritzburg Town Planning Scheme, December 1990)

The term "density" is contained within most Town Planning Schemes in the KwaZulu-Natal Province, including Pietermaritzburg, and is generally used in the context of a single definition namely : "dwelling units per hectare", which refers to the intensity of residential development.

It is the contention of this thesis that the use of such a single expression of density is both insufficient in providing a comprehensive understanding of the subject and inadequate in its attempt to meet the challenge of the task at hand. i.e. to effectively regulate the intensity of residential developments. Moreover, various forms of density such as Occupancy Density or Population Density are referred to but are seldom incorporated within planning context. (Stevens, 1960 and Senior, 1984).

In addition, these various forms of density are further influenced by more than a dozen subjective factors which together create what might be termed the sense of density i.e. an impression of the degree or intensity of a particular residential development, which in turn relates to the general sense of amenity. (See definition of Amenity in Appendix A).

These factors include the layout and design of a housing complex such as: the architectural design and orientation of the individual units; the presence of trees and landscaped gardens, which can create pleasant views from within the individual units and of the complex as a whole; the design and construction of noise reducing provisions; the design for maximum privacy, such as a safe internal road system and the screening of parked motor vehicles to reduce the visual impression of a cluttered development, the overall size of the development i.e. the number of units; the presence and size of clusters which create small neighbourhoods within the complex, all of which contribute to an impression of the degree or intensity of the development. The proper attention to these aspects can result in a high density, well designed development creating a more favourable impression and proving more desirable than poorly designed developments at significantly lower development intensities.

The Pietermaritzburg Town Planning Scheme is not alone in its inclusion of the term "Medium Density Housing". Indeed the majority of Town Planning Schemes in KwaZulu-Natal contain the term which is defined as a distinct type of land use, rather than being an informant of the degree of intensity, as in low or high density housings which may or may not be permitted within one or other of the variously defined zones.

Notwithstanding this fact, the choice of the words "Medium Density" within the term "Medium Density Housing", is clearly intended to qualify and nature of this type of land use, since it refers to the intensity of a housing development.

However, neither the literature in general nor Town Planning Schemes in particular are clear as to the definition of "Medium Density Housing". Moreover, the regulation of the development of "Medium Density Housing" is exercised via a set of parameters governing the intensity of such developments, termed development regulations, and a set of procedures governing the manner in which such a land use may be both applied for, and basis on which such applications are considered or evaluated ie. procedural regulations.

In the context of the term "Medium Density Housing", the number of dwelling units per unit area, has tended to be singled out by both the authorities and the public as the overriding measure of what is deemed to be desirable or not, as the case may be. The result has been that "density" has become almost synonymous with "the number of residential units per hectare".

Consequently, the acceptability and desirability of housing developments in the "medium density" category is being evaluated and judged largely on the number of units per hectare alone, and in this context low density is generally perceived as being desirable and high density as being undesirable. This rigid use of such a simplistic measure of what is a most complex concept is most regrettable.

It is these misguided perceptions and the consequent incorporation and application of such crudely determined development regulations, ill-defined terms and vague definitions within Town Planning Schemes, together with their associated procedural regulations, that must be corrected if "Medium Density Housing" is to be properly formulated and thereby assume its rightful place as an important element within the residential sector of the market, which can make a meaningful contribution towards residential densification and urban consolidation and thereby curtail and even reverse urban sprawl.

## 1.2 Statement of the Problem

The previous section deals with the context of this thesis, and lists three issues which contribute to the difficulties experienced in achieving what is termed, within the Pietermaritzburg Town Planning Scheme, as "Medium Density Housing". These issues are as follows:

1.2.1 Vague, and inappropriate regulations relating to the intensity of residential development ie. development regulations;

1.2.2 Rigid and inappropriate procedures for achieving an increase in the intensity of residential development ie procedural controls; and

1.2.3 Confusing and in some cases incorrect terminology and definitions contained within many of the Town Planning Schemes within the KwaZulu-Natal Province, including Pietermaritzburg.

It is submitted that these three issues have together contributed to and in many cases resulted in the commonly held misconceptions surrounding the need for and desirability of increases in the intensity of residential developments, particularly within or adjacent to existing lower intensity residential neighbourhoods. This fact has resulted in either the inability of developers to secure the rights to

develop such "Medium Density Housing" or in the inappropriate development thereof. This thesis submits that a proper understanding of the concept and implications of density within the Town Planning context will result in the development of an appropriate policy and practice pertaining to the increase in the intensity of residential development within our towns and cities, including Pietermaritzburg, which will lead to improved economies of development and result in substantial savings in service infrastructure development costs for both the public authorities and ultimately for the aspirant homeowner.

## 1.3 The Goal of this Thesis

### 1.3.1 Preamble

This thesis contends that "Medium Density Housing" is not a distinct form of housing, rather the term represents a qualification of the degree of residential development intensity which encompasses the complete range of housing options, each of which may, to a greater or lesser extent, be accommodated within a determined range of residential development intensity which places them within the ambit of the term Medium Density.

This is not to say that residential densities within the "Medium Density" range should be developed for any and all types of housing options, types and configurations, since some of these housing options can be better accommodated at "medium" densities than others. Rather that each of these housing options carry with them important limitations, trade-offs and potentially negative impacts that need to be understood and weighed up in the design stage of the housing development.

It follows therefore that the definition of "Medium Density Housing" rests not so much on the types of housing options, existence of common land, presence of a body corporate, the existence or otherwise of formal subdivisions, their dwelling/unit density relative to any adjoining dwelling/unit density, the vehicle of ownership or the delivery system, *but rather* on the range of development intensity, the proximity and access to the ground and on the design, of such housing in harmony with both the other units within the development and in harmony with the surrounding land uses.

In this regard, layout and design is certainly a key influential of what might be deemed to be successful "Medium Density Housing" since it is generally acknowledged that good housing and site layout design at even high unit densities will enhance the visual appeal of a complex and may thereby lessen the impact or impression of such higher density complexes when located adjacent to lower density residential developments. Indeed the importance of good layout and design is directly proportional to residential development intensity.

Consequently, it is suggested here, that suitable principles and regulations can be identified and developed which enhance and encourage the development of appropriate "Medium Density Housing" whilst affording the appropriate checks and balances necessary to safeguard the integrity of the neighbouring land uses.

Once this has been achieved, it is possible to extend the use of such regulations and principles into Town Planning and residential development policy and practice, so as to enable decisions in respect of "Medium Density Housing" applications to be made in a uniform, rational way.

1.3.2 Goal

This thesis sets out to demonstrate :

- that the definition and regulation of "Medium Density Housing" within the Pietermaritzburg Town Planning Scheme as a distinctly separate housing form *per se* is incorrect.

- That the removal of the term "Medium Density Housing" as a distinct form of housing, from the Town Planning Scheme and the introduction into the Scheme of appropriate and effective zones and regulations governing development intensity and procedures for the implementation thereof, will result in a more appropriate and cost effective mix of housing densities within a town or city, and

- that this new approach will allow the formulation and implementation of definitive policy pertaining to housing and Population Density, which will in turn encourage appropriate residential densification and urban consolidation.

1.4 Approach and Objectives

In the context of the goal as detailed above, the approach of this dissertation is threefold, namely :

1.4.1 To examine and, where necessary, reformulate the terminology used to describe residential developments of an increased intensity;

1.4.2 To examine the substance of the Town Planning Scheme regulations governing both the intensity of residential development, ie. development regulations, and the procedures whereby an increase in the intensity of development may be effected ie. procedural regulations; and

1.4.3 To determine a means whereby the implementation of increases in the intensity of residential development, within the Town Planning Scheme, may be appropriately facilitated to the benefit of all concerned, including the local authority, the developer, and the owner and/or occupants of both such developments and of the neighbouring land uses.

Each of these approaches is supported by objectives as follows:

Approach 1.4.1 : Objectives

(i) To establish a meaningful definition of the commonly used term "Medium Density Housing" as a statutory term and where necessary, to reformulate the existing terminology.

(ii) To investigate and evaluate the concept, and varying degree and nature of the intensity of residential developments ie. residential density.

Approach 1.4.2 : Objectives

(i) To evaluate existing Town Planning Scheme regulations, and establish their effectiveness and appropriateness in achieving their desired aim i.e. to effectively regulate "Medium Density Housing", and the extent to which these regulations either encourage or discourage the development of "Medium Density Housing".

Approach 1.4.3 : Objectives

(i) To identify key informants that will foster a better understanding of residential density in general and of "Medium Density Housing" in particular.

(ii) To develop a set of appropriate development and procedural regulations that will overcome the current problems associated with the existing regulations.

(iii) To formulate broad policy guidelines which properly guide the establishment of appropriate "Medium Density Housing", and thereby contribute towards curbing the excesses of urban sprawl.

## 1.5 Methodology

A diagrammatic representation of the approach adopted in this study is presented in Figure 1.

Part One : Formulation of Goal Statement

(i) A statement of the problem, the goal and identification of the approach and objectives of this thesis (Chapter 1).

Part Two : Exploration of Goal Statement

(ii) A theoretical investigation into and a comprehensive literature search of the term "Medium Density Housing" and related elements. This includes literature and case studies from South Africa as well as from abroad. Research into the various types of "Medium Density Housing", their definition, derivation and origins, which are necessary in order to remove the confusion created by a plethora of loosely used terms. (Chapter 2)

(iii) On exploration of the term density and an investigation of the practical implications of the use of density as an effective town planning tool. (Chapters 3 and 4).

(iv) An evaluation of various Development Regulation systems and standards from the literature and investigation into the role of density within the current practice of development regulation within the Province of KwaZulu-

Natal. (Chapter 5).

(v) A detailed comparative study of both the Provincial Standard Town Planning Schemes and the Pietermaritzburg Town Planning Scheme, with particular emphasis on identifying shortcomings in the provisions and regulations applicable to "Medium Density Housing". (Chapter 6).

Part Three : Testing of the Goal Statement, Presentation of Findings, and Formulation of Proposals

(vi) Using information arising out of the literature search and the investigations into case studies, identify key informants and measures of residential density, investigate ways in which density may be more effectively integrated into Town Planning Schemes and formulate a set of appropriate regulations that govern both the development intensity and the procedures whereby such development may be effectively implemented (Chapter 7 and 8).

(vii) Formulate guidelines for a definitive policy pertaining to Population Density within towns and cities (Chapter 9).

(viii) Draw conclusions regarding the accuracy of the goal statement and the degree to which it has been possible to satisfy the thesis aims and objectives. (Chapter 10).

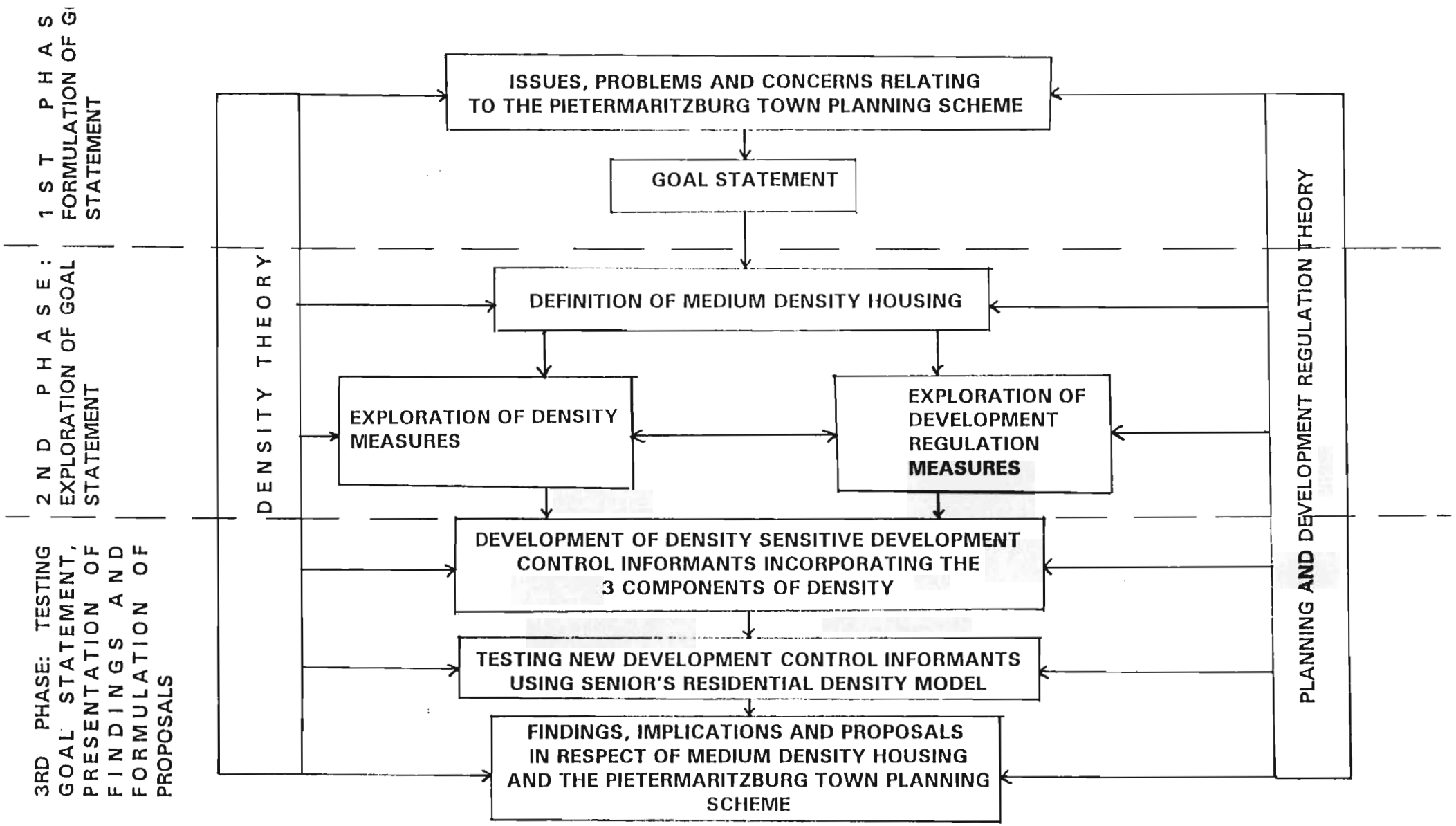



FIGURE 1: DIAGRAMMATIC REPRESENTATION OF STUDY APPROACH

## PART TWO : EXPLORATION OF GOAL STATEMENT

## 2. TOWARDS A DEFINITION OF MEDIUM DENSITY HOUSING

### 2.1 Review of the Literature

"Medium Density Housing" has eluded clear and common definition in the literature. However "Density" has been used as a prime determinant as to whether or not a residential development may be deemed to fall within numerous definitions of, for example low, medium or high residential density development. The literature includes a host of factors, some specific, some general, and some sources using generic terminology all of which serves only to confuse the reader. (Untermann and Small, 1977; Natal Town and Regional Planning Commission, 1975; Natal Provicial Administration, 1973, and 1988; Taylor, 1973; Rosenberg 1980, McCormack, 1980, and Urban foundation, 1988). (Refer to Appendix B for further Details regarding the Definition of "Medium Density Housing"). Natal Municipal Association and South African Property, 1972.

Residential development within such broad categories results in a wide range of housing forms of varying designs being constructed largely at the developers discretion, and often to the consternation of the neighbours.

This author contents that "Medium Density Housing" is too general a term to be used as a definition of a specific type or form of Housing within a Town Planning Scheme which itself relies on the customary two or three residential land use zones, each governed by a set of development and procedural regulations.

What is required is a clear definition of the term "Medium Density Housing" together with a definition of each of the possible forms of housing that fall within what is broadly termed "Medium Density Housing". These individual housing forms could then either individually or collectively be permitted in a particular use zone or range of use zones, each zone being governed by their own specific set of development and procedural regulations.

Such an approach will put an end to the current confusion surrounding the definition of "Medium Density Housing" and will remove the element of uncertainty regarding the specific form of housing that is permitted on a site.

### 2.2 Defining a Range of Options

A wide range of housing options have been defined in both the literature and in the Town Planning Schemes in KwaZulu-Natal. However, these definitions are considered to be largely inadequate. This fact is recognised in a publication by the "Housing Policy Unit" of the Urban Foundation (1988) which identifies three areas of inadequacy with which this author has much sympathy:

(i) These definitions are often one-dimensional in that they describe housing options from one point of view only. These include options focusing solely on:

- suitability - according to various stages of life cycle e.g. family housing, or bachelor flats;

- the form or dimensions of the building e.g. tower blocks or slab blocks;
- the type of accommodation offered e.g. maisonettes or studio apartments;
- marketing terminology e.g. villas or duplexes;
- extendability and flexibility e.g. core houses or shell houses.

To this may be added:

- By the number of dwelling units per building, for example; simplex or duplex; (Urban Land Institute, 1978)
- By relating structures to one another, for example; attached, detached, row, cluster or group; and
- By referring to some architectural or characteristic feature of design, for example; atrium house, Patio house or garden apartment.

(ii) While having to express a meaningful range of options described multi-dimensionally, this range is seldom sufficiently limited, specific or commonly understood to be useable (Urban Foundation, 1988).

A classic example of such a confused definition is the following:

> "Plexes are similar to townhouses, yet they have many of the characteristics of single-family detached housing. This dwelling type may or may not occupy its own structure from ground to roof but does have an outside entrance, it is separated from other structures by yards or other open space, and it is designed for occupancy by one or more families. A structure for occupancy by two families is a duplex; for three a triplex; for four a fourplex or quadplex; and so on. The prefix identifies the number of dwelling units per building". (Urban Land Institute, 1978).

(iii) The ranges of many definitions are simplistic and fail to differentiate between those "generic factors" (key independent variables that both describe the dwelling and determine consequences) and "characteristics" (important attributes implicit in the options). (Urban Foundation, 1988).

In defining the range of options within "Medium Density Housing", this thesis considers six factors to be pertinent, namely:

a) relationship with the ground (height in storeys),

b) degree of attachment,

c) form of ownership

d) type of delivery system,

e) size of dwelling unit, and

f) degree of development intensity.

2.2.1 Relationship with the ground (Height in storeys).

The Urban Foundation (1988) defines a units relationship with the ground into three categories, namely:

- on the ground;
- ground related (walk up via stairs);
- ground unrelated (access via elevators/lifts and/or stairs).

Height may be categorized as follows:

- Single storey on ground level;
- Two to four storeys, being low-rise ground related;
- Five to ten storeys being medium-rise, ground unrelated; and
- Eleven storeys or more being high-rise ground unrelated (Urban Foundation, 1988).

2.2.2 Degree of attachment

The locational relationship of one dwelling to another and their juxtaposition influences the building configuration, cost of construction, type of delivery system, site utilization and the intensity of development.

Attachment may be categorized as follows:

- Detached dwellings;
- Dwellings attached horizontally;
- Dwellings attached vertically; and
- Dwellings attached horizontally and vertically.

2.2.3 Form of ownership

Housing may be developed under a number of different forms of ownership, namely:

i) Exclusive title ownership where each dwelling unit is situated on a separate, conventional sub-division. These may either be single detached (free standing) units or attached as in a semi-detached unit with a commonly owned (party) wall which divides or separates the units;

ii) Exclusive sectional title ownership of an attached or detached dwelling unit situated on its own separate subdivision, and may include communal ownership of a portion of "common land" in conjunction with the other sectional title holders via a body corporate; and

iii) Ownership of a block of shares within a Shareblock company which owns the entire fixed property including the premises thereon, and where the shareblock owner owns both a right to the exclusive use of a specifically defined, attached or detached dwelling unit, with or without a defined area of land, and a right to the communal use of other defined areas and/or premises in conjunction with the other shareholders.

### 2.2.4 Type of delivery system

Delivery system refers to the manner in which the various types of housing are developed and delivered into the housing market, namely:

i) A single vacant serviced site (eg. site and service).

ii) A serviced site with fully developed top structure ie. dwelling unit.

iii) A serviced site with a partially developed top structure ie. a core or shell unit.

Housing at a development intensity that may be considered to be of medium density can be developed and be delivered via any of the above systems. However, the Provincial Standard Scheme Clauses included the phrase "the whole development having been designed as an harmonious entity" which introduced an element of subjectivity since the interpretation of this phrase was left to the discretion of the regulator and developer. Although, this harmony is clearly more likely to be attained via a delivery system where the serviced sites within a defined area or housing complex was developed either simultaneously or in close sequence of one another using substantially the same type and colour of materials and in accordance with the same or substantially similar architectural style.

### 2.2.5 Size of Dwelling Unit

Unless very large, the size of dwelling units within a "Medium Density Housing" development is superfluous to any definition thereof. The size of dwellings does have a bearing on the cost of construction, the type of accommodation and the intensity of development and consequently has an influence on the household type which is likely to be accommodated therein and the ability of the dwelling to generate income.

Dwelling size may be categorized as follows:

- Micro (30 square metres and less)
- Very small (30 to 50 square metres)
- Small (50 to 70 square metres)
- Medium (70 to 100 square metres)
- Large (100 to 200 square metres)
- Very large (200 square metres and more).

Height and attachment may be combined to form a range of sub-categories. The Housing Policy Units report prepared by the Urban Foundation (1988) illustrates the various permutations of height and attachment in Figure 2.

### 2.2.6 Degree of Development Intensity

In the context of the definitions investigated (refer to Appendix B) there is some consensus that a "Medium Density Housing" complex is developed to a maximum intensity of 70 dwelling units per hectare (Town and Regional Planning Commission 1973). Untermann and Small (1977) determined in their research that the average density for residential

developments described as being "Medium Density" was 37 units. The lower limit is less clearly defined, with Pistorius in his keynote address to a conference on Medium Density Housing (Natal Town and Regional Planning Commission, 1973) stating a figure of 15, and various Town Planning Schemes within the Province of KwaZulu-Natal holding that "Medium Density Housing" may be developed in a particular zone at a rate of 25 units per hectare (Natal Provincial Administration, 1988) or as in the case of the Pietermaritzburg Town Planning Scheme (1991) 20 units per hectare. It is possible that the general understanding of what constitutes a low or a medium density has moved over time, with what might previously have been considered as being medium density, now being considered as low density.

In the absence of a clear ruling on the lower limit of what may be defined as being "Medium Density Housing" this author has adopted a lower limit of 25 units per net hectare.

## 2.3 Synthesis

The results of an examination of the six factors, which may influence or be considered in the course of defining "Medium Density Housing" suggests that the principle determinant of what may be deemed to constitute medium density within the context of housing development is the degree of the development intensity.

Factors such as relationship with the ground, degree of attachment, form of ownership, type of delivery system and size of dwelling unit are all further qualifications of development intensity.

It would appear that the principal source of confusion in the existing definitions within town planning schemes (Refer to Section 5 for general purpose and intent of a Town Planning Scheme) surrounds the following:

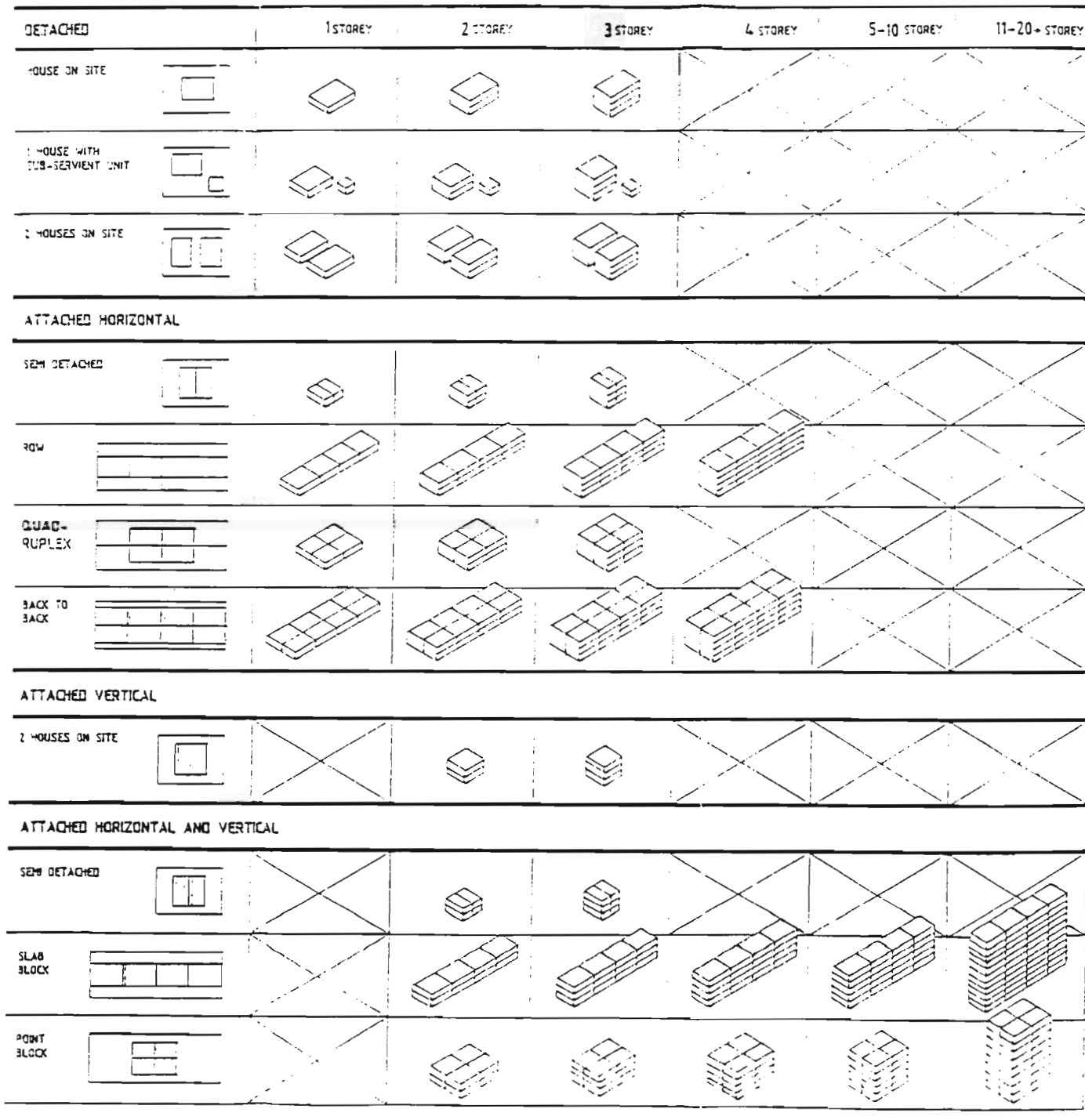
i) an inability to separate the development intensity from the other five factors, and

ii) the failure to see "Medium Density Housing" only as a qualification of the degree of development intensity, and not as a distinct type of housing, and

iii) the inclusion within the town planning schemes of the definition of "Medium Density Housing" as a type of land use together with various types of housing, thereby creating the impression that "Medium Density Housing" is a form or type of housing.

In the context of this thesis, "Medium Density Housing" is described as a generic term that refers to residential land use (housing) that falls between what is considered to be low density (1 to approximately 25 units per net hectare) and that which is generally considered to be high density (greater than the approximate figure of 70 units per net hectare), and includes housing forms that comprise two or more low-rise, ground related, dwelling units, that vary in size and may be comprised of a variety of ownership forms and delivered via a variety of delivery systems which, range from single detached residential units, occupied by an individual or household (living independently of each other), through to a single structure of groups of such structures, each containing two or more residential units.

**FIGURE 2: HEIGHT AND ATTACHMENT JOINTLY DEFINE A RANGE OF HOUSING OPTIONS** (URBAN FOUNDATION, 1988)



# 3. DENSITY : AN EVALUATION OF THE CONCEPT

## 3.1 Introduction

The general confusion surrounding the concept of density in the residential context is illustrated by the following quotations:

"There are few planning concepts so important and so misunderstood as residential density" (McConnel, 1969).

"Despite its central role in planning and design, the concept of residential density remains largely misunderstood and is generally only used in simplistic ways. Although density is a measurable factor and can, therefore be used in a quantifiable and rational way, it is generally used in a value-laden and emotional way" (Senior, 1984).

The aura surrounding density and its acceptance as the single factor that determines the composite quality of the environment is aptly summed up by the critical statement : "Density, like some genie of the lamp, it is summoned up to perform a great variety of tasks" (Department of the Environment, 1973).

Density has tended to be used as little more than a static control mechanism, to be applied without thought or imagination usually in the context of a town planning scheme by prescribing the maximum number of dwelling units per net or gross hectare and relying on additional regulations of Floor Area Ratio and Coverage to complement its application.

It is submitted that the use of the term density as being synonymous with "Units per hectare" and only in this context is both insufficient to provide a comprehensive understanding of the subject and inadequate in attempting to meet the challenge of the task at hand.

Indeed, any attempt to do so, misses the opportunity of experiencing the real value of density as a planning and design tool through the realisation of its full potential.

Planning decisions taken on the strength of density alone appear to be based on a belief by the decision takers that they possess some intuitive understanding thereof, which in turn is based on preconceived notions of its impact.

After exhaustive research into the subject, during the course of his doctoral thesis, Senior (1984) makes the blunt statement : "A rational system of assessing the implications of density does not exist".

Density is particularly relevant in the context of the residential environment since residential land use accounts for some fifty percent of land within towns and cities.

In considering how best to optimise the limited resources of land, its development and the financial implications thereof, the issue of residential density is, therefore, of cardinal importance.

The intensity at which land is developed clearly relates to the efficiency with which it is used, the cost effectiveness of the infrastructure required, and ultimately the unit cost of the dwellings thereon. In addition, density implications go beyond merely the household, the local environment and land utilization to issues of city-wide relevance in terms of the development and cost of transport, service infrastructure and the provision of facilities (Urban Foundation, 1988).

## 3.2 The Analysis of Density Theory

Senior (1984) conducted considerable research into the subject and explains that a bibliography prepared by the Council of Planning Libraries in 1973 (Ponningen, 1973) covers 43 pages and well over 600 references. This excluded the "growing number of references on crowding and population density, on behavioral, cultural, physiological, psychological and similar aspects of density" which have been included in a further eight bibliographies.

In his detailed study of the references, Senior (1984) states that "in general the theories and writings on density are unrelated, unco-ordinated, isolated and independent". To illustrate his point, Senior undertook an analysis of some 70 references, and described these in terms of a series of headings including, Study focus, Scale, Perspective, Depth, Density measure and Density range.

The major conclusion drawn by Senior (1984) in analyzing the existing density theory is that there is no focus, and the work is diverse, compartmentalised and fragmented.

Arising out of Senior's research, there appears to be 3 broad categories of works on density, namely:

"(i) Works where density is a peripheral aspect of another subject. In such cases density has an effect upon the subject being studied but is not central to the work. Its importance in relation to the subject being studied varies from subject to subject. Examples include theories related to defensible space, site planning and city economics (eg. Newman 1972, Lynch, 1971 and Stone, 1973).

(ii) Works where density is the main issue studied but due to a specific focus only one particular aspect of density is considered in detail. In this instance the aspect in question is considered in detail with little or no reference to other general density issues. For example it may be studied in relation to either, economical, social, physical or political factors, but rarely all of them. Consequently comparative analysis and evaluation is difficult or impossible. Moreover, it is generally studied at varying levels or scales i.e. city, neighbourhood or site or the work covers only part of the density range i.e. the built form and housing layout as it relates to density (Department of Environment, 1961, and Diamond, 1976).

These studies are useful but because of their compartmentalised and fragmented nature they are of limited value to a general understanding of the subject.

(iii) Those works where density is studied in a way which provides a comprehensive overview where the various aspects of density are understood in relation to one another. There are notably few such works although Stevens (1960) made a major contribution in his early work on densities in housing areas, and Senior (1984) undertook a most comprehensive evaluation of density as it relates to the residential environment and he developed a density model which proved to be accurate. Senior's work is perhaps the most significant work on density since Stevens, as the density model allowed the development of a housing options assessment manual by the Urban Foundation (1988), which has been responsible for an increase in the awareness of decision-makers as to the complexity of, and the opportunities and limitations in respect of the use of density as a planning tool.

## 3.3 Misconceptions in respect of Density

The Urban Foundation (1988) too holds the view that there exists within the literature a general and fundamental misunderstanding of density, in that it is presented as a simplistic, one dimensional measurement device used primarily as a mechanism for the blanket control of development. Very rarely is density understood as the complex interaction of social, economic, physical, and cultural factors which, when used selectively and sensitively, provides both a valuable guideline in decision-making and an insight into the rich complexity inherent in the planning and design of residential environments.

This simplistic use of "density" has led to the entrenchment of a number of basic misconceptions as "truisms".

The following represent the more commonly held of these misconceptions:

"(i) Density is intuitively related to quality of environment where lower densities are assumed to be inherently "good" and a model to guide aspirations. Higher densities, on the other hand, are often associated with slum or "ghetto" conditions, stigmatised as public housing projects and assumed to be synonymous with "bad" environments. In reality, environmental quality varies independently of density and is, in itself, a subjective issue of judgement coloured by the values, preferences and prejudices of the observer.

(ii) Density measures are often quoted as guidelines and regulations as though they, in themselves, describe all aspects of the residential environment. Furthermore, it is assumed that such density measures provide a basis for comparing one environment with another. In this regard a wide variety of measures are bandied about (people per hectare; bed spaces per hectare, dwellings per hectare; habitable rooms or floor area etc.). Each measure is, in itself subject to variables and assumptions. The confusion is compounded by whether "gross" or "net" densities are being quoted and what precisely is measured in each case. Net and gross residential densities are dealt with in more detail below.

(iii) Various density measures have unfortunately become synonymous with certain housing options to a point where one either fails to explore a wider range of options associated with a particular density or fails to anticipate the possible development responses within a blandly stated density control. In reality there exists the potential for a variety of housing options to be realised within even a narrowly defined density range.

(iv) There is often a failure to understand the development implications and impacts associated with various densities. For example, audial and visual privacy have to be explicitly designed for once certain density thresholds are crossed. Equally site utilization, layout, height and pedestrian and traffic circulation characteristics vary as density varies and the implications of these need to be understood". (Urban Foundation, 1988).

These misconceptions, have in turn given rise to the formulation and application of a number of "solutions" about which there is cause for some considerable concern.

**"Were it not for the fact that density is an issue of central importance, there would be no grave danger in the inadequate understanding that typically surrounds it".** (Urban foundation, 1988).

The Urban Foundation's (1988) study highlights the emergence of a number of extremely worrying propositions regarding the manipulation of densities with the view to alleviating the housing shortage in South Africa, based on fundamentally flawed assumptions, namely:

(i) There is a view that the housing shortage could be overcome by significantly increasing densities, most notably in the form of high-rise housing schemes.

While it is true that, on a net residential basis, a marked increase in population density is possible, it is a fact that the gross residential density is not significantly increased. This is caused by the commensurate increase in space requirements for associated facilities necessitated by the increased number of people.

Of course it must also be noted that as dwellings cease to be ground related, their suitability for a major section of the household profile is substantially reduced. Equally, it has to be noted that there is no socially acceptable way of controlling the number of people occupying a dwelling. In most low income housing schemes, in fact, household sizes typically exceed the design standards originally intended. While the implications of this are somewhat mitigated by the occupants' ready access to an outdoor area, no such coping mechanism exists in non-ground related dwellings.

(ii) A commonly-held view is that the density in existing schemes comprising detached dwellings, could be substantially intensified with the addition of new housing. Again it must be noted that the occupancy rate of dwellings in these existing housing schemes is typically high and the value of the existing outdoor space must not be underestimated. On one hand, the addition of new floor area might simply be taken up by the existing population, in which case no increase in population density will have been achieved. If, on the other hand, the additional floor area is taken up by new households, the outdoor space will have been greatly depleted as an

asset off-setting the high occupancy rate within dwellings.

(iii) The land requirement for housing is often thought to be capable of significant reductions by significantly reducing the site, lot or subdivision size for dwellings. As noted earlier, while the number of dwellings per net hectare can be increased in this way, the relative land saving is fairly small in gross terms when one considers the land requirements of the additional facilities necessitated by the increase in population. In addition, the impacts of greatly reduced stand sizes in terms of, for example, overlooking, overshadowing, visual and audial privacy and the most effective utilisation of the stand require careful design regulation. This either limits the extent to which people can develop their own housing or, where no regulations or design criteria are applied, the suitability of the residential environment is compromised. This is often the case where layouts comprising small stands are given over to be developed with a standard, inappropriate house type insensitively placed on sites, lots or subdivisions with little or no regard as to how the limited space on the stand is best optimised. In addition, there is little regard for how the house relates to the public environment or the neighbours on either side and to the rear of the house (Urban Foundation, 1988).

Importantly, the Urban Foundation Housing Policy Unit's report concludes:

"This is not to say that there is no merit in the cases cited above. Rather it must be noted that these and other options carry with them important limitations, trade-offs and potentially negative impacts that need to be understood and weighed up in decision-making."

## 3.4 The Nature of Density

Density in its simplest form, has been defined as "some numerical measure of the extent to which land is occupied by buildings or people" (Evans, 1973).

When dealing with density in the context of a residential environment, there is some degree of consensus on the essential components.

At the outset, the most common term in general use is **residential density**. This is measured in a variety of ways, including the number of persons, dwellings or habitable rooms per unit of area, and it is therefore important to be specific about the type of residential density i.e. residential unit denity or residential population density.

The four common components of residential density are consequently:

(i) the unit density (ie. the number of units per unit of area);

(ii) the building density, (or intensity) ie. the amount of floor area per unit of area, (not the number of dwelling units);

(iii) the occupancy density i.e. the density at which people occupy dwellings, buildings or parts of buildings, and

(iv) the population density, which is the number of persons per unit of area.

These four components are related and interdependent upon one another. Any analysis of density must examine and take account of each one of these components since their use independently provides only a partial picture of the whole. Residential complexes may each comprise a number of dwelling units, each unit consisting of building structures with varying floor areas, and each unit may similarly be occupied by persons at different densities.

However, in order to determine the residential population density of a given area, it is argued that population density is not so dependent on the number of units within an area (or complex) but rather it is dependent on both the building density (or intensity) and the occupation density.

Senior (1984) argues that if a comprehensive density approach is to be adopted in which both environmental and the human aspects are to be considered, then it is the latter three components or density types which must be used in a relationship with one another. It is therefore these three components that are at the core of the density issue:

(i) Building density: The amount of floor area or intensity at which residential buildings are developed, relative to their site area. (not synonymous with the number of dwellings per unit area).

(ii) Occupancy density: The rate at which the floor space within these buildings is occupied.

(iii) Population density: The resulting number of people per unit area.

Each of these components possess a host of other factors which govern their arrangement, and hence the density concerned. If it is accepted that there are three basic components of density each of which are interrelated and mutually dependent, then it follows that the measures of each component of density must also be interrelated (Senior, 1984). Senior (1984) determined that the relationship and interdependence between these components can be identified and measured and the understanding gained thereby can enable decisions on density to be made in a rational way.

It is therefore instructive to note that "Unit density" is not a key determinant of residential density. It follows, that the use of "Unit density" as a mechanism within the context of development regulation will cause an unreliable result. Therefore, if one is to design an effective set of regulations or determinants of Residential Density it is necessary to examine the various options inherent within the remaining 3 components of density.

## 4. THE IMPLICATIONS OF DEVELOPING LAND USE REGULATIONS RELATING TO DENSITY

To gain an overall appreciation of density as a meaningful concept which may be applied as an instrument of development regulation within the residential context, it is essential to consider the three fundamental components of density in relation to one another.

### 4.1 Building Density

Stevens (1960) in his research singled out habitable rooms, dwellings per area and floor area per hectare as the most suitable units of accommodation in measuring Building Density. However, he argues that the number of dwellings and habitable rooms fail to convey any useful information regarding the real amount of accommodation unless accompanied by some standard which indicates the size of that accommodation.

Stevens (1960) recommends habitable space in the form of floor area as being the most suitable measure of Building Density, since it is a precise absolute measure of the amount of accommodation which is valid across the whole spectrum and which does not rely on a subjective judgement relating to space utilisation or the degree of occupancy. It is therefore not difficult to see why floor area and the ratio of floor area to land area, being the floor area ratio have achieved popular acceptance.

Building Density is the amount of floor area built on a site and most commonly measured as the ratio of floor area to site area. As indicated in Figure 4, Floor Area Ratio (FAR) is the total floor area existing on all floors of a building divided by the area of the site on which the building is erected.

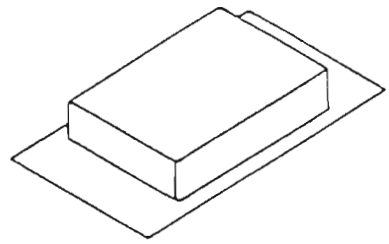
$$FAR = \frac{\text{Total Floor Area}}{\text{Site Area}}$$

The proper understanding of Building Density is crucial for the Development Regulation if one is to administer and implement a Town Planning Scheme. It is therefore important to understand that Building Density is itself the product of the variety of ways in which influencing factors interrelate, primarily in terms of the form of the building and the layout of the housing. The mathematically derived relationship of areas constituting the Fresnel Square (refer to Figure 5) illustrates the principle that tends to make the courtyard configuration a particularly efficient housing option. Whereas a building occupying the centre of a site may have to be extremely tall to accommodate a particular floor area (the conventional tower block), the same amount of floor area placed along the perimeter of the site achieves the same Building Density yet reduces the number of storeys required. In this way identical Building Densities can be achieved without the dwellings becoming non-ground related for family housing. Furthermore, the nature of the space encapsulated within the built form is an extremely valuable addition to the overall residential environment.

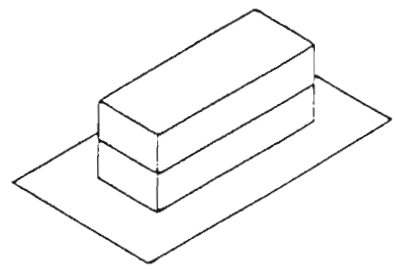
Thus, as shown in Figures 4 and 5, a given FAR can be accommodated on a site in a variety of ways, each having profoundly different implications.

FIGURE 4

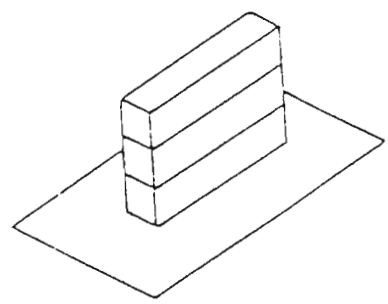
EXAMPLES OF A VARIETY OF BUILT FORM THAT CAN RESULT FROM A GIVEN SITE AREA AND FLOOR AREA RATIO (URBAN FOUNDATION, 1988)



| | |
|---|---|
| SITE AREA | 1000m² |
| FLOOR AREA RATIO | 0.6 |
| HEIGHT | 1 |
| COVERAGE | 60% |



| | |
|---|---|
| SITE AREA | 1000m² |
| FLOOR AREA RATIO | 0.6 |
| HEIGHT | 2 |
| COVERAGE | 30% |



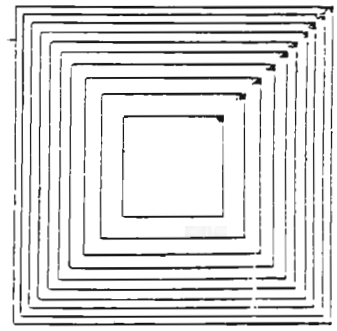
| | |
|---|---|
| SITE AREA | 1000m² |
| FLOOR AREA RATIO | 0.6 |
| HEIGHT | 3 |
| COVERAGE | 20% |

For a specific Floor Area Ratio, it is possible to achieve a wide range of housing forms and layouts. Indicated above are four examples all with the same F.A.R. Not only can the height and coverage be varied as shown but also how the building is located on the site (configuration). Indicated are three different configurations: PAVILION with the building located in the centre of the site; STREET with the buildings spread across the site in parallel rows; and COURT with the building located on the perimeter of the site. Martin and March (1972) have shown that in terms of site utilisation the court is the most efficient, followed by the street and finally the pavilion.

Source: Senior, 1984.

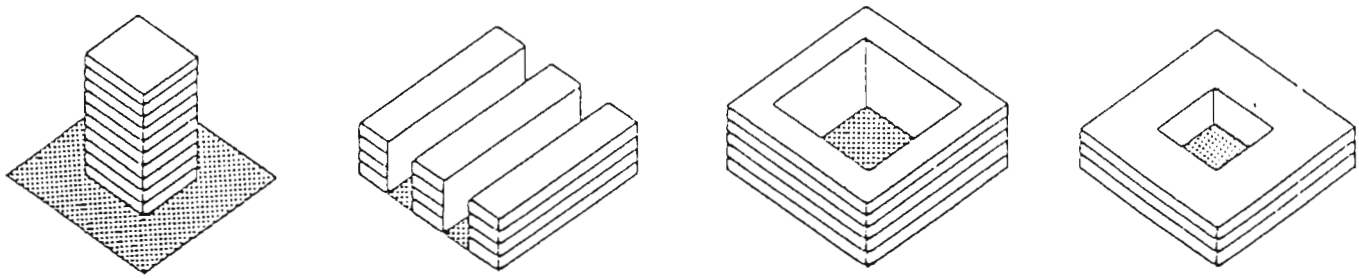
## FIGURE 5

## BUILDING DENSITY DEPENDS UPON THE HOUSING FORM AND LAYOUT



FRESNEL SQUARE

IF THE TOTAL SQUARE REPRESENTS 100% OF THE AREA THEN EACH RING IS DRAWN TO CONTAIN JUST 10% OF THIS AREA AS DOES THE SQUARE IN THE MIDDLE. THE RINGS ALTHOUGH EQUIVALENT IN AREA GROW NARROWER AND LONGER TOWARDS THE PERIMETER OF THE SQUARE.



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| FLOOR AREA RATIO | 1.0 | FLOOR AREA RATIO | 1.0 | FLOOR AREA RATIO | 1.0 | FLOOR AREA RATIO | 1.0 |
| COVERAGE | 10% | COVERAGE | 25% | COVERAGE | 20% | COVERAGE | 35% |
| HEIGHT | 10 | HEIGHT | 4 | HEIGHT | 5 | HEIGHT | 3 |
| CONFIGURATION: | PAVILION | CONFIGURATION: | STREET | CONFIGURATION: | COURT | CONFIGURATION: | COURT |

ır a specific Floor Area Ratio, it is possible to achieve a wide range of housing forms and layouts. Indicated above are four examples all with the me F.A.R. Not only can the height and coverage be varied as shown but also how the building is located on the site (configuration). Indicated e three different configurations: PAVILION with the building located in the centre of the site; STREET with the buildings spread across the site parallel rows; and COURT with the building located on the perimeter of the site. Martin and March (1972) have shown that in terms of site ilisation the court is the most efficient, followed by the street and finally the pavilion.

ıurce: Senior, 1984.

## 4.2 Occupancy Density

Occupancy Density is the relationship between floor area and the number of people occupying that floor area. Occupancy Density is best measured as a Floor Space Rate (FSR), this being the amount of floor space per member of a household.

$$FSR = \frac{\text{Total Floor Area of Dwelling}}{\text{Number of household members}}$$

Occupancy Density is a socially, culturally, economically and a politically sensitive variable. In South Africa, occupancy rates in excess of design standards are common amongst low income groups by virtue of the shortage of housing, low levels of affordability, extended family living patterns and, in many cases, the use of the dwelling as a generator of income for the owner both by way of sub-letting or from which business is conducted.

In the past Occupancy Density has tended to enjoy only limited attention by planners and housing administrators, being relevant only in circumstances when overcrowding is apparent. Indeed, Keeble (1964) in his early work stated that occupancy rate had in the past been used merely as a rough measure of overcrowding.

Stevens (1960) records that at his time of writing, no standard guide to floor space rate (Occupancy Density) existed. He concluded that there was a need to understand the underlying forces which affect floor space rates (Occupancy Density) and that occupancy standards, which take account of prevailing social and economic conditions, should be selected. He went further to state that in deciding new Occupancy Densities for a particular area, planners will be required to exercise great care in the study of the existing rates for various classes of accommodation and different social and economic groups within the community.

Clearly, Stevens (1960) recognised that the floor space rate was influenced by a number of variables, and although Stevens alluded to the nature of some of these variables i.e. the socio-economic characteristics of the inhabitants, little further work has been undertaken in this regard. Indeed, Senior (1984) states that this recognition by Stevens "constitutes virtually all the existing theory" in this regard.

The most likely reason for this lack of attention by past researchers is the fact that a reliable occupancy rate can only be determined through empirical investigation and survey. When this fact is related to the number of variables which must be considered i.e. social, cultural, economic, locational and circumstantial to name a few, then the task is daunting. Generally, estimates of floor space rate and or Occupancy Density have been based on assumptions tempered by perception.

The nature of these assumptions is further evident if one studies Figure 6, the flow diagram prepared by the British Department of the Environment (1976).

To convert Population Density to Building Density, or one measure of Building Density to another, assumptions must be made on the relationship between them. The main measures of residential density, and the assumptions which have to be made, are:

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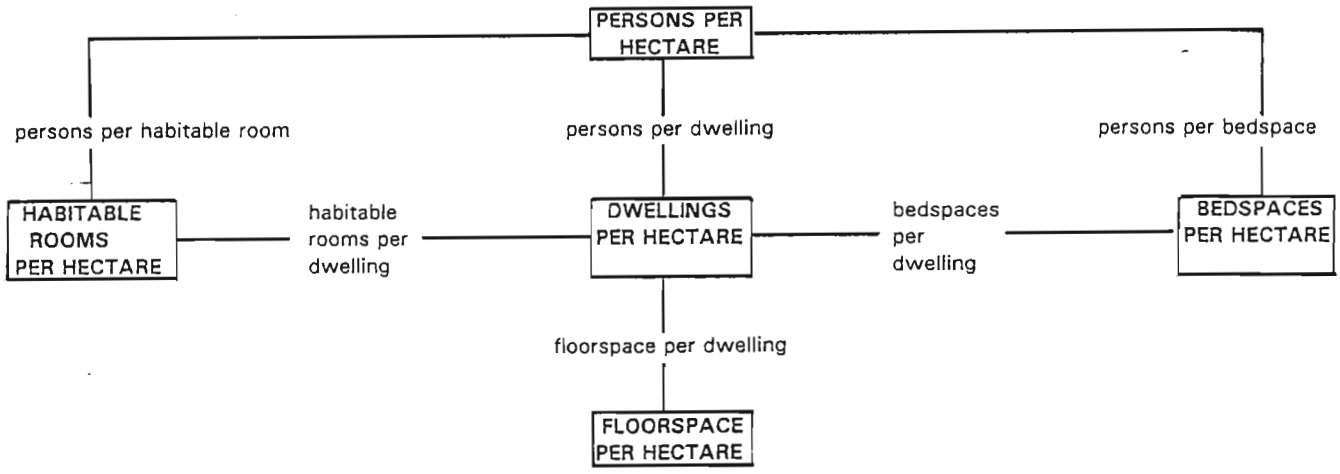



**FIGURE 6: CONVERSION FROM ONE DENSITY MEASURE TO ANOTHER IS UNDERTAKEN BY ASSUMPTIONS**

Source: Department of The Environment (British) (1976)

Stevens' (1960) points out that studies of surveys relating to different housing conditions throughout the world revealed a floor space rate as low as 1,1$m^2$ per person, in the congested areas of Asian cities, while this increased in the middle and upper income groups within these same cities.

Research in South Africa by Wood (1980) shows that there is a wide range of floor space rates, from as low as 3$m^2$ per person to 150$m^2$. (Refer to Table 3).

Consequently, an incorrect assumption can result in a gross distortion of both the Occupancy Density and ultimately of the Population Density estimates.

Therefore, when referring to density as a basis for planning, design, guidance or control, it is important to assess the extent to which density can be regulated. Typically Building Density, through the regulation of coverage, height and FAR can be controlled. However, planners and City administrators have long since grappled with the dilemma of developing a socially acceptable means to control the rate of occupancy in dwellings (Occupancy Density) and, hence, the Population Density.

## 4.3 Population Density

Population Density is the number of people occupying a given area of land and is commonly measured as people per hectare (PPH).

$$PPH = \frac{\text{Total number of people}}{\text{Number of hectares occupied}}$$

Population Density is a product of Building Density and Occupancy Density ie. Population Density is the result of any given floor area and the rate at which that floor area is occupied.

$$\text{People per hectare (Population Density)} = \frac{\text{FAR (Building Density)}}{\text{FSR (Occupancy Density)}} \times 10{,}000$$

Figure 7 illustrates this relationship and Table 1 tabulates the resultant relationship in terms of Population Density for any given Building Density (FAR) and the Occupancy Density (FSR) adopted. Both Figure 7 and Table 1 illustrate the point that Population Density is very sensitive to Occupancy Density (FSR) in particular, for example a Floor Area Ratio (FAR) of 0,5 and a Occupancy Density (FSR) of 10 square metres per person results in a Population Density of 500 persons per hectare, while an Occupancy Density of 5 square metres per person at the same Floor Area Ratio results in a Population Density of 1000 persons per hectare.

## TABLE 1

### THE POPULATION DENSITY CORRESPONDING TO ANY GIVEN FLOOR AREA RATIO DEPENDING UPON THE FLOOR SPACE RATE ADOPTED (Senior, 1984)

The population density (persons per hectare) indicated in the matrix is the result of the rate at which a given Floor Area Ratio is occupied.

EXAMPLE : At a Floor Area Ratio of 0,9 and a Floor Space Rate of 90sq.m. per person the resulting population density will be 100 persons per hectare.

| FLOOR SPACE RATE (M² PER PERSON) | FLOOR AREA RATIO 0,1 | 0,2 | 0,3 | 0,4 | 0,5 | 0,6 | 0,7 | 0,8 | 0,9 | 1,0 | 1,2 | 1,4 | 1,6 | 1,8 | 2,0 | 3,0 | 4,0 | 5,0 | 6,0 | 7,0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 100 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 120 | 140 | 160 | 180 | 200 | 300 | 400 | 500 | 600 | 700 |
| 95 | 11 | 21 | 32 | 42 | 53 | 63 | 74 | 84 | 95 | 105 | 126 | 147 | 168 | 189 | 210 | 316 | 421 | 526 | 632 | 737 |
| 90 | 11 | 22 | 33 | 44 | 56 | 67 | 78 | 89 | 100 | 111 | 133 | 156 | 178 | 200 | 222 | 333 | 444 | 556 | 667 | 778 |
| 85 | 12 | 24 | 35 | 47 | 59 | 71 | 82 | 94 | 106 | 118 | 141 | 165 | 188 | 212 | 235 | 353 | 471 | 588 | 706 | 824 |
| 80 | 13 | 25 | 38 | 50 | 63 | 75 | 88 | 100 | 113 | 125 | 150 | 175 | 200 | 225 | 250 | 375 | 500 | 625 | 750 | 875 |
| 75 | 13 | 27 | 40 | 53 | 67 | 80 | 93 | 107 | 120 | 133 | 160 | 186 | 213 | 240 | 267 | 400 | 533 | 667 | 800 | 933 |
| 70 | 14 | 29 | 43 | 57 | 71 | 86 | 100 | 114 | 129 | 143 | 171 | 200 | 229 | 257 | 286 | 429 | 571 | 714 | 857 | 1000 |
| 65 | 15 | 31 | 46 | 62 | 77 | 92 | 108 | 123 | 138 | 154 | 185 | 215 | 246 | 276 | 308 | 462 | 615 | 769 | 923 | 1077 |
| 60 | 17 | 33 | 50 | 67 | 83 | 100 | 117 | 133 | 150 | 167 | 200 | 233 | 267 | 300 | 333 | 500 | 667 | 833 | 1000 | 1167 |
| 55 | 18 | 36 | 55 | 73 | 91 | 109 | 127 | 145 | 164 | 182 | 218 | 255 | 291 | 327 | 364 | 545 | 727 | 909 | 1090 | 1273 |
| 50 | 20 | 40 | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 240 | 280 | 320 | 360 | 400 | 600 | 800 | 1000 | 1200 | 1400 |
| 45 | 22 | 44 | 67 | 89 | 111 | 133 | 156 | 178 | 200 | 222 | 267 | 311 | 356 | 400 | 444 | 667 | 889 | 1111 | 1333 | 1556 |
| 40 | 25 | 50 | 75 | 100 | 125 | 150 | 175 | 200 | 225 | 250 | 300 | 350 | 400 | 450 | 500 | 750 | 1000 | 1250 | 1500 | 1750 |
| 35 | 29 | 57 | 86 | 114 | 143 | 171 | 200 | 229 | 257 | 286 | 343 | 400 | 457 | 514 | 571 | 857 | 1143 | 1429 | 1714 | 2000 |
| 30 | 33 | 67 | 100 | 133 | 167 | 200 | 233 | 267 | 300 | 333 | 400 | 467 | 533 | 600 | 667 | 1000 | 1333 | 1667 | 2000 | 2333 |
| 25 | 40 | 80 | 120 | 160 | 200 | 240 | 280 | 320 | 360 | 400 | 480 | 560 | 640 | 720 | 800 | 1200 | 1600 | 2000 | 2400 | 2800 |
| 20 | 50 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 600 | 700 | 800 | 900 | 1000 | 1500 | 2000 | 2500 | 3000 | 3500 |
| 15 | 67 | 133 | 200 | 267 | 333 | 400 | 467 | 533 | 600 | 667 | 800 | 933 | 1067 | 1200 | 1333 | 2000 | 2667 | 3333 | 4000 | 4667 |
| 10 | 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1200 | 1400 | 1600 | 1800 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 |
| 5 | 200 | 400 | 600 | 800 | 1000 | 1200 | 1400 | 1600 | 1800 | 2000 | 2400 | 2800 | 3200 | 3600 | 4000 | 6000 | 8000 | 10000 | 12000 | 14000 |

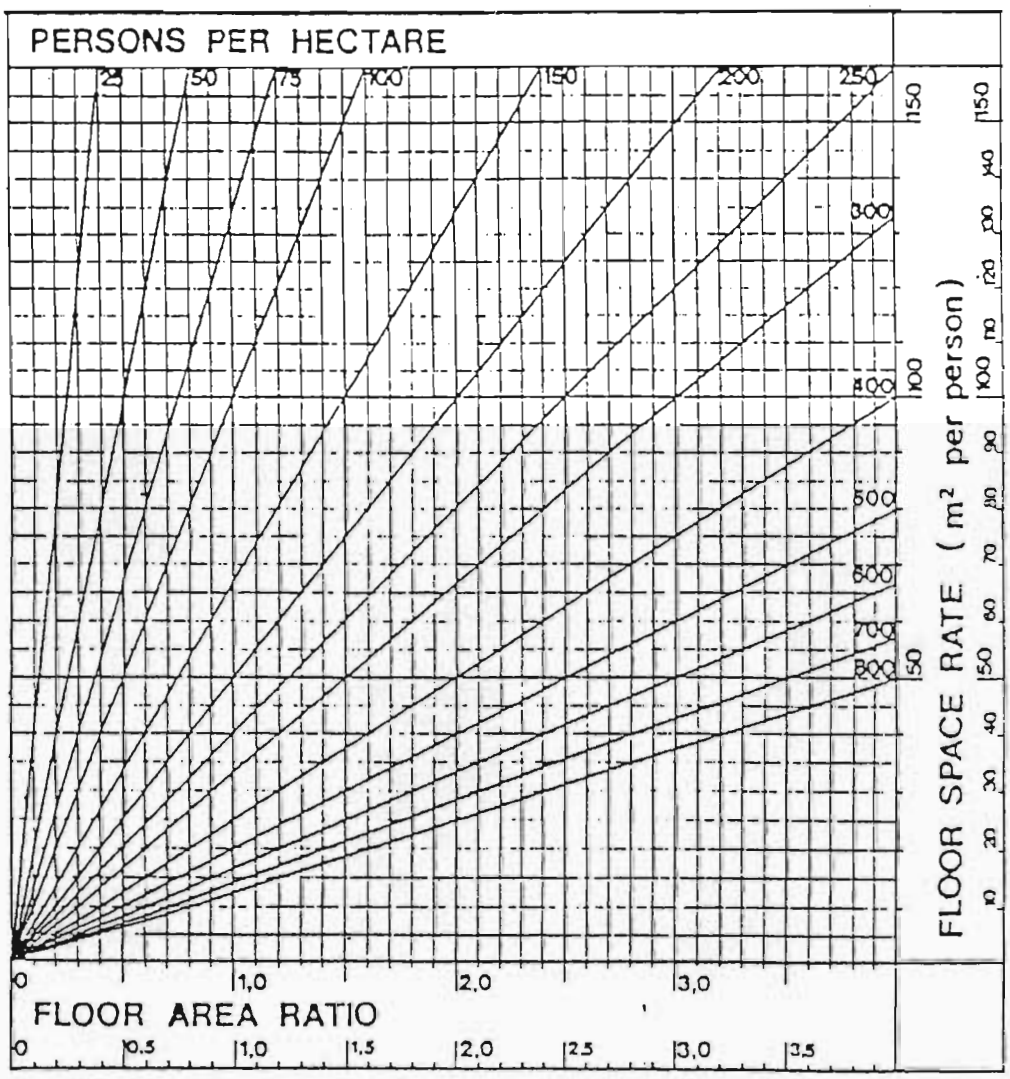



**FIGURE 7: POPULATION DENSITY RELATES BUILDING DENSITY AND OCCUPANCY DENSITY** (SENIOR, 1984)

## 4.4 The Relationship between Building, Occupancy and Population Density

From the aforegoing, it is clear that an understanding or expression of only one of the three density types, represents only a partial understanding of the residential environment. It is essential that the relationship between the three density types be both acknowledged and understood if a meaningful insight is to be gained.

Measures of habitable rooms or dwelling units per hectare alone, fail to convey reliable information regarding the real amount of accommodation available unless accompanied by some standard which indicates both the size and occupancy rate of that particular accommodation.

This point is clearly illustrated by Senior (1984) (Refer to Table 2) who compares two projects with similar unit density (dwellings per hectare) but vastly different building density (floor area ratio), namely: a high rise residential building in Parktown (Majestic Towers) and a single storey hostel in Soweto (Meadow-Lands Hostel). These two developments each have the same number of dwelling units per hectare, being 135, yet the floor area ratio of the Parktown scheme is ten times that of the Soweto hostel, namely 2,2 and 0,24 respectively, while the Occupancy Density and ultimately the Population Density is vastly different.

The model indicated in Figure 8 is a simplified abstraction from the complex model developed by Senior (1984) and provides a basis for understanding the relationship between the three essential components of density in an integrated manner.

The importance of incorporating measures of each of the 3 core components of density within development regulations is well illustrated if one compares a development with 25 units (dwellings) per hectare of 150$m^2$ per unit ie. a Building Density (FAR) of 0,375, and an Occupancy Density of 50$m^2$ per person (3 persons per unit) which has a Population Density of 75 persons per hectare with a development of the same 25 dwellings (of 150$m^2$ each) per hectare but with an Occupancy Density of 25$m^2$ per person (6 persons per unit) which has a Population Density of 150 persons per hectare. (refer to Table 3)

**TABLE 2: A SUMMARY OF VARIOUS SCHEMES, AS BUILT, AND THEIR RESPECTIVE DENSITIES BASED ON CASE STUDIES*** (Senior, 1984)

| CASE STUDY POPULATION | BUILDING DENSITY (FAR) | OCCUPANCY DENSITY ($M^2$) | POPULATION DENSITY (PPH) |
|---|---|---|---|
| Houghton | 0,10 | 157 | 6 |
| Moroko (Soweto) | 0,10 | 11 | 93 |
| Oaklands | 0,13 | 128 | 10 |
| Forest Town | 0,15 | 81 | 18 |
| Winterveld | 0,15 | 12 | 120 |
| Parktown North | 0,19 | 95 | 20 |
| Melville | 0,24 | 61 | 39 |
| Meadowlands Hostel | 0,24 | 3,5 | 690 |
| Sandown Village | 0,34 | 40 | 85 |
| Linmeyer Gardens | 0,50 | 39 | 129 |
| Yeoville | 0,61 | 49 | 124 |
| Princess Place | 1,14 | 71 | 160 |
| Killarney Court | 1,60 | 98 | 162 |
| Majestic Towers | 2,20 | 73 | 297 |
| Joubert Park | 3,00 | 57 | 528 |
| Hillbrow | 3,97 | 57 | 700 |

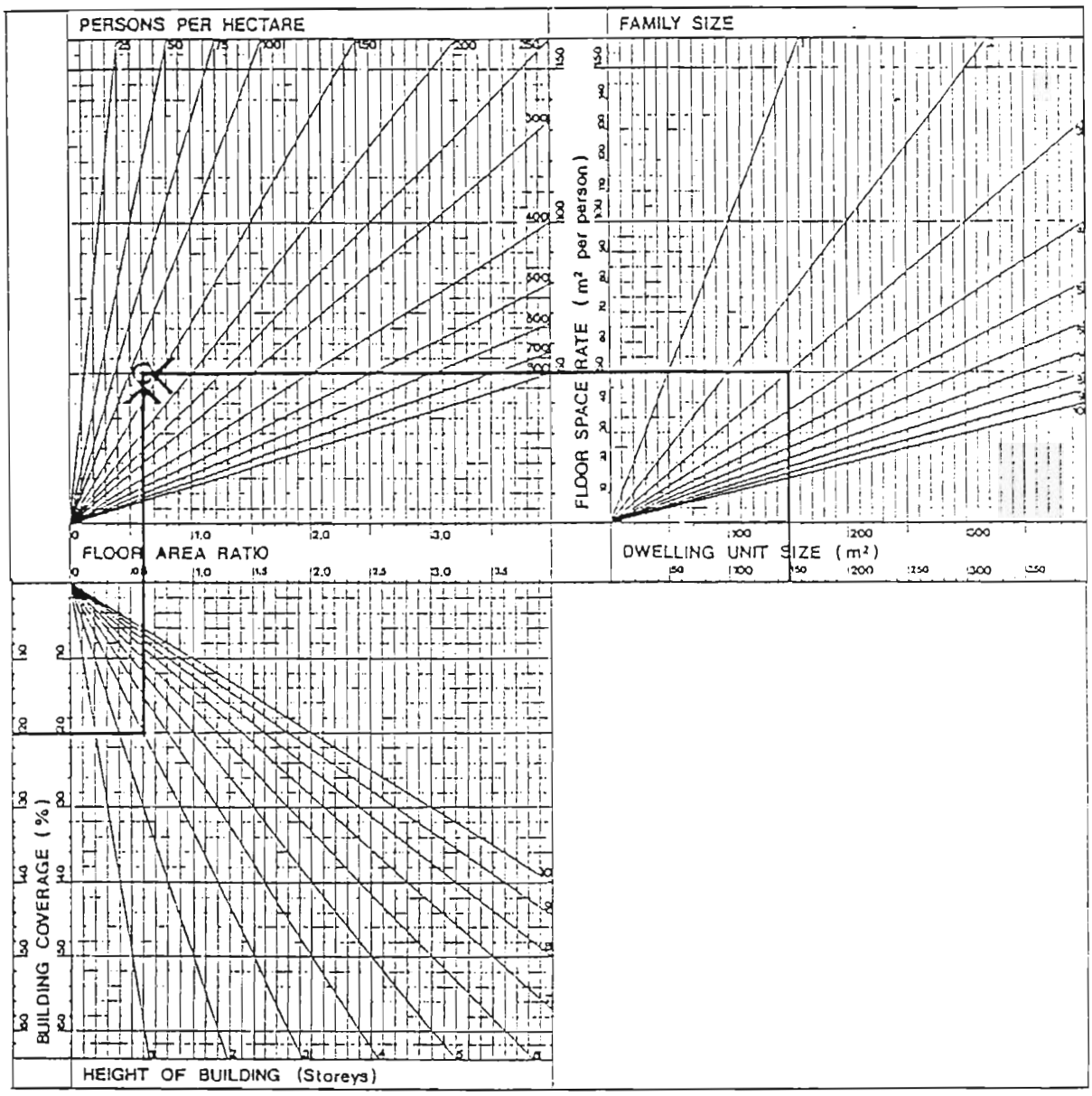
* The above local case studies are ranged in order of ascending building density. It can be seen that for the same building density a wide range of population densities can occur depending upon the rate at which people occupy the building. (Example: Melville and Meadowlands Hostel above). Occupancy density is therefore a major factor affecting population density.

## FIGURE 8

## A BASIC MODEL FOR RELATING BUILDING, OCCUPANCY AND POPULATION DENSITY

GRAPH 1

GRAPH 3




GRAPH 2

The above model is part of a larger model developed on residential density. The basic model relates building density (FAR), occupancy density (FSR), and population density (PPH). This is shown in Graph 1 where, for any given FAR and FSR, a resultant PPH can be determined, (Example : FAR 0,6, FSR 50sq.m. per person results in 120 PPH).
Graph 2 relates two further factors which themselves determine FAR - Coverage and Height. (Example : with a coverage of 20% and a height of 3 storeys the resulting FAR will be 0,6).

Graph 3 relates two factors which in turn determine FSR - Dwelling unit size and household size. (Example : with a dwelling unit of 150sq.m. and a family size of 3, the resulting FSR will be 50sq.m. per person). Through this "Nomograph" it is possible to relate each of these aspects which affect density to each other.

Source: Senior (1984)

TABLE 3: THE RELATIONSHIP BETWEEN BUILDING, OCCUPANCY AND POPULATION DENSITY

| Area/ha. | 25 Dwelling units of 150m² each i.e. Building Density (FAR) per hectare | Average Occupancy per unit | Occupancy Density in m² per person (FSR) | Net Population Density (PPH) |
|---|---|---|---|---|
| 1,0 | 0,375 | 3 | 50 | 75 |
| 1,0 | 0,375 | 6 | 25 | 150 |

## 4.5 The Importance of Specifying NET or GROSS Density Values

When applying the concept of density within a small area such as a 1 hectare site, the distinction between net and gross density is less obvious that when viewed in the context of a 100ha or on a city-wide scale.

It is at this larger scale that the implications of net or gross density take on the greatest relevance, and it is therefore particularly important to differentiate between a net or gross figure when formulating housing policy, which must address the service infrastructure requirements and land requirements.

Net Population Density deals only with the building used for residential purposes, the site on which the building is erected and the local access serving that particular site and is synonymous with the term net Residential Population Density. Gross Population Density, on the other hand, considers the residential environment as a whole and includes the area required for the associated public utilities and community facilities within that environment and is synonomous with gross Residential Population Density. For illustrative purposes only it is instructive to note Gross Population densities for various world cities to place the South African experience in a wider context. Table 4 lists the Gross population densities applicable to various cities in ascending order of density and it is noted that Johannesburg, by world standards, has a relatively low overall density.

The importance of correctly determining the additional land requirements of the ancillary Community facilities such as Schools, sport, recreation and open space areas, when planning and developing residential areas, is illustrated in figures 8, 9, 10, 11 and 12 in Table 5.

TABLE 4: GROSS POPULATION DENSITY OF SOME MAJOR CITIES OF THE WORLD

| | POPULATION MILLIONS | OVERALL DENSITY PERSONS PER HECTARE |
|---|---|---|
| DETROIT | 4,5 | 8 |
| SAN FRANCISCO | 4,0 | 9 |
| SYDNEY | 2,8 | 10 |
| **JOHANNESBURG** | **3,0** | **12** |
| TORONTO | 3,0 | 14 |
| LOS ANGELES | 8 | 14 |
| PARIS | 10 | 15 |
| LONDON | 10 | 16 |
| NEW YORK | 15 | 18 |
| MOSCOW | 10 | 31 |
| PEKING | 5 | 34 |
| SAO PAULO | 11 | 34 |
| TOKYO | 24 | 46 |
| MEXICO CITY | 17 | 65 |
| HONG KONG | 4,5 | 68 |
| CAIRO | 9 | 74 |
| BOMBAY | 8 | 78 |

SOURCE: ENCYCLOPEDIA BRITANNICA, INC, BRITANNICA ATLAS
Helen Hemmingway Benton 1986

**TABLE 5 : THE IMPLICATIONS OF THE CONVERSION OF NET TO GROSS POPULATION DENSITIES** (Refer to Table 12 for the Spatial Representation)

| TOTAL POPULATION | AREA REQUIRED FOR RESIDENTIAL LAND USE (ha) | NET POPULATION DENSITY (PPH) | AREA REQUIRED* FOR ANCILLARY LAND USE (ha) | TOTAL AREA REQUIRED (ha) | GROSS POPULATION DENSITY (PPH) |
|---|---|---|---|---|---|
| 1000 | 100 | 10 | 5 | 105 | 9,5 |
| 5 000 | 100 | 50 | 25 | 125 | 40 |
| 10 000 | 100 | 100 | 50 | 150 | 67 |
| 20 000 | 100 | 200 | 100 | 200 | 100 |
| 40 000 | 100 | 400 | 200 | 300 | 133 |
| 60 000 | 100 | 600 | 300 | 400 | 150 |
| 80 000 | 100 | 800 | 400 | 500 | 160 |

*Based on the general assumption that 1000 persons require a minimum of 5ha space for recreation, schools etc.

From Figure 12 it is evident that the gain in terms of Gross Population Density is relatively small above 200 persons per hectare Net Residential Density. The implications drawn from this table and from the figures is that to obtain a proper perspective on residential development, viz-a-viz. total land requirements and the development and occupation thresholds of dwelling units and population density respectively, it is necessary to examine these figures by a comparison of the Net and Gross values.

The result of this comparison suggests that it would be undesirable to develop dwelling units at a Net density greater than 100 du/ha, since the additional area required for auxiliary land uses (ie. community facilities such as recreation, schools etc.) depresses the gross unit density so dramatically beyond this point that the continued social and economic viability of such a development must be questioned.

Moreover, the comparison of Net and Gross population densities suggests that it would be unwise to allow the planning and development of residential areas which permit net population densities in excess of 600 persons per Net hectare, while net population densities above 200 persons per net hectare should be planned and monitored with care so as to ensure that the integrity of the amenities enjoyed by the inhabitants of such high density populations are not unduly compromised.

Table 5 read together with figures 9 and 12 illustrate that if one applies the generally accepted standard of a 5 ha additional space requirement (for ancillary land use) per 1000 population, then beyond a Net Population Density of approximately 600 persons per hectare (PPH) the absolute increase in Gross Population Density declines dramatically.

A similar trend is evident after 100 dwelling units per hectare when converting from net to gross densities as indicated in Figures 10 and 12.

Finally, in Figures 11 and 12, the 5 ha per 1000 population is held constant as a land requirement for facilities against the different household sizes. It is clear that household size is a critical determinant of Population Density and it will be seen that beyond 100 du/ha net there is virtually no absolute increase in gross densities as occupancy rates approach 10 people per household (Urban Foundation, 1988).

FIGURE 9: **THE CONVERSION OF NET POPULATION DENSITY TO GROSS POPULATION DENSITY ASSUMING DIFFERENT LAND REQUIREMENTS FOR ASSOCIATED FACILITIES** (URBAN FOUNDATION, 1988)

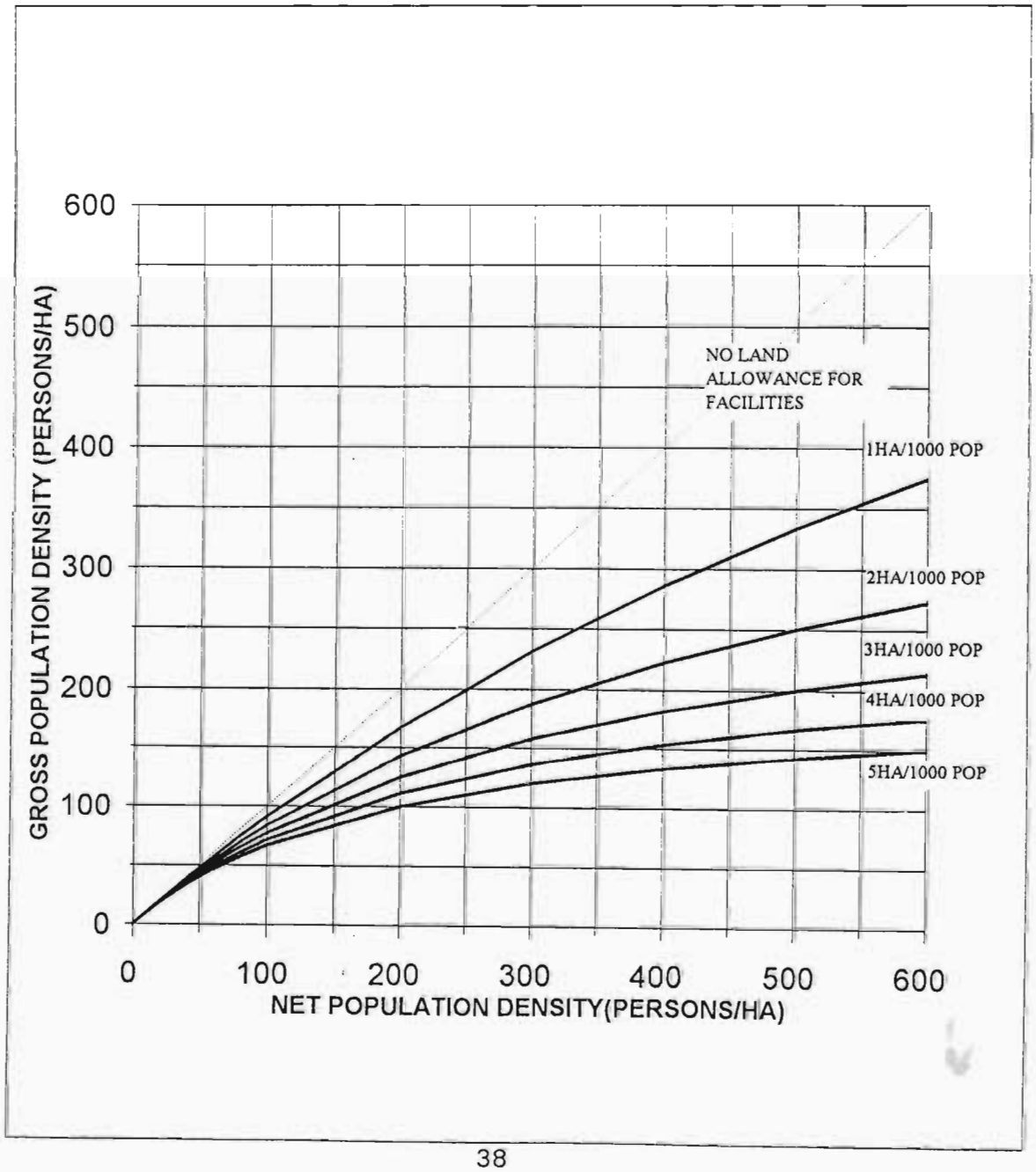


FIGURE 10

THE CONVERSION OF NET DWELLING DENSITY TO GROSS DWELLING DENSITY ASSUMING DIFFERENT LAND REQUIREMENTS FOR ASSOCIATED FACILITIES BASED ON A HOUSEHOLD SIZE OF 6 PERSONS (URBAN FOUNDATION, 1988)

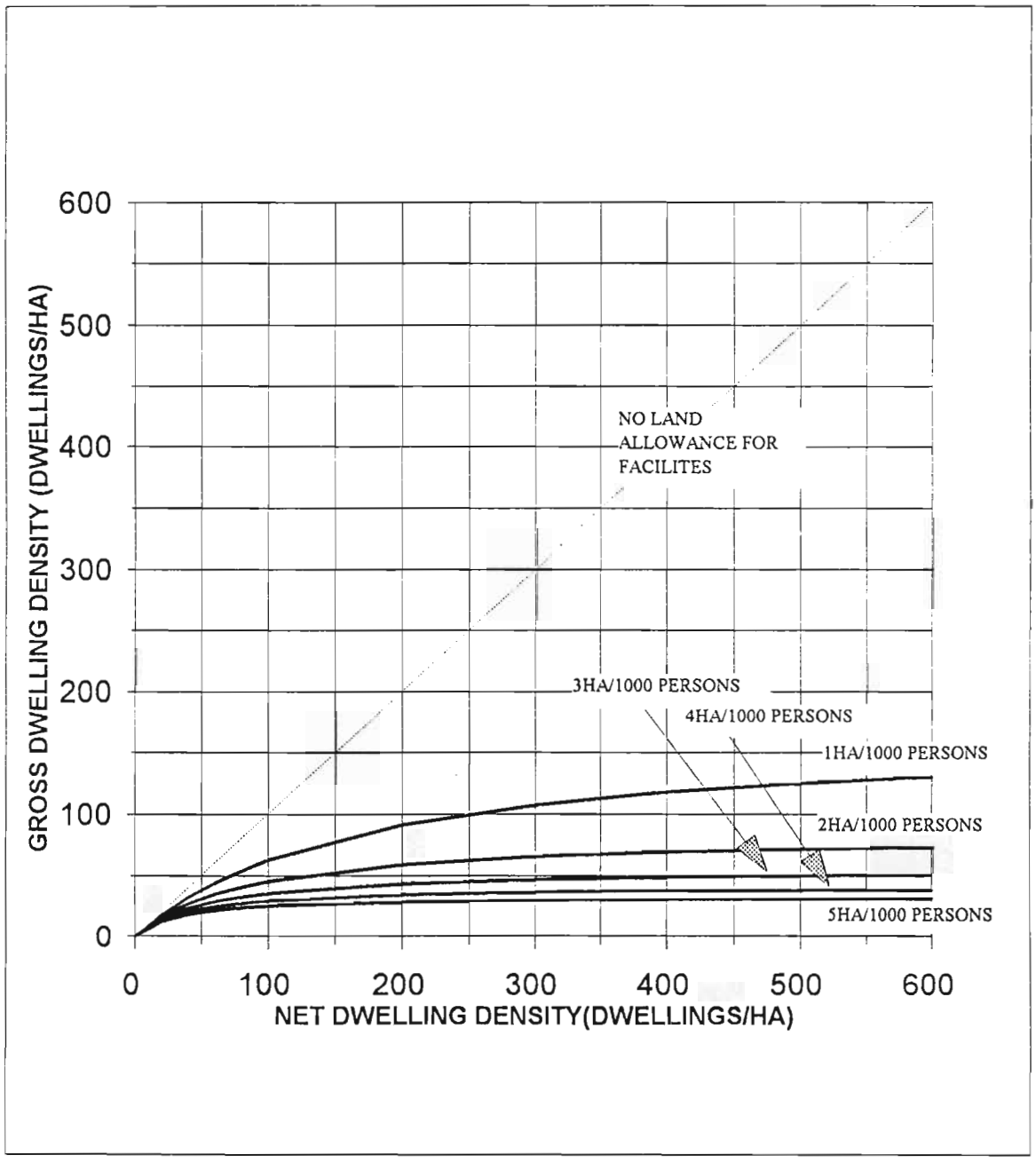
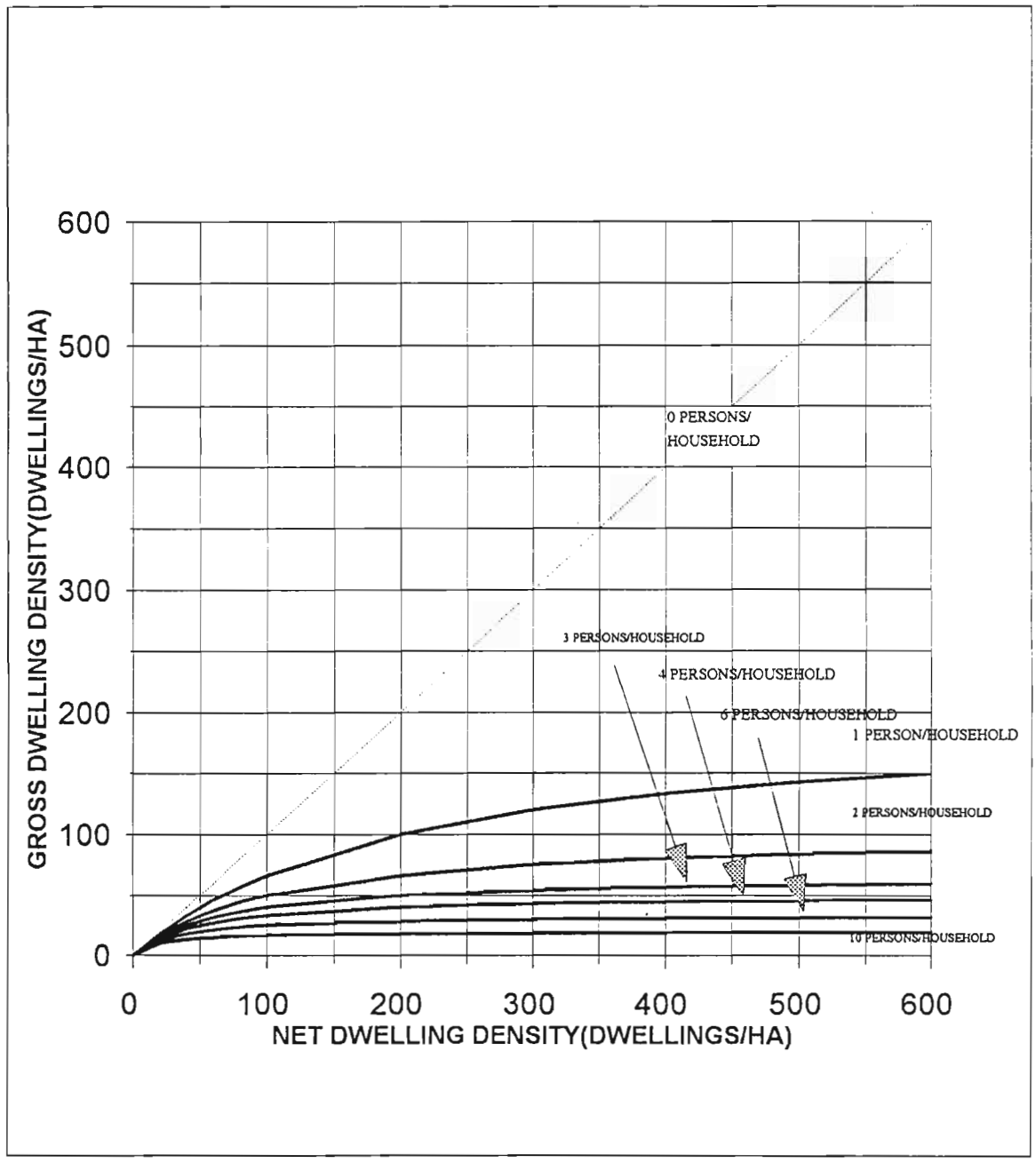


FIGURE 11:

THE CONVERSION OF NET DWELLING DENSITY TO GROSS DWELLING DENSITY ASSUMING DIFFERENT HOUSEHOLD SIZES BASED ON 5 HECTARES PER 1000 POPULATION BEING REQUIRED FOR ASSOCIATED FACILITIES (URBAN FOUNDATION, 1988)



In summary, an examination of the term Residential Density has demonstrated that the development of residential environment has certain limits beyond which little real advantage can be achieved by further densification.

The implications of these findings are as follows :

i) It is essential to translate NET Population Densities into GROSS Population Densities in order to gain a proper perspective of Residential Density,

ii) It is unwise to plan and/or develop dwelling units as a NET density of greater than 100 dwelling units per hectare.

iii) The planning and development of Residential environments with NET Population Densities above 200 persons per net hectare should be undertaken with care so as not to compromise the integrity of the residential amenity and quality of life.

iv) It is unwise to plan and/or develop a residential environment beyond a NET Population Density of 600 persons per hectare.

### 4.6 A description of the Land envelope over which Residential Density is determined

The composition of the envelope of land over which residential density is to be determined is crucial to the determination of either a gross or a net result. For example the density of the number of persons within the boundaries of a site, which includes all municipal road reserves/streets, public open space areas and community conveninces and facilities (local shops, schools and the like) would be defined as the Gross Residential Population Density. While the population density of the accumulative area of only the individual residential sites would be refered to as the Net Residential Population Density. The same principle would apply in the case of the number of units or the building or occupancy densities.

Senior (1984) argues that it is important to use the gross Population Density (gross residential population density) rather than net population density when calculating a value for the permissible population (or accommodation) on a site or within a residential area. Since the adjacent road and open space areas constitute an integral part of any site. In addition to being used for vehicular and pedestrian traffic roads and public open space are used as an integral part of the community space (such as the Woonerf concept popularised in the Netherlands where the road is specifically designed so as to incorporate it as neighbourhood activity space). Moreover, road space provides an additional distance when separating dwellings, and therefore the opportunity for additional light and sun, and even privacy. Similarly, Senior (1984) continues, that public open space *per se* is an amenity enjoyed by a residential community and when it is located adjacent to a residential development, it can exert a significantly positive influence by lending a perception of spaciousness and character to the adjacent properties. Furthermore, Senior (1984) argues that Gross Population Density results in the more equitable and economical utilisation of space within a residential area.

On the other hand, the term site density is often used to refer to the density within the boundaries of a particular site. If the site or subdivision complies with

the minimum lot size, has direct public street frontage and is occupied by a single unit, the calculation of a net site density is appropriate. However, when multiple unit sites are developed where units without public street frontage exist and which must therefore be served by private roadways, then the situation becomes more complex, since if these internal roadways are included and the half portion of public roads/streets are excluded as is the case in Pietermaritzburg, then the resulting Residential Density is a confused portion of both net and gross values.

If confusion is to be avoided, it is therefore important that a Town Planning Scheme should contain clear definitions of the planning or development land envelope over or within which Residential Density is to be determined.

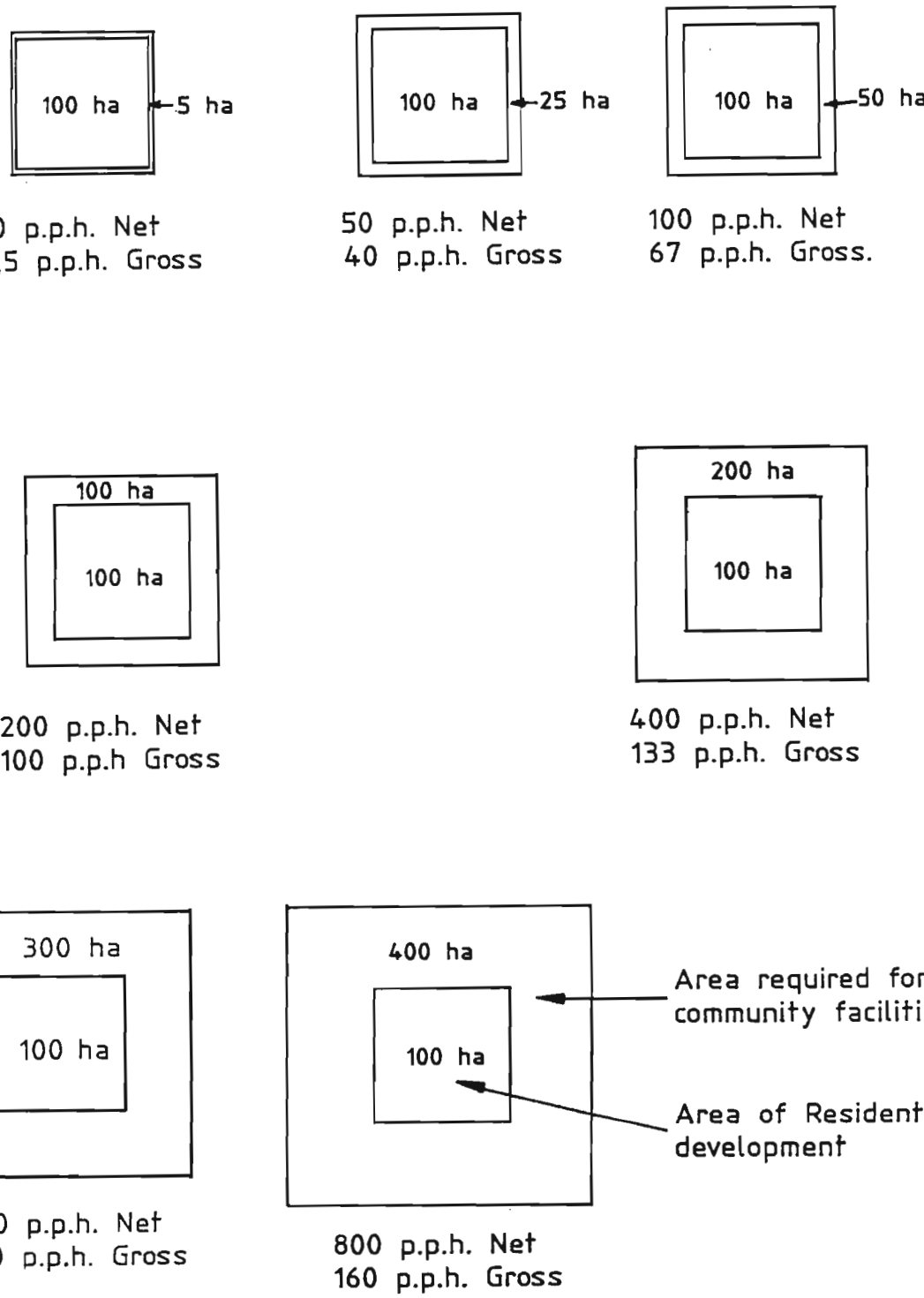



**FIGURE 12: THE SPATIAL REPRESENTATION OF THE RELATIONSHIP BETWEEN NET AND GROSS POPULATION DENSITIES WHEN 5HA OF LAND IS REQUIRED PER 1000 PERSONS, BASED ON A NET RESIDENTIAL AREA OF 100HA.**

## 5. AN EXAMINATION OF THE GENERAL PURPOSE AND CONTENT OF A TOWN PLANNING SCHEME AS THE DEVELOPMENT REGULATION MEDIUM IN KWAZULU-NATAL

### 5.1 Introduction

Any proposal or application to develop land for residential use must have regard for the provisions of the Town Planning Scheme and if one exists, for the provisions of the Structure Plan. The Structure Plan is a Policy document accompanied by a map or Plan which sets out goals for a town or city, based on its role, character and its expected or planned growth, and provides policy and strategy for achieving those goals. (Froud, 1989). Therefore, a Structure Plan, if one exists, acts as a further guide in assessing the appropriateness of the application in question.

However, the main planning and development regulation instrument is undoubtedly the Town Planning Scheme.

The general purpose of this chapter is to set the context within which "Medium Density Housing" may be applied for or developed in terms of the provisions of a Town Planning Scheme, and then to examine in some detail the content of the industry standard Town Planning Scheme i.e. the KwaZulu-Natal Provincial Standard Scheme Clauses and the case study i.e. the Pietermaritzburg Town Planning Scheme.

These two Schemes are then compared with an acknowledged example of a model Scheme i.e. the City of San Bernardino Development Code (Jacobson and Wack, 1993).

### 5.2 General Purpose and Scope of a Town Planning Scheme

A Town Planning Scheme is prepared and enacted in terms of the KwaZulu-Natal Town Planning Ordinance of 1949 (As Amended). Its general purpose is to "achieve a co-ordinated and harmonious development of an urban area in such a manner as will most effectively tend to promote health, safety, order, convenience and general welfare as well as efficiency and economy in the process of development and the improvement of communications". (Lex Patria, 1994).

The extensive scope of a Town Planning Scheme is further reinforced in the Ordinance by reference to a schedule of particular matters that should be dealt with, some of which are set out in Appendix C as an indication of the range of concerns.

In view of the wide range and scope of a Scheme it could be argued that the preparation of a Town Planning Scheme and its subsequent administration is the single most important management function of a Local Authority.

## 5.3 Main Components of a Scheme

A Town Planning Scheme is normally prepared and submitted in the form of a written statement of planning intent, a set of statutory provisions that will, upon adoption, give effect to the planning intent of proposals together with a plan of the area covered by the Scheme in question. The written statement, as the basis of the provisions, is of particular importance and should contain a comprehensive assessment of existing conditions; how they have come about over time and in relation to physical factors and developments beyond the boundaries of the scheme area. Apart from attempting to understand the existing situation the assessment should also identify where corrective action is required and where, in terms of anticipated growth, potential exists for such future development. The assessment should logically lead to a clear statement of planning intent and thereafter to specific proposals that will determine the role and nature of the statutory provisions.

Public involvement throughout this work in terms of its input, its understanding of the issues and its approval of the proposals is vital to the scheme's ultimate success.

The legal provisions of the Town Planning Scheme comprise two main components which operate in tandem, namely :-

(i) a Scheme map depicting "zoning", and

(ii) the Scheme Clauses or text containing regulations.

The Scheme map is prepared on a survey base that accurately depicts all registered sub-divisions of land and existing roads on which is overlaid the nature and extent of each use zone and the reservation of all land for public purposes such as new roads, road closures and widenings; open space and recreation; education etc.

In this form the Scheme map forms a dual purpose, ie. it enables identification of any plot of land in its physical relationship within the planned development of its surroundings including matters that might have a direct effect on the plot such as street widening or the allocation of adjoining land for shopping or other purposes. In this way it may be seen that a scheme fulfils an important role in property investment and ill considered subsequent amendments could seriously erode investment confidence.

The other role of the Scheme map is as a property/zoning key for the application of the regulations. It should be noted however that the map does not record existing land usage and development although in many cases zonings and land reservations might accurately reflect such conditions. For example there is no distinction, where land is reserved for public open space, between a developed park and land that still has to be acquired and developed for such purpose. Equally an existing shop might be located within a residential zone although the use Shop is a precluded. Non-conforming existing use rights will be dealt with later but a brief examination of zoning as an urban development regulating device might be appropriate here.

The demarcation or zoning of areas of land for particular use purposes, has become the most significant and debated feature of a Town Planning Scheme. In practice, zoning attempts to achieve its purpose by the physical separation of various activities and the grouping of compatible activities within a specific zone. In this latter regard zoning employs a cascade or hierarchical principle in terms of which zoning for a certain order of use - for example; high density residential development - will usually permit a variety of lower order uses such as - medium density and low density residential developments. Similarly, zoning that permits noxious industry may also permit less noxious industries and related activities such as general, light and service industries and office uses.

Consequently, in cases where a zoned area has not been developed to its highest permissable order this may be an indication that the zone may be premature or inappropriate.

It may therefore be observed that since zoning can permit a range of uses or intensities of use, it affords a degree of flexibility to the extent of what might be deemed desirable at some future time. As a result zoning should be treated with caution as a basis for accurately assessing the magnitude of future development or the development potential of an area.

In order to cater for this future development potential within a zone, the town planning regulations permit a degree of flexibility via 3 categories of provisions. These provisions specify the usage and development of land and buildings according to those that are:

* Expressly permissible (ie. a free entry right)
* Expressly prohibited
* Conditionally permitted by "Special Consent" of the Local Authority.

## 5.4 Types of Town Planning Applications

In light of the above, a person or entity wishing to initiate a development or action for which the regulations require application to be made, is faced with a number of alternatives:

(i) In the case where the intended use is expressly permissible (a "Free Entry" right) there is clearly no need for a Town Planning application. It remains for the developer to prepare and submit the necessary building plans (which comply with the building regulator) to the authority concerned.

(ii) Where the desired use is expressly prohibited the applicant must prepare and submit an application in terms of Section 47 bis of the Ordinance No. 27 of 1949 to amend the Town Planning Scheme by rezoning the property in question to a zone which expressly permits the use in question. Should this application be refused for some reason or reasons which cause the applicant to be "aggrieved" then he/she may make a second application in terms of Section 67 bis of the Ordinance No. 27 of 1949. This latter application constitutes a means of bypassing the local authority and gaining access to the Town Planning Appeals Board since, unlike the

limited powers of the local authority, the Board may consider and give a decision on something which is in conflict with the provisions of the Scheme.

(iii) In the third category, namely, conditionally permitted uses, which may be permitted with the Special Consent of the local authority, the applicant is required to prepare and submit an application in terms of Section 67 bis of the Ordinance No. 27 of 1949, which seeks to demonstrate the appropriateness of the proposed use and, in particular, that the proposed use or development will not interfere with the amenities of the neighbourhood. On reaching a decision, the opportunity to appeal is then provided to the applicant if the local authority refuses to grant its consent, or to any objector to the application if the local authority approves the application.

In either case, the Town Planning Appeals Board would consider the facts and either uphold or dismiss the appeal.

## 5.5 Design considerations for Town Planning Schemes

The KwaZulu-Natal Provincial Department of Local Government and Housing is responsible for the regulation of all planning and development within the province in terms of the Provincial Ordinance No. 27 of 1949 as amended, and each town planning scheme in the Province is prepared in terms of this Ordinance.

The "industry standard" on which most town planning schemes are based and/or amended is contained in a set of guidelines known as the "Standard Town Planning Scheme Clauses" (KwaZulu-Natal Provincial Administration, 1973, as amended at July 1994).

Consequently, these Standard Clauses, which are themselves amended from time to time, reflect Provincial policy in respect of development regulation in KwaZulu-Natal.

The Pietermaritzburg Town Planning Scheme in its original form first took effect on 1st August 1950, and many of its clauses, land use types and definitions are substantially the same as those contained in the Provincial Standard Clauses which is testimony of their influence.

However, both the Provincial Standard Clauses and the Pietermaritzburg Town Planning Scheme exhibit broad residential zoning and land use categories which invites much speculation and provides room for some contrary contentions concerning the process of application in respect of the development of residential environments.

This point is more fully dealt with later on in this thesis, however, for the sake of clarity an example of this broad categorization is the existence in the Pietermaritzburg Town Planning Scheme of the land use "Medium Density Housing" as a type or form of housing, which may be either expressly permitted, permitted by Special Consent or prohibited in a particular zone.

The definition of this "land use" further demonstrates the broad nature of this categorization by including a wide range of house types/forms from "duplex flats" to "dwelling houses", for example, there exists no explanation as to what a "zone" is or how a "land use" differs from that of a "zone". Moreover, the various residential zones are not described and no explanation is given as to what principle is to be upheld or the purpose or objective sought in the various zones.

All this and more must be devined through the interpretation of the various clauses, provisions and tables.

Surely it is desirable to provide unambiguous guidance to the property owner, developer and planning practitioner as to what precisely it is that the town planning scheme wishes to encourage or discourage within the various zones.

A foremost example of this latter approach is contained within the City of San Bernardino Development Code (Jacobson and Wack, 1993).

The San Bernardino Development Code employs a wide range of different types of residential zones, each being carefully described in terms of the purpose for which it is to be established, including the precise type of housing, the density and even a description of the character or ambience of the neighbourhood (e.g. this zone is intended to promote the development of low density, single family, detached, dwelling units, conveying an "estate" character and individually located on large lots or subdivisions with a minimum size of 2000 $m^2$).

By contrast the Standard Scheme Clauses and the Pietermaritzburg Scheme regulations are vague and therefore give rise to much speculation, negotiation, acrimony and unnecessary delays and expense in the development of much needed housing.

Moreover, the inclusion in a Scheme of vague regulations and provisions based on subjective standards which require the exercise of a large measure of professional discretion, requires a large staff complement of well trained, qualified town planners with a large measure of experience, if the task is to be handled both effectively and efficiently.

In the absence of such a large, highly skilled and experienced staff in KwaZulu-Natal (if not the South African) local authorities, it would seem desirable that these town planning schemes should be designed to be more precise and "user-friendly" in respect of the residential environment and more particularly so in the area of "Medium Density Housing".

## 5.6 Development Regulation

The need for development regulation and types of standards employed in the regulation process are dealt within Appendix D.

In the context of this thesis, development regulation may be broadly defined as the process whereby development is regulated according to a set of provisions and standards as contained within a Town Planning Scheme.

The 2 principle variables within this process are the nature and content of the provisions and standards and the knowledge and skill of the regulating agent or scheme administrator.

Clearly, the more user-friendly and precise the provisions and standards the less will be the areas or points of uncertainty and contention.

However, in the pursuit of regulations and measures which are deemed to be capable of simple, unambiguous implementation one must guard against over simplication to the point where the entire system is reduced to only a few land use zones, which accept a wide range of differing land use types by way of Special Consent.

Rather, the regulation system should be systematically examined and amended so as to minimize those areas where discretion must be exercised in favour of specification and performance standards. (Refer to Appendix D for summary of the types of standards).

## 6. REVIEW OF THE EXISTING DEVELOPMENT REGULATION SYSTEM IN KWAZULU-NATAL PROVINCE IN GENERAL AND OF PIETERMARITZBURG'S SYSTEM IN PARTICULAR AND AN AMERICAN EXAMPLE (THE SAN BERNARDINO DEVELOPMENT CODE)

### 6.1 Introduction

This Chapter reviews 2 South African examples namely, the Provincial Standard Town Planning Scheme Clauses and the Case study i.e. the Pietermaritzburg Town Planning Scheme, and an American Scheme, the San Bernardino Development Code, which is considered to be one of the foremost examples of a town planning scheme by virtue of its innovative and "user-friendly" approach.

The modus operandi adopted here is to expose the various provisions and standards of each of these schemes only as they relate to the residential land use in general and to Medium Density Housing in particular.

The presentation of the provisions and standards is followed by a comparative critique of the individual schemes.

### 6.2 KwaZulu-Natal Province : Development Regulations as contained in the Standard Town Planning Scheme Clauses

#### 6.2.1 Introduction

The development regulations as discussed below are sourced from the Standard Town Planning Scheme Clauses. (KwaZulu-Natal Provincial Administration, 1993 as amended at July 1994).

These Standard Clauses are used as the basis in the preparation of new Town Planning Scheme Clauses for towns not previously catered for and for the amendment of existing schemes in the case where schemes already in existence require updating. Consequently, the Standard Clauses, which are themselves amended from time to time, reflect the provincial policy in respect of development regulation in KwaZulu-Natal.

The relevant controls may be divided into 5 sections, comprised of 5 parts and 3 sets of tables, namely:

(i) Standard Definitions are contained in Part 1 and Definitions of Types of Buildings and Land Use in Table A, while the various use zones together with their respective "free entry", "consent" and "prohibited uses" are detailed in Table C.

(ii) Building lines, side and rear spaces in Part 3.

(iii) Application Procedures in Part 4 and Lot Controls in Part 5. While the respective Density and Additional Controls are located in Table D.

(iv) External appearance of buildings and parking controls in Part 6.

6.2.2 Standard Definitions, Land Use and Use Zones

The Standard Scheme Clause definitions include three basic types of housing developments, which may be deemed to fall within the ambit of the term "Medium Density" namely:

(i) Medium Density Housing *per se* and related definitions;

(ii) Residential Buildings and related types of buildings and uses;

(iii) Mobile Home Park and related definitions;

(iv) Definitions of a family, and related interpretations; and

(v) Use Zones.

**(i) Medium density housing *per se* and related definitions.**

This includes the following interpretations: Medium Density Housing (as a land use), and related definitions of Common Land and Private Open Area and such defined housing types as Duplex Flats, Semi-detached housing, Terrace Houses, Maisonettes or Dwelling Houses.

"Medium Density Housing" means a group of two or more attached and/or detached dwelling units, together with such outbuildings as are ordinarily ancillary thereto, with each dwelling unit having direct access to a private open area and access to common land, the whole development having been designed as an harmonious entity. Such development may include duplex flats, semi-detached houses, terrace houses, maisonettes or dwelling houses.

"Medium Density Housing Site" means a defined area of land upon which medium density housing is established or is proposed to be established and which comprises dwelling unit curtilages and common land, but excludes any land required by the local authority for public purposes.

"Private Open Area" means a usable area, exclusive of utility areas, driveways and parking areas, which is open to the sky and which is adjacent to and has direct access from a dwelling unit on a medium density housing site, such private open area being reserved for the exclusive use of the occupants of the associated dwelling unit, but may include covered open areas (patios) and verandahs.

"Common Land" means that portion of a Medium Density Housing site or Mobile Home Park site which is set aside for the use and enjoyment of all the occupants of the dwelling units on that site and from which the general public may be excluded.

"Semi-detached House" means a building other than a dwelling house comprising 2 dwelling units contained in one building, both on the ground floor and each provided with a separate entrance.

"Terrace House" means a dwelling unit in a building comprising 3 or more dwelling units, each having a separate entrance on the ground floor with direct access to a private open area or areas.

"Duplex Flat" means a dwelling unit in a building each such unit consisting of a ground floor and one upper floor connected by an internal staircase and having direct access to a private open area.

"Maisonette (or Pair of Maisonettes)" means a two storey building consisting of 2 dwelling units placed one above the other with separate entrances.

"Dwelling Unit Curtilage" means a single defined area of land forming part of a medium density housing site comprising the land upon which a dwelling is erected or is intended to be erected together with such private open areas and other areas as are reserved for the exclusive use of the occupants of the dwelling unit.

"Dwelling House" means a freestanding dwelling unit used as a dwelling for a single family, together with such outbuildings as are ordinarily used therewith.

"Outbuilding" means a building ordinarily used in conjunction with a dwelling unit(s), and used for the garaging of private motor vehicles, storeroom, servant's rooms, servant's toilet, workroom and other such similar uses.

(ii) **Residential Building and Related Types of Buildings and Uses.**

This includes types and uses not defined in the Scheme such as a block of flats, boarding house, hotel, residential club or hostel and the building types: Chalets, Duplex Flats, Semi-detached House, Terrace House and Maisonette which are specifically excluded from the definition of the land use "Residential Building". It is not clear why this distinction is made, particularly between the building type of "Block of flats" and "Maisonette" which seem to be arguably the same.

A further apparent anomaly lies in the separate distinction being made for "Extended Residential Building".

"Extended Residential Building" means a building other than a dwelling house but having the general appearance of a single dwelling house, which is used, constructed, designed or adapted for use for human habitation and comprises not more than 3 dwelling units, together with such outbuildings as are ordinarily used therewith.

"Residential Building" means a building or portion of a building other than a Dwelling House, Chalet, Duplex Flat, Semi-detached House, Terrace House or Maisonette used for human habitation, together with such outbuildings as are ordinarily used therewith, and includes a block of flats, boarding-house, hotel, residential club or hostel.

(iii) **Mobile Home Park and related definitions.**

The mobile home is not as mobile as its name suggests since the cost of relocating such a home tends to dictate that it be sold *in situ* rather than relocated. Nonetheless, the densities at which these parks are developed together with the fact that they are used as permanent residential accommodation place them firmly within the ambit of medium density housing developments.

"Mobile Home" means a factory-assembled structure, 12,5m or greater in length and 3,3m or greater in width, with the necessary service connection, so made as to be movable on a site as a unit with or without wheels, and designed for use as a permanent dwelling unit and which complies with the S.A.B.S. specification 1122-1976.

"Mobile Home Stand" means a portion of a Mobile Home Park site that has been demarcated and set aside for the placement of a Mobile Home and for the exclusive use of the occupants of the Mobile Home.

"Mobile Home Park Site" means a portion of land upon which mobile homes are accommodated or are intended to be accommodated, regardless of whether or not a charge is made for such accommodation.

"A Static Caravan" means a factory-assembled structure without any accessories which is less than 12,5m in length and 3,3m in width but greater than 7m in length and 2,3m in width, with the necessary service connection, so made as to be movable on a site as a unit, on its wheels, and designed as a temporary holiday dwelling unit.

"Caravan" means any vehicle permanently fitted out for use by persons for living and sleeping purposes whether or not such vehicle is a trailer.

"Chalet Development" means a grouping of a number of Chalets on a lot; a chalet meaning a detached habitable building used as a holiday dwelling with a floor area not exceeding 53m$^2$ and not less than 32m$^2$ consisting of not more than 3 living rooms with or without sanitary convenience, bathroom, shower and kitchen, together with approved outbuildings or ancillary buildings to be used in conjunction with a chalet or series of chalets, but shall not include a dwelling house or residential building. A series of chalets shall denote any grouping of a number of chalets.

(iv) **Definition of a family and related interpretations**

The Provincial Standard Scheme contains definitions of a "Family" and both "Dwelling Unit" and "Dwelling House". These are as follows:

Family : means a man or a woman or both, with or without their parents and with or without children of one or the other or both of them living together as one household.

Dwelling Unit : means a self-contained interleading group of rooms for a single family including not more than one kitchen.

Dwelling House : means a freestanding dwelling unit used as a dwelling for a single family, together with such outbuildings as are ordinarily used therewith.

(v) **Use Zones**

Table C details the various use zones together with the purposes for which buildings may be erected and used and land may be used by "free entry", only with Special Consent and prohibited uses.

The following Table indicates the situation as regards the medium density housing and related uses within the relevant zones.

**TABLE C** (Extract from the Provincial Standard Town Planning Scheme, 1973)

| ZONE | PERMITTED (FREE ENTRY) | PERMITTED BY SPECIAL CONSENT | PROHIBITED |
|---|---|---|---|
| Special Residential | (i) Dwelling House | (i) Medium Density Housing | (i) Residential Building<br>(ii) Chalet Development<br>(iii) Extended Residential Building<br>(iv) Mobile Home |
| Intermediate Residential | (i) Dwelling House<br>(ii) Medium Density Housing | | (i) Residential Building<br>(ii) Chalet Development<br>(iii) Extended Residential Building<br>(iv) Mobile Home |
| General Residential 1 | (i) Dwelling House<br>(ii) Medium Density Housing<br>(iii) Residential Building | | (i) Chalet Development<br>(ii) Extended Residential Building<br>(iii) Mobile Home |
| General Residential 2 | (i) Dwelling House<br>(ii) Extended Residential Building<br>(iii) Medium Density Housing<br>(iv) Residential Building (excluding Hotel with liquor licence) | | (i) Chalet Development<br>(ii) Mobile Home<br>(iii) Residential Building (Hotel with liquor licence) |
| General Residential 3 | (i) Dwelling House<br>(ii) Extended Residential Building<br>(iii) Medium Density Housing<br>(iv) Residential Building (excluding an Hotel with liquor licence) | | (i) Chalet Development<br>(ii) Mobile Home<br>(iii) Residential Building (Hotel with liquor licence) |

6.2.3 Building Lines, Side and Rear Spaces.

Building lines of Medium Density Housing sites are 7,5 metres which is the same as for dwellings within Special Residential zones. General Residential zones are subject to a 9 metre building line.

Side and rear spaces for a Residential Building, Duplex Flat, Maisonette, Semi-detached House, Terraced House or Medium Density Housing site are 4,5 metres as opposed to 2 metres for dwellings within a Special Residential zone.

In the case of a Mobile Home Park site and within individual stands within the site, the minimum side and rear space requirement is 3 metres.

6.2.4 Application Procedures, Lot Controls, Density and Additional Regulations

The application procedure, design and layout of Medium Density Housing and Mobile Home developments are appended in Annexure D.

In the case of medium density housing, the Province originally envisaged a 2-phase application process, the first phase required the preparation and

submission of a layout plan showing in outline, proposed buildings, roads, access points and private open areas, to the local authority for a decision in principle.

If and when the approval in principle was granted then a detailed set of plans were to be produced showing a host of detailed information. (KwaZulu-Natal Provincial Administration, 1973).

This 2-phase procedure was subsequently amended to a single phase, omitting the decision in principle phase. Further controls contained within Table D : Density are as follows:

(i) In Special Residential zones the minimum lot area for medium density housing is 1800m$^2$ and the maximum number of units which may be established is determined by dividing the area of the site concerned by the appropriate minimum lot area per dwelling house and rounded off to the nearest whole number.

Floor Area Ratio (F.A.R.), coverage and height remain the same as for a dwelling house, namely: 0,30, 30% and 2 storeys respectively.

(ii) In the Intermediate Residential zone the number of units is restricted to a maximum of 20 per hectare with a minimum lot area of 1800m$^2$, a maximum coverage of 30% and a height of 3 storeys. The F.A.R. is not considered applicable since it is believed that the number of units per hectare together with the coverage will restrict the F.A.R. on the site.

(iii) In the General Residential zones the minimum lot area is 1800m$^2$. A unit density of 30 units per hectare is permitted in the case of General Residential 1 and 2, while a maximum coverage of 35%, an F.A.R. of 0,75 and 0,50 respectively and a height of 3 storeys is permitted. In General Residential 3 zones 25 units per hectare is the maximum permitted, with a 30% coverage, an F.A.R. of 0,35 and a height of 3 storeys.

The application procedure for a Mobile Home development is similar to that of medium density housing and certainly as detailed. (Refer to Annexure D). The principle controls applicable to a Mobile Home development are as follows:

(i) The minimum site area is 1 hectare.

(ii) The maximum permissible number of units is limited to 16 per gross usable hectare.

(iii) The maximum permitted F.A.R. is 0,30, coverage 30% and height is restricted to a maximum of 2 storeys.

6.2.5 External Appearance of Buildings and Parking Controls

This part of the Standard Scheme Clauses prescribes that the character, design and external appearance of buildings, including the material used in their construction, shall be subject to the approval of the local authority, and that no building shall be erected without the approval of the local authority.

In considering any application, the local authority is required to have regard to the character of the locality in which it is proposed to erect such building and shall take into account whether or not the building will be injurious to the amenities of the locality by reason of its external appearance or the materials it is proposed to use.

An application for approval in terms of the above is required to lodge a number of drawings showing various elevations together with a schedule specifying the general construction and finishes.
The parking requirements set by the Scheme are as follows:

For every Residential Building (as defined in the Scheme) or chalet there shall be 1 garage or covered parking space for each dwelling unit and a suitable area for visitors parking at the rate of 1 car space for every 2 dwelling units.

In the case of a Medium Density Housing site, the same provision is required save for the fact that the visitors parking spaces may not be placed on the private open area.

In the case of Mobile Homes, accommodation for motor vehicles is the same as that for medium density housing.

## 6.3 Relevant Development Regulations as contained in the Pietermaritzburg Draft Town Planning Scheme

6.3.1 Introduction

The Pietermaritzburg Town Planning Scheme in its original form first took effect on 1 August 1950. Subsequently, various areas have been incorporated into the city and the Scheme Clauses have been developed and adapted over the course of time. The format was somewhat complex and the various sections and the amendments thereto did not always follow concurrently. Consequently, the first impression of the Scheme was a haphazardly arranged set of provisions and controls. To counter this situation the Town Planning Scheme was streamlined into a more ordered and logical format together with minor amendments, and this new format was advertised in the customary manner during early 1990 and took effect on 10 May 1991. (Pietermaritzburg City Engineers Department, 1990).

The new Scheme format is arranged according to the zoning - each zone forming a separate, stand alone section and containing most of the

information relevant to that particular zone.

The Scheme is comprised of 8 parts, namely:

| | |
|---|---|
| Part One: | Introduction and Interpretations (which includes definitions of buildings and land use). |
| Part Two: | Erection and/or use of Buildings and use of land. |
| Part Three: | Use of Land and Buildings in the various use zones and allied matters, including density provisions. |
| Part Four: | Reservation of land and associated matters. |
| Part Five: | Saving for Special purposes. |
| Part Six: | Subdivision of land. |
| Part Seven: | General Amenity and Convenience. |
| Part Eight: | Miscellaneous. |

Finally, there are 9 appendices, the first of which deals specifically with "Medium Density Housing".

The sections relevant in the context of this dissertation are dealt with below.

### 6.3.2 Density Provisions

Density within the Pietermaritzburg Town Planning Scheme is controlled by two forms of provisions; the first is the standard form of Building Density control, namely: floor area ratio that is expressed throughout the scheme for the various uses, while the second form is specific to residential land use and is expressed as a blanket "maximum number of dwellings per hectare".

This latter control is expressed in Clause 3.1.4 of the scheme and includes reference to a density zone, a set of maps and a table of 7 Scales of intensity, which reads as follows:

"Density Control

The maximum number of Dwellings per hectare which may be permitted shall be dependent upon the zoned area of the site upon which such dwellings are erected, but shall not exceed the number per hectare, to the first whole number, as provided for in the following table and subject to the Council's Special Consent. Provided that in the event of three or less dwellings being established on a single subdivision, the Special Consent procedures may be waived if the written consent of all contiguous owners and other such owners the Council may determine, are submitted to Council."

PIETERMARITZBURG DENSITY ZONE TABLE : SCALES OF INTENSITY (EXTRACT FROM THE SCHEME)

| DENSITY ZONE NO. | MAP REFERENCE TPR G/56F | UNITS/ HECTARE |
|---|---|---|
| 1 | Violet | 45 |
| 2 | Yellow | 30 |
| 3 | Dark Green | 25 |
| 4 | Pale Green | 20 |
| 5 | Pale Red/Brown | 15 |
| 6 | Brown | 10 |
| 7 | Orange | 7 |

This table illustrates the range of densities as permitted in the Pietermaritzburg Town Planning Scheme.

"The maximum coverage permitted on any site in the Special Residential zone shall be 1/2. (50 %)"

"The maximum bulk factor for all other uses shall be 1/2. (50 %)

The maximum height permitted on any site in the Special Residential zone shall be 2 storeys, save with the Special Consent of the Council".

However the extent of the envelope of land over which these density provisions are applied comprises only that land within the property boundaries.

Hence, the calculation of residential densities in terms of these provisions results in the determination of the net residential unit density, although this is not specifically stated.

6.3.3 Interpretations

The following interpretations are given for the use of land and buildings: (the Dwelling Unit was recently amended and both the old and new definitions are included here for the sake of comparison).

"Dwelling Unit (The old scheme interpretation)
means a coherent suite of rooms used or designed for use as residential accommodation for a single family and shall comprise not more than ten (10) habitable rooms nor more than one (1) kitchen, save with the consent of the Council."

"Dwelling (New Scheme amendment)
means a coherent suite of rooms used, or designed for use, as residential accommodation for a single family and shall -

(i) in respect of sites within Density Zones allowing 20 units/ha and greater, comprise not more than six (6) habitable rooms, save with the special consent of the Council, and shall in any event, include not more than one (1) kitchen, which may be in addition to the allowable number of habitable rooms;

(ii) in respect of sites within Density Zones allowing 15 units/ha and less, comprise not more than ten (10) habitable rooms, save with the special consent of the Council and shall in any event include not more than one (1) kitchen, which may be in addition to the allowable number of habitable rooms."

"Flat
means any suite of rooms not being a single dwelling house or semi-detached house, contained in a building having 2 or more floors."

"Medium Density Housing
means a group of two or more dwellings contained in a building not exceeding two storeys in height, which has been designed as an harmonious entity together with such outbuildings as are ordinarily used therewith. The individual units may be attached or detached."

"Park Home Estate
means an area of land laid out with adequate roads and essential services and open space and communal facilities which may include incidental commercial use, intended for the accommodation of factory-assembled self-contained dwelling units, each unit of which can be transported from the factory to the destination in not more than two sections and which, when placed in position, is ready for occupation once the essential services have been connected."

"Residential Building
means a building or part of a building other than a dwelling house or flats designed for use for human habitation, together with such outbuildings as are ordinarily used therewith, and includes blocks of tenements, apartment houses, hotels, residential clubs and hostels, but does not include any building mentioned, whether by way of inclusion or exclusion, in the definitions of "place of instruction" and "institution."

"Self-contained Residential Unit (Granny Flat)
means a building utilised for habitable purposes and which shall comply with the following requirements -

(i) the unit shall be for the accommodation of not more than 2 persons who shall be aged parents of the owner or, in exceptional circumstances satisfactory to the Council, other members of the owners family;

(ii) the unit shall comprise not more than one bedroom, a lounge/dining room, a kitchen and a bathroom/toilet;

(iii) except in special circumstances satisfactory to the Council, the unit shall not be accessible from within a dwelling or outbuilding to

which it may be attached;

(iv) the total floor area of the unit shall not exceed 25% of the total floor area of the dwelling on the site."

"Semi-detached House
means a building other than a dwelling house comprising 2 dwelling units contained in one building, both on the ground floor and each provided with a separate entrance."

6.3.4 Use of Buildings and Use of Land (together with related controls) in the various Use Zones and Allied Matters as contained within the Town Planning Scheme

(a) Special Residential Zone

(i) Use of Land and Buildings:

"Medium Density Housing" is permitted within this zone by special consent, save where not more than 3 dwelling units are to be established, then, provided the written consent of all abutting owners and any other owners which the Council may determine is obtained, the Council may waive the Special consent procedure. Where more than 3 dwelling units are to be established, the requirements of Appendix 1 of the Town Planning Scheme shall apply. (Appendix 1 is contained in 6.3.7).

(ii) Density, Bulk, Coverage and Height Controls:

The maximum coverage permitted is 33 1/3% of the site in question. The maximum bulk factor is 50% and maximum height is 2 storeys. The maximum number of dwelling units per hectare which may be permitted shall not exceed that number as provided for in the Table pertaining to density provisions (contained in Item 8.4.2) and be subject to the Council's Special consent. This number is calculated by dividing the reigning minimum lot size of the respective area into the area of the proposed site and adjusting the figure so derived to the first whole number.

(iii) Building Lines, Side and Rear Spaces:

Building lines, side and rear spaces remain the same as for a dwelling i.e. 6 metres in Density Zones 1-4 and at least 7 metres in Density Zones 5-7, 1,5 metres side space and 3 metres rear space in all density zones.

(iv) Minimum Site Area:

The minimum lot area on which "Medium Density Housing" may be established is 0,3 hectares.

(v) Provision of On-Site Parking:

At least one on-site parking space shall be provided for each

dwelling house.

(b) Intermediate Residential Zone

(i) Use of Land and Buildings:

"Medium Density Housing" is permitted by "free entry" within this zone while Park Home Estate and Self-contained Residential Unit are permitted by Special consent and Residential Building and Flat are prohibited uses.

(ii) Density, Bulk, Coverage and Height Controls:

The density and height controls within this zone are as follows:

| TYPE OF BUILDING OR USE OF LAND | MAX. BULK FACTOR OR MAX. UNITS/HECTARE | MAX. COVERAGE FACTOR | MAX. HEIGHT |
|---|---|---|---|
| Dwelling Units | 20 Units/hectare | 1/3 (30 %) | 2 Storeys |
| All other uses | 1/2 (0,5) | 1/2 (50 %) | 2 Storeys* |

* No specified height limit for Places of Public Worship.

Provided that where "Medium Density Housing" is to be established on a site where there is a dwelling house existing at the time, that dwelling house shall be taken into account when determining the number of dwelling units which may be permitted on the site. Provided if that dwelling house is sub-divided or is to be sub-divided into more than one dwelling unit, that number of units shall be taken into account when determining the number of dwelling units which may be permitted on the site.

(iii) Building Lines, Side and Rear Spaces:

Building lines are to be at least 7 metres for all new dwelling units, in addition, "Medium Density Housing" developments are required to observe a side and rear space of 4,5 metres, there being no provision for the relaxation thereof. However, outbuildings and other structures not being residential units, shall observe a side space and rear space of not less than 1,5 metres.

(iv) Minimum Site Size:

The minimum lot area for "Medium Density Housing" in this zone is 3000m$^2$.

(v) Design Requirements:

All "Medium Density Housing" development in this zone must observe the specific requirements contained in Appendix 1 of the Scheme. (Refer to Section 6.3.7).

(vi) Provision of On-Site Parking:

2 car parking spaces shall be provided for every dwelling unit, at least one of which shall be covered, in addition, 2 car parking spaces shall be provided for visitors for every 3 dwelling units. Such on-site parking must be located behind the building line and free of the side and rear spaces.

(c) General Residential Zone

(i) Use of Land and Buildings:

"Medium Density Housing", Residential Building and Flat are free entry uses within this zone, while Park Home Estate and Self-contained Residential Unit are permitted by Special consent.

(ii) Density, Bulk, Coverage and Height Controls:

The relevant controls for bulk zones 2 and 3 are shown in table form below:

| TYPE OF BUILDING OR USE OF LAND | MAX. BULK FACTOR OR MAX. UNITS/HECTARE | MAX. COVERAGE FACTOR | MAX. HEIGHT |
|---|---|---|---|
| Dwelling Units (Flats) | 175 uph | 1/3 (33,34 %) | Not specified |
| Residential Buildings | 3/4 (0, 75) | 1/3 (33,34 %) | |
| All other uses | 1/2 (0,50) | 3/4 (75 %) | |

(iii) Building Lines, Side and Rear Spaces:

Building lines as contained in the Scheme are 7 metres throughout, while the Scheme requires that all new buildings accommodating or comprising residential buildings, or flats, shall observe a side space of not less than 3m within the Central City Area, and not less than 4,5m outside the Central City Area, there being no provision for the relaxation hereof. Provided that this space shall be increased by 1,5m for each additional storey above three storeys, for the full height of the building, above three storeys. Provided further that, in the case of the Council having granted its special consent for relaxation of the minimum mean width, as provided for in the Scheme, the side spaces may be relaxed by an amount, the sum of which does not exceed the relaxation of mean width.

All new buildings accommodating or comprising residential buildings, or flats, shall observe a rear space of not less than 5m within the Central City Area, and not less than 9m outside the Central City Area, there being no provision for the relaxation hereof. Provided that this space shall be increased by 1,5m for each additional storey above three storeys, for the full height of the building, above three storeys.

Outbuildings and other structures including single detached dwelling units, not being a building accommodating or comprising residential

buildings or flats, shall observe a side space and a rear space of not less than 1,5m.

(iv) Minimum Site Size:

The minimum site size in this zone is 1000m$^2$.

(v) Provision of On-Site Parking:

The parking provision is detailed below:

| TYPE OF BUILDING OR USE OF LAND | NUMBER OF PARKING SPACES OR EXTENT OF PARKING AREA TO BE PROVIDED ON SITE |
|---|---|
| "Medium Density Housing" | 1. Two car parking spaces shall be provided for every dwelling unit. At least one space for each dwelling house shall be under cover. For the purpose of this Clause a parking space shall not be less than 6,0 metres in length.<br>2. Two car parking spaces for visitors shall be provided for every three dwelling houses. |
| Flats | One space for every flat |
| Residential Buildings (other than flats) | One space for every one for the first ten bedrooms or part thereof and one space for every four bedrooms thereafter or part thereof other than staff bedrooms and in addition to the foregoing a further fifteen parking spaces in the case of an hotel having a public bar. |

6.3.5 Subdivision of Land for Residential Purposes

The Pietermaritzburg Town Planning Scheme set out 3 sets of provisions governing the subdivision of land under special circumstances, namely:

a) Subdivision of land by Double Parcellation;

b) Subdivision of land for Residential purposes, without individual access to the street; and

c) Subdivision of land (Development Scheme) without access to a street.

These rather complex regulations appear to be contradictory and require careful reading if some measure of understanding is to be reached. (Refer to Appendix E).

6.3.6 Regulations Governing General Amenity and Convenience

The Town Planning Scheme requires the following plans indicating the external appearance of building to be submitted:

"(i) A person intending to erect a building in any use zone (in this Clause referred to as a "building owner") shall furnish the Council (in addition to any plans and particulars required to be submitted

under the bylaws) with drawings or other sufficient indication of the external appearance of the proposed building, including such description of the materials to be used in its construction as may be necessary for that purpose (all of which are hereafter in this Clause referred to as the "Particulars").

The drawings shall be on suitable and durable material on a scale of not less than 1 : 100 except that, where the buildings are so extensive as to render a smaller scale necessary, the drawings may be to a scale of 1 : 200.

(ii) The Council shall, within forty-two days from the date of submission to it of particulars under this Clause:

(a) approve the particulars; or

(b) if it considers that, having regard to the character of the locality or of the buildings erected or proposed to be erected therein the buildings would disfigure the locality by reason of their external appearance, disapprove the particulars; and shall give notice of its decision to the building owner and if it disapproves, of the reason for its decision."

6.3.7 General Conditions and Design Criteria for Medium Density Housing

The following regulations are contained in the Town Planning Scheme:

"Appendix 1 to the Pietermaritzburg Town Planning Scheme

Medium Density Housing - General Conditions and Design Criteria

(a) In both the "Intermediate Residential" and the "General Residential" use zones, the maximum number of dwelling houses in a "Medium Density Housing" development shall be 20 per gross hectare and the minimum site area shall be 0,3ha.

(b) On any site 0,3ha in extent or larger in the "Special Residential", "Office", "Educational" or "Municipal Purposes" zone, the Council may, upon application permit the establishment of "Medium Density Housing". The maximum number of dwellings which may be established shall be dependent on the gross surveyed area of the property concerned or, if appropriate, the area of the particular site which is zoned "Special Residential", "Office", "Institutional", "Educational" or "Municipal Purposes", but shall not exceed the number per hectare provided in Table F raised to the next whole number. Before considering such application the City Council shall ensure that the intending applicant has complied with the provision of Section 67 bis of the Ordinance. Furthermore, the City Council may require an intending applicant to notify by registered post all adjoining property owners and persons as it may see fit.

(c) In considering any application for the establishment of "Medium Density Housing", including the number of units to be permitted in the "Special Residential" zone, the City Council shall -

(i) have regard to any objections received in response to the statutory advertisement;

(ii) have regard to the aesthetic desirability of "Medium Density Housing" as against conventional single dwelling development, bearing in mind the general character of the locality;

(iii) have regard to the physical suitability of the site (slope, basic soil type, surface drainage, etc.);

(iv) have regard to the availability of services such as sewerage, water and electricity and the cost to the City Council of any necessary augmentation and extension of existing services to accommodate any such medium density development;

(v) require the applicant to submit a suitable sketch plan to indicate the form of the proposed development; and

(vi) notwithstanding, the provisions of para. 2 hereof, have regard to the established residential density in the vicinity of the particular site.

(d) In any medium density development, provision shall be made for satisfactory access for fire tenders, refuse removal vehicles, commercial vehicles and the like, to the satisfaction of the City Engineer. Furthermore, all parking spaces be so located to the satisfaction of the City Engineer, in relation to roadways that traffic to and from such roadways will not be impeded and that no hazard will be created.

(e) All internal services such as roads, stormwater drainage, kerbing and channelling, sewerage, water and electricity will be the responsibility of the developer, all at his own cost. This shall apply to initial capital costs as well as subsequent maintenance. Design standards for internal services shall be submitted for the approval of the City Engineer.

(f) In approving any medium density development, the Council shall require the developer to indicate the extent and disposition of both common open ground, as well as individual private open spaces attached to each dwelling unit."

## 6.4 The City of San Bernardino Development Code

### 6.4.1 Introduction

The San Bernardino Development Code described below was developed for and in conjunction with the City's Department of Planning and Building Services by land use planning consultants, Jacobson & Wack of Santa Barbara, California, USA in May 1991 with subsequent amendments to January 1994. This code is the primary tool for implementing the goals, objectives and policies of the San Bernardino General Plan.

This Development Code or Scheme as we know it, has received wide acclaim both for the high standard of its content and for its representation of complex planning and development issues in a format that is easy to comprehend and implement.

This Scheme is comprised of 4 chapters, namely :

i) General Provisions;
ii) Land Use Zoning Districts;
iii) General Regulations; and
iv) Administration.

### 6.4.2 General Provisions

This chapter commences with the purpose of the Scheme which is essentially a list of goals or objectives. This is followed by a list of standard or general definitions, and a statement regarding Density and Intensity, to the effect that the limitations in these respects are established in the land use element of the San Bernardino General Plan.

### 6.4.3 Land Use Districts

Each of the land use districts or zones are embodied separately in its own sub section, together with clear statements as to the general purpose of each land use component i.e. Residential environment, and the specific purpose of each of the residential zones is further described therein.

The Scheme identifies a wide range of specific residential zones, each of which are carefully described.

Much use is made of diagrammatic and tabular representation of the regulations, and written provisions are clear and concise.

The clear tabular representations of the all regulations in a single table is easy to comprehend and allows for the easy comparison of the various zones.

The right to use and/or develop land and buildings is subject to 4 categories, namely :

i) Permitted i.e. free entry;

ii) Permitted subject to a development permit i.e. this procedure is intended to protect the integrity and character of for example, the residential areas, in a manner designed to determine whether the pursuit should be approved by weighing the public need for and the benefits to be derived from the use, against the impacts it may cause.

iii) Permitted subject to conditional use permit i.e. since conditional uses are unique and their effect on the surrounding environment cannot be determined in advance of the use being proposed for a particular location. The consideration of such a use is determined by comparing the proposed use to establish development standards and design guidelines and then weighing the public need for and the benefit to be derived from the use against the impact which it may cause.

iv) A prohibited use i.e. such a use may not be permitted under any circumstances.

6.4.4 General Regulations

These include property development and off-street parking and loading standards and subdivision regulations.

6.4.5 Administration

As its name implies, this chapter deals with all matters relating to Scheme Administration including applications for the various permits and exceptions or variances.

## 6.5 Specific Conclusions drawn from a comparative Analysis of the Standard, the Pietermaritzburg and the San Bernardino Schemes, in respect of Medium Density Housing.

### 6.5.1 Number of Residential Land Use categories/zones

#### 6.5.1.1 **Standard Scheme**

The Standard Scheme differentiates between 3 broad residential categories or zones, namely :

Special,
Intermediate and
General

While the General category is further categorized into 3 General Zones, the principle difference being the permitted number of units per hectare and the existence of a uses hotel and Extended Residential.

6.5.1.2 **Pietermaritzburg Scheme**

The Pietermaritzburg Scheme differentiates between 3 broad residential categories or zones, namely :

Special,
Intermediate and
General

There is no further categorization.

6.5.1.3 **San Bernardino Scheme**

The San Bernardino scheme differentiates between 5 specific residential categories or districts, namely :

Residential Estate
Residential Low
Residential Suburban
Residential Urban
Residential Multi-family

The Residential Multi-family is further divided into 3 specific categories, namely :

Residential Medium
Residential Medium High
Residential High

6.5.2 Explanation of the Residential Land Use Categorization and clarity of purpose.

6.5.2.1 **Standard Scheme**

The basis of categorization is not explained, neither is the purpose for which each category or zone is to be used clear.

The distinction between the various categories must be deduced from the differentiation in permissable and prohibited land uses or housing types / forms and by way of differentiation in building densities i.e. number of units per net or gross hectare.

6.5.2.2 **Pietermaritzburg Scheme**

The basis of categorization is not explained, neither is the purpose for which each category or zone is to be used clear.

The distinction between the various categories must be deducted from the differentiation in permissable and prohibited land uses or housing types / forms and by way of

differentiation in building densities i.e. number of units per hectare.

6.5.2.3 **San Bernardino Scheme**

Each residential land use district is clearly categorized according to a wide range of types, describing the precise form or type of housing and including a detailed and comprehensive chapter on residential development design guidelines, and which are permitted according to building density i.e. number of units per gross acre.

Moreover, the residential land use chapter is begun with a clear statement as to both the general purpose of the chapter as well as the specific purpose of each of the individual residential land use districts.

6.5.3 Interpretive clarity of Regulatory Standards and Provisions and use of Subjective, Specification and Performance Standards with particular reference to density regulations.

6.5.3.1 **Standard Scheme**

The regulatory standards and provisions are spread throughout 5 of the Schemes 7 sections, and all of the 4 tables.

Effective use and interpretation of the Scheme requires extensive knowledge of the scheme content and method of application.

The Scheme makes extensive use of subjective and specification standards in its regulations and provisions while some use is made of performance standards.

Regulations of residential density are applied via the specification standard : "number of units per hectare" coupled with the performance standard : floor area ratio (F.A.R).

Residential Density is measured via a single component namely :

Building Density i.e. FAR. While some attempt is made to limit occupancy density via definitions of a dwelling unit and a family, no attempt is made to actually regulate it or to measure it in the planning context.

No decernable definitive policy on Residential Density is evident in the Scheme.

Other variables influencing building density include restrictions such as maximum permitted coverage, spaces between buildings and permitted height of the building.

The Special Residential zoning within the Provincial Standard Scheme Clauses possesses considerable potential for further building densification particularly in terms of the high permissible floor area ratios and coverage, which are not generally realised at present when developed for a single family in the traditional 3 or 4 bedroom mould.

The Scheme does contain definitions of both a Dwelling Unit and and Dwelling House, while Family Unit is also defined. However, the general lack of specific controls in respect of Occupancy Density provides a wide margin of opportunity for a considerable increase in the overall Population Density within a residential area, since the Family Unit, a variable of Occupancy Density, includes the statement

"with or without their parents"

which implies the acceptance of extended households containing at least 2 families.

The definitions of Dwelling House contains a point of contention, namely the phrase "single family". The Town and Regional Planning Commission has long recognised the difficulty of defining a family in the narrow sense and added the words "living together as one household". This was an important departure from the traditional understanding of the constitution of a "single family". During the course of a Town Planning Appeal where the wider meaning of "a single family" was discussed, a senior planner on the staff of the Commission expressed the opinion that the proper test to be applied when considering the meaning of this concept was whether it might be that there was in occupation of the dwelling, "one household which shares a common table". (Natal Town Planning Appeal No. 1803,1985)

As a result, it may be argued that the general level of amenity enjoyed in most high income residential neighbourhoods could be meaningfully altered under this Scheme, if the properties were:

(i) developed to maximise their permissable floor area ratios and coverage factors; and

(ii) occupied by a family larger that traditionally experienced in these areas (lodges aside), or in the case of extended households, by 2 families.

Moreover, this state of affairs may be achieved under the present Town Planning Scheme Clauses without seeking any further Town Planning approvals, while a "Medium Density Housing" development on the same site requires at the very least a Special Consent application and the likelihood of being subjected to the rigours of the public's poor perception of an increase in the number of units per hectare.

6.5.3.2 **Pietermaritzburg Scheme**

The regulatory standards and provisions governing the residential environment are embodied into 3 general sections and 3 specific sections.

This format constitutes a substantial improvement on the Standard Scheme format and the Scheme is consequently more "user-friendly".

However, the effective use and interpretation of the scheme requires extensive knowledge of the rationale and method of application.

The Scheme makes extensive use of subjective and specification standards in its regulations and provisions while some use is made of performance standards.

The Pietermaritzburg Town Planning Scheme utilises controls which determine the Net Residential Density, thereby excluding between 20 and 40% of the some 20 % of the residential area (road reserves and community conveniences and facilities) from the calculations. The fact that the scheme does not incorporate Gross Residential density, as a more meaningful performance standard, to measure and regulate residential development intensities, is of concern.

Moreover, the Pietermaritzburg Draft Town Planning Scheme Clauses apply controls relating to only one component of density, namely; Building Density (Floor Area Ratio). The Scheme abounds with coverage limitations and restrictions in terms of units per hectare, but little attention is paid in the field of "Medium Density Housing" or "Flats" to bulk or floor area ratio. Indeed in some instances the bulk is indirectly limited only be the degree to which the housing market is prepared to pay the appropriate price for a unit which is remote from the ground. The old adage, the sky is the limit, could well be appropriate here.

The general lack of consideration of either Occupancy Density or of policies and supportive definitions and regulations relating to overall Population Density is further

evident. Under the present Scheme controls there is considerable potential within some areas, notably in Special Residential and General Residential zones, for increasing the occupancy ratio beyond that which was perhaps originally envisaged as being acceptable. Occupancy Density is alluded to in the definition of Dwelling Unit in restricting such a unit to 10 habitable rooms and only one kitchen, for occupation by a single family. However, since "family" is not defined within the scheme and the size of the "rooms" are restricted only by the coverage and in some cases by the F.A.R., the resultant possible densities could in some instances permit population densities in areas zoned Special Residential which would approach those in General Residential zones with conventional occupancy, which is surely not the intention of the Scheme.

6.5.3.3 **San Bernardino Scheme**

The regulatory standards and provisions governing the residential environment are embodied in a single residential specific section and 3 general sections.

This format is particularly "user-friendly", and the inclusion of extensive explanatory text describing the general and specific purpose of the various provisions, regulations and land use districts, together with a comprehensive set of design guidelines and the extensive use of diagrams and comparative tables ensures that while this scheme is complex, it readily is interpreted and used by literate persons without a specialised knowledge of planning.

The Scheme makes extensive use of specification and performance standards, while subjective statements are largely restricted to the descriptions of purpose and intent.

All the residential development standards are contained within a single table which makes for easy comparison and comprehension.

Residential Density is measured via 2 components of density, namely : Building Density via a complex combination of the specific coverage percentage and a height limitation in both stories and feet, and Occupancy Density via a clear statement of purpose in the regulations governing the following :

- a minimum dwelling unit size and
- maximum number of bedrooms;
- the careful definition of, for example : a "family", and a "dwelling unit", a "Granny Flat" "Senior units", "gross site area" and "net site area".

This Scheme avoids the use of vague, lengthy and complex verbal descriptions of regulations by making maximum use of diagrammatic and tabular representations.

Although the regulations governing Occupancy Density are somewhat complex, the result is a clearly decernable pattern of both Building and Occupancy Density according to the type of residential districts. Hence, it is clearly possible to plan the city and formulate policy in terms of its Population Density.

6.5.4 Use of the Distinction between NET and GROSS Residential Density and a description of the land envelope over which density is to be calculated.

6.5.4.1 **Standard Scheme**

No clear distinction is made.

6.5.4.2 **Pietermaritzburg Scheme**

No clear distinction is made.

6.5.4.3 **San Bernardino**

A clear distinction is made throughout the scheme both in the definitions and throughout the text.

6.5.5 The inclusion of concise, unambiguous definitions in the form of general or specific land use provisions and interpretations.

6.5.5.1 **Standard Scheme**

The Provincial Standard Scheme defines "Medium Density Housing" as a specific type of land use that includes various types of forms of housing such as Duplex Flats and the like. This recognition by the Province is in keeping with the findings of this research.

However, some confusion surrounds the definition of other land uses such as Residential Building, Chalet Development, Mobile Home and Extended Residential Building, since the inclusion of these as separate and distinct land uses which are set apart from the land use "Medium Density Housing" is clearly inappropriate since it may be argues that all of these uses may be associated with housing at various development intensities and could therefore qualify as forms of "Medium Density Housing".

Similarly, the inclusion of the type of form of housing : Block of Flats (which is itself not defined) within the definition of a Residential Building which then specifically

excludes other related housing types such as Duplex Flats, and Maisonette is a further indication of the confusion that exists within the Scheme definition.

Certainly, the isolation of these three forms of development as being separate and apart from the definition of "Medium Density Housing" is difficult to justify.

6.5.5.2 **Pietermaritzburg Scheme**

The definitions and interpretations contained within the Pietermaritzburg Scheme have been found to be generally confused and poorly interrelated.

The Pietermaritzburg Scheme defines "Medium Density Housing" as a type or form of housing, which is clearly incorrect.

No definition of a family is provided within either the old or the new Scheme despite the use of the term "a single family" in the definition of "Dwelling". However, a more comprehensive interpretation of "Dwelling" is provided in the new Scheme which specifies the maximum number of habitable rooms permissable within certain density zones, in a misguided attempt to introduce an element of Occupancy Density.

It was clearly the purpose of the new Scheme to streamline the definitions and bring them all in line. Nonetheless, this Scheme maintains the distinction between the Flat and a Dwelling and a Semi-detached House. The definition of a Flat is confusing in that it specifies that to qualify as being a Flat, it must be contained in a building having 2 or more floors. When read together with Dwelling Unit and Semi-detached House, Residential Building and "Medium Density Housing"; there may be some confusion as to whether a development of two storeys constitues a block of flats or "Medium Density Housing" and further begs the question as to why it is necessary to make a distinction between a Flat and a Dwelling. It is further unclear as to what a single unit within a "Medium Density Housing" development would be referred to; presumably a "Medium Density Housing" unit.

6.5.5.3 **San Bernardino Scheme**

The definitions within the San Bernardino Scheme have been found to be soundly formed, concise and well inter-related.

6.5.6 Regulations pertaining to Building lines, side and rear spaces

6.5.6.1 **Standard Scheme**

Regulations governing building lines and side and rear spaces, are described verbally within the text of the various scheme provisions.

An examination of this provisions reveals a measure of confusion since a number of anomalies exist.

In the case of building lines, side and rear spaces, the increase in the side and rear space from 2 metres for a dwelling unit to 4,5 metres in the case of a "Medium Density Housing" development is curios. This is possibly an attempt to lessen the impact of a higher density development on the lower density adjacent properties by introducing a buffer by way of an additional 2,5 metres.

Notwithstanding this fact, the building line for the two uses remains the same while lots in the General Residential zones are subject to an increased building line of 9 metres. If it is considered that General Residential Zones 2 and 3 each allow a height of 3 storeys, then the impact of such developments, albeit a "Medium Density Housing" development, are likely to impact on the character of the locality, especially if the adjoining lots are zoned Special Residential.

In Special Residential zones the height limit is 2 storeys and, except in areas where lot sizes are 1000 $m^2$ or smaller, the dwelling houses together with their outbuildings are seldom built on either the building line or on the 2 metre side or rear spaces. Consequently the development of "Medium Density Housing" within such areas is likely to project the general appearance of a denser development when viewed from the street.

6.5.6.2 **Pietermaritzburg Scheme**

The building lines and side and rear spaces within the Pietermaritzburg Scheme are described verbally within text of the various scheme provisions.

These provisions are differentiated according to the land use zone. In the case of a Special Residential zone these provisions are the same for Medium Density Housing as for a Dwelling House in that the building line is increased from 6 to 7 metres for density zones no.'s 5 to 7, while side and rear spaces remain 1,5 and 3 metres respectively throughout all Special Residential density zones.

While in the Intermediate and general Residential zones these spaces are appreciably increased in accordance with their perceived increase in density.

6.5.6.3 **San Bernardino Scheme**

The building lines, and side and rear spaces are all illustrated in a single table which makes both comparison and comprehension easier than the verbal descriptions contained within the text of both the Standard and Pietermaritzburg Scheme.

These building lines and side and rear spaces generally follow a logical pattern of increase or decrease in accordance with an increase in residential density.

6.5.7 Regulations governing floor area ratio, coverage and height

6.5.7.1 **Standard Scheme**

The Standard Scheme contains fixed regulations irrespective of lot size, ranging from a ,30 FAR, 30% coverage and 2 storeys in a Special Residential zone to 0,75 FAR, 35 % coverage and a height of 3 storeys in a General Residential zone.

These factors are applicable irrespective of the type of residential land use.

Consequently, in the case of Medium Density Housing, the applicable floor are ratio (bulk) and coverage factors are likely to further increase this sense of densification. It is a fact that few individual dwelling units within Special Residential zones are developed to the full extent of their permissible bulk and coverage. This is certainly true within residential areas with lot areas larger than 1000m². It is considered that a 2000m² property, zoned Special Residential, permits a bulk and coverage of 600m² and excludes from the bulk calculation the floor areas used exclusively for the parking of motor vehicles (which is conservatively estimated as 1 garage or carport of 18m²), it is clearly unlikely that the full extent of the permissible area will be used save under exceptional circumstances.

By contrast, a developer of "Medium Density Housing" must, by virtue of his profit motive, maximise the use of the permissible bulk and coverage. Such maximisation is likely to impact on the character of the locality where the adjoining sites are zoned Special Residential.

Consequently, it may be argued that the Provincial Standard

Scheme Clauses do not afford adequate protection to the adjoining Special Residential zoned properties where "Medium Density Housing" developments are concerned, and that this manifestation is likely to become increasingly evident as the area of the individual residential properties increases above 1000m².

6.5.7.2 **Pietermaritzburg Scheme**

(i) The factors applicable in a Special Residential zone.

The interpretation of "Medium Density Housing" within the context of the Special Residential zone is rather unclear. In essence, the Scheme controls the reigning residential density by permitting the number of units per unit area to be calculated on the basis of the gross site area i.e. including internal roadways, turning circles and utility areas. Consequently a site of 1 hectare would, if appropriately shaped, yield 8 and, with careful design and minimum road-reserve widths, possibly 9 separate subdivisions each with a 1000m² minimum lot size area. The road would need to be constructed to Pietermaritzburg Corporation standards with the required widths, curb and channelling, and stormwater catchpits and drainage. On completion, the road including its reserve would be donated to the City and be maintained by the City's Roads Department.

If the same site were to be developed in accordance with the Town Planning Scheme, as a "Medium Density Housing" development then 10 units could be applied for by Special Consent Procedure. Although, from past, practical experience, it is unlikely that more than 9 would be ultimately permitted. These 9 units would then be developed on the site either clustered, attached or detached as the demand required. The roadway would not have to be developed to the Pietermaritzburg Corporation's standards since it would remain in common ownership by the owners of the unit. Consequently, it may be narrower and could be more easily integrated into the development as an additional area of amenity, to be used as joint utility and play area. The individual units could be placed either on a surveyed site and sold as mini-subs or by sectional title or the whole site could be in common ownership and sold to shareholders who would be required to control, maintain and administer the land in common ownership.

The end result would be a development at substantially the same density as the surrounding individually sub-divided and developed Special Residential zone.

Under the present Scheme provisions, the advantage to a

developer of such an option is questionable. Suffice to say that with the additional survey and legal costs involved in such a development, coupled with the cost of making a special consent application (both in terms of professional fees and the time taken for its advertisement and consideration) together with the risk of refusal, reduction in the unit number or inclusion of onerous conditions, the opportunity of developing an additional unit per hectare together with the marginal cost savings in the construction of the roadway and service provisions, is a small incentive indeed.

Moreover, when such a development is undertaken within areas with reigning net site densities of less than 15 units per hectare, this can hardly be termed a Medium Density Development.

In such areas, the application process is aimed rather at an alternative system or package of delivering housing rather than for any material increase in density.

Consequently, it is arguable whether such a development should even be subject to the Special Consent Application procedure when undertaken within a Special Residential zone.

Indeed, the Pietermaritzburg Town Planning Scheme details 3 sets of provisions aimed at guiding and controlling the development of residential land through subdivision (a permutation of panhandle lot development). (Double appellation, without individual access to a street via Sectional Title, although this is not specifically stated) and a Development Scheme without individual access to a street (via Sectional Title). (Refer to Appendix E for detail) The essential difference between the former and the latters provisions rest on the fact that the formers common area is only the roadway, while in the latter this includes a garden and other common utility areas as well. These provisions are unclear and if "Medium Density Housing" were to be redefined, they would be unnecessary.

(ii) The factors application in the Intermediate Residential Zone

The Intermediate Residential zone permits a residential density of 20 units per hectare, although whether this net or gross density is uncertain since it contains elements of both types, (eg. this excludes all public streets and other facilities and land uses, but it is calculated on the basis of the total site area inclusive of private roadways and private utility areas i.e. on the gross site area) with a maximum coverage of 33 1/3% and a height restriction of 2 storeys.

Consequently, 20 x 2 storey units each measuring up to 300m² may be developed per hectare. If it is considered that covered parking is not included in the coverage factor then it is conceivable that an Intermediate Residential zone may be developed with a floor area ratio of between 0,6 and 0,67 or between 6000m² and 6720m² per hectare.

Therefore, the introduction of an Intermediate Residential zone into an area where the Special Residential net site densities are 20 units per hectare or greater for the purpose of achieving Medium Density Housing would not be necessary since at such a density it would have substantially the same result. However, the introduction of such a zone into an area where net site densities of 7 units per hectare predominate could have a marked impact, due to the obvious difference in development intensity between these 2 types of developments/

Moreover, if one considers the options of developing "Medium Density Housing" within such a low residential intensity area, it is a question of either feast or famine, since the Town Planning Scheme does not apply a differential or incremental density scale or allow compromise either above or below the 20 units per hectare. This has been one of the major deficiencies of the Pietermaritzburg Draft Town Planning Scheme in respect of "Medium Density Housing".

(iii) The Factors Application in the General Residential Zone

The net site density within a General Residential zone ranges between a maximum of 175 units per hectare for "Flats" with a 33 1/3% coverage and unrestricted height, to a maximum of 0,75 floor area ratio with the same 33 1/3% coverage and unrestricted height for Residential buildings (as defined in the Scheme).

The factors attributed to this General Residential zoning constitute a major increase if compared with those of Intermediate Residential.

This again highlights the generally inflexible nature of the controls within the Scheme. Since the Schemes net site density ranges from the maximum of 45 units per hectare in a Special Residential zone to 175 units per hectare in the General Residential zone with no gradations or increments in between.

A further obvious anomaly contained in the Scheme allows 175 "Flats" per hectare with unlimited height to be developed as a free entry use in a General Residential use

zone but according to Appendix 1 of the Scheme "the maximum number of dwelling houses in a "Medium Density Housing" development within the same zone shall not exceed 20 per gross hectare".

### 6.5.7.3 The San Bernardino Scheme

The San Bernardino Scheme applies a complex combination of factors including the following :

i) 8 different classes of unit density ranging accross the whole range of residential land uses;

ii) Lot or site dimension specifications;

iii) a differencial system of building lines (setbacks), side and rear spaces (setbacks);

(iv) a distance between buildings specification;

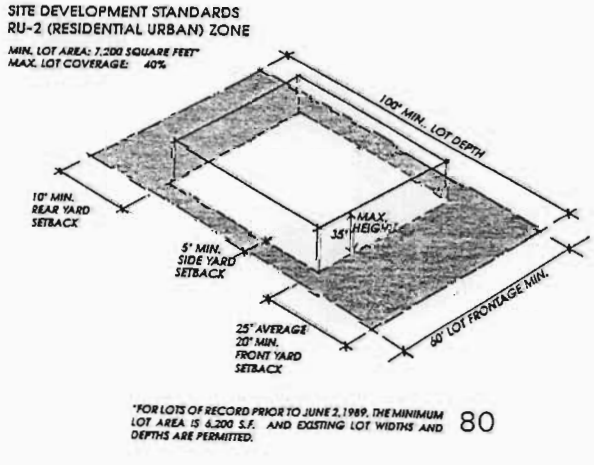
(v) a Lot coverage factor; and

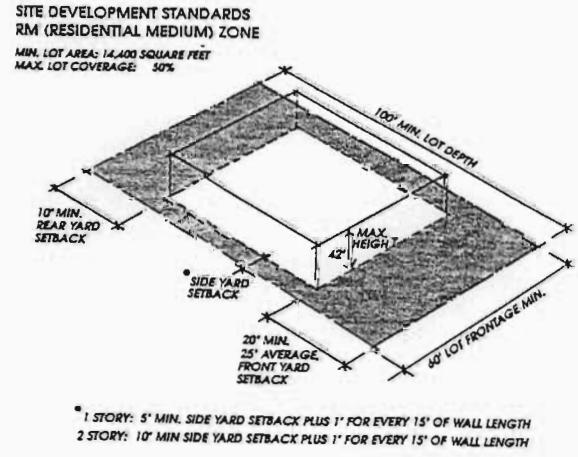
(vi) a maximum height in both storeys and in feet.

No Floor Area Ratio Factors are used in this context.

These factors and specifications are reproduced in a single table, and represented in diagramatic format as per below.

Coupled to this are a range of minimum room and dwelling size standards, and a maximum bedroom number specification, all of which are well illustrated. The result is a carefully controlled and planned environment that is designed to look varied and attractive, while minimizing the opportunity for amenity impairment. While such a regulation system may not find total favour in South Africa, there are a number of areas which can and should be adopted and applied. This aspect is dealt with in Part 3 of this thesis.



## PART THREE : TESTING THE GOAL STATEMENT, PRESENTATION OF FINDINGS AND FORMULATION OF PROPOSALS

# 7. THE PREREQUISITES OF A DEVELOPMENT REGULATION SYSTEM THAT EFFECTIVELY ADDRESSES MEDIUM DENSITY RESIDENTIAL DEVELOPMENT

This chapter draws on the research and findings contained in Part Two : Exploration of the Goal Statement, and sets out to test the goal statement through the development of guidelines for the development of density sensitive land use regulations.

## 7.1 Towards the Development of Density Sensitive Land Use Regulations

If one is to formulate policies and regulations which are to effectively address Population Density within an area, a Town, or a City, then the regulations or regulations embodied within the governing Town Planning Scheme must include reliable measures and regulations of the other two components of density, namely : Occupancy Density and Building Density.

While in the past, Building Density has been relatively simple to measure and regulate, planners and town and city administrators have been faced with the dilemma of developing a socially acceptable measure of Occupancy Density.

Their attempts to regulate Occupancy Density in the past have included the introduction and use of crude surrogate measures.

These measures include various regulations with a tenuous relationship to both Building Density and Occupancy Density, namely; units per hectare and lot size in conjunction with floor area ratio.

The focus of this dilemma lies in the current regulations inability to accurately address the question of the occupancy of a dwelling unit.

It follows that if the basic unit of occupation (a dwelling unit) can be properly defined and regulated then we are a step closer to regulating the Occupancy Density and hence the Population Density.

However, to successfully regulate Occupancy Density it would be necessary to regulate the occupation of a Dwelling Unit by a family, and any such attempts within a free society are fraught with difficulties.

Notwithstanding the moral issues involved, the question as to what constitutes a "single family" is far from resolved. The Natal Town Planning Appeals Board is on record as proposing the use of the term "a household" as in "one household which shares a common table" rather than the term "family" since the Board continues, "this is what the planner had in mind when he coined the phrase". The Board states that the term "a household", "accords with the objectives of the Scheme and is not in disharmony with the Ordinance, it allows a local authority to take a commonsense approach to a planning problem without embarking upon

the purposeless and largely impossible exercise of establishing consanguinity. It affords, finally, recognition of Indian family custom and of the economic restraints which compel people to live together or, indeed, of those many other reasons which prompt people to share a house." (Lex Patria : Natal Town Planning Appeal No. 1803, 1985)

Consequently, it is submitted that a more socially acceptable means of regulating Occupancy Density is to do so indirectly and at most, to apply some means of encouraging lower rather than higher Occupancy Densities, since in extreme cases, the latter can result in a host of attendant problems, including the impairment of neighbourhood amenities and various contraventions of the building and health regulations.

Seniors (1984) research has shown that Net Population Density (Residential Density) is related to affordability and affordability is related to income. This research demonstrates the obvious, that while high income residential areas are generally characterised by relatively similar gross Building Densities (ie. the cumulative floor Area Ratio of the total number of dwelling units per hectare), they exhibit a lower Occupancy Density and hence a lower Population Density, than is the case in lower income residential areas.

This relationship across the income spectrum is illustrated in Table 6.

This table shows that by introducing a differentiated Residential land use zoning in accordance with the type of residential unit eg. single or multiple, attached residential units and various permutations thereof, a minimum lot size together with regulations relating to the number of dwelling units permissable per Net or Gross hectare (as the case may be) and by applying an estimate (based on knowledge of the socio-economic status of the intended occupants) as to the threshold size of the occupying family unit or household, it is possible to remain within close proximity of a specified maximum threshold Net or Gross (as the case may be) population per hectare. Which in turn will ensure that bulk services and utilities such as roads, sewerage, water and electricity may be adequately catered for and that the commensurate community facilities may be properly planned and provided.

However, in the absence of the results of research into household size in the specific residential areas, planners will still have to rely on conjecture as per the above.

Moreover, Table 6 demonstrates, that the question of Net or Gross Population Density must be specified at all times if the planning authority wishes to determine, implement and properly manage residential density. Since an incorrect assumption in this regard can produce widely differing results, and thereby hamper the proper and cost effective planning and development of residential areas. This point is illustrated by way of the following example :

the population of a 100 ha residential area may be developed using a Net Residential (site) area density of 20 units per hectare and a Net population density of 120 persons per hectare. By contrast, the Gross residential (site) area density of this site is 12 units per hectare and the Gross population density is 72 persons

per hectare.

The difference between these two figures is substantial and consequently, the incorrect assumptions or use of terminology can make a material difference in the policy, planning and development process.

Moreover, the implications are particularly relevant in respect of land/area requirements for community facilities. If this area is calculated on the basis of a fixed rate, as in the number of units e.g. 1 ha per 100 residential sites, then Table 6 shows that while the 420 high income residential sites will be well provided for in terms of the recognised 5 ha per 1000 population, (at 7,9 ha per 1000 population) the application of such fixed area allocation in the face of the actual population in the case of a low income, affordable housing area, would amount to only 1,7 ha per 1000 population.

This disparity underlines the importance of understanding the true nature of density and of incorporating density sensitive land use regulations into Town Planning Schemes.

## TABLE 6 : ILLUSTRATION OF THE DEVELOPMENT OF A NET AS COMPARED WITH A GROSS RESIDENTIAL AREA MEASURING 100ha*:

### *SHOWING THE RELATIONSHIP BETWEEN THE FOUR COMPONENTS OF DENSITY AND DEMONSTRATING THE FEASIBILITY OF ESTABLISHING EFFECTIVE MEASURES OF OCCUPANCY AND POPULATION DENSITY

*comprised of a residential area of 60ha, a Public Utilities (roads and servitudes) area of 20ha and a Community Facilities (sport, recreation, education etc) area of 20ha

| OCCUPATION BY TYPE OF RESIDENTIAL LAND USE AND BY INCOME CATEGORY | NO. OF UNITS PER GROSS RESIDENTIAL AREA (i.e. 100ha) | MINIMUM LOT SIZE | MAXIMUM PERMISSIBLE FAR @ 35% (i.e. BUILDING DENSITY) | NO. OF UNITS/ha PER NET RESIDENTIAL AREA (i.e. 60ha) | NO. OF UNITS/ha PER GROSS RESIDENTIAL AREA (i.e.100ha) | OCCUPANCY DENSITY IN M² PER PERSON (ASSUMING 6 PERSONS PER UNIT) | MAXIMUM POTENTIAL NET POPULATION DENSITY (i.e. OF 100ha AREA) | MAXIMUM POTENTIAL GROSS POPULATION DENSITY (i.e. OF 100ha AREA) | MAXIMUM POTENTIAL TOTAL POPULATION OF THE GROSS RESIDENTIAL AREA (i.e. 100ha) | THE NUMBER OF HECTARES OF LAND AVAILABLE FOR COMMUNITY FACILITIES EXPRESSED AS ha PER 1000 POPULATION |
|---|---|---|---|---|---|---|---|---|---|---|
| UNIT OF MEASURE | Units | m² | m² | Units | Units | m² | Persons per Hectare | Persons per Hectare | Persons | Hectare |
| COLUMN | A | B | C | D | E | F | G | H | I | J |
| MEANS OF CALCULATION | 60ha x D | Not Applicable | Fixed Factor | 10,000m² ÷ B | A ÷ 100ha | C ÷ 6 persons | D x 6 persons | 60% of G | H x 100ha | 20ha ÷ (I ÷ 1000) |
| SINGLE UNIT : HIGH INCOME | 400 | 1500 | 525 | 6,67 | 4 | 87,5 | 40 | 24 | 2400 | 8,3 |
| SINGLE UNIT : MIDDLE INCOME | 600 | 1000 | 350 | 10 | 6,0 | 58,3 | 60 | 36 | 3600 | 5,6 |
| SINGLE/MULTIPLE UNIT : MIDDLE/LOW INCOME | 1200 | 500 | 175 | 20 | 12,0 | 29,2 | 120 | 72 | 7200 | 2,8 |
| SINGLE/MULTIPLE UNIT : LOW INCOME (AFFORDABLE) | 1998 | 300 | 105 | 33,3 | 20,0 | 17,5 | 200 | 120 | 12,000 | 1,7 |
| SINGLE/MULTIPLE UNIT : LOW INCOME (SUBSIDISED) | 3000 | 200 | 70 | 50 | 30,0 | 11,7 | 300 | 180 | 18,000 | 1,1 |

Assumptions : i) Each Residential site (excepting the Multiple unit category) is occupied by a single residential unit.
ii) Each Residential unit is occupied by a single individual or by a family or household comprising of an average occupancy total of 6 persons.

*Net Residential Area : Includes area of Public utilities but excludes area of Community facilities.
**Gross Residential Area : Includes areas of both Public utilities and Community facilities.
To calculate Gross Building Density, it is necessary to multiply the number of units per 100ha area with the maximum permissible FAR of that area.

## 7.2 Criticisms of the Development Regulation System

In his foreword to the Planning Advisory Services report on "Intensity Zoning : Regulating Townhouses, Apartments and Planned Developments" the Deputy Director of the American Society of Planning Officials writes:

> "Zoning, like the weather, has been the butt of constant attack from those who think that most control techniques impede good site planning and building design. The critics are essentially right. But, the problem of what should replace the Euclidean System of Zoning has been dealt with haphazardly. Some communities have adopted floor area ratios as a density control, some have required a usable open space percentage; some control density on a number-of-bedrooms basis; and a few communities use planned unit development (PUD) provisions that essentially say: "Show us what you want to do, and we'll let you know if we like it. These techniques are tacked onto an ordinance that becomes increasingly complicated, with results on the ground that aren't much better". (Bair, 1976).

The same can be said of the current KwaZulu-Natal Town Planning Schemes.

Over the years, the Natal Town and Regional Planning Commission has made some modifications and refinements to their recommended development regulation system in an attempt to adapt to changing conditions and new trends and forms of development, however, the basic essence of this system has remained the same.

In South Australia, where the development regulation process is similar to that of our own, the planning administrations appear to have grappled with a similar conviction, since, in an extensive review of housing in Adelaide, South Australia, conducted by the Australian Institute of Urban Studies (1982), considerable attention was paid to the calls for a complete "overhaul" of the cities policies pertaining to the residential sector and to the high level of criticism levelled at the residential zoning regulation system.

These criticisms were broadly summarised as follows:

"(1) the lack of an explicit statement of residential development control policies in the 1962 Adelaide Metropolitan Development Plan needed to be rectified, particularly as some of the Adelaide MDP's policies were now outdated;

(2) the spate of residential zoning changes had effectively precluded the achievement of proposed population targets; and

(3) the zoning system did not encourage innovation in residential development because the specification of standards had assumed an administrative rigidity. The distinction in the regulations between areas where there can be "flats" and areas where there cannot was also rather blunt. It

concluded that there was a need for a more subtle, performance and design orientated development control system". (Australian Institute for Urban Studies, 1982).

This latter report includes a strong statement which is quoted in full here because it makes reference to almost all the rationale for urban consolidation - flexible development control, containment of urban sprawl and the small households/broader housing choice argument which have relevance to our own KwaZulu-Natal situations :

"The time has come to recognise more clearly the changing structure of the metropolitan population and the need to offer a real alternative to the continued expansion of the fringe areas of Adelaide. This will require changes in development control policies, to encourage rather than discourage more intensive development in existing urban areas. It should be possible to devise controls which achieve this aim without excessive adverse impact on the amenity of existing residents provided that the controls are clearly performance orientated and provide a reasonable degree of flexibility to the development industry. ..... revised controls should also take account of the need to avoid disadvantaging the groups in the community to rely on "flats" for accommodation, by unnecessarily raising standards and hence costs and by forcing them to look further afield for housing than they would wish". (Australian Institute for Urban Studies, 1982).

The general thrust of the argument in the above case was clearly to both improve opportunities for and to facilitate the development of, "Medium Density Housing" within the inner city in an attempt to curb urban sprawl together with all its attendant problems.

Since, the South Australian Development Regulation System is not unlike our own South African system, it is relevant to note that one of this study's major conclusions was that "there is a need for a review of the whole residential development control issue in metropolitan Adelaide if proportions of different kinds of residentially zoned land are seen to be a problem", (Australian Institute for Urban Studies, 1982).

The essence of this argument is summarised as follows: that there are intrinsic benefits to be gained from flexible development controls aimed at minimising constraints to viable residential development, i.e. there is a need for some public control of private development but that these controls should be more clearly expressed and should aim to encourage development rather than unnecessarily inhibit it (Australian Institute for Urban Studies, 1982).

Apart from the more detailed criticisms of the Schemes contained in Chapter 6, general criticisms of the present KwaZulu-Natal system of regulation fall into four areas of concern as the following:

(i) The first criticism relates to development regulations, and submits that the zoning and subdivisional regulations contained within the town planning scheme are poorly formulated to the extent that their effectiveness has been sacrificed for the sake of simplicity, i.e. a regulation is formulated in as simple a manner as possible so as to ensure that it may be understood and implemented by laypersons; for example; regulations relating to density deal only with Building Density (floor area ratio and units per hectare) and ignore the other two vital components of Occupancy Density and Population Density. The apparent reason for this approach is that the latter two density components are difficult to establish and to regulate and therefore the authorities apply Building Density regulations as surrogate measures in the vague hope that somehow this will result in the regulation of the other two components.

(ii) The second criticism relates to procedural regulations ie. to the actual administration of the Town Planning Scheme and submits that these regulations are inordinately rigid in their formulation and therefore fail to cater for anything but the standard forms and types of developments. Moreover, it is generally alleged that the persons who administer the scheme apply their own, at times, limited experience and judgement in the interpretation of the Schemes regulations and fail to take proper cognisance of the principles underlying development regulation to the extent where the letter of the law is upheld without a proper understanding of the real nature of the situation. The Natal Town Planning Appeals Board cases are filled with such cases where the applicant has sought both costly and time consuming recourse to this problem.

(iii) The third criticism of our KwaZulu-Natal Schemes is that they are filled with unnecessary historical "baggage", anomalies and contradictions and the process of rectifying these problems by further amendments is often more complex and time consuming than meets the eye. A number of such anomalies as contained in both the Provinces Standard Scheme Clauses and the Pietermaritzburg Town Planning Scheme are highlighted in Chapter 6, sub-section 6.5.

(iv) The fourth criticism is again one of a procedural nature in that the Schemes amendment procedure (to change or amend a zone or the content thereof) and various application processes are so cumbersome and lengthy that they discourage even the most energetic of scheme administrators and aspirant developers. A number of these processes are dealt with in Chapter 6 Section 6.3 from which it should be clear that in the context of the New South Africa, where appropriate development generates both much needed income and employment, we can ill-afford to operate processes that impede or even prevent such appropriate development.

## 7.3 Towards the Inclusion of Effective Medium Density Housing Regulations in Town Planning Schemes

It follows from the aforegoing that to effect the proper and effective development of housing at various predetermined intensities using the regulations and provisions of a Town Planning Scheme, requires their appropriate amendment by the inclusion of performance related regulations and provisions which relate to the 3 components of density, namely:

i) Building Density;

ii) Occupancy Density; and

iii) Population Density.

It is proposed that these amendments would fall into 3 categories, namely; amendments to:

i) Definitions;

ii) Zoning nomenclature; and

iii) General Scheme provisions and procedural controls.

### 7.3.1 Amendments to Definitions

#### 7.3.1.1 The Exclusion of "Medium Density Housing" as a distinct type of Housing

It has been submitted that "Medium Density Housing" is not a use *per se* ie. it is not in itself a distinct form of housing but rather it is a collective term which refers to residential developments (or land use) that fall within a specified range of intensity, for example, between approximately 25 net residential units per hectare and approximately 70 net residential units per hectare, and which comprise a range of housing forms. These various housing forms range from single detached residential dwelling units, occupied by an individual or a family, through to a single structure or group of structures, each comprising 2 or more residential dwelling units.

Consequently, any reference to "Medium Density Housing" as a distinct type of use or housing within the definitions of a Scheme should be avoided.

#### 7.3.1.2 The Definition of Various Housing Forms/Types

Similarly, a Scheme should only include definitions of individual housing forms such as "flat", "semi-detached house", "terrace house", "duplex flat", "maisonette" and the like, when they are specified within a specific residential zone. For example, a low density residential zone may allow housing forms such as a single attached Dwelling House and exclude others such as Maisonette. Conversely, if a specific land use is contained within the definitions then it should be specified within one of the land use zones, for example, if "Hotel" is detailed as one example of a

Residential Building then "Hotel" should be properly defined within the Scheme.

7.3.1.3 The Need to Effectively Address the Question of Occupancy and Population Density

"Town Planning embraces the preservation, protection and creation of amenity in its widest sense. Planning will often impose conditions on development or stop it altogether in its regard for amenity. It is important to note, too, that the word includes the aspect of futurity" (Natal Provincial Administration, 1968).

In the course of town planning, various areas are set aside as a zones for residential use. Each of these residential zones contains a set of regulations governing lot sizes, side and rear spaces, building density (FAR) and the like, all of which establish a certain sense of amenity in each residential neighbourhood.

It is this amenity that town planning and Town Planners seek to preserve and protect through the creation and effective administration of regulations contained within the town or city's Town Planning Scheme.

It follows, therefore, that these regulations should be constantly reviewed so as to ensure that they measure up to the task at hand.

One of the major problems of Town Planning Scheme regulations as highlighted within this thesis is their inability to regulate or allow for the predetermined planning of Population Density within any given area or zone.

The principle reason for this short-coming is the inability of the Scheme's regulations to properly and effectively address the question of Occupancy Density.

This has given rise to inefficiencies in both the provision and utilisation of services to and within residential areas, and to unnecessary conflict between three parties, namely: the public officials responsible for the planning and/or the approval of housing developments, potential developers of such developments, and objectors (usually residents in adjacent or adjoining areas) to such developments.

In the first instance, the provision of bulk service supplies to, and the reticulation of such services (for example: water, electricity and effluent disposal) within residential townships cannot be designed and constructed with any certainty, when the population that is to inhabit or reside within the township, area or zone cannot be established with any accuracy, prior to occupation. For example, the building density of a neighbourhood

with 500 dwelling units, a minimum lot size of 1 500 m² and a permissable floor area ratio of 0,35 (35% of lot area) may range widely with some lots being developed to their full potential i.e. 525 m², although the majority of lots will contain single 3 and 4 bedroom dwelling houses of a more traditional size, i.e. 250 to 300 m². Consequently the population of a 500 dwelling unit development may vary between 1500 persons (ie an average of 3 persons per unit) and 5000 persons (ie an average of 10 persons per unit) depending on the household size.

This results in a dilemma for both the public officials and the potential developers as to the design threshold of the bulk services to and from this 500 unit development, and the design capacity of internal services. Added to this dilemma is the uncertainty of future requirements to upgrade the internal services and therefore the uncertainty of future demands for additional supplies and capacity, and most importantly, uncertainties as to the provision of sufficient land/area for community facilities.

In the second instance, the uncertainties regarding the future population and occupancy density are perceived by the adjacent and adjoining residents as a threat to their amenity. Since the development of properties whose town planning regulations permit substantially higher Building Densities and therefore Population Densities, than those densities experienced within their own neighbourhood are perceived as a threat to the peaceful ambience, safety and security (i.e. amenity) which they currently experience.

Consequently, the residents of the existing adjacent residential area are likely to object to the introduction and development of such regulations and housing.

Notwithstanding this fact, this threat to amenity is ever present in the higher income residential areas of Pietermaritzburg which are zoned Special Residential and where property/lot sizes are larger, since a standard fixed Building Density factor (floor area ratio) is applied irrespective of lot size.

Under the current Pietermaritzburg Town Planning Scheme regulations Building Density in a Special Residential zone is principally governed by 3 regulations, namely:

| Factor | Measure |
|---|---|
| Floor Area Ratio | 0,50 (50% of lot area) |
| Coverage | 0,334 (33 1/3% of surface area) |
| Height in Storeys | 2 |

Table 7 illustrates the relationship between lot area and the current fixed floor area ratio factor.

**TABLE 7 : THE RELATIONSHIP BETWEEN LOT SIZE AND THE FIXED F.A.R. FACTOR OF THE PIETERMARITZBURG TOWN PLANNING SCHEME**

| LOT SIZE ($m^2$) | SPECIAL RESIDENTIAL REGULATIONS | |
|---|---|---|
| | F.A.R. FACTOR (0,50 or 50% of Lot Area) | COVERAGE (33 1/3% of Lot Surface) |
| 4 000 | 2 000 $m^2$ | 1 336 $m^2$ |
| 3 000 | 1 500 $m^2$ | 1 002 $m^2$ |
| 2 000 | 1 000 $m^2$ | 668 $m^2$ |
| 1 000 | 500 $m^2$ | 334 $m^2$ |
| 500 | 250 $m^2$ | 167 $m^2$ |
| 200 | 125 $m^2$ | 83.50 $m^2$ |

Notwithstanding the huge development potential which exists within large Special Residential zoned lots, it is seldom if ever that a conventional household comprising a single family would require to utilize even one third of the potential Building Density or area of such large lots, while the smaller lots situated in lower income areas often experience very high occupancies (or conversely:low floor space rates) and it is here where the full potential of developable areas is utilized and indeed further space is generally required. (Refer to Table 7).

This author contends that such disparities in the provision and take up of developable area suggests that the regulations governing such development are wrong.

The substantial development potential inherent in these large lots poses a constant threat to the residential amenity of all residents and owners of such large properties, from the possible utilization of this full development potential either in order to accommodate an inordinately large household or through the development of "Medium Density Housing" strictly in terms of the scheme regulations.

For example, a lot of 4 750 $m^2$ zoned Special Residential within Pietermaritzburg's higher income area of Montrose (which falls within the Density zone that permits a maximum of 7 units per hectare) would be allowed to develop 4 "medium density" housing units, the bulk of each of which could be as high as 594 $m^2$ (with a total permissable F.A.R. of 2 375 $m^2$).

While the next door properties of substantially the same area are each occupied by a single household within a 430 $m^2$ dwelling house.

This situation is hardly conducive to the preservation or protection of amenity.

It is no wonder that aggrieved neighbours of such "medium density" housing or houses with large households call for the regulation of occupancy density.

There has been some hesitancy, to date, to apply direct Occupancy controls in the form of a floor space rate (the minimum allowable area in $m^2$ per person), and understandably so since these controls have been deemed to be unenforceable and/or socially undesirable.

It is this authors view that the need for an effective control has been readily recognised but that it is the high degree of confusion and misunderstanding surrounding the concept of density, within both the general practice of Town Planning and Development Control, and within the literature, that has been the root cause why this issue has not been addressed sooner.

**TABLE 8: AN EXTREME EXAMPLE OF HOW LARGE *HOUSEHOLDS WHICH COMPLY WITH THE EXISTING SCHEME REGULATIONS MAY RESULT IN A REDUCED AMENITY FOR THEIR NEIGHBOURS UNDER THE EXISTING PIETERMARITZBURG SCHEME.**

| | EXISTING SCHEME REGULATIONS | |
|---|---|---|
| **Scheme Regulations / Resultant Development** | **Small Household** | **Large Household*** |
| 1. Number of "Families" | 1 | 6 |
| 2. Scheme Floor Area Ratio (Permitted) | 0,50 | 0,50 |
| 3. Actual Development F.A.R. | 0,175 | 0,50 |
| 4. Actual Developed Building Area | 350 $m^2$ | 1 000 $m^2$ |
| 5. Actual Building Floor Space Rate ($m^2$/person) | 137$m^2$/person | 28$m^2$/person |
| 6. Actual Ave. Number of persons per site | 2,55 persons | 35 persons |
| 7. Site/lot area | 2 000 $m^2$ | 2 000 $m^2$ |
| 8. Actual land to person ratio | 647 $m^2$/person | 57 $m^2$/person |
| 9. Ave. Number of Vehicles per household | 2,55 | 6 |

* "Household" as in extended family.

Senior (1984) has researched the relationship between household income level and the floor space rate and the income level of the occupant. The result of this research suggests that the extent of the floor space rate is related to affordability and is directly proportional to income ie. a high income residential area has a high floor space rate and a low income area exhibits a low floor space rate.

The principle reason for this situation is presumably the lower income sectors desire to maximise the return on investment, i.e. in a low income

household will be larger and occupy a smaller built area relative to a high income household.

In view of this situation, a standard floor area ratio of 50% in the Pietermaritzburg Scheme or 35% as within most other Schemes, will disadvantage and possibly discourage a low income household from occupying the traditionally smaller lots available within low income housing estates, since 50% or 35% of a 200 $m^2$ lot would only allow a 100 $m^2$ or 70 $m^2$ house respectively.

However, a 2 000$m^2$ site in a middle or high income housing estate which is also subject to a 50% or 35% floor area ratio freely permits a house size of 1 000 $m^2$ or 700 $m^2$.

It seems therefore that a more equitable approach would be to introduce a floor area ratio with a sliding scale which varies according to lot size. For example, since it is seldom if ever that a lot of 4 000$m^2$ would be developed beyond 10% (ie. 400$m^2$) and a 2000$m^2$ lot beyond 17,5% ie. 350$m^2$) then it would seem to be more appropriate in such cases to introduce floor area ratios of approximately 0,10 and 0,175 respectively.

Conversely, lots of 200$m^2$ may be perceived as being penalized by a floor area ratio of 0,35 since a floor area ratio of 0,50 would permit a house of 100$m^2$ as opposed to the 70$m^2$ of the former factor.

In this way, the floor space rate per household could be increased in low income residential areas, while those within middle and high income areas would be reduced accordingly. In addition there is clearly less incentive for developers to encourage a low income household to relocate their extended family to a 2000$m^2$ site with a development threshold of 350$m^2$, when 10 x 200$m^2$ sites deliver a development threshold of 1000$m^2$. (Refer to Table 8).

In view of the apparent inequalities in the arbitrary nature of the floor area ratio (FAR) factors contained in our current town planning schemes, the author sought a more equatable solution to the determination of FAR factors. In the course of consultation with Prof J Hearne (1995) it transpired that a factor derived from a hyperbola and therefore governed by a sliding scale according to lot size may provide a solution.

The use of the following standard hyperbola formula is proposed:

$$\text{Floor Area Ratio (FAR)} = \frac{a + b}{(\text{lot size} + c)}$$

where a, b and c are constants
and a = 0,04
b = 500
c = 750
The value of the constants have been adjusted so as to obtain the best "fit".

Figure 13 and Table 9 illustrates the range of FAR according to lot size when using a sliding scale, and shows the physical size in metres squared of the structure permitted in each case, and by way of comparison Table 7 illustrates the result of the current fixed FAR factor. While Figure 14 provides a comparative illustration of the relationship of F.A.R. based on a sliding/scale and Residential lot size and Dwelling house size.

**TABLE 9 : THE RELATIONSHIP BETWEEN RESIDENTIAL LOT SIZE AND HOUSE SIZE USING A SLIDING SCALE BASED ON A HYPERBOLA**

| MAXIMUM PERMITTED FAR Sliding Scale | LOT SIZE | MAXIMUM PERMITTED HOUSE SIZE |
|---|---|---|
| 0,105 | 4 000 | 421 |
| 0,133 | 3 000 | 400 |
| 0,182 | 2 000 | 364 |
| 0,286 | 1 000 | 286 |
| 0,400 | 500 | 200 |
| 0,500 | 250 | 125 |
| 0,526 | 200 | 105 |

**FIGURE 13: A SLIDING SCALE FLOOR AREA RATIO (FAR) BASED ON A HYPERBOLA**

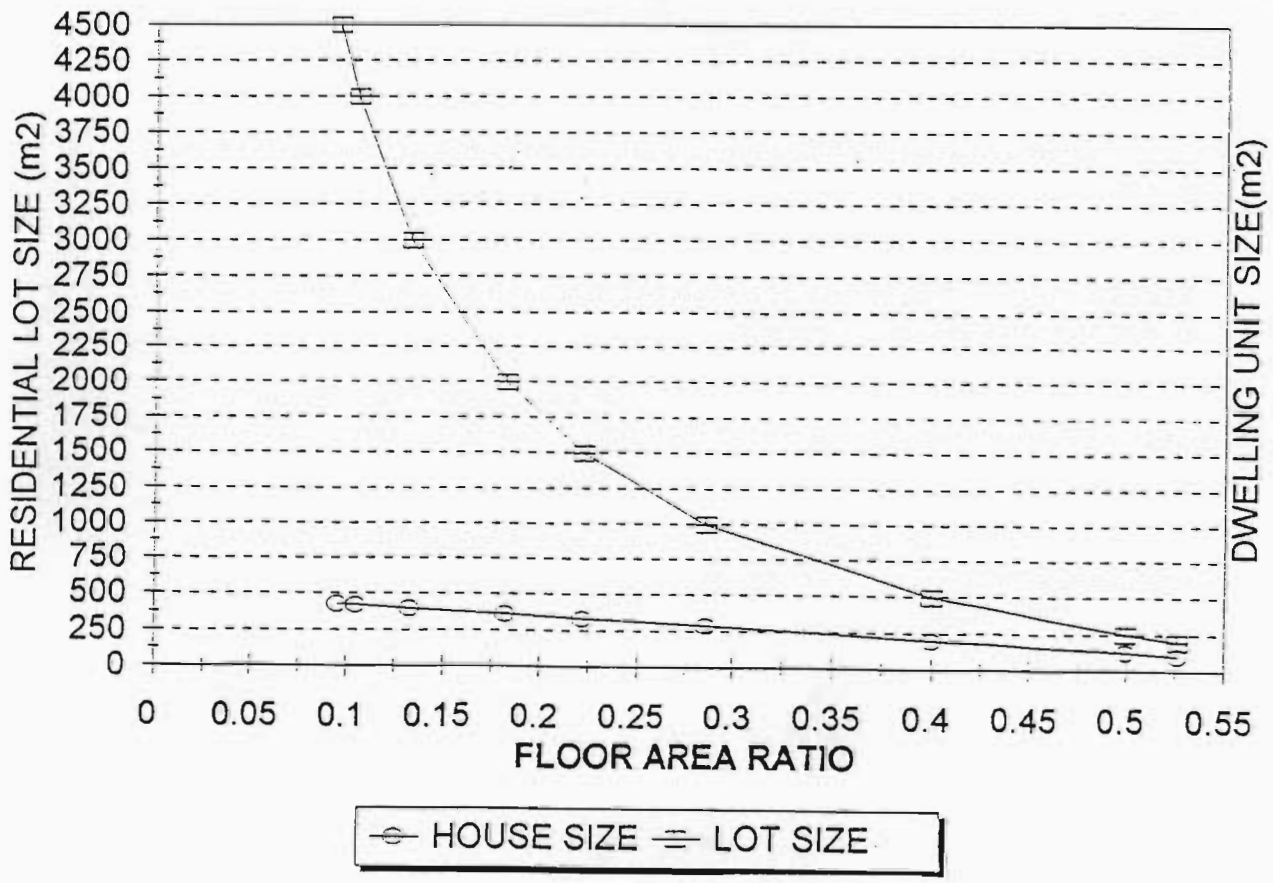
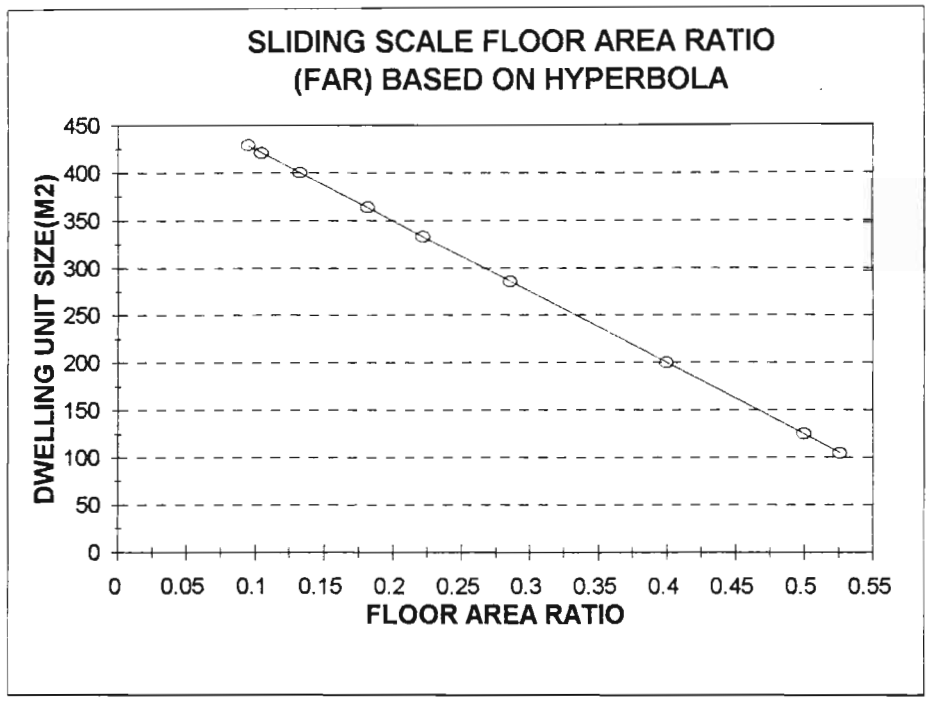
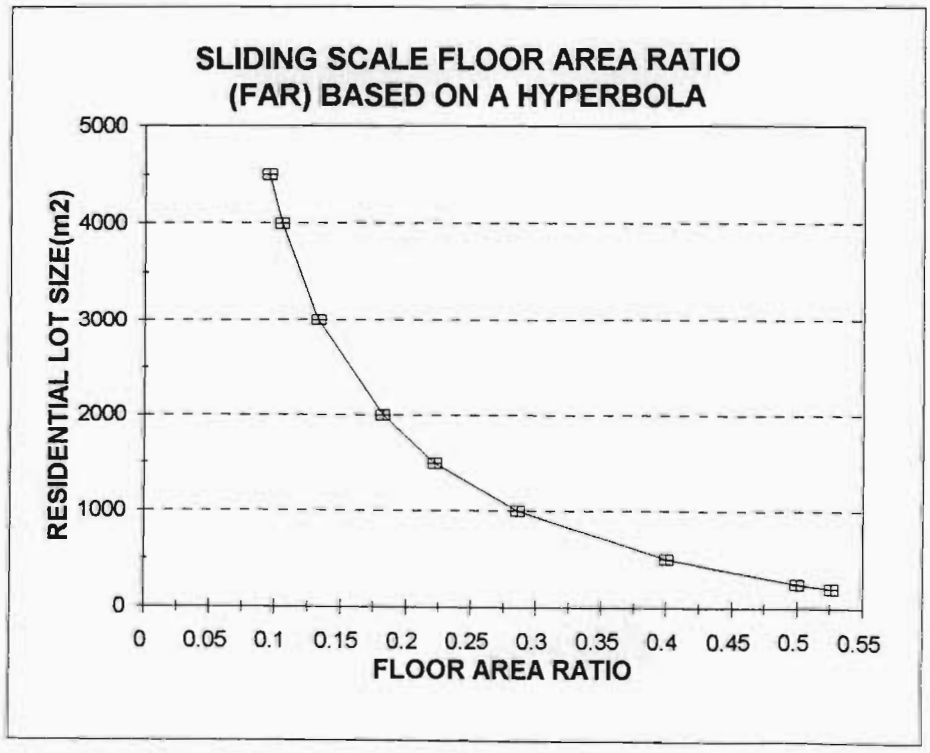


FIGURE 14: AN ILLUSTRATION OF THE RELATIONSHIP BETWEEN A FLOOR AREA RATIO BASED ON A SLIDING SCALE AND RESIDENTIAL LOT SIZE AND DWELLING HOUSE SIZE



It is suggested that the adoption of this approach will neutralize the current disparities which cause much social conflict. The adoption of such a proposal will ensure that a floor area ratio factor is in keeping with the reigning level of development within the residential area in question, irrespective of the lot size. This approach would therefore remove the need to require a developer to make such a Special Consent application to develop a complex of sectional title units.

Consequently, this author submits that Occupancy Density may be controlled more efficiently in the Pietermaritzburg Town Planning Scheme through the amendment and introduction of appropriate development and procedural controls. This requires the amendment of the existing Floor Area Ratio controls within such low density residential zones from the relatively high factor of 0.5 or 50% of the gross site area to a more realistic factor utilizing a sliding scale, depending on the extent of the minimum lot size provision.

Simultaneously, there is a need to tighten the definitions of a "family" and a "dwelling unit" in a manner which clarifies the relationship of the persons which constitute a "family". For example, the following definitions may be considered:

"Family means an individual, of 2 or more persons related by blood, marriage or legal adoption, or a group of not more than 6 persons who are not so related but are living together as a single housekeeping unit." (Jacobson and Wack, 1991)

"Dwelling unit means one or more rooms including bathroom(s) and a kitchen, designed as a separate self-contained unit for occupancy by 1 family for living and sleeping purposes". (Jacobson and Wack, 1991)

The above approach has been successfully applied within a number of Town Planning Scheme and Zoning Codes (the American Term for a Scheme) of which the City of San Bernardino Development Code (Jacobson and Wack, 1991) is the most recent example to receive wide acclaim.

7.3.1.4 <u>The Need to provide for a Distinction between Net and Gross Densities and Site Areas</u>

If development controls relating to Occupancy Density are to be effective, it is further necessary to provide a clear distinction within the definitions between net and gross Population Density.

In the case of a defined residential Zone or area such as for example that illustrated in Table 5 on page 37 it will be seen that even at relatively low development intensities, the difference is significant, for example the distinction between a net Population Density of 50 persons per hectare converts to a gross Population Density of 40 persons per hectare, while at high development intensities there exists an even greater distinction, for example : a net Population Density of 400 persons per hectare converts to a gross Population Density of 133 persons per hectare.

Consequently, all relevant definitions should include the distinction as to whether it is a net or a gross Density.

Moreover it is important to properly define the residential site density in smaller scale developments, for example a distinction should be made as to whether net or gross residential site density is to be used and this use should remain consistent accross all zones and land uses throughout the scheme and the scheme should contain definitions to this effect.

### 7.3.2 Amendments to the Zoning Nomenclature

In light of the aforementioned, it is submitted that zoning should be defined not only on the strength of a measure such as units per hectare, but on the basis of the type and form of housing that is to be permitted, coupled with a specific range in population density that is desired. Indeed, it is further submitted that "Medium Density Housing" should be classified as a zone or series of zones within which the various forms of housing or land uses may be permitted or excluded as the case may be. Table 10 illustrates this submission.

**TABLE 10 : THE IMPLICATIONS OF ZONING BY POPULATION DENSITY AS COMPARED WITH NET RESIDENTIAL UNIT DENSITY**

| | LIKELY NO. OF PERSONS** PER LOT OR DWELLING UNIT (Occupancy Density) | MINIMUM LOT/SUBDIVISION SIZE ($M^2$) | NET POPULATION DENSITY (Persons per hectare @ 6 persons per unit) | THEORETICAL NO. OF UNITS PER NET HECTARE (@ 6 persons per unit) |
|---|---|---|---|---|
| ZONE TITLE* | | | | |
| Low Density Residential 1 | 6 | 2000 | 30 | 5 |
| Low Density Residential 2 | 6 | 1500 | 42 | 7 |
| Low Density Residential 3 | 6 | 1000 | 60 | 10 |
| Low Density Residential 4 | 6 | 500 | 120 | 20 |
| Medium Density Residential 1 | 6 | 300 | 200 | 33 |
| Medium Density Residential 2 | 6 | 200 | 300 | 50 |
| Medium Density Residential 3 | 6 | n/a | 400 | 67 |
| High Density Residential 1 | 6 | n/a | 500 | 84 |
| High Density Residential 2 | 6 | n/a | 600 | 100 |

* The zone title may be amended by adding refinements which describe the type or form of permissible housing.

** The maximum number of persons being based on the assumption of a household size of 6.

Clearly, the title of a specific zone is arbitrary, but ideally, it should be used to describe the type or form of housing permissible therein, for example, conventional single stand alone residential housing may be termed a "Low Density Residential" zone rather than a "Special Residential" zone and a zone specifically set aside for multi-unit, attached housing units may be described as a Medium Density or High Density

Residential zone depending on net population density and theoretical number of units per net hectare. In this way, it would be possible to specifically include or exclude any of a range of housing forms, within a given Occupancy Density and a predetermined Building Density, and thereby maintain the predetermined net Population Density range of a residential area.

### 7.3.3 Amendments to General Scheme Provisions

A number of the General provisions of the scheme would require amendments so as to ensure that these fall in line with the amendments proposed above. These include making provision for the consideration of exceptions to the regulations ie. conditional approval of certain exceptions, the right of appeal, making provision for specific classes of residents eg. a retirement village and the like.

# 8. PROPOSALS FOR THE AMENDMENT OF THE PIETERMARITZBURG TOWN PLANNING SCHEME AND THE INTRODUCTION OF A DEVELOPMENT REGULATION SYSTEM THAT ADDRESSES MEDIUM DENSITY HOUSING EFFECTIVELY

## 8.1 Introduction

This chapter draws on the findings and prerequisites of the previous chapter and translates these proposals into a set of both development and procedural regulations against which the goal statement of this thesis may be tested. Therefore, this Chapter has the following aims:

i) to demonstrate the feasibility and desirability of developing a regulation system that recognises the fact that "Medium Density Housing" is a generic term which encompasses the complete range of housing types, forms and options, each of which may be developed within the predetermined range of net Population Densities, that is termed "Medium" Density.

ii) to test the proposed regulation system and procedures and to determine their ability to provide clear direction for proposed developers of such "Medium Density Housing" and provide for the appropriate protection of the amenity of the neighbouring residential land uses via reformulated definitions and development and procedural regulations which are specifically designed to take account of the three components of "Density", namely:

   i) Building Density;
   ii) Occupancy Density; and
   iii) Population Density.

iii) to examine these reformulated regulations and to determine the extent to which they will facilitate the formulation and support of policies relating to the efficient development and servicing of residential areas within towns and cities.

## 8.2 The Reformulation and Introduction of Appropriate Definitions within the Pietermaritzburg Town Planning Scheme.

In light of the aforegoing, the following is proposed:

i) The definition of "Medium Density Housing" should be excluded from within the proposed system of reformulated definitions and provisions.

ii) The term and definition of "Flat" should be excluded in favour of using a reformulated definition of "Dwelling Unit" which should be repositioned within the standard definitions so as to avoid it being seen or interpreted as being a form of housing. Should it further prove necessary to qualify such a Dwelling Unit, this could be achieved according to the type of housing eg. a Dwelling Unit situated within a "Semi-Detached House", etc.

iii) The definition of Outbuilding should be redefined to exclude buildings designed for human habitation, e.g. Outbuilding (or Accessory Building or Structure) means a structure detached from a principal structure on the same lot, incidental to the principal structure, and not designed for human habitation. Domestic (servants) rooms or flatlets should be subject to Special Consent.

iv) The definition of "family" should be amended to clarify the nature of the relationship and number of persons which constitute a "family". This reformulated definition could perhaps include clarification on communal accommodation comprising groups of students or single persons so as to set this land use apart from that of a Dwelling House and thereby clarify the position as regards this type of household as compared with the more conventional household.

v) The term "Residential Building" should be redefined and split into 2 categories so as to take account of single building structures which contain multiple dwelling units (ie. which would include the existing terms used in the scheme for such forms of housing as "Blocks of Tenements" and "Apartment Houses"), and buildings containing guest rooms and suites, such as a "Boarding House", "Hotel" and "Hostel" type accommodation, since the former accommodates permanent residents and the latter provides for transient occupation. In this regard the term "Multi-Unit Residential Building (Permanent)" is proposed for the former, while the latter may be termed "Multiple Unit Residential Building (Transient)" which may be shortened to MURB (Permanent) and MURB (Transient).

vi) All forms or types of Medium Density Housing accommodation refered to in other definition within the Scheme should be defined, for example : "Blocks of Tenements", "Apartment House", "Boarding House", "Hotel", "Hostel" and the like. (All of which are referred to in the present Scheme but none of which are presently defined).

vii) The Scheme should include the definition of all possible additional specific types of Medium Density Housing as is the case with the existing definitions of "Semi-detached Housing", "Granny Flat" and "Park Home" within the Pietermaritzburg Scheme and "Terrace House", "Duplex" or "Maisonette" as contained in the Provincial Standard Scheme and including the wide range of other possibilities. These forms of housing could be: specifically permitted; conditionally permitted; and/or prohibited; within the revised range of zonings under a new structure.

viii) The Scheme should include definitions of land used for Residential purposes such as "Residential Sub division or Site", together with distinctive areas such as "Net Residential Site Area", and "Gross Residential Site Area", for example : "Net Residential Site Area means the total area within the lot lines of a lot or site or subdivision of land after public roads, servitudes or other areas to dedicated or reserved for pubic use are deducted from such lot, site or subdivision". This should then be followed by proper definitions of "Lot Lines", "Public Road" and "Public and Private Servitude" and

these could be further illustrated by use of a diagram so that there can be no room for misunderstanding.

8.3 A Proposed Zoning Nomenclature for the Pietermaritzburg Town Planning Scheme

It is submitted here, that the zoning nomenclature within a Scheme should not only use terms which are readily identifiable (perhaps by the fact that they describe the type of land use permitted within the zone in question), but that each such zone should be clearly defined in terms of the purpose for which it is intended to be introduced or used within the Scheme. (Refer to Table 11)

**TABLE 11: PROPOSED ZONING NOMENCLATURE** (Modified after Jacobson and Wack, 1991)

| ZONE CATEGORY | PURPOSE OF ZONE |
|---|---|
| Low Density Residential 1 : | This zone is intended to promote the development of low density single family detached dwelling units individually conveying an "estate" character located on large lots or subdivisions each with a minimum size of 2000m² (or larger as the case may be). |
| Low Density Residential 2 : | This zone is intended to promote the development of low density single family, detached dwelling units individually located on large lots or subdivisions each with a minimum size of 1500m² ranging to 2000m². |
| Low Density Residential 3 : | This zone is intended to promote the development of single family, attached and detached units in a suburban setting individually located on lots or subdivisions each with a minimum size of 1000m² ranging to 1500m². |
| Low Density Residential 4 : | This zone is intended to promote the development of detached and attached dwelling units in a suburban setting, each unit being for occupation by a single family, and being individually located on lots or subdivisions with a minimum size of 500m² ranging to 1000m². |

| | |
|---|---|
| Medium Density Residential 1 : | This zone is intended to promote the development of attached and detached dwelling units in a suburban setting either developed individually, or as part of a planned residential development each unit being for occupation by a single family, and being either individually located on lots or subdivisions within a minimum size of 300m² or developed as a multi-unit residential building on a lot equivalent in size to 300m² for each and every unit located thereon. |
| Medium Density Residential 2 : | This zone is intended to promote the development of attached and detached dwelling units in a suburban setting either developed individually as part of a planned residential development each unit being for occupation by a single family and being either individually located on lots or subdivisions with a minimum size of 200m² or developed as a multi-unit residential building on a lot or subdivision which size shall be equivalent in size to 200m² for each and every unit located thereon. |
| Medium Density Residential 3 : | This zone is intended to promote the development of multi-unit residential units as part of a planned residential development, each unit being for occupation by a single family. All Medium Density Residential 3 zones are required to comply with the maximum densities and minimum lot sizes provided in Table 12. |
| High Density Residential 1 : | This zone is intended to promote the development of Multi-unit residential units as part of a planned residential development, each unit being for occupation by a single family.<br><br>All High Density Residential 1 zones are required to comply with the maximum densities and minimum lot sizes provided in Table 12. |
| High Density Residential 2 and 3: | This zone is intended to promote the development of multi-unit residential |

units as part of a planned residential development, each unit being for occupation by a single family. All High density Residential 2 and 3 zones are required to comply with the maximum densities and minimum lot sizes provided in Table 12.

Consequently the following is proposed:

i) The current use of zoning nomenclature should be amended to include the use of terms which are readily identifiable, for example, "Special Residential" should be replaced by "Low Density Residential", "Intermediate Residential" should be replaced by "Medium Density Residential" and "General Residential" should be replaced by "High Density Residential".

ii) The Scheme should contain clear descriptions of each zoning category which should describe both the purpose and specific housing form (or land use) for which each zone is intended. (Refer to Table 11)

iii) The various land uses permitted either freely or conditionally; or prohibited within the various zones should be amended in accordance with the proposals contained in 8.2 and should be depicted in a single comparative table (Refer to example in Table 13) so as to facilitate a clear understanding thereof.

8.4 Proposed General Scheme Provisions

8.4.1 Development Regulations

It is proposed that the zoning nomenclature be complemented by the additional of a more comprehensive and unambiguous set of Residential Development Regulations and Standards, in table form, which would replace the long-winded, ambiguous statements currently found in the Scheme.

Table 12 represents an example of such a set of standards.

Consequently, the following is proposed:

i) all reference to "Medium Density Housing" as distinct type of housing be omitted from the various provisions, and that the "Density Provisions" be substantially amended to reflect the use of all three components of density in line with the proposed additional definitions in this regard;

ii) the current practice of using one set of maps showing the residential zones and an additional set of maps depicting the density zoning should be dispensed with, and replaced with a revised single zoning map and a table such as is proposed in Table 12;

iii) all reference to density on a large or area-wide scale should include the distinction as to whether it is Net or Gross density, while a smaller scale distinction should be made between net or gross

residential site density. Moreover, all these forms of net or gross density should be carefully defined within the Scheme;

iv) the use of a table such as that shown in Table 12 will replace the need for the existing long-winded written explanations of the development controls for the various zones, for example: building lines, side and rear spaces can be readily compared;

v) where appropriate, subjective standards should be replaced by Specific standards and Performance standards;

vi) the various zoning Tables which show the various land uses as described in (iii) of 8.3 above and the long winded verbal discription of the same should be reformulated into a single table so as to clearly illustrate the differences between the various zones, and thereby facilitate comparison and understanding. (Refer to Table 12);

vii) a floor area ratio on a sliding scale should be introduced in accordance with the formula given in Section 7.3.1.3 and depicted in Figure 13;

viii) It has been shown to be undesirable to develop dwelling units at a net density of greater than 100 dwelling units per hectare. (Refer to Section 4.5 of this thesis);

ix) it is unwise to allow the planning and development of residential areas which permit net population densities in excess of 600 persons per net hectare, while net population densities above 200 persons per net hectare should be planned and monitored with care so as to ensure that the integrity of the neighbourhood amenity and quality of life of the inhabitants are not unduly compromised. (Refer to Section 4.5 of this thesis);

x) Household size is a critical determinant of Population Density and it has been demonstrated that beyond 100 dwelling units per net hectare there is virtually no absolute increase in gross population densities as occupancy rates approach 10 persons per household. (Urban Foundation, 1988).

Consequently, the Town Planning Scheme regulations should be redefined so as to include provisions that limit or restrict household size accordingly including regulations that ensure that the planning and development of residential environments with relatively large household sizes be restricted to a lower unit density relative to those environments which are to accommodate smaller households.

## TABLE 12: AN EXAMPLE OF THE PROPOSED REFORMULATED RESIDENTIAL DEVELOPMENT REGULATIONS AND STANDARDS (AFTER JOCOBSON AND WACK, 1991)

| REGULATION/STANDARD | LOW DENSITY | | | | MEDIUM DENSITY | | | HIGH DENSITY | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | RES 1 | RES 2 | RES 3 | RES 4 | RES 1 | RES 2 | RES 3 | RES 1 | RES 2 | RES 3 |
| MINIMUM LOT AREA ($m^2$) | 2000 | 1500 | 1000 | 500 | 300 | 200 | 3000 | 2000 | 2000 | 4000 |
| MAX. NO. UNITS/*NET HECTARE | 5 | 7 | 10 | 20 | 33 | 50 | 67 | 84 | 100 | 100 |
| *RETIREMENT VILLAGE UNITS | 7* | 10* | 15* | 30* | 49* | 75* | 100* | 126* | 150* | 150* |
| MINIMUM LOT WIDTH (m) | 30 | 25 | 20 | 15 | 12 | 10 | 20 | 20 | 20 | 20 |
| MINIMUM LOT DEPT. (m) | 45 | 35 | 30 | 25 | 20 | 18 | 30 | 30 | 30 | 30 |
| BUILDING LINE (m) (TO BE INCREASED BY 1,5M PER STOREY ABOVE 3 STOREYS) | 6 | 6 | 6 | 6 | 5** | 4** | 7 | 7 | 7 | 7 |
| REAR SPACE (m) | 6 | 6 | 5 | 4 | 1,5** | 1,5** | 7 | 7 | 7 | 7 |
| SIDE SPACE (m) SINGLE DETACHED<br>ATTACHED OR MULTIPLE UNITS | 3<br>4.5 | 3<br>4.5 | 2<br>4.5 | 2<br>4.5 | 1,5**<br>4.5 | 1,5**<br>4.5 | 4.5<br>4.5 | 4.5<br>4.5 | 4.5<br>6 | 4.5<br>6 |
| COVERAGE (%) | 20 | 25 | 30 | 40 | 50 | 50 | 50 | 50 | 50 | 50 |
| MINIMUM DISTANCE BETWEEN BUILDINGS (m) | 6 | 6 | 4 | 4 | 3 | 3 | 6 | 6 | 6 | 6 |
| PRIVATE OUTDOOR LIVING SPACE | N/A | N/A | N/A | N/A | 150$M^2$ OR 25 % OF UNIT SIZE WHICHEVER IS LESS | | | | | |
| COMMON USEABLE OUTDOOR SPACE | N/A | N/A | N/A | N/A | 30 % OF NET SITE AREA | | | | | |
| MAX. HEIGHT (storeys) SINGLE UNIT DETACHED/<br>ATTACHED MULTI-UNITS | 2<br>N/A | 2<br>N/A | 2<br>2 | 2<br>2 | 1<br>2 | 1<br>2 | 2<br>3 | 2<br>4 | 2<br>5 | 2<br>6 |
| FLOOR AREA RATIO*** | 0,182 | 0,222 | 0,285 | 0,400 | 0,476 | 0,526 | 1,0 | 1,0 | 1,50 | 2,00 |
| MAX. NET POP. DENSITY (ha) | 30 | 42 | 60 | 120 | 200 | 300 | 400 | 500 | 600 | 600 |
| MAX. NO. OF ATTACHED DWELLING UNITS | N/A | N/A | 6 | 8 | 12 | 12 | 12 | UNRESTRICTED | | |

* EACH RETIREMENT VILLAGE UNIT MAY BE RESTRICTED TO A PERMANENT OCCUPATION BY A MAXIMUM OF 2 PERSONS

** THE BUILDING LINES, SIDE AND REAR SPACE OF BUILDINGS WITHIN MEDIUM DENSITY ZONED LOTS, WHICH ADJOIN LOW DENSITY ZONES SHALL BE INCREASED TO THE SAME STANDARDS AS APPLY WITHIN THE RESPECTIVE ADJOINING LOW DENSITY ZONE

*** CALCULATED ON THE BASIS OF A SLIDING SCALE ACCORDING TO LOT SIZE (SEE FIGURE 13)

ABLE 13: **AN EXAMPLE OF A TABLE SHOWING PROPOSED PERMITTED (FREE ENTRY) CONDITIONALLY PERMITTED AND PROHIBITED RESIDENTIAL LAND USES IN A SINGLE TABLE (Modified after Jacobson and Wack, 1991)**

| | LOW DENSITY | | | | MEDIUM DENSITY | | | HIGH DENSITY | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | RES 1 | RES 2 | RES 3 | RES 4 | RES 1 | RES 2 | RES 3 | RES 1 | RES 2 | RES 3 |
| 1. Single detached Dwelling Unit | p | p | p | p | p | p | p | p | p | p |
| 2. Outbuilding | p | p | p | p | p | p | p | p | p | p |
| 3. Single attached Dwelling Unit | x | x | c | c | p | p | p | p | p | p |
| 4. Second Dwelling Unit | c | c | c | c | c | c | c | c | c | c |
| 5. Multi-Unit Res Bldg (Permanent) | x | x | x | x | c | c | c | p | p | p |
| 6. Multi-Unit Residential Building (Transient) | x | x | x | x | x | x | x | c | c | c |
| 7. Maisonette | x | x | x | x | c | p | p | p | p | p |
| 8. Duplex flat | x | x | c | c | p | p | p | p | p | p |
| 9. Subsidised Housing | x | x | x | c | p | p | p | p | p | p |
| 10. Park Home | x | x | x | x | c | c | c | p | p | p |

INTERPRETATION OF ABBREVIATIONS

P = Permitted (Free Entry)
C = Conditionally Permitted (i.e. by Special Consent)
X = Prohibited

### 8.4.2 Procedural Regulations

The omission of "Medium Density Housing" *per se* from the scheme will greatly enhance the opportunity to streamline the plethora of complex and unnecessary procedural regulations related thereto.

Once this has been implemented the need for Special Consent applications for the previously Conditionally Permitted uses such as "Medium Density Housing" would be removed, and the inclusion of a Table which will show unambiguously what is Freely Permitted, Conditionally Permitted and Prohibited such as that depicted in Table 13. This situation together with the "new" understanding of the term "Density" will further alleviate the need for costly and time consuming Scheme amendments (to rezone land) and "engineered" appeals.

## 9. IMPLICATIONS FOR HOUSING POLICY

The implications underlying the research undertaken during the preparation of this thesis are that housing trends are a reflection of the needs and capabilities of the housing market, tempered by the content and application of the governing regulations and regulatory procedures.

Experience within Pietermaritzburg suggests that there is a trend towards densification within residential areas, with a marked increase in the number of "Medium Density Housing" developments being established. The Pietermaritzburg Deputy City Planner, Mr Brian Basset confirms : "We are looking at a more efficient use of land and densification of the formal city" (Natal Witness, 24 October 1994).

Urban consolidation and densification are currently "buzz words", and City Planners and administrators both in South Africa and abroad are engaging in the debate as to what precisely is meant by urban consolidation and whether their city should actively pursue such consolidation and if so, how might consolidation and its alleged benefits be best achieved? Indeed, this point was made recently by the Cape Town City Councillors and Planners, who believe that "Cape Town will have to break out it is 'one person, one plot' attitude towards living space if the City is to stop encroaching on valuable agricultural land on its fringes." (Weiss, 1993).

The definition of Urban Consolidation was reviewed by the Australian Institute of Urban Studies as follows:

> "The definition of what constitutes urban consolidation has varied as a result of the importance attached by researchers to each of or a combination of these reasons. Some have focused on the social and economic improvements in urban structure that would result from consolidation and have defined it in these macro terms. For example, urban consolidation is "a change within the existing urban area resulting in an increase of dwellings, populations or both" (Roseth, 1980,1) or is a change in the rate of decrease of the gross population density of the existing urban area (deMonchaux, 1980,). Others have specifically avoided a clear, unilateral definition of urban consolidation and have instead focused on the means for its general encouragement. As a consequence they have emphasised deregulation not only for urban consolidation reasons but more generally as a means for achieving "the objective of allowing the housing market to meet the diverse and changing needs and preferences of households in each area of the metropolis." (Archer, 1980). The deregulation envisaged here is not the abolition of public controls but rather the adoption of more rational, less arbitrary regulation which aims to meet clearly defined objectives".(Australian Institute of Urban Studies, 1982).

It is evident that central to this debate, was the conviction that the need for urban consolidation is, in most cases, seen as being inseparable from the need to review residential development and procedural regulations.

The reasons as to why a city might pursue a policy of urban consolidation, are as follows:

i) the need to economise on service infrastructure provision for new residential development on the urban fringe;

ii) the need to achieve optimal use of existing underutilised housing stock in established suburban areas;

iii) the need to provide additional housing, particularly in the established suburban areas where consumer preference indicates increasing demand;

iv) the need to conserve energy through a more compact city development; and

v) the need to provide for the wider needs of the housing market by providing a greater variety of choice in terms of type or form, development intensity, size, affordability etc. so as to better cater for the needs of all sectors of the buying and renting community.

In summary, there are acknowledged and important reasons to support urban consolidation, the main aims rest on the need to provide equitable access to housing and on the need to ensure more efficient use of a city's physical and social infrastructure.

The challenge is to achieve these aims without disturbing the social fabric. This may be achieved through the sensitive implementation of urban consolidation and densification policies which properly regulate the introduction of such land uses within and adjacent to existing residential areas in a manner which ensures that the amenity and integrity of the various residential areas remains intact.

Clearly, the advantage of a better understanding of the nature of density must influence the formulation of such a housing policy and the ultimate implementation and application of such a policy within our Cities.

The Australian Institute of Urban studies states that should Urban consolidation form part of a City growth and change strategy, then the housing objectives and arrangement can be formulated and related to policies regarding residential densities, public transport, centres of employment and continuing incremental fringe development. (AIUS, 1982).

An example of such an objective in the Pietermaritzburg context may be :

"That the building of smaller, affordable and more densely arranged dwellings, to serve both the rental and purchasing sector of the housing market, be actively pursued and accelerated over the next 5 years".

To achieve a timely but orderly progression towards such an objective requires a clear understanding of the concept of density and an effective set of development and procedural measures and regulations

Much has been written about the obstruction caused by local government town planning and development regulations. This thesis has demonstrated that the current Pietermaritzburg Town Planning Scheme does not have sufficient regard for the wider cities diverse housing needs and no published policy exists in this regard.

This thesis contends that our current regulatory framework within both Pietermaritzburg and the Province of KwaZulu-Natal requires urgent revision to enable it to express our changing social and economic conditions and planning perspectives, and a fuller understanding of the true meaning of "Medium Density Housing" will facilitate this revision process.

## 10. CONCLUSIONS

10.1 It is submitted that during the course of this thesis it has been possible to largely satisfy the 3 aims and their various objectives, and thereby to verify the correctness of the problem statement.

10.2 Central to the achievement of these aims is the fact that the various misconceptions surrounding the term "Medium Density Housing" have been identified and proposals for their correction have been identified, verified and submitted.

10.3 It is further asserted that, given this new understanding it is possible to approach the, hitherto sensitive issue of, Occupancy Density via the introduction of new definitions, the reformulation of existing definitions, amended zoning nomenclature and appropriate amendments to other related general scheme provisions. Furthermore it has been demonstrated that this approach will streamline the procedural regulations, which in turn will facilitate the appropriate and effective regulation of the planning and development issue which is of cardinal importance in these times, namely : housing.

10.4 Finally, it has been demonstrated that a proper understanding of residential density and its translation into appropriate housing policies and effective housing strategies can lead to the provision of more equitable access to housing and the more efficient use of our cities physical and social infrastructure.

# APPENDIX A

APPENDIX A

**EXTRACT : DEFINITION OF AMENITY (Natal Provincial Administration, 1968)**

**DEFINITIONS : AMENITY**

Town Planning embraces the preservation, protection and creation of amenity in its widest sense. Planning will often impose conditions on development, or stop it altogether in its regard for amenity. It is important to note, too, that the word includes the aspect of futurity.

Town Planners and others have attempted to define the word, the following being some of the more notable definitions:

a) "...amenity is not a single quality, it is a whole catalogue of values. It includes the beauty that an artist sees and an architect designs for; it is the pleasant and familiar scene that history has evolved; in certain circumstances it is even utility - the right thing in the right place - shelter, warmth, light, clean air, domestic service ... and comfort stations."

b) "...amenity is something which gives you a vague feeling of unease or dissatisfaction if you are deprived of it."

c) "I think the word 'amenity' appears to mean 'pleasant circumstances or features, advantages'."
"Wide streets and plenty of air and room between houses, seem clearly to be amenities and a provision securing them by setting back houses to a given line seems to me to be a provision with a view to securing amenity."

d) "...it is one of those slogans, catchwords, vague and comfortable phrases, that covers anything from the conservation of a National Park to the provision of grass verges in residential streets; from the restoration of St. Paul's Cathedral to the removal of litter; from the provision of electricity in rural districts to the abolition of electric sky signs.
"Properly understood, amenity is simply good planning - the preservation of what is useful, exemplary, or in the true sense, symbolic, and the making of opportunities for creative design, orderliness, and pattern in our streets and in our lives."

*Footnote :*

(a) Lord Holford - "Preserving Amenities" - Paper to Royal Society of Arts, 1959.
(b) "The Citizens Guide to Town and Country Planning" - 1966.
(c) Lord Justice Scoutton in re Ellis and the Ruislip-Northwood Urban District Council (1920, 1K.B.343) - from Steyn vs City Council of Johannesburg, 1934 WLD 143.
(d) Lord Holford - Notes of Lecture No. 4 at Harvard University 15.5.47.

APPENDIX B

# 1. TOWARDS A DEFINITION OF MEDIUM DENSITY HOUSING

## 1.1 Review of the Literature

Pre-establishing human density for housing environments is, at best, an approximation. A suitable maximum density can only be determined during the site planning process, since each site, and the way it is developed, suggests its own optimum density. At best we can establish a density range. This density will further be influenced by physical limitations which, while not fixing a density, do set some broad limits (Untermann et al p.9.).

By examining many examples of medium density housing throughout the world - America and Western Europe in particular, Untermann and Small (1977) - determined an average density of 37 dwelling units per hectare.

This far exceeds the existing average single-unit suburban density of 12 units per hectare, but falls well below the 250 unit per hectare average which was determined for high density, high rise housing environments (Untermann and Small (1977) p.10.).

Medium density housing appears to have eluded clear and common definition in the literature. Moreover, residential development alternatives or the arrangement of developments are often confused with types of residential building. This confusion has been compounded in some instances by the practice of differentiating between the various residential alternatives on the basis of whether or not a Home Owners' Association is present and others which distinguish between medium density and other forms on the basis of density alone.

Medium density housing was broadly described by Mr R.A. Pistorius. In his keynote address to the Natal Town and Regional Planning Commission's (1973) working conference on Medium Density Housing in 1972 as:

> "... the in-between range (of residential densities) where there were perhaps 15 to 70 dwelling units per net hectare."

Clearly, density has been used as the prime determinant as to whether or not a residential development may be deemed to be medium density housing, although there is little agreement on the range of such densities and much confusion as to which components of density should be used.

Within the ambit of medium density housing there occurs a wide variety of descriptive terms attributable to various residential types, these include:

Atrium house
Cluster house
Condominium
Duplex
Flat
Garden apartment
Grouped house
Maisonette
Patio house

Plex
Row house
Semi-detached house
Simplex
Studio apartment
Terrace house
Town house

These housing types all have their origins in the traditional single unit dwellings. As single units have merged together, side spaces have ceased to exist and front yards have become partly walls. The purpose of front yards has shifted from the traditional semi-private open space to an anonymous public or common open space. The traditional "back yard" once served many functions, some of which were purely utilitarian. Many of these utilitarian uses have ceased to exist and the "back yard" has become a private, passive recreation space and garden for exclusive use by the resident family.

The organization of internal spaces has also been shifted from the rural tradition of viewing the road from the front porch or the living room window to fronting the living room and other private internal spaces onto the private garden area at the back of the dwelling (Untermann and Small, 1977).

The various types or groupings of residential dwellings represent various layout configurations wherein the units are arranged to take advantage of the Town Planning Scheme controls, the physical characteristics of the site and the socio-economic characteristics of the intended inhabitants.

The use of the generic classification alone to describe a housing type results in much confusion since terminology varies with location. In some areas a townhouse refers to a specific identifiable design solution while in others it is used to describe an individual dwelling unit within another entity, for example, a one bedroom flat inside a "garden apartment" while in still other countries it can mean simply a compact, attached dwelling unit in a multi-unit complex.

The term "cluster housing" is one generic term that has been widely used.

Taylor (1973) in his dissertation on group and cluster housing defined cluster housing as:

> "a group of houses subject to development control regulations that apply to the group as a whole, each with a private entrance and directly linked with a privately owned open space shared by the house owners or directly linked to individually owned private open spaces as well as shared private open space, each dwelling not usually exceeding more than two storeys in height and being capable of being owned by an individual; the net residential density generally not exceeding 44 dwellings per hectare and going as low as 1 unit per 1.5 hectares".

This is one of the few definitions that included a density component.

The conference proceedings of the Natal Town and Regional Planning Commission's working conference on Medium Density Housing held in Pietermaritzburg in October 1972 proposed the following definition:

> "Cluster housing means an interrelated group of buildings containing dwelling units either attached or detached and having an area or areas of land under common ownership".

This definition was subsequently amended (Natal Town and Regional Planning Commission, 1975) to read:

> "means two or more attached and/or detached dwelling units standing within the boundaries of a Cluster housing site, each dwelling unit having direct access to a private open area and having access to common land."

Clearly, this definition hinges on two points, firstly on the interrelated nature of the housing development and secondly, on the existence of a "body corporate" or some association of the unit owners which would own, administer and maintain the land under common ownership.

The Australian Department of the Environment and Planning (1982) in their technical bulletin on residential development standards defines cluster housing as follows:

> "Cluster housing is a group of unattached houses which share communal open space or driveways. This involves the co-ordinated planning of houses and their private gardens, communal and public open space, roadways and associated services and amenities".

The reference to unattached units would suggest that this definition is more closely akin to the American concept of Cluster developments which refers to a development where the developer is allowed to develop smaller lots than those specified in the zoning ordinance, provided the land saved is reserved for permanent common use, usually in the form of open space (Sanders 1980).

McCormack (1980) in his thesis on cluster housing controls used the generic classification which was well qualified as:

> "Accommodation where:
>
> (i) there is more than one dwelling on a lot,
>
> (ii) there are areas of common land on the lot which are available for use by all the residents in the housing development, but from which the general public may be excluded,
>
> (iii) each dwelling has adjacent to it an associated garden area or areas which is/are reserved for the exclusive use of the occupants of that dwelling,
>
> (iv) individual access exists to each dwelling".

This definition differs from the previous definition in that it prescribes that to be termed Cluster housing the development must be sold by Sectional title, a shareblock or some co-ownership scheme, since without such an arrangement item (ii) would be unachievable.

The Natal Town and Regional Planning Commission (1973) working conference in 1972 provided a wider option by defining a Cluster housing lot as:

> "A lot on which it is proposed to erect cluster housing. Such cluster housing lot shall be capable of being subdivided respectively into a prescribed number of individual dwelling unit lots and an area of private open space under common ownership administered for the benefit of the owners of the individual dwelling unit lots by a home owners' association".

This definition allowed the option of separate subdivisions but retained the link to land under common ownership.

However, the Natal Town and Regional Planning Commission subsequently discarded the term "cluster housing" and "cluster housing lot" in favour of the wider classification of "Medium Density Housing". This latter classification was included in the Commission's Standard Town Planning Scheme Clauses with the following definition:

> "Medium Density Housing means a group of two or more attached and/or detached dwelling units, together with such outbuildings as are ordinarily ancillary thereto, with each dwelling unit having direct access to a private open area and access to common land, the whole development having been designed as an harmonious entity. Such development may include duplex flats, semi-detached houses, terrace houses, maisonettes or dwelling houses (Natal Town and Regional Planning Commission, 1988)".

The reference to "common land" clearly excludes any development with a medium density in which no common land exists.

On the basis of the above definition a mini-subdivision development consisting of a number of sites with lot sizes of, for example, 330m$^2$ (which translates into a net density of 30 units per hectare) and which has no land in common ownership, can not be described as medium density housing.

The late Monte J. Rosenberg recognised this discrepancy and retained as an additional land use, that of Group housing, within the Town Planning Schemes that he prepared (Rosenberg, 1980).

Group housing was originally defined by the Natal Town and Regional Planning Commission (1973) as:

> "A building containing more than one dwelling unit each of which has direct access to a garden or plot reserved for its exclusive use".

This definition was further supported by the definition of a group housing lot as:

> "A site on which it is proposed to erect group housing, either attached or detached. Such group housing lot shall be capable of being subdivided into a prescribed number of individual dwelling unit lots in such a manner that there shall be no common area remaining after subdivision".

The above definitions appear contradictory in that the first refers to "a building with more than one dwelling" and the lot definition gives the option of either attached or detached housing. These definitions were subsequently superseded by a further publication of the Town and Regional Planning Commission (1975).

> "Grouped Housing means a group of two or more attached and/or detached dwelling units standing within the boundaries of a grouped housing site, each unit standing on a lot whose area is permitted to be less than the minimum lot size prescribed for dwelling houses in the zone within which it is situated in recognition of the existence of a related area of public open space."
>
> and,
>
> "Grouped Housing Site means a defined area of land upon which grouped housing is established or is proposed to be established and which comprises dwelling unit lots together with such public open space land as the local authority may require or has required to be vested in it as a condition of approval of the grouped housing and any land which may be required for road purposes."
>
> There was nevertheless a clear distinction between the Cluster and Group Housing as originally proposed by the Commission in that:
>
> (i) Cluster housing was associated with an area or areas of land under common ownership while group housing had no commonly owned land, and
>
> (ii) Cluster housing was to comprise an interrelated group of buildings, while in group housing no mention was made of the need for such an interrelationship.

Some local authorities avoided this distinction by excluding the term group housing from the Town Planning Scheme and the definition of Cluster housing was adapted to read:

> "..... and which <u>may</u> be situated upon a site which is a separate subdivision or, if not so situated, shall include any area of reserved open space, and shall have the right to use any common property on the Cluster housing lot" (Umhlanga Town Planning Scheme No. 1, July 1983).

This author is of the opinion that there is no real reason to distinguish between Group and Cluster housing since the resulting development will in most cases have the same general appearance.

A further factor which complicates the search for an appropriate definition is the recent trend in the provision of low cost housing in the form of low rise, single storey, detached houses situated on individual subdivisions at net densities as high as 55 units per hectare (Durban Corporation 1971, as amended).

These latter developments comply in most respects with the general definition of the term "medium density housing" used by the Province (Natal Town and Regional Planning Commission (1973).

(i) the net density falls within the range of 25 to 70 units per hectare,

(ii) the units are both attached and detached (although the latter is more often the case),

(iii) each unit has direct access to a private open area, and

(iv) the whole development is designed and constructed as an harmonious entity.

However, these latter housing developments do not comply with the Natal Town and Regional Planning Commission's definition on one count, being that of:

> "..... having access to common land" within the Commission's definition of common land which reads:
>
> "That portion of a medium density site ... which is set aside for the use and enjoyment of all the occupants of the dwelling units on that site and from which the general public may be excluded."

The common land within these housing developments is set aside as public open space and are ultimately destined for ownership by the local authority. Clearly then the public may not be excluded from these areas.

From the Commission's definitions it may be deduced that individual units within medium density housing developments must have the sole-rights of common ownership and access to a portion of land and the owners and/or inhabitants of these developments may or may not permit public access thereto.

Presumably this is to ensure that the inhabitants of developments which have small portions of private garden/recreation areas will be in a position to make use of the larger commonly owned areas as a guaranteed supplementary source of open area.

All township development in Natal which is controlled by the Town Planning Ordinance No. 27 of 1949 and administered by the Private Townships Board is, in any event, required to set 10% of the proposed township area, or 1 hectare for every 100 lots within the township, aside for use as public open space and it is required that such open space should be readily accessible to the residents of the township in question. Consequently, the prerequisite of a "common area" of land within a medium density housing development has no real foundation at the township development stage. Moreover, in the case of infill development the amount of common land can be better controlled via the application of density zones within the Town Planning Scheme.

It is submitted therefore that a definition of medium density housing can dispense with the imperative "and access to common land" and insert the words "may include" between the words "and" and "access".

As to the subdivision of sites within a development, the variety of options in this regard make any reference to a developments subdivisional capabilities superfluous.

1.2 Defining a Range of Options

From the proceeding section it is apparent that a wide range of housing options or housing typologies, have been defined in both the literature and in the Statutory Draft Town Planning Schemes in Natal. However, these definitions are considered to be largely inadequate. This fact is recognised in a recent publication by the "Housing Policy Unit" of the Urban Foundation (1988) which identifies three areas of inadequacy with which this student has much sympathy:

(i) These definitions are often one-dimensional in that they describe housing options from one point of view only. These include options focusing solely on:

- suitability - according to various stages of life cycle e.g. family housing, or bachelor flats;
- the form or dimensions of the building e.g. tower blocks or slab blocks;
- the type of accommodation offered e.g. maisonettes or studio apartments;
- marketing terminology e.g. villas or duplexes;
- extendability and flexibility e.g. core houses or shell houses.

To this may be added:

- By the number of dwelling units per building, for example; simplex or duplex;
- By relating structures to one another, for example; attached, detached, row, cluster or group; and
- By referring to some architecturally or characteristic feature, for example; atrium house, Patio house or garden apartment.

(ii) While having to express a meaningful range of options described multi-dimensionally, this range is seldom sufficiently limited, specific or commonly understood to be useable (Urban Foundation, 1988).

A classic example of such a confusion of definition is the following:

> "Plexes are similar to townhouses, yet they have many of the characteristics of single-family detached housing. This dwelling type may or may not occupy its own structure from ground to roof but does have an outside entrance, it is separated from other structures by yards or other open space, and it is designed for occupancy by one or more families. A structure for occupancy by two families is a duplex; for three a triplex; for four a fourplex or quadplex; and so on. The prefix identifies the number of dwelling units per building". (Urban Land Institute, 1978).

(iii) The ranges of many definitions are simplistic and fail to differentiate between those "generative factors" (key independent variables that both describe the dwelling and determine consequences) and "characteristics" (important attributes implicit in the options). (Urban Foundation, 1988).

The use of the term "generative factor" together with a supposed clarifying definition in brackets is not understood by this student. Perhaps the authors intended the term "generic" thereby denoting a genus or any individual of a large group or class, rather than denoting the ability or power of generating or producing.

In defining the range of options within Medium Density Housing, three factors are considered pertinent, namely:

(i) Height: Height can affect the cost of dwellings, their relationship to the ground, the type of access, the type of open space, household type, the delivery system, site utilization and the intensity of development.

Height may be categorized as follows:

- Single storey on ground level;
- Two to four storeys, being low-rise ground related;
- Five to ten storeys being medium-rise; and
- Eleven storeys or more being high-rise (Urban Foundation, 1988).

In the literature, Medium Density Housing units are generally characterised by a relationship or linkage relative to an area of Private Open Space designed for the exclusive use of the inhabitants of the unit.

(ii) Degree of attachment

The locational relationship of one dwelling to another and their juxtaposition influences the building configuration, cost of construction, type of delivery system, site utilization and the intensity of development.

Attachment may be categorized as follows:

- Detached dwellings;
- Dwellings attached horizontally;
- Dwellings attached vertically; and

- Dwellings attached horizontally and vertically. (Urban Foundation, 1988).

(iii) Ownership

Housing may be developed under a number of forms of ownership, namely:

i) Exclusive title ownership where each dwelling unit is situated on a separate, conventional sub-division. These may either be single detached (free standing) units or attached with a commonly owned (party) wall;

ii) Exclusive sectional title ownership of an attached or detached dwelling unit situated on its own separate subdivision, together with communal ownership of a portion of "common land" in conjunction with the other sectional title holders; and

iii) Ownership of a block of shares within a Shareblock company which owns the entire fixed property including the premises thereon, and where the shareblock owner owns both a right to the exclusive use of a specifically defined attached or detached dwelling unit, with or without a defined area of land, and a right to the communal use of other defined areas and/or premises in conjunction with the other shareholders.

(iv) Dwelling size:

Unless very large, the size of dwelling units within a Medium Density Housing development is superfluous to any definition thereof. The size of dwellings does have a bearing on the cost of construction, the type of accommodation and the intensity of development and consequently has an influence on the household type which is likely to be accommodated therein and the ability of the dwelling to generate income.

Dwelling size may be categorized as follows:

- Micro (30 square metres and less)
- Very small (30 to 50 square metres)
- Small (50 to 70 square metres)
- Medium (70 to 100 square metres)
- Large (100 to 200 square metres)
- Very large (200 square metres and more).

Height and attachment may be combined to form a range of sub-categories. The Housing Policy Units report prepared by the Urban Foundation (1988) illustrates the various permutations of height and attachment in Figure 2.

Having succinctly set out the range housing options the Housing Policy Unit then rather unfortunately includes in their report an unnecessary and confusing categorization of dwelling type, providing four examples, namely:

- House
- Town House
- Flat
- Maisonette.

Nowhere are these types defined, although each is diagrammatically represented, albeit in an inconclusive manner.

The Content of a Town Planning Scheme

* Streets

  - their grades and widths and their intersection with other streets,
  - the volume and character of the traffic which they may be expected to carry in the future and measures to ensure the safety of the travelling public,
  - the closure or deviation of existing streets,
  - the cultivation of trees and the like and the provision of ornamental works to improve the appearance of streets.

* The extinction or variation of private rights-of-way and of servitudes generally.

* The prohibition, regulation or control of advertisements in public places or within public view.

* Lighting and water supply.

* Sewerage, drainage and sewage disposal.

* The prohibition, regulation or control of the deposit or disposal of waste materials and refuse.

* The reservation of land for new roads or the widening or other improvement of existing roads or for purposes of recreation or for parks and other open spaces, aerodromes, the parking of vehicles and other matters generally of a public nature.

* The demarcation or zoning of areas to be used exclusively or mainly for residential, business, industrial and other specified purposes.

* The reservation of land for Government and Municipal purposes of a public nature.

* The extent of lots to be laid off and the alteration of existing lots with the view to improvement in the design or layout of any portion of the scheme area.

* The prohibition, regulation or control of buildings and structures.

* The disposal of land acquired by a Local Authority.

* Land to be employed solely for agricultural and similar purposes and the application thereto of differential rating.

* The preservation of buildings or other objects of architectural, historic or artistic interest and places of natural interest or beauty.

## DEVELOPMENT REGULATION

1. The Need for Development Regulation

The need for development regulation may be said to stem from the planning process, although it plays a role subservient to this process, since it has little direct influence on goal formulation, the nub of a rational planning process.

Alder (1989) in his landmark work on development regulation in Britain states:

> "Indeed, in a sense the development control system is the antithesis of 'Planning' relying as it does upon unco-ordinated initiatives from individual developers both public and private, not all of whom are subject to control"

and he quotes Switzer (1978) as describing the development regulation process as a "bluff, bargain, blackmail and buy".

Alder (1989) proceeds by stating that the purpose of planning has been described as "managing change" and "redistributing resources" and he quotes the following examples:

(i) "A principle or style informing the management or governing process whereby the process will have certain characteristics. That is to say it will be anticipatory, analytical, purposeful, evaluative, innovatory, apparent, responsive, corrective, effective and adaptive".

(ii) (a) "To enhance and develop the beauty and true usefulness of land and buildings, town and countryside.
(b) to reconcile competing needs and to see that any change ... is for the common good. (Royal Institute of Chartered Surveyors, Caring for Town and Country (1979) p.1.).

(iii) "enhancer of the quality of life", "provider", "instrument of social justice", "steward and manager", "controller", "source of information" (Royal Town Planning Institute, Planning in the Future (1976)).

(v) "The deliberate social or organisational activity of developing an optional strategy of future action to achieve a desired set of goals for solving novel problems in complex contexts, and attended by the power and intention to commit resources and to act as necessary to implement the chosen strategy" (Alexander, Town Planning Review 52(2), April 1984 at p. 137).

Alder (1989) continues his inquiry by stating that "planning has no particular purpose of its own but is a microcosm of government or society as a whole". He concludes that development regulation within a market economy is not to be thought of as planning, since in the former, the "regulators" lack the power and resources to implement any chosen plan.

While this may be the case in Britain, the situation in South Africa is subtly different. In Britain planners have sometimes been described as adopting a

"megalomaniac vision" where their planning schemes and policy plans include matters of social engineering, and that planners then use their powers to achieve their own sometimes dubious and generally arbitrary vision of a just society. (Alder, 1989).

It is the authors contention that a similar situation exists in South Africa where the planners can and often do adopt similar visions, however, they generally lack the powers and resources to achieve them. Consequently, it is left to the development regulators to "browbeat", "cajole", "blackmail" or otherwise persuade private developers to design and implement their developments in conformity with the planners vision.

Therefore, the theory on which the content of the policies and provisions of Town Planning Schemes are based must be soundly based if we are to ensure the implementation of developments that both meet and serve societies needs and goals.

It is an unfortunate fact that the content of development regulation provisions are often designed to contain those regulations or measures which are deemed to be capable of simple, unambiguous implementation. It is at this point that the content of the development regulation provisions must be carefully selected and formulated so as to ensure that the proper intentions of the planning goals and objectives are not sacrificed in the quest for simplicity or ease of implementation.

In establishing a set of regulations aimed at the maintenance or achievement of the planning goals, it is necessary to identify a number of objectives of the regulation process.

Süzzna (1970) lists the following objectives:

(a) Protection of property values by requiring uniformity,

(b) Exclusion of dangerous nuisance uses,

(c) Prevention of over-exploitation and,

(d) Fostering public service efficiency.

Development regulation systems are therefore seen as tools for guiding urban change and growth in the direction of the planning goals.

## 2. Types of Standards Employed in the Development Regulation Process

A Town Planning Scheme generally includes three types of regulations, or types of standards, namely:

(i) Subjective standards

(ii) Specification standards

(iii) Performance standards.

2.1 Subjective Standards

Subjective standards are similar to policy statements in that they may refer to a desired end state or performance in a vague manner without being sufficiently specific to allow it to be administered without making a discretionary judgement. Many such examples exist, two such examples of a subjective standard are contained in the Pietermaritzburg Town Planning Scheme's definition of Medium Density Housing, for example, "..... which have been designed as an harmonious entity .....", and in their definition of Dwelling "..... as residential accommodation for a single family .....". The scheme does not attempt to further define or provide criteria on which these terms may be interpreted - hence they are open to subjective interpretation by both parties. At times, the discretion is specifically given to the City Council or its officials as in the case of clause 3.1.7 : Minimum Site areas, the proviso states "..... if the applicant satisfies the Council that, having regard to the situation of the site in question and the provisions of this scheme, that the erection of a dwelling thereon would not in the circumstances be detrimental to or prejudicially affect any neighbouring properties".

The problem surrounding this type of standard is that there is no quantitative basis for determining what constitutes "a detrimental effect" or as to what criteria this may be deemed to be "prejudicial".

Hence, the planning administrator or officer has no quantifiable guidelines to tell him or indeed, the applicant, what might constitute "a detrimental effect" and whether there are degrees of such a detrimental effect beyond which such an effect is no longer tolerable.

Notwithstanding the above, subjective standards are not without value. They may serve a useful purpose in setting and clarifying the planning intent within the scheme as in the planning aims, goals and objectives.

Nonetheless, Stockham (Oregon State University Extension Land Resource Management Program, 1974), states that "..... users of this type of standard should recognise its limitation in regard to be subjective and difficult to administer without involved hearings" (Oregon State University Extension Land Resource Management Program, 1974).

2.2 Specification Standards

As the name implies, these standards set certain specifications that can be measured and therefore can be enforced.

An example of such a standard is the number of units per hectare specifications as contained within a scheme.

It is important to note that this type of standard refers only to the extent to which a site may be developed and it has no bearing on the use, function or the effect of the particular use. As in the case of the example, such a standard may relate to Building Density but it does not necessarily

lend itself to interpretation, explanation or measurement as to whether the original reason for this standard is being satisfied, for example, in limiting the size and number of the dwellings, as a means of attempting to limit the occupancy density and therefore the population density of an area. In other words, Specifications standards state how a development is to be laid out or how a building is to be constructed. Specification standards may be used in conjunction with either a subjective standard or a performance standard qualification or solely as a specified standard, as in a side or rear space provision, without any qualifications of either a subjective or performance type.

## 2.3 Performance Standards

Taking the previous example further, the distinction between a specification standard and a performance standard lies in the fact that the performance standard may set out a ceiling or limit for Residential Density of a site and would leave the implications of this limit to be interpreted by the builder or developer, i.e. the standard may not specify for instance, as to the number and size of dwelling which should be designed, that regulation would be set by another performance standard, namely: Floor Area Ratio.

There is a tendency in some town planning schemes to expand the definition of performance standards to include actual specifications. This interpretation often fails to recognise that performance standards are applied to effects rather than to structural or design features, and misses the point made by protagonists of performance standards that an important reason for using such standards is to abandon the use of inflexible specifications which dictate specific use and specific design.

In such an approach, the proposed development may not be limited by what you may or may not do, but rather by the extent to which the proposed development or use will impact upon the social, economic or natural environment. Consequently, this approach requires the establishment of a set of detailed performance standards which may be related to the goals and objectives which have been established by the community.

Although there is no single definition of a performance standard Dennis O'Harrow, a pioneer of industrial zoning performance standards, has suggested the following:

> "The ideal Zoning Performance Standard will substitute a quantitative measurement of an effect for a qualitative description of that effect that we have used in the past. It will not use the terms limited, substantial, objectionable, offensive. Instead, it will establish definite measurements with standardised instruments to determine whether the effects of a particular use are within predetermined limits, and therefore permissible in a particular zone" (D. O'Harrow, 1951, quoted in Oregon State University Land Resource Management Program, 1974).

The key words in this description are "quantitative" and "effect", to qualify as a performance standard the control or regulation must involve measurement. Secondly, what is being measured must be an effect or impact of a particular activity.

The term "performance zoning" is merely an application of performance standards in a zoning context. For example the criteria for establishing a land use zone and for regulating land use within these zones is based primarily on performance rather than on use or design specifications.

Consequently, a performance standard within a particular zone is defined by a list of permitted impacts as opposed to a list of permitted uses, for example, a specified net or gross Population Density or a specified floor area ratio which is an example of an existing performance standard that relates to Building Density.

The cumulative impact of such performance standards is to direct, guide and control the creation and maintenance of the desired quality and character of a development, and not to be over prescriptive as to how that development should be designed and/or constructed.

## 2.4 Summary of Types of Standards

A Town Planning Scheme may contain all three of these types of standards depending on the intent behind particular sections of a Scheme. While performance standards have some clear advantages over the other two types, there are certain design and impact factors where the use of subjective standards or specification might be more appropriate.

Nonetheless, general consensus in the literature is aptly summarised by the following statement that "there is general agreement that the assessment of the performance of a particular development in relation to a set of objectives having regard to, in particular, the character of the surrounding area is the way of the future for development control" (Australian Institute of Urban Studies, 1982).

**APPENDIX E**

## EXTRACT FROM PIETERMARITZBURG TOWN PLANNING SCHEME

## SUBDIVISION OF LAND FOR RESIDENTIAL PURPOSES

The Town Planning Scheme sets out 3 sets of provisions governing the subdivision of land under special circumstances. These include:

"(a) Subdivision of land by Double Parcellation

Double parcellation is defined within the Scheme as the subdivision of land in such a manner that one subdivision gains access to the road by means of a strip of land alongside a boundary of another subdivision.

In terms of the Scheme, the Council may consent to the subdivision of land by double parcellation subject to the following conditions:

(i) In the case of a piece of land within the "Special Residential" zone or to be used for dwelling houses, there shall be an access strip not less than 4 m wide at any point. Provided that if more than 3 dwellings are to be established on a single subdivision the access strip shall be not less than 6 m wide at any point.

(ii) In the case of a piece of land within the "Intermediate Residential" zone or to be used for medium-density housing, there shall be an access strip not less than 6 m wide at any point.

(iii) In the case of a piece of land within the "General Residential" zone or to be used for flats, there shall be an access strip not less than 9 m wide at any point. Provided that if in any case the Council considers it necessary in view of the shape of the subdivision, slope of the land, or other matter, it may require an access strip of greater width.

(iv) No access strip shall exceed 70 metres in length.

(v) Not more than two access strips shall abut one another.

(vi) Where any access strip is not straight along its entire length the Council shall satisfy itself that adequate vehicular access shall be provided, and for this purpose the Council may require an increased width for the access strip concerned and/or may require splay corners where the access strip changes direction. The provisions of this clause notwithstanding, the Council may refuse its consent to any subdivision for which an access strip which is straight along its entire length cannot be provided.

(vii) The subdivision created by "double parcellation" shall be of sufficient area to contain within its boundaries a figure having an area (including the access strip) and mean width (excluding the access strip) not less than that required for normal subdivision within the relevant density zone.

(viii) Generally, buildings and other structures on a double parcellation site shall not be erected or established within a distance less than the building line applicable to that subdivision, from any common boundary which is opposite the street boundary of the adjoining site. Provided that the Council may relax that distance if the written consent of the owner of the adjoining site concerned is first obtained by the applicant. Provided further that if the written consent of the owner of the adjoining site concerned cannot be obtained, the special consent of the City Council shall be sought for such relaxation.

(b) Subdivision of Land for Residential Purposes, without individual access to a Street:

The Town Planning Scheme provides that the Council may consent to the subdivision of land, into not more than ten subdivisions where the resulting subdivisions do not have individual access to a public street, subject to the following conditions:-

(i) The applicant shall submit for the Council's approval, a layout plan to a scale of 1 : 500 or any other scale acceptable to the Council, as provided for in Section 18 of Ordinance No. 14 of 1936, showing the individual subdivisions as well as the common property.

(ii) The common property shall have the primary function of accommodating a roadway providing vehicular access to the individual subdivisions and that common property shall have frontage to a public street, and a mean width, of not less than 6m where not more than five such subdivisions are involved, and a frontage to a public street, and a mean width, of not less than 9m where not more than ten subdivisions are involved.

(iii) The individual subdivisions shall observe the requirements of the General Restrictions in Respect of the Subdivision of Land), except as provided for in the Subdivision of Land for Residential Purposes.

(iv) For the purposes of this Clause only, any reference to minimum frontage, shall mean frontage to the common property or to a street.

(v) Building lines, as required in terms of the Scheme, shall be observed where individual subdivisions abut either a street or common property.

(vi) All other cadastral boundaries are to be considered as such for the purposes of determining side and rear spaces.

(vii) The individual subdivisions shall be registered in the Deeds Office under separate title, each with an individual undivided share in the common property in the layout, subject to the condition that no such subdivision shall, without the express consent of the Council, be alienated in any manner separately from its undivided share in the common property.

(viii) The owners of the subdivisions shall be jointly responsible in perpetuity for the maintenance of the common property in a clean, tidy and serviceable condition, to the satisfaction of the Council and shall take all steps to ensure that no part of such common property shall become a public street or public place for which the Council may be required to accept responsibility, without the express consent of the Council.

(ix) For the purpose of all dealings with the Council in regard to the levying of rates and the rendering of Municipal services to the scheme and for the purposes of complying with the obligations imposed upon them, the owners of the subdivision shall establish an Owners' Association, with perpetual succession, to administer and maintain the said common property and deal with any other matter pertaining to the scheme which is of common interest to its members. The affairs of such Owners' Association shall be regulated by a Memorandum and Articles of Association or Founding Statement, as the case may be, which shall have been approved by the Council before any transfer of a subdivision may be registered.

(x) For the purpose of the foregoing paragraph "Owners' Association" means a company registered in terms of the Companies Act No. 61 of 1973, as amended, or, at the discretion of the Council, a Close Corporation registered in terms of the Close Corporation Act No. 69 of 1984, membership of which shall be exclusive to and compulsory for the owners of the subdivisions in the "Medium Density Housing" scheme referred to in this Appendix.

(c) Subdivision of Land (Development Scheme) without Access to a Street

The Town Planning Scheme further provides that Council may consent to the subdivision of land on which there are existing or proposed free standing buildings or buildings in a continuous block, forming part of either a "Medium Density Housing" scheme or other similar such scheme, subject to the following conditions:-

(i) The applicant shall submit for the Council's approval a layout plan to a scale of 1 : 500 or any other scale acceptable to the Council, showing the position of all existing and proposed buildings, structures, all internal streets, parking areas both covered and uncovered, pathways, screen walls to clothes drying areas, etc.

(ii) The minimum distance between buildings shall be in accordance with the National Building Regulations. In the case of buildings in a continuous block, each unit shall be separated by a firewall, in conformity with the requirements of the National Building Regulations.

(iii) In the case of "Medium Density Housing", every freestanding dwelling, or dwelling in a continuous block, which is to be alienated shall have attached to it a curtilage not less than 150m$^2$ in area.

(iv) There shall be no building line to the internal streets within the site. However, the City Engineer shall be satisfied that all parking spaces shall be located in relation to roadways so as to ensure that traffic to and from such roadways will not be impeded and that no hazards will be created. A building line as laid down for the density zone in which the site is located shall be observed in respect of all buildings on any site which fronts on to a public street.

(v) The overall development may be completed in stages provided such stages are indicated on the layout plan.

(vi) The building unit subdivisions shall be registered in the Deeds Office under separate title, each with an individual undivided share in the common property in the scheme, - consisting of streets, open spaces and the like, not forming part of any of the proposed building unit subdivisions, - subject to the condition that no such building unit subdivision shall, without the consent of the Council, be alienated in any manner separately from its undivided share in the common property.

(vii) The owners of the subdivisions from time to time shall be jointly responsible in perpetuity for the maintenance in a clean, tidy and serviceable condition to the satisfaction of the Council of the common property referred to in paragraph (vi) and shall take all steps necessary to ensure that no part of such common property shall become public streets or public open spaces for which the Council may be required to accept responsibility, without the express consent of the Council.

(viii) For the purpose of all dealings with the Council in regard to the levying of rates and the rendering of Municipal services to the "Medium Density Housing" scheme and for the purposes of complying with the obligations imposed upon them in (vii) the owners of the subdivision shall establish an Owners' Association, with perpetual succession, to administer and maintain the said common property and deal with any other matter pertaining to the scheme which is of common interest to its members. The affairs of such Owners' Association shall be regulated by a Memorandum and Articles of Association or Founding Statement as the case may be which shall have been approved by the Council before any transfer of a subdivision may be registered.

(ix) For the purpose of the foregoing paragraph "Owners' Association" means a company registered in terms of the Companies Act No. 61 of 1973, as amended or at the discretion of the Council, a Close Corporation registered in terms of the Close Corporation Act No. 69 of 1984, membership of which shall be exclusive to and compulsory for the owners of the subdivisions in the "Medium Density Housing" scheme referred to in this Appendix.

(x) For the purposes of this Clause, the owners of the subdivisions shall, at their expense, cause all deeds, servitudes and the like that may be required to be registered in the Deeds Office, to be so registered, whether in favour of the Council or otherwise.

(xi) The approval of any scheme in terms of this Clause shall be subject also to any conditions that may be imposed by the Council in terms of Section 18 of Ordinance No. 14 of 1936, in regard to the subdivision of land.

(xii) No transfer of any subdivision in a scheme approved under this Clause shall be permitted unless a building has been erected thereon and an occupation certificate has been issued in respect of such building in terms

of the National Building Regulations. Provided that the Council may require that no dwelling unit shall be transferred or separately registered before the whole "Medium Density Housing" site, or such portion as the Council may specify, has been developed to the satisfaction of the Council. Provided further that this Clause shall not affect any rights of preference conferred by any mortgage bond registered over the property, nor a mortgagee's right to cause the property to be sold in execution and in any such circumstances the City Council shall be deemed to have waived the requirements of this Clause, the subsequent purchaser, however, becoming bound by the same."

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