

A STRATEGY FOR LOW INCOME HOUSING
IN SOUTH AFRICA

by

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Submitted to the Department of Architecture
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ABSTRACT

It is the intent of this thesis to investigate an alternative strategy for design and implementation of low cost housing in South Africa.

For this purpose a site is chosen and a design strategy is formulated. The core concept in this strategy is the combination of site and services approach and supports methodology.

Although site specific, this strategy is proposed and discussed in a way to have general and wider implications both in South African context and also other third world countries. Finally, a series of issues are raised on implementation implications of such strategy.

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My deepest gratitude to my friend Trevor Davis for his company and comments and for the much needed reference material and data that he made available to me.

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Last, but not least, my gratitude to my parents whose loving support and encouragement are beyond the means of expression.

CHAPTER I

- A -- Introduction
- B -- Importance of the study
- C -- Objectives
- D -- Limitation of the study
- E -- Methodology

CHAPTER 1

A -- Introduction:

The purpose of this study, as the title implies, was to prepare "A Strategy for Low Income Housing in South Africa." In this context the viability of joint implementation of the concepts of the "Sites-and-Services" and "Supports" on an experimental site in South Africa, with a view to providing large number of dwellings at the lowest possible cost and shortest possible time and maximum participation of dwellers has been tested.

This study was not therefore, concerned directly with the preparation of final designs of houses but it was mostly concerned with the strategy appropriate to the solution of low income housing.

B -- Importance of the Study

Today the first priority of all developing countries is industrialization which causes rapid urbanization. World Bank¹ in a paper produced in April 1974 suggested that the growth in urban population of developing countries is expected to exceed 4% per annum for the next two decades. In actual practice during the last decade the growth in urban population has been two or three times the national rate of growth of population in developing countries, or six to nine percent per year. This staggering figure shows that whatever housing program the government may finance and implement, it could not cope with the need for housing in these countries and the gap between the number of those who are in need of adequate shelter and housing production becomes wider and wider. The result is overcrowding of sites and individual homes.

In South Africa, by the end of the century 80% of the population would be urbanized.² This is beyond the power of the government and private industry to provide dwelling for these people in the conventional manner.

This is not a unique problem which is found just in South Africa. The United Nations³ issued a report in 1974 that gives some percentages in Africa, Asia and South American countries which showed that an average of 50% of the population in these continents live in sub-hygienic, highly congested slums.

In all these areas, including South Africa, the solutions put forward by both the government and private investors has been the provision of high standard dwellings which is neither affordable

in cost⁴ nor such dwellings could be built in quantity and speed that would satisfy the demand.⁵

The emphasis has been put on lowering the cost by decreasing the standards, mass production of building materials on one hand and the increase of financial support of low cost housing on the other hand, neither of which has solved the problem.

The concept of Sites and Services argues that instead of providing complete dwellings to a few beneficiaries, land and basic utilities and services should be provided to a larger sector of the population and encourage them to build their dwellings themselves.

The concept of "Supports and Infills" recognizes two spheres of decision making in the process of housing, public and individual that is the private. If the individual dweller can make decisions about an element of his dwelling, this element is called "Detachable units" and if the dweller as an individual cannot decide about an element in his dwelling, then this element is part of the "Support." The support is the product made in the public sphere, made for the community and the detachable units are products about which the dweller can make decisions.

Both these concepts have been tested in different areas in recent years with a lot of success and some failure.

Site and Services schemes have had an unhappy connotation in South Africa, because poor attention was paid to the required basic aids, supervision and control measures. As a result, this strategy in housing provision was condemned and eliminated from continued application.⁶

An acceptable modification of this system could be found in the form of what may be described as "planned self-help incremental housing." This should be undertaken in an orderly planned and properly laid out area in which appropriately identifiable and defined residential building sites equipped not only with basic services such as safe water supply, proper sanitation, but also with all technically sensitive elements that an individual cannot decide about in making his house, such as foundation, wet cells, roofing, etc. In addition, suitable controls over the materials of construction and quality of implementation and minimum acceptable standards of dwelling must be attained.

The aim of this study is to try to combine the two concepts of "Sites-and-Services" and "Supports" with a view to achieving the above-mentioned objectives.

It is hoped that, by implementation of schemes of this kind, contribution of the public sector plus active participation of private dwellers and informal sector as well as an overall planning and control, a reasonable housing for a larger segment of low income population may result.

To make this study more tangible and its eventual application possible, a site in Pietermaritzburg, South Africa has been selected. This site is in the initial stages of housing development. This study could be presented to the government authorities in charge of development as an alternative concept for development.

C -- Objectives

The objectives of the thesis were to:

- 1 -- propose a new strategy needed as a practical alternative to fully-built government housing programs for low income people, the cost of which has been beyond the means of nearly 60% of the urban households;
- 2 -- demonstrate the potential role of the private sector in providing self-financing, low income housing, thereby easing the burden on government resources;
- 3 -- encourage provision of adequate community facilities and effective community development programs as an integral part of low cost housing.
- 4 -- generate employment through labor-intensive construction methods and organization of small commercial ventures; and
- 5 -- bring down the cost of dwelling to a level that low income groups could afford within their own budget.

D -- Limitation of the Study:

This study was limited to the following:

1 -- From the viewpoint of the type of dwelling, the study is limited to Low Income housing.

2 -- The emphasis has been put to the application of the concepts of "Sites and Services" and "Support" and formulation of a strategy for production of low cost housing.

3 -- The intention has not been to prepare detailed site layout nor was it intended to propose definite housing plan.

4 -- The layout and plans that are prepared are only for the support and illustration of the issues.

E -- Methodology

The author has utilized the methodology of reading of collected information by correspondences, direct and indirect interviews with those knowledgeable of the low cost housing and especially problems of logging low income groups in South Africa.

The author has also used the methodology of library research, collecting, reading and preparing resume of the application of the concept of "Sites and Services" and "Support," problems related to such applications and ways and methods to avoid problems.

CHAPTER II

A -- Concepts of: "Sites and Services"

B -- Concept of "Support"

C -- Strategy Out Line - "Combined Concepts"

A -- The Concept of the Sites-and-Services

The central concept of the sites-and-services project is a shift of focus from providing houses to providing serviced lots. The attempt is to develop a policy instrument capable of meeting the needs of families at lower end of the income spectrum and to harness the energies of occupants themselves in building a low-income house. This concept tries to provide houses for that portion of the population that are unable to afford the cheapest new standard housing.

In the sites-and-services project, government plays the land assembly role which would otherwise be assumed by the squatter or illegal subdivider. It purchases a tract of land, prepares it, installs basic infrastructure, and sells plots. Except for, perhaps, some ancillary social services, a small loan program, a construction material depot, things then proceed much as they would have in the informal processes of the squatter settlement or illegal subdivision. Families erect temporary shelters and slowly improve or replace them over as many years as necessary. While construction must conform to minimum building codes, many projects attempt to have a liberal attitude with respect to vegetable gardens, renting rooms, and other means of supplementing income which do not conflict with the basic goal of creating a residential neighborhood.

This concept of sites-and-services has been implemented in many countries around the world. It has had the support of the World Bank and has made it possible for the poor to house themselves in a viable, cohesive community with a minimum of public expenditure.

Like all other innovations, sites-and-services programs have their own problems, which some of important ones are as follows:

1 -- Although the government action in furnishing technical assistance, in using bulk buying of construction materials, etc. is capable of lowering the cost for low-income builders but the government administration costs money and it is even possible that the government may produce a more costly product than informal systems.

2 -- The central concept of the serviced lot implies a monthly charge and frequently a down payment, which are burdensome for those at the bottom of the economic ladder.

3 -- The payment of monthly charge and down payment may attract more established members of the working class, leaving the real low-income group behind.

4 -- In cases that the government finds a way to solve problems of down payments and service charges, then the consequence of a large-scale sites-and-services might be the creation of a sharply defined underclass with markedly fewer economic opportunities for economic survival than now prevail in the economically mixed area, in which steady wage-earners live close by those who serve them in a score of minor, but financially critical, ways.

5 -- On the subject of self help, the owner-occupant and his family will supply much of the unskilled labor, but contract out to neighborhood roofers, plumbers, carpenters, etc., the more technical parts of the work.

6 -- Bulk buying of construction material may result that the large supplier, who normally has difficulty selling in low-income areas, becomes able to penetrate this market and eliminate small producers who

are a member of low-income groups.

7 -- The question of location is also important. Those with no regular source of employment, each day is a new search for one's daily bread. A prime requisite for survival is a continual and easy access to the central pools of economic activity which are normally located in the middle of the city. Therefore, locations that are cheap are far from the city and thus difficult for the lowest income participants.

8 -- Size of the lot is another problem. Low income groups living far from the city need a bigger lot in order to grow their vegetables. A big lot of land very soon becomes an investment which attracts land speculators.

9 -- Problem of title is also an important factor. If title is given to the first occupant, very soon they become landlord and rent their place to another group or they may sell the subsidized house in free market. And the poor will be brought out by middle-income people.

To overcome some of the above problems, the following suggestions can help:

1 -- Try to make individual projects as small as possible, offering wide variety of locational choices.

2 -- Within each project there should be a variety of lot sizes, with per-meter land prices.

3 -- Allow flexible choice of "services package" to be selected by the occupant. It means that sites-and-services projects as initially created would furnish only rock-bottom minimums of services, but establishes mechanisms by which group of householders could organize themselves to purchase additional services.

4 -- Care must be taken that the projects do not segregate different low income classes that depend upon each other works and do not become vehicle for the penetration and domination of middle and upper class suppliers into the sector of the housing market.

B -- SAR. PHILOSOPHY

SAR Principles are based on the participation of the dweller in the housing and the concept of supports and infills.

In the process of mass-housing as it is known today, there is no place for the individual dweller. We all know that the mass-housing has failed in the application of industrial methods.

A dwelling always exists in two spheres: the sphere of the community, that is the public sphere; and the sphere of the individual, that is the private sphere. Today in the mass-housing process everything is decided in the public sphere, the result of which is uniformity. In the public sphere there is no possibility for the individual. The concept of supports and infills recognizes both spheres.

The definition of the word "support" and the word "infill" is not a technical one. It is a definition based on a division of the decisions to be made. If the individual dweller can make decisions about an element of his dwelling, then this element is-- by definition--an infill. Regardless of the question whether this element is industrially made or not. If the dweller as an individual cannot decide about an element in his dwelling, then this element is part of the support.

If we want to make supports and infills, we must start with a philosophy that tells us where the decisions to be made in the public sphere will stop and where the decisions to be made by the dweller begin. Only then can we start with the design problem.

The support is the product made in the public sphere, made for the community. Infills are products about which the dweller can make decisions. The support, therefore, is a piece of real estate. It is the result of a design-process in the public sphere. It can be prefabricated, but it can also be built in traditional building methods. When the support is finished, the dweller can make decisions about the detachable units he wants to use to make his dwelling in this support.

The infill can be made as an industrial product. It can be considered as a durable consumer good. Therefore, supports and detachable units represent not only two spheres of responsibility. They are also the result of two spheres of production. The production of real estate and the production of durable consumer goods. In both spheres the methods of industrial production can be applied. In the building of supports, industry can produce prefabricated elements out of which the support can be built. In that case the industry serves the building trade. In the production of infills the industry serves directly the dweller.

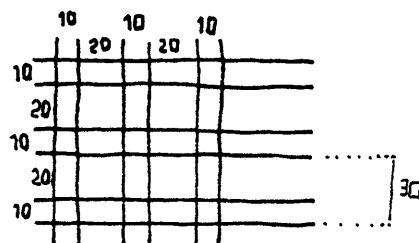
In the new housing process the architect should stop producing dwellings. A dwelling is not a thing that can be designed or can be produced. Architects should design supports and infills. Builders should build supports. Industry should produce infill packages. The dwelling will be a result. The result of the participation of the dweller. This methodology is based on two sets of rules. The first set has to do with the position and dimensions of materials. The second set has to do with the position and dimensions of space.

How do we make decisions about materials and space? When we consider the design process we can recognize some characteristics that can give us an indication. So the first characteristic of the design process is that it runs from the intangible to the tangible. Secondly, when we start putting down our decisions on paper--whether it be in drawings or in writing--we will first work in general terms and then we consider details. This does not mean that the specific will not be considered from the beginning. But in the process itself the general arrangement proceeds gradually to the more specific final decisions.

In a support all different arrangements for floor plans of dwellings should be possible. This means that we cannot evaluate a support on the basis of one or two possible floor plans it can, or must, have. When we design a support we have to deal with general statements about possibilities. The supports have to be judged on these general possibilities. To be able to do that we need tools to notate such general statements in the process of design.

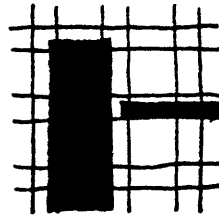
1. Modular Coordination:

SAR considers rules for modular coordination to be useful as a means for communication. The internationally accepted basic module of 10 cm. and the preferred module of 30 cm. are very useful vehicles for communication about dimensions. SAR uses these modules in a tartan grid of 10 cm. and 20 cm. bands. In this grid the



center-to-center dimensions of two bands of the same width are always $n \cdot 30$ cm. The tartan grid offers the possibility to make rules about the position of material in a general way. Many different rules are possible. But SAR proposes one main rule for the design of supports and detachable units. This rule states that:

2. Material shall end in the 10 cm. band.

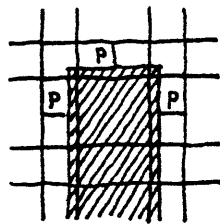


This rule enables us to decide about the position of materials in a clear way even before we know what will be the exact dimension of an element.

For example: A load-bearing wall as part of a support can be placed in such a way that the material ends in two successive 10 cm. bands. The thickness of the wall in that position can be varied from a minimum of 20 cm. to a maximum of 40 cm. A wall placed in that position can still have a range of dimensions. The exact dimension can be decided upon in a later stage. Thus the 10/20 cm. grid with the rule that material ends in the 10 cm. band makes it possible to distribute material in space in a general way with the possibility to foresee the range of dimensions that can be chosen in a later stage of the design process.

The advantage of the tartan grid is that it allows for the thickness of material in the stage where the designer is mainly occupied with the distribution of spaces. He knows that the space that results from the placing of material (e.g., walls or columns) will be between $n. 30-10$ cm. and $n. 30+10$ cm. Thus he can work with nominal space dimensions of $n. 30$ cm. But he knows that eventually when a later stage the exact dimension of the material is decided upon the minimum available space will be always $n. 30-10$ cm. and the maximum possible space can be $n. 30+10$ cm. Even in a rough sketch, orientation on the possible dimensions becomes very easy.

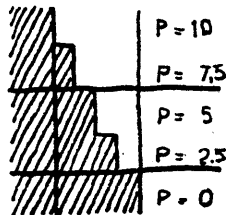
By following the rule that material ends in the 10 cm. band, the general position of the material is known. Eventually the exact position will have to be designated. This means that eventually we will have to give information about where the material exactly ends in the 10 cm. band.



To do so, the concept of the "fitting dimension" is introduced. The fitting dimension is the dimension from the material to the next grid line. The fitting dimension is always free space. The tolerance needed for production and positioning of the material lies outside the fitting dimension.

With the rule that the material ends in the 10 cm. band, we know

that the fitting dimension will always be between 0 and 10 cm. It would be a great advantage if from this general rule an agreement could be reached on a set of preferred fitting dimensions, e.g., 0, 2, 4, 6, 8 and 10 cm. or 0, 2½, 5, 7½, 10 cm.



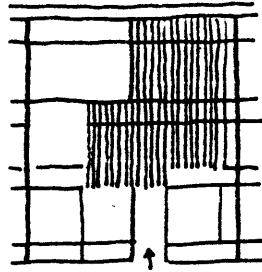
But such an agreement can only be the result of further coordination of the parties involved. The important thing is that we can use rules of modular coordination as a means of communication, that facilitates the design process.

3. Zones and Margins

With the design of supports the designer has to make decisions about the position and dimension of material without knowing the floor plans that eventually will be found in the support. This means that he cannot make his decision about the material of the support on the basis of a floor plan. He has to work from possibilities of floor plans. To be able to do so he must be able to make general statements about the possible distribution of spaces in the support.

The concept of zones and margins has been developed to make general statements about the distribution of spaces in a support visible in a design. A zone is an area in a support to which rules are attached concerning the position and dimension of spaces and functions allowed for in the support.

The principle is as follows: First classes of possible spaces or functions are determined. Secondly, zones are defined that give possible situations for spaces. Finally, rules are formulated about the position of spaces in the given zones.

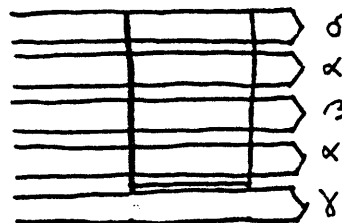


Three classes of spaces. In any given dwelling three classes of spaces can be found:

- 3.1. General living space;
- 3.2. Specific living spaces (e.g., bedrooms, working room, kitchen, etc.);
- 3.3. Utility spaces (e.g., storage room, bathroom).

These three kinds of spaces give some kind of hierarchy in each floor plan. Generally speaking it might be said that utility spaces serve specific living spaces and that specific living spaces are distributed in relation to general living spaces.

Four zones. In supports four zones can be defined.



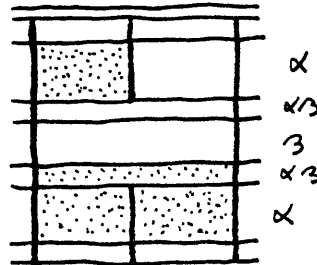
α -zone: Inside space for private use with relation to outside space.

β -zone: Inside space for private use without relation to outside space.

α -zone: Outside space for private use (balcony, garden, loggia).

β -zone: Space for public use (circulation) either inside or outside.

Between two zones will be a margin. The margin has the properties of the two adjacent zones. It deserves its name from these zones. (e.g., the margin between the α - and β -zone is called " $\alpha\beta$ -margin.")



Now the elements out of which a floor plan is made are known (the three classes of spaces) and the areas are known in which these elements can be found (the zones). Next we have to regulate the relation between the spaces and the zones. To do so SAR works with one general rule:

4. Specific living spaces will end in two successive margins.

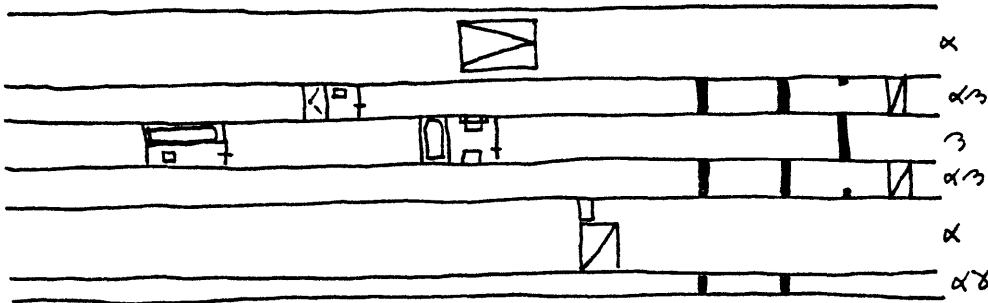
This rule means that the dimensions of specific living spaces are related to the width of zones and margins. The width of a zone will always be the minimum depth of a specific living space located on that zone. The width of a zone and the two adjacent margins gives the maximum depth of a specific living space located on that zone.

By giving dimensions to the zones in a support, the designer makes a statement about the dimensions of specific living spaces that must always be possible in the given support. Consequently, the zones give information on two things:

- 4.1. The general pattern of possible distribution of spaces that can be deduced from the arrangement of zones (type of dwelling).

4.2. The minimum and maximum dimensions possible for the specific living spaces.

The general rule formulated above, that specific living spaces should end in two succeeding margins, leaves so much open that designers will feel the need to add other rules in the course of the design process. Such additional rules can be a great help in further organization of a support system and give the parties involved in the design process the means to translate more specific requirements into the same language.

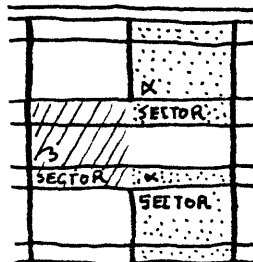


Examples of such additional rules are:

- Sanitary cells will be found only in β -zones.
- or: Sanitary cells will be found either in β -zones or $\alpha\beta$ -margins.
- Bedrooms will be found only in α -zones.
- Load bearing elements will not be found in α -zones.
- Vertical ducts will be found only in $\alpha\beta$ -margins.

Several other concepts related to the use of zones and margins have been introduced by SAR. In this brief introduction of the methodology, two must be mentioned as examples.

5. The Sector

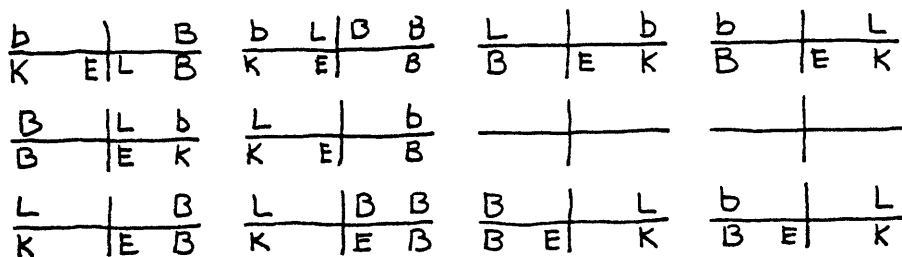


A sector is a certain free length of a zone with its adjacent margins. Thus the space between two load-bearing walls in a support can also be called a sector. As a zone gives only one dimension, the sector gives two. A sector can be analyzed on its possibilities of use for different combinations of functions. As most supports will give material that intersects the zones, the analysis of the resulting sectors is an important exercise in the evaluation of a support design.

The sectors in a support are the built spaces given to the dweller for further partition or combination into a specific dwelling. It might be said that a dwelling in a support can be seen as a sector group. In principle, each group of adjacent sectors in a support can be a dwelling.

6. The Basic Variant

If a given sector group can be seen as an area for a dwelling in this area, a great many possible floor plans can be expected. Even if one only considers the floor plans according to the rules on which the support is designed, in most cases the number of possible variations is very great. To make orientation on the number of variations in a given sector group possible, the concept of the basic variation has been developed. A basic variation is a notation of the position of functions for specific living spaces and general living spaces. The different functions are notated. This notation does not give the dimension of the space required. It only states that this kind of space can be located in that place. Such a notation in the area of one dwelling (sector group) gives a basic variant.



For any given area in a support to be used for a dwelling, the series of possible basic variants can be written out. They give much information on the different living patterns possible in the given area. Each basic variant gives a great many possible sub-variants that is: Specific floor plans that all have the same function pattern.

An analysis of the basic variants gives valuable information on the properties of a given support design.

C -- STRATEGY OUTLINE
"COMBINED CONCEPTS"

As a rule, the low-income family would like to build its house in phases, as and when it can afford to, and according to its needs.

The official policy in South Africa towards Site and Services schemes has been favorable, but few such schemes were implemented with not much success. Therefore, there are authorities who object to pure Site and Services housing schemes and state that a permanent slum would be created.

The reason for failure of Site and Services schemes lies in the way such schemes have been implemented. A site has been allocated for housing, basic services were supplied and inhabitants were left to build shelters without any guidance, supervision or control.

In a seminar of the "Aspect of Black Housing in South Africa" R. L. Stevenson⁷ reported his finding that: "Site and Services and self help can work, provided it was controlled and provided aspiring home seekers were encouraged to help themselves."

The West Rand Administration Board⁸ of South Africa in its report paper in the same seminar, stated that:

The solution to the problem of providing low income housing lay in a recognition that the people were in fact eager and willing to help themselves provided they were given the opportunity, encouragement and the right advice and guidance and the right framework in which to operate.

Some major problems facing self-help programs in South Africa are:

- Irregularities in buildings, spontaneous settlements with no regard for sanitation.

- The squatters mostly have little or no knowledge in building and construction, and educational services are not available.

- Certain parts of the house, such as kitchen, bathroom, and toilet, are difficult to build by dwellers; also, roofs and drainage cause major obstacles.

The result of the eight-month study done in 1981, and seven papers presented by the state, private and local authorities on the subject of low-cost housing⁹ was:

It is widely agreed at the discussion and studies that the state could not possibly adequately satisfy South Africa's low income housing needs, and a combination of Site and Services and Core housing approaches was therefore required.

Considering the above studies and recommendations, I decided to add some carefully selected "Supports" to the concept of Sites and Services to overcome problems related to this concept.

These "Supports" shall consist of:

1 - Technical guidance to the dweller to enable him to construct a platform as a base for his house. This platform may have three alternative sizes: 6x4 or 6x8 or 6x12. The dweller can choose one size and expand it later.

The platform is built with some and/or concrete blocks and filled with stone or gravel to: (a) prevent water from penetrating the building, and (b) problem of foundation is eliminated and dweller can build or add rooms with great ease.

2 - Three connections to water and sewer system will be made

available to occupier, for kitchen, bath and toilet with basic equipment in order to satisfy the minimum requirement of a family and ensure sanitation.

3 - Alternative plans with sizes of $6 \times 4 \text{ m}^2$, 6×8 and $6 \times 12 \text{ m}^2$ will be made available to occupier. Plans are designed in ways which expansion is always possible. Technical assistance will be made available to the dweller to guide him and to solve his problems during construction.

4 - The most important element, at this stage, will be the roof. Prof. Wallas Van Zyl¹⁰ believes that:

Where self-help or mutual aid functions, the average family, if helped with a roof, will manage to make or buy the earthen bricks or blocks with which to put up a shelter. Both private and public agencies could assume the responsibility for making roofs available to families at reasonable cost. Help with roof can stimulate relatively unskilled people to grapple with their own shelter problem and to master some of its complexities.

Therefore, as part of the "Supports," a complete roof shall be made available to dwellers.

5 - The process by which building materials are secured is important. It is needed to create a housing infrastructure which the community may tap in two ways, either for contractor or self-help services. Materials such as off cut planks of wood, plastic, cement, asbestos and roofing felts could be supplied at a central depot by the authorities or private enterprises. It would be of great help if centers are created where building and repair skills can be acquired. This could become a part-time job training.

In this connection it should be mentioned that one of the best materials for building single story shelters is sun-dried bricks which have been successfully used for centuries in the Middle East. The success, low price, and availability of clay in any part of the world has encouraged Technical Assistance Department of the United Nations to build two Lab-Research Centers, one in Cairo, Egypt and the other in India, to improve making application of sun-dried bricks and mud blocks. The result of their study is the production of a kind of sun-dried bricks and mud block that is as strong as baked bricks. It is made of clay and straw with some crude oil and some 5% cement. No expertise is required for their making; it could be produced in any size and shape. Its application is easy and its heat transfer resistance is twice as much as cement blocks.

If a reasonable roof is put on a shelter made of such sun-dried bricks, it could last as long as a cement block home.

Finishing of such houses also could be done by plastering of clay and straw and whitewashing the walls with a mixture of lime and water which is not only as hard and stable as plaster, but is the best natural insect repellent.

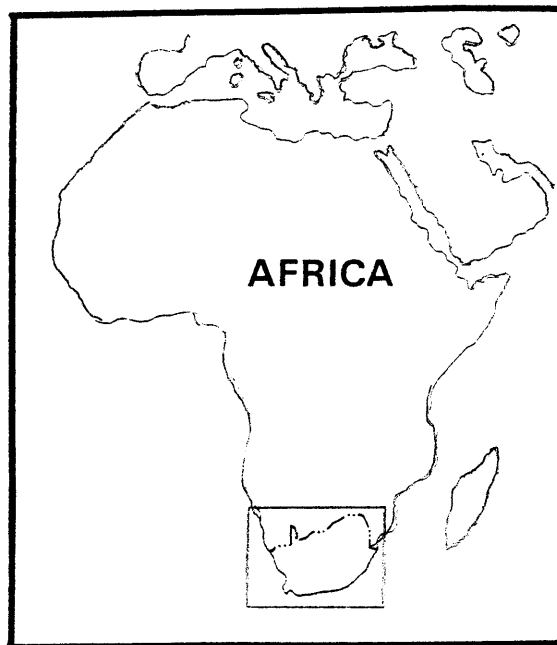
6 - Informal sector and private entrepreneurs will be helped and guided and encouraged to provide infill services in the area.

7 - A practical, realistic code and standard of building shall be prepared and continuously and strictly enforced by day-to-day inspection and supervision. This will prevent mistakes and shortcomings in the construction process which will ultimately cost the dweller more.

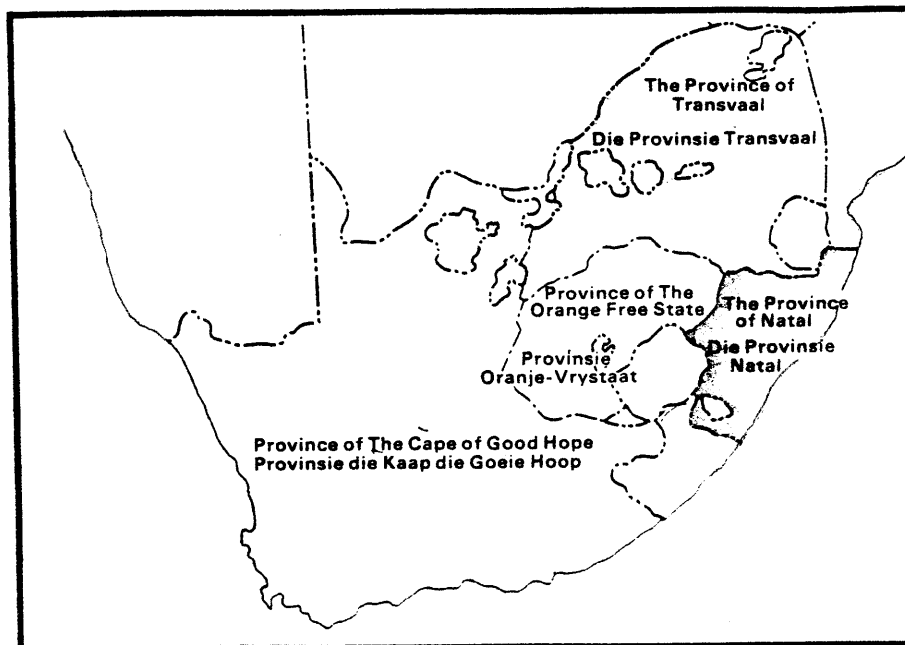
CHAPTER III

- A -- Selection of Site for Project
- B -- Site Layout
- C -- Site Planning
- D -- Support Design Objectives
- E -- Support System
- F -- Infill
- G -- Design Methodology
- H -- Proposed Building code

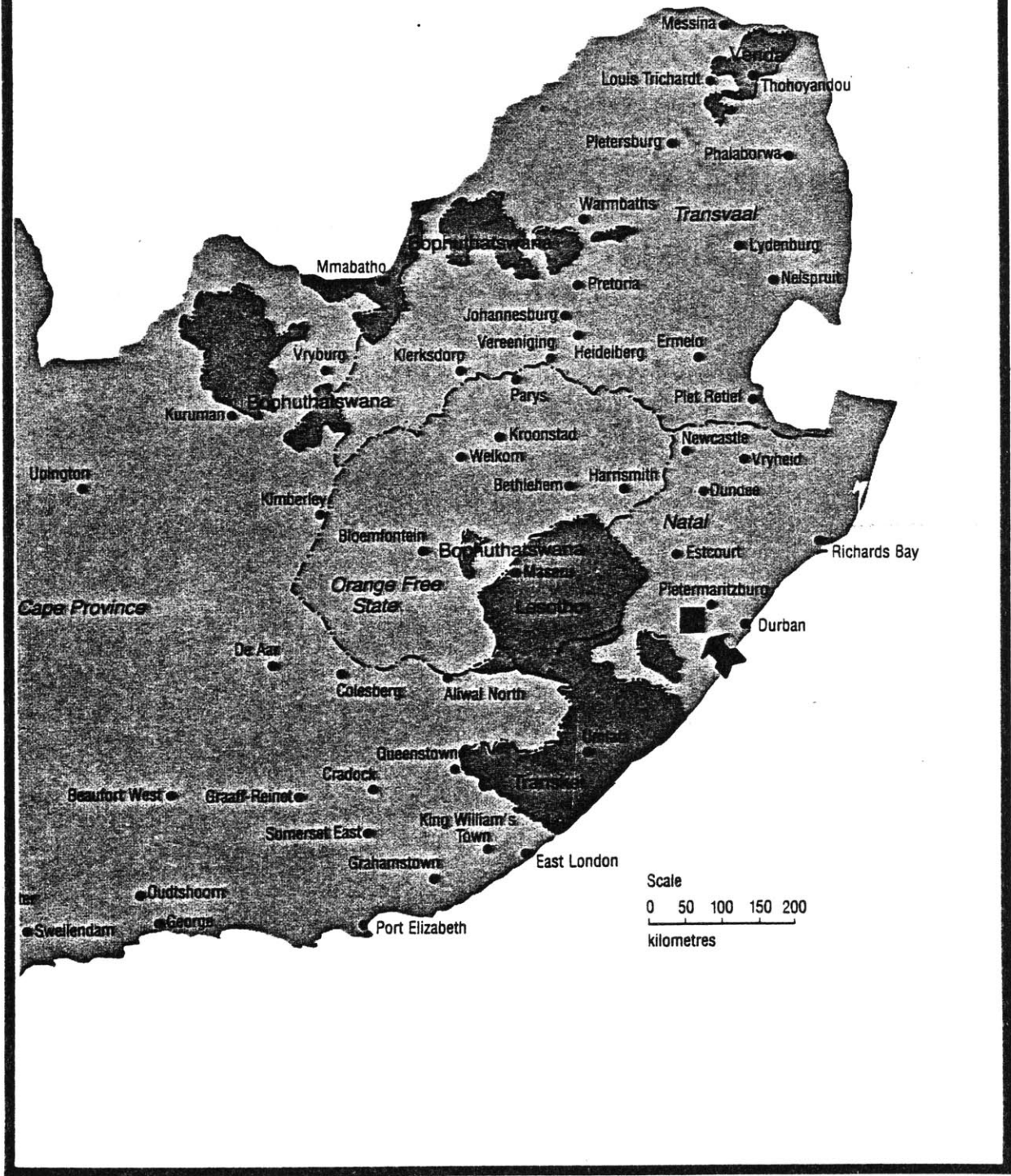
LOCATION MAP



KEY TO PROVINCES, REP. OF SOUTH AFRICA



REPUBLIC OF SOUTH AFRICA



A -- Selection of a Site for Project

Framework

In order to propose a concept and formulate a strategy for low income housing in a definite location in South Africa, the national and local urbanization trends, urbanization policies, programs and priorities in South Africa have been studied. The housing institutions, housing needs, supply and patterns of effective demands have been reviewed.

Existing low-income settlements--squatter areas and other non-conventional approaches to housing--have been reviewed.

On the basis of the above studies, few locations for the project have been selected. Then alternative locations in terms of: proximity to source of employment, compatibility with desirable patterns of urban development, relative off-site infrastructure, land ownership, and natural features of these locations have been evaluated and then preferred location for the project has been selected.

Location is part of the township of Wilgefontein properties that the Department of Co-Operation and Development, in New Germany, South Africa is planning to develop for low-cost housing. Therefore, the location is an actual and real location for which this project might become of some help.

1 -- Neighbourhood Area

The neighbourhood area always has a great effect on the future

of the project; therefore, some knowledge about the neighbourhood area is essential. The Neighbourhood Area in which the Subject Properties are situated is that area of land where important factors affecting land value such as the farming system or land use (which are governed by primary factors such as climate, soils, markets, roads, communications and amenities) and socio-ecological influences have a similar influence on the economic thinking of developers.

1.1 Location and Extent

The Neighbourhood Area in which the Subject Properties are situated is located in the Natal ecological zone known as the Coast Hinterland in the Edendale area of Pietermaritzburg. The extent of the Neighbourhood Area is approximately 8.5 km on its east/west axis and 7.0 km on its north/south axis. It is about 60 square kilometres in extent.

1.2 Climate

The Neighbourhood Area experiences hot summers with mild-to-cool winters. The mean annual rainfall is between 850 mm and 950 mm most of which falls during the spring and summer months. The mean annual temperatures are between 18° and 20°C. The climatic hazards include occasional droughts and light frost in the valleys.

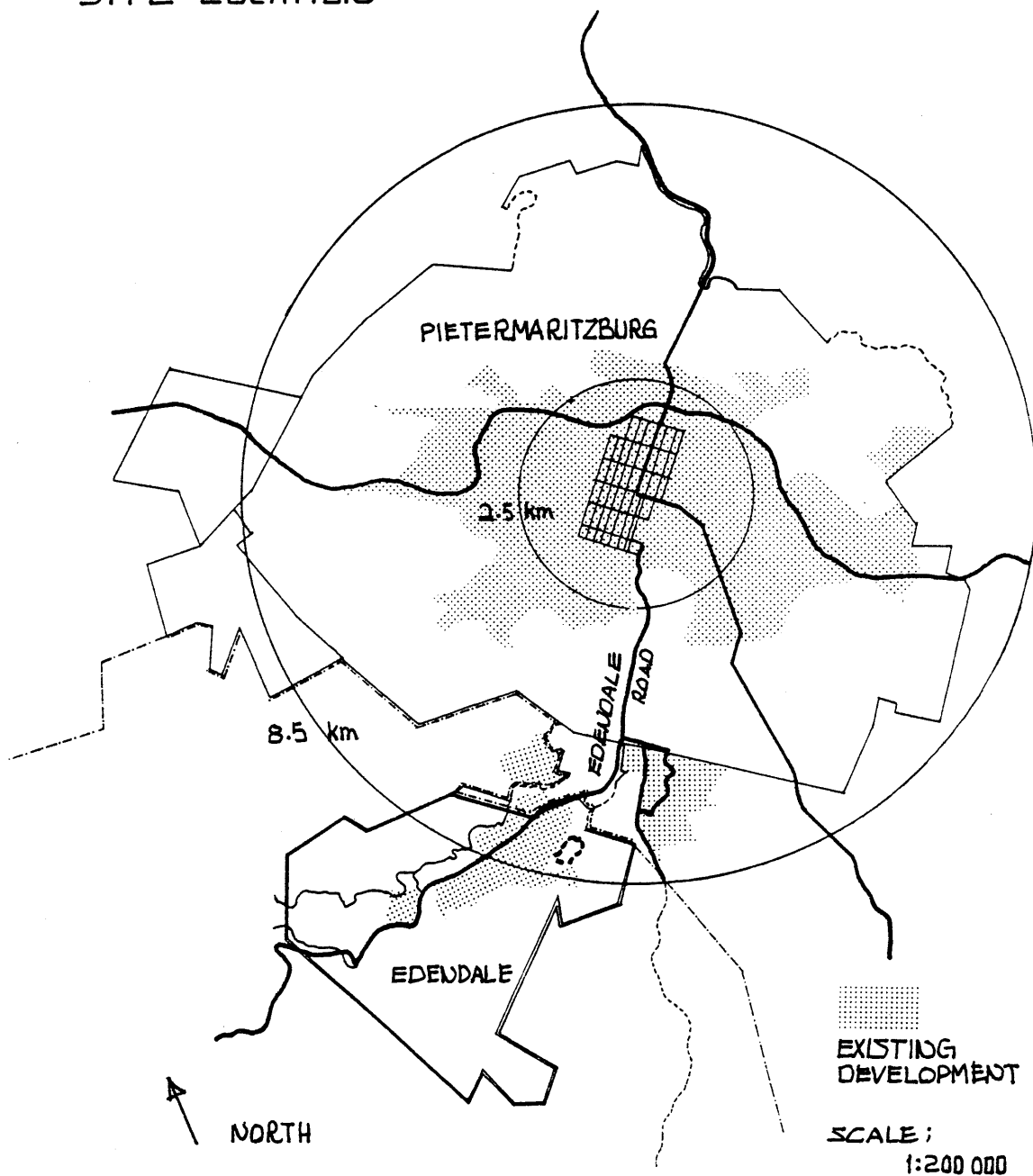
1.3 Topography and Altitude

The topography is mainly moderately steeply undulating with relatively flat valleys.

1.4 Soil and Vegetation

The soil is mainly shallow. The climax vegetation ranges

SITE LOCATION



from evergreen forest on the southern and eastern slopes to open woodland. The original settlement farms had land set aside as commonage for pasturage.

1.5 Water Resources

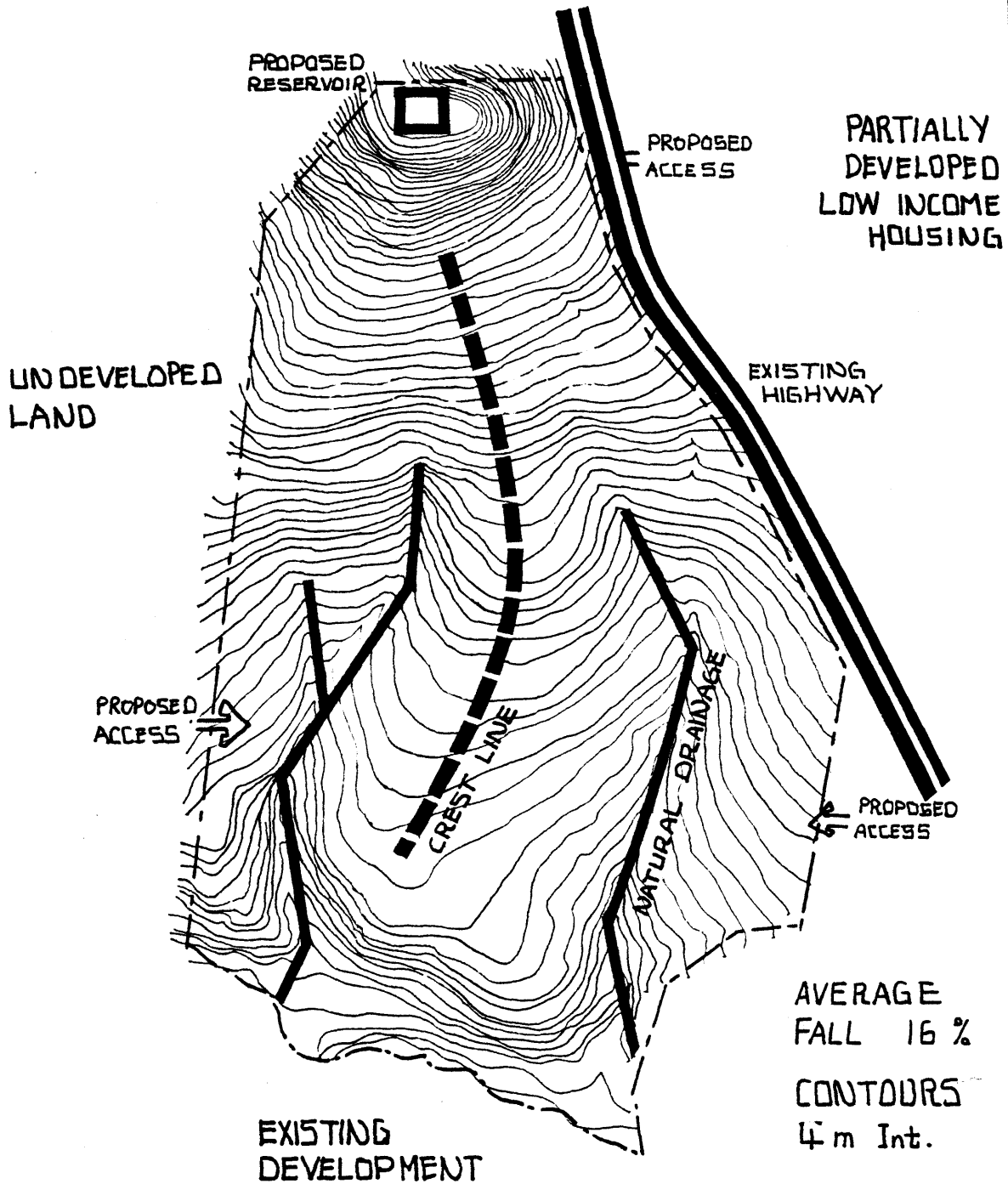
The Neighbourhood Area is mainly dependent on streams and springs for domestic and stock watering purposes. Some of the areas, which are under the jurisdiction of the Land and Development Services Board, have piped water with taps along some of the streets.

2 -- General Information of the Site

The proposed project will be situated on unit P at the Edendale Township. The area of land is 174,7 ha situated approximately 12 km towards the south of Pietermaritzburg. The land has an average gradient of 10% to 20% in a northeasterly direction with a large portion of the site overlooking Pietermaritzburg. The land is so situated that a large portion of the site does not overlook existing lower class development in the area, making the land ideal for a prestige and improved type of housing development.

In the area of Pietermaritzburg, the sites are well served by public transportation and are adjacent to the existing industrial corridors on the major highways. The project site borders the developing West and North Industrial Corridor. The site is well located in relation to off-site infrastructure, i.e., roads, water, sewage, and power mains. The terrain is sloping in various directions with maximum use being made of even slopes well suited to low-cost infrastructure development. Site characteristics are summarized in Table 1. Basic Data. All urban centres face sub-

SITE ANALYSIS



NORTH 

stantial deficits in housing, basic infrastructure and community facilities, especially among the urban poor.

The lie of the land and the type of soil found on the land makes the development of the Township feasible from an engineering point of view.

3 -- Urbanization in the Area

The Bureau of Market Research Report No. 73/79 states that in 1978 there were 219,023 migrants living in the Pietermaritzburg area and that the growth rate since 1970 was 3.06% per annum. With the growth rate of 3.4% (1970-78) per annum compared to a growth rate of 9.4% for the area during the period 1960-1970, it appears as if the influx of immigrants which took place during the 1960-1970 period has come to an end. It is in fact difficult to substantiate that this has in fact happened. Depending on the influx control as well as the provision of job opportunities in the area, an increase of the growth rate could become a reality for the area.

4 -- Shelter Problem in the Area

4.1 Research done by the Bureau during 1975 found that the average household size in the Pietermaritzburg area was 5.53. Based on this household size and the estimated population figures, the number of houses required in the Pietermaritzburg area until the turn of the century is estimated to be as shown under Tables 2 and 3. Table 2 is based on a growth rate of 3.06%, while Table 3 is based on a growth rate of 5% after 1980.

4.2 All of Pietermaritzburg's urban area faces substantial deficits in housing, basic infrastructure and community facilities,

TABLE 1
EDENDALE UNIT P
BASIC DATA

Area	174.7 hectares
Population	126 thousand
- Edendale	57 thousand
- in other adjacent urban areas	69 thousand
Population Growth Rate	3.06% p.a.
Annual Number New Households in Urban Areas (including migration) 1960-1970	10,000
Annual Urban Housing Production (public and private) (Republic of South Africa)	2,500 units

particularly among the urban lower-income peoples. Most homes in the area lack individual electricity, water supply and sewerage. The use of low quality materials and poor construction methods contribute to the rapid physical deterioration of the housing stock. The problem has been intensified by severe overcrowding, particularly in poorly serviced courtyard tenements where densities may reach 600 persons/ha.

4.3 Statistics show that from 1970-1970 public and private housing production in the area of Pietermaritzburg area averaged only 1000 units per year, during which time 73,555 new households were formed.

4.4 Public housing schemes have traditionally suffered from the lack of involvement and responsibility on the part of occupants for maintaining or improving their residential environment. A sense of community has been slow to develop in part because of the lack of community services and an integral community development program, being further complicated to date by the lack of security of tenure.

4.5 The research done by the Bureau of Market Research during 1975 found the income distribution in the Pietermaritzburg area to be distributed as per Table 5. Assuming an average increase of 15% per annum since 1975, the income groups would increase to those indicated under Table 6.

4.6 By 1982 1.48% of the population is expected to earn more than R10,000 per year and would qualify for a house in this area.

4.7 Using a growth rate of 2.06% on the housing requirements of 1982 as per Table 1, the market potential for property in the

TABLE 2
HOUSING REQUIREMENTS (3.06% growth)

DESCRIPTION	1980	1985	1990	1995	2000
Estimated population	170,831	198,615	230,918	268,475	312,141
Housing units required	30,891	35,915	41,757	48,548	56,445
Housing units required per 5-year interval	5,024	5,842	6,791	7,897	

TABLE 3
HOUSING REQUIREMENTS (5% growth)

DESCRIPTION	1980	1985	1990	1995	2000
Estimated population	170,831	218,026	278,260	355,137	453,252
Housing units required	30,891	39,426	50,318	64,220	81,962
Housing units required per 5-year interval	8,535	10,892	13,902	17,742	

TABLE 4
HOUSING LOANS

CATEGORY RANGE (R)	NUMBER OF LOANS	PERCENTAGE OF TOTAL NUMBER
0 - 5,000	43	66
5,000 - 10,000	3	5
10,000 - 20,000	9	14
20,000 and more	10	15

price range in excess of R20,000 would be 1.48% of 32,810 which equals 485 units.

4.8 Using the above-mentioned information and assumptions and the housing requirements of Table 2, the estimated market potential for property in the higher price range would be as per Table 6.

5 -- Private and Public Roles

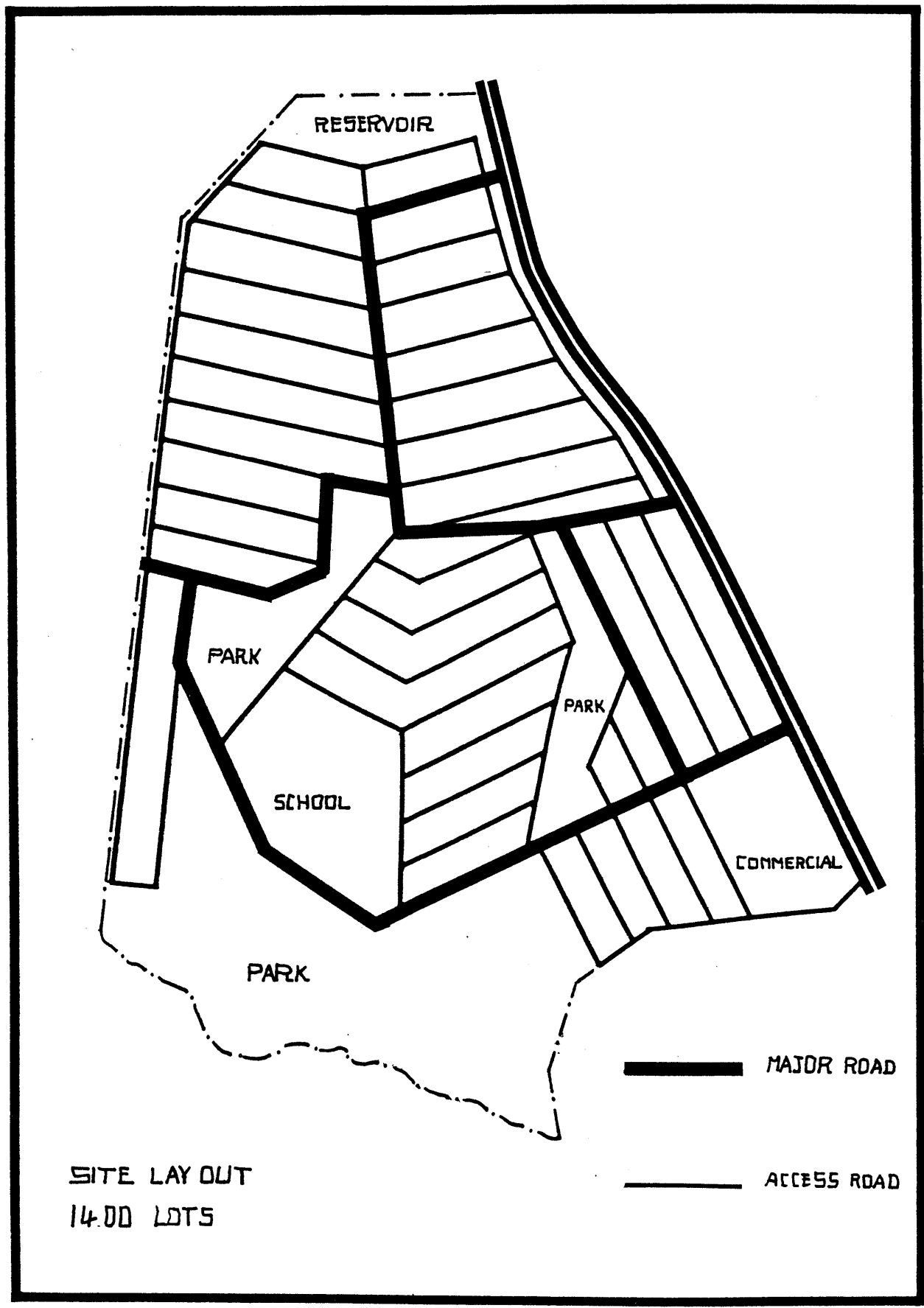
5.1 In June 1980, government promulgated legislation making it possible for low-income families to obtain 99-year leasehold tenure on land. The parcel of land referred to in this development is the only parcel of land on which freehold title will be obtainable by these households.

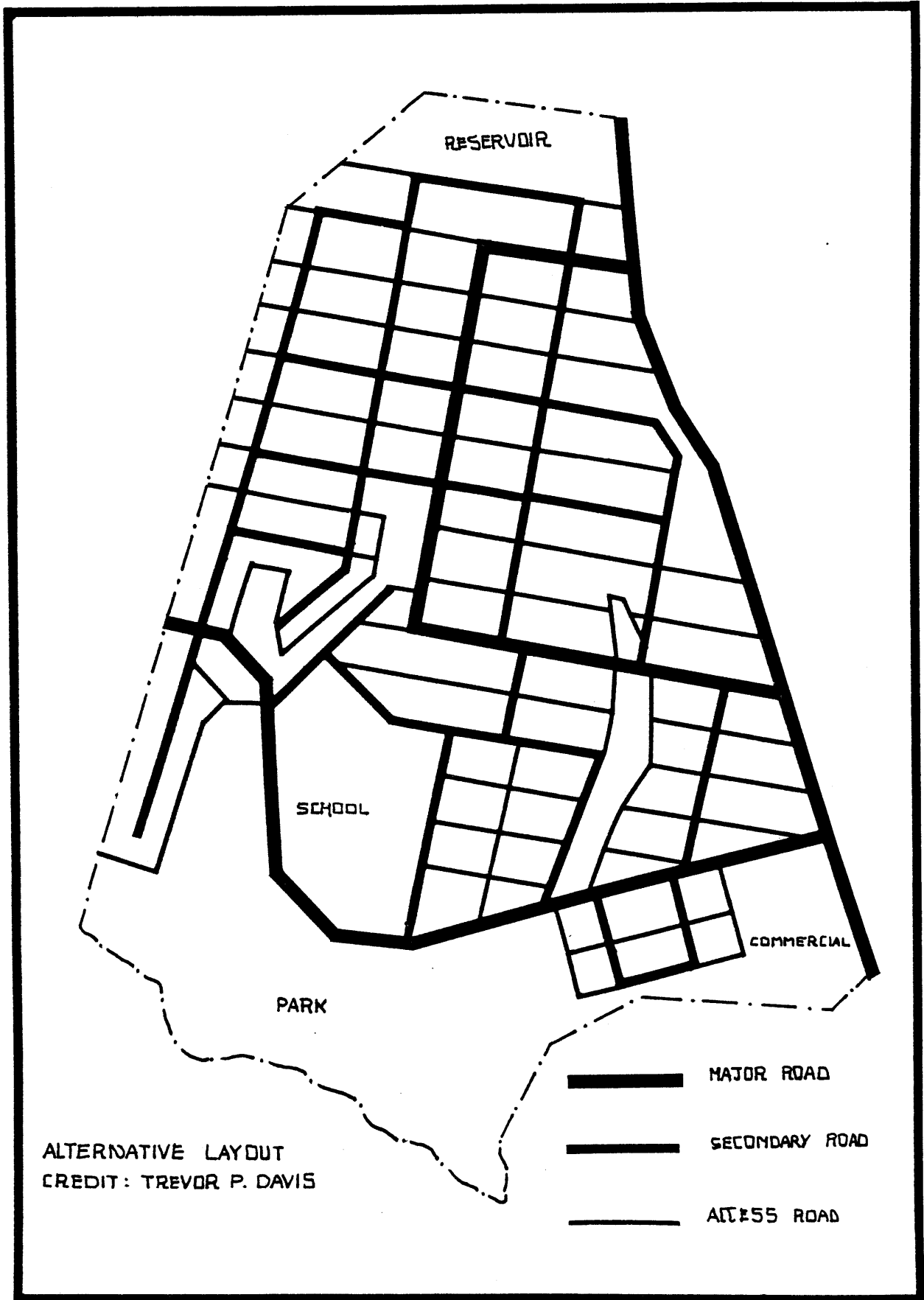
5.2 This site is unique in its Land Tenure and its use of a private agency to execute a large-scale development program. The project should be highly replicable for future projects which might be executed by other agencies.

B -- Site Layout:

The site layout has been prepared after due consideration and careful analysis of slopes, natural drainage patterns, proportions of private and public uses, circulation plan, vehicular and pedestrian.

Lot sizes are decided on the basis of functional requirements, local tradition and preferences and minimization of infrastructure frontage. Lots are ranged from 300 square meters to 700 square meters yielding sites small enough to achieve economies of scale, but not so small as to concentrate too many low-income families in a given area.





A grid of pedestrian walkways provides access to each site and contains sanitary sewage pipes and storm water drainage channels. The pathway system links each lot with other lots and community facilities. Vehicular crossings of pedestrian walkways is minimized. Larger commercial and market areas are at site entry point or bus stops, providing easy access and social links with adjacent residential areas and communities.

All lots are serviced to the same level of infrastructure, with individual water, sewage and electricity connections. Street lighting is installed along major access roads and at main circulation points.

C -- Site Planning

Among the housing resources, consisting of land, labour, material and human enterprise as well as money, the land and money, in South Africa, are likely to be in short supply. Therefore, the maximum use must be made of the other resources on one hand and the land and the money should be used in its most economical way, on the other hand.

In the recently "regularized" settlement in South Africa there is a wide density range which goes as low as 3.9 persons per hectare and up to 47 persons per hectare.

If a standard plot of 500 m² is adopted with an average family size of 6.3 persons, then it is possible to house 75 persons per hectare which is double the present highest figure.

In the proposed site plan, lots have been designed with sizes ranging from 300 m² to 650 m², which would result in a density of 60 persons per hectare.

TABLE 5
DISTRIBUTION OF EARNER'S INCOME

ANNUAL INCOME GROUP	PERCENTAGE OF POPULATION
0,01 - 999,99	32.28
1,000,00 - 1,999,99	46.29
2,000,00 - 2,999,99	16.34
3,000,00 - 3,999,99	3.61
4,000 - 4,999,99	0.21
5,000 +	1.27
	100.00

TABLE 6
ESTIMATED INCOME DISTRIBUTION

INCOME GROUP 1975	PERCENTAGE OF POPULATION	INCOME GROUP 1982	INCOME GROUP 1983	INCOME GROUP 1984
0,01 - 999	32.28	0 - 2660	0 - 3058	0 - 3517
1000 - 1999	46.29	2661 - 5320	3059 - 6118	3518 - 7035
2000 - 2999	16.34	5321 - 7980	6119 - 9177	7036 -10553
3000 - 3999	3.61	7981 -10640	9178 -12236	10554 -14071
4000 - 4999	0.21	10641 - 1330	12237 -15295	14072 -17589
5000 +	1.27	13301 +	15295 +	17590 +

TABLE 7
ESTIMATED MARKET POTENTIAL IN THE
HIGHER PRICE RANGE

DESCRIPTION	1985	1990	1995	2000
Housing units required	35,915	41,757	48,548	56,445
Higher price potential	531	618	718	835

It should be kept in mind that as the economy grows, the grownup children of the family seek independence and the average family size will come down from 6.3 to 4 or 5, and the density will decrease.

D -- Support Design Objectives. (Edendale)

1 - This approach is aimed at rationalizing design, production and construction of houses in ways which combine the cost benefits of standardization (product and operation) and user participation in the above-mentioned process.

2 - To achieve this, the system and components of the house are grouped into categories--Support and Fill. The system is designed to provide maximum flexibility to the dweller who participates according to his capacity and priority. For this reason the Support is divided into components which can be combined in a simple linear way to produce a more complete Supports. The Infill production is left to the dweller himself, or formal and informal sector.

3 - This distribution, also, identifies two corresponding streams of production, conventional and industrialized. This idea enables the attributes of both systems to be applied in one project with significant results.

4 - The design package proposed in this part can be used by private developers as a guideline of possible provision and design alternatives.

E -- Support System

The components are designed to accommodate a variety of house size and plans of different characteristics. It is organized so

that the decisions of how much of house is Supports, and how much Infill is the dweller's decision. It enables easy and incremental changes to be made over time to dwellings, to meet changing needs, standards and aspirations. These components and materials (platform, wet cell, shower, walls, roof, services, etc.) are designed so that they can be highly prefabricated. They are, however, completely independent from the Infill.

F -- Infill

Since the Support can vary from an empty lot with services to a fully developed finished house, the Infill variety could be enormous and this could create a highly encouraging atmosphere for formal and informal sector to participate in production of Infill packages.

G -- Design Methodology

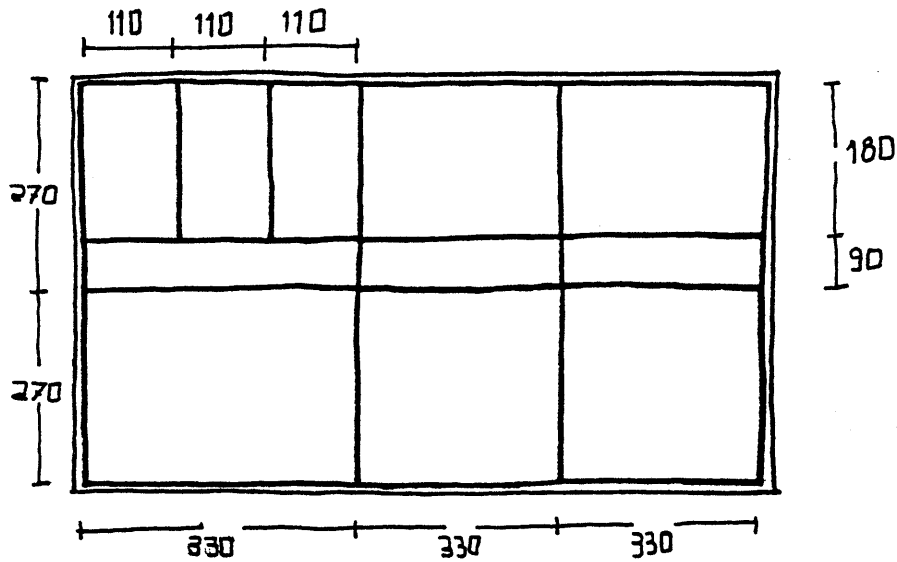
The design methodology forms the third and instrumental part of the scheme, and enables Support and Infill components to be designed and produced independently.

This part is symbolized so that developers or dwellers can draw and evaluate house plans in the most simple and direct fashion. The intention is to reduce confusion and management of coordination between decisions and elements.

Proposed Building Codes

One of the integrated parts of this study is the revision of building specifications. The building specifications which have always been prepared by the governments with good intentions to prevent construction of unsafe and unhealthy houses usually tends to become an obstacle in low-cost housing.

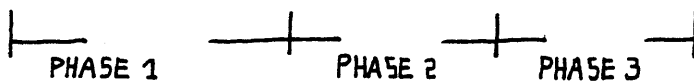
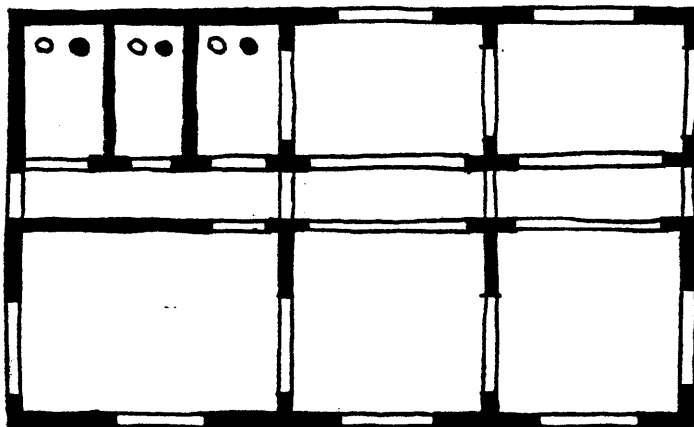
SUPPORTS DEVELOPMENT



SECTOR COMBINATION AND MARGINS

DIMENTIDNS IN CENTIMETERS

WET CELLS

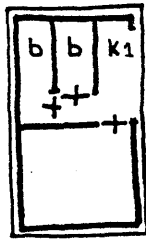
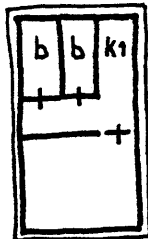
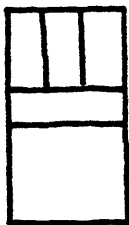


STRUCTURAL ELEMENTS IN DIRECTION OF EXPANSION

- WATER CONNECTION
- SEWAGE CONNECTION

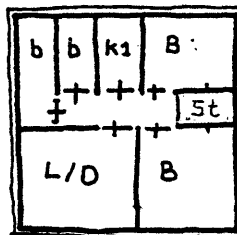
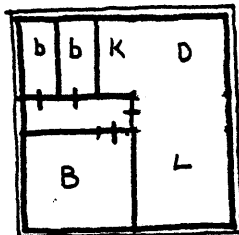
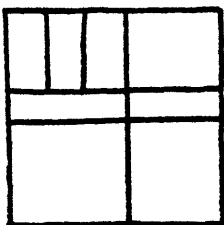
PLAN VARIATIONS

PHASE 1

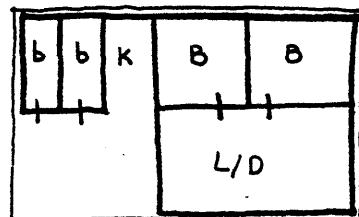
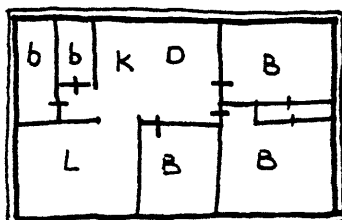
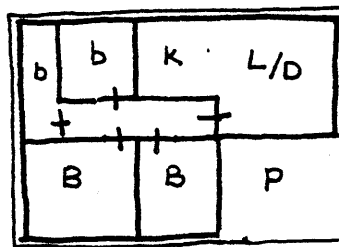
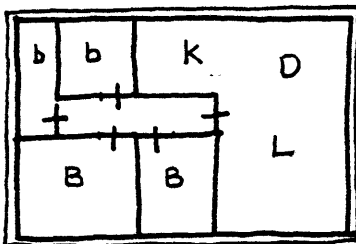
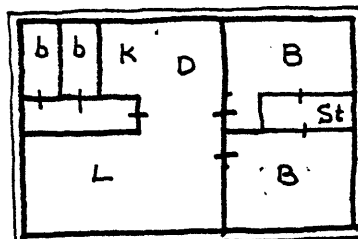
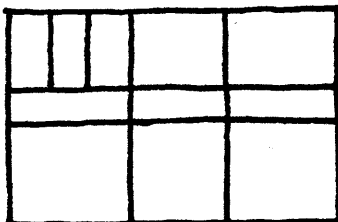



- L = LIVING
- B = BEDROOM
- K = KITCHEN
- D = DINNING
- b = BATH
- P = PORCH
- St = STORAGE

PHASE 2



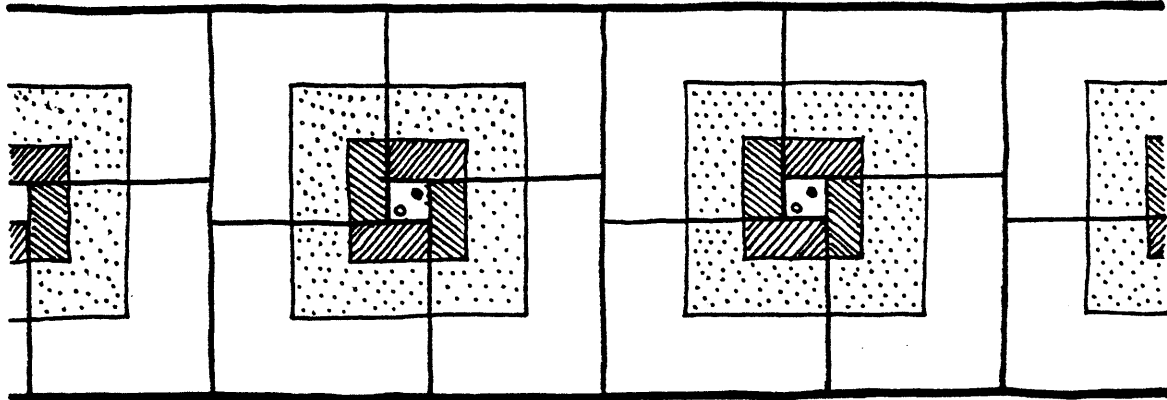
PHASE 3



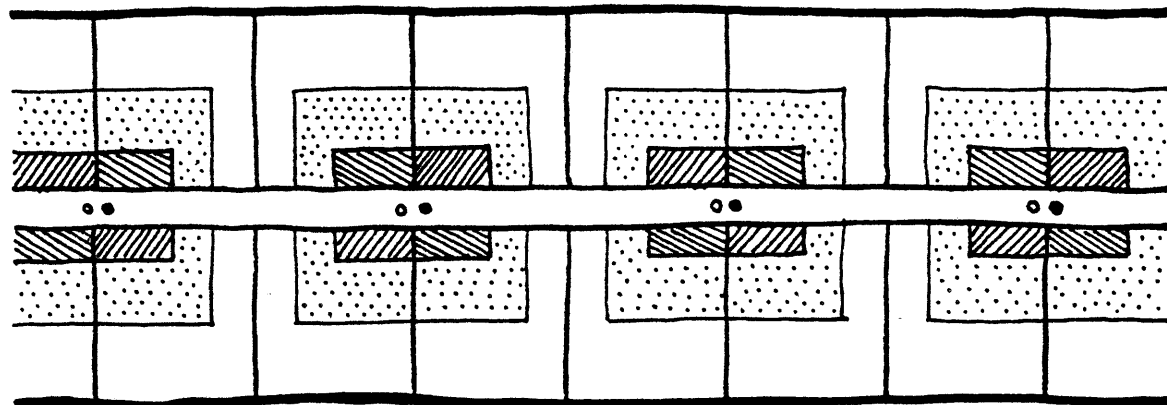
 WET CELLS  PLATFORM

BLOCK MODELS

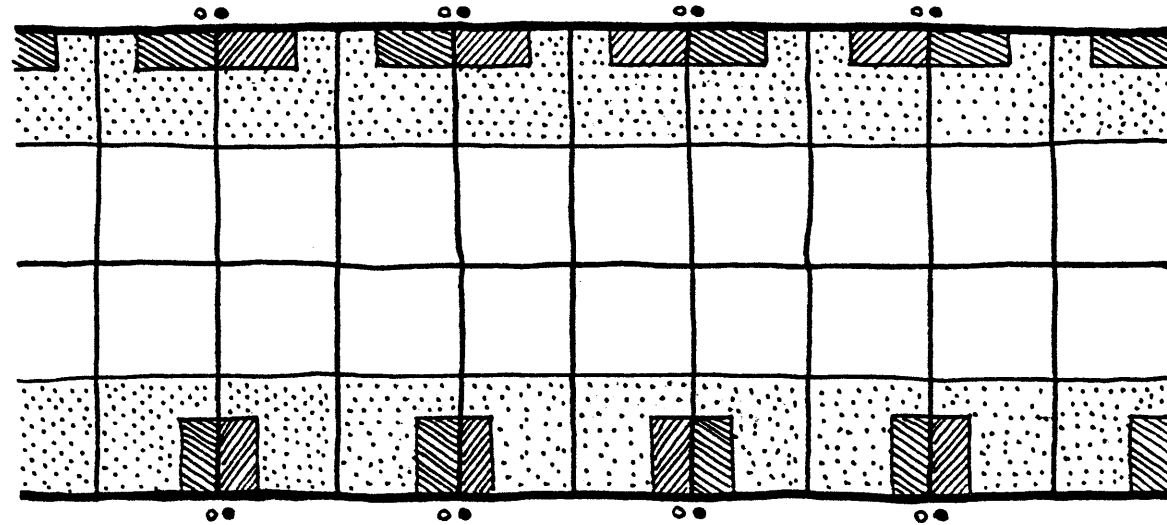
MODEL 1 ~ CENTRAL SERVICES CORE



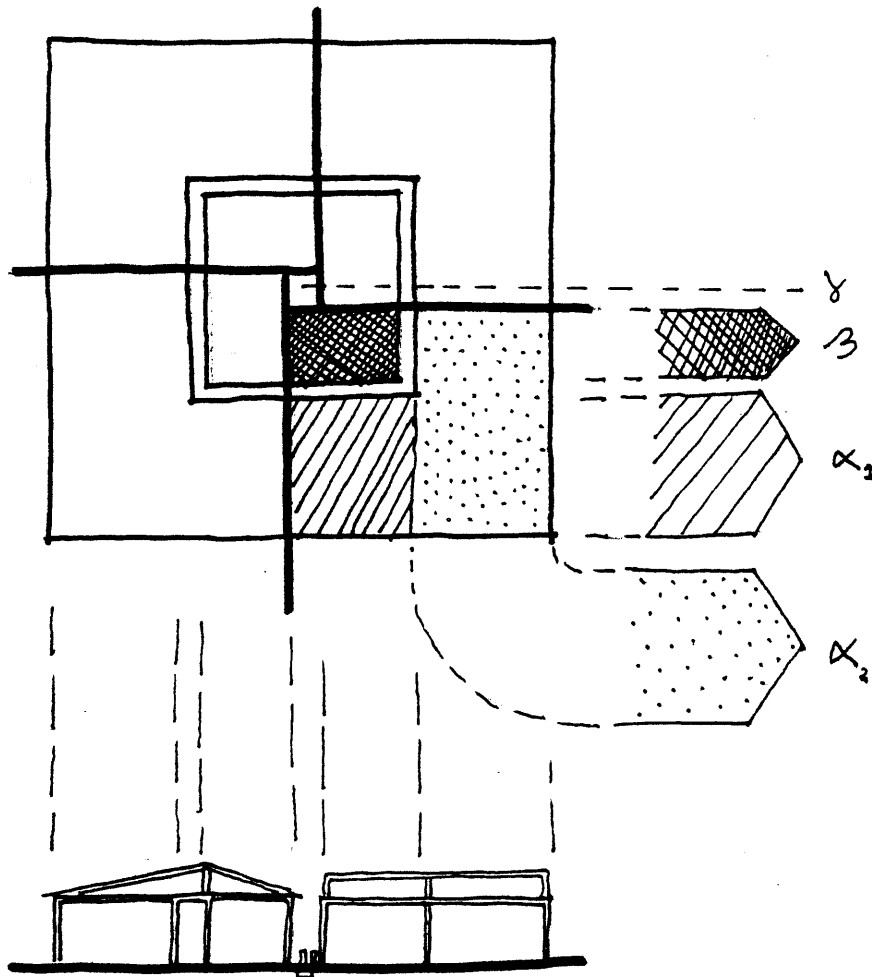
MODEL 2 ~ SERVICES ALLEY



MODEL 3 ~ SERVICES FROM PUBLIC STREET



SUPPORT MODEL 1



γ - COMMON AREA FOR CONNECTION TO WATER AND SEWAGE

β - ZONE FOR ALL WET FUNCTIONS - KITCHEN, WC, SHOWER

α_1 - INITIAL CORE ROOM

α_2 - EXPANSION ZONE

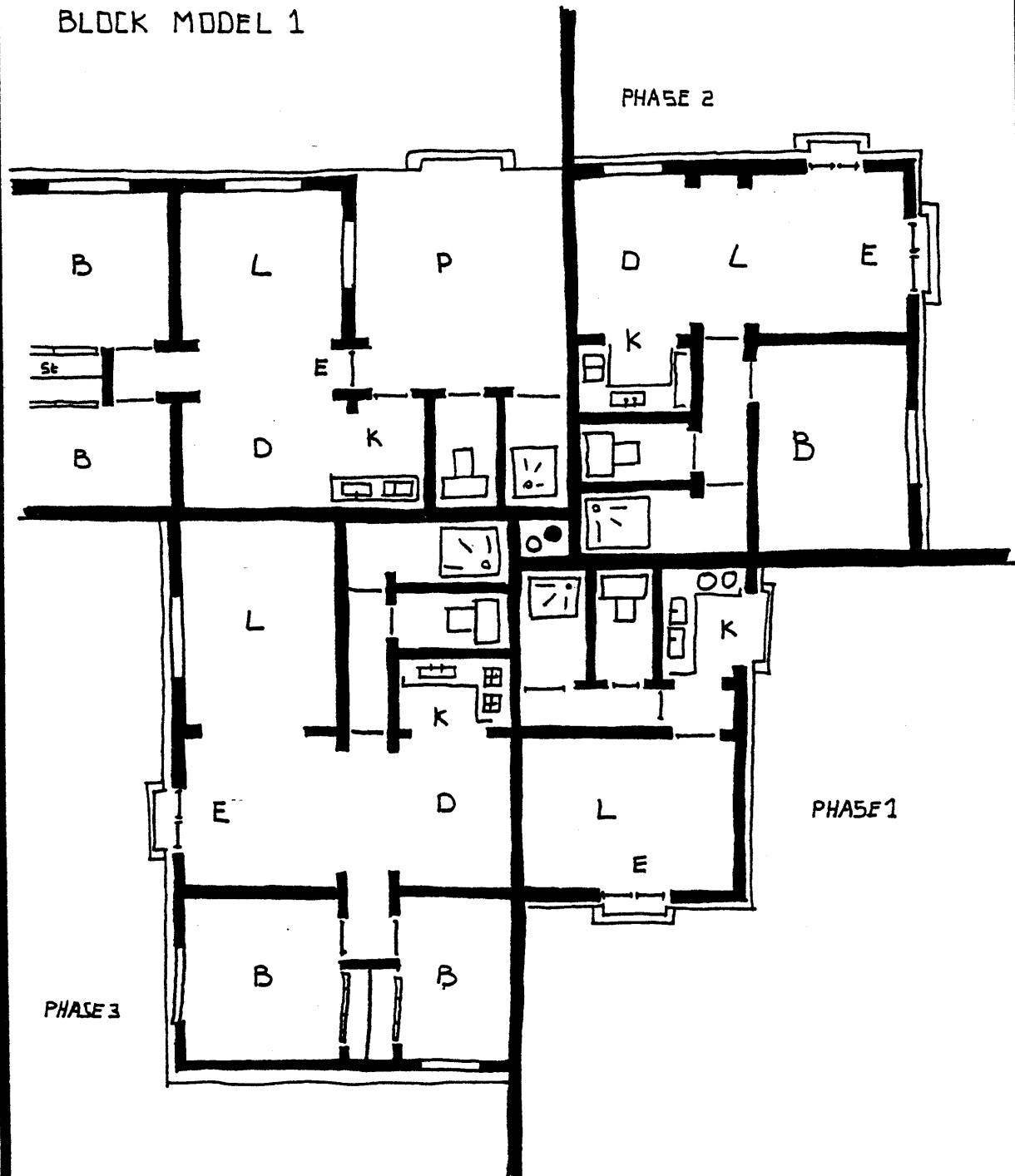
— PARTY WALL BETWEEN LOTS

$(\beta, \alpha_1, \alpha_2)$ ZONES TO BE BUILT ON A 50^{mm} PLATFORM

(β, α_1) ZONES TO BE ROOFED

SUPPORT PLAN

A PLAN POSSIBILITY USING
BLOCK MODEL 1



As an example, the building specification in South Africa calls for external walls of 220 mm in concrete bricks to SABS approval, doorframes with standard pressed steel of 813 x 2032 mm in size, etc., which would make building of low-cost housing impossible (Appendix III). Worse is the minimum requirements for the granting of building loans in which the standard of building is so high that it makes the receiving of loans by low-cost builders impossible (Appendix IV).

The standard proposed in this project is only limited to the standard needed for provision of utilities, and infills. Utilities usually are provided by the public sector; therefore, the private dweller has nothing to do with it. Infills are limited to platform, kitchen, washroom, some supporting walls, and roof. All of them should be constructed under the supervision of an architect, therefore minimum guidance would suffice. The rest of the house is built by the occupier with little interference from outsiders. Therefore, the required standard is minimal and could be grouped as follows:

Specification and Minimum Standards

STRUCTURE

Footings and Foundation Walling

1. Every house should build a platform to act as footings and foundation.
2. Alternative designs of platform are available from the Architect and must be built by the dweller or contractor under the supervision of the Architect.

3. The height of the platform should not be less than 35 cm.
4. Platform shall be constructed of stones or cement blocks, as wall of the platform and filled with stone or gravel.
5. The walls of platform shall be built with cement mortar.

Floor

6. All surfaces of the platform, whether rooms are built on it or not, should be covered by 40 mm cement or 50 mm clay mud and straw.

Structure

7. External walls: 220 mm. in concrete bricks, 440 mm in baked clay bricks or 400 mm sun-dried bricks.
8. Corner L walls should be built continuously, not in two portions.
9. Internal walls 220 mm concrete bricks, backed clay or sun-dried bricks.
10. Mortar for concrete bricks shall be cement and for baked and sun-dried bricks could be clay mud.

Roof and Ceiling

11. Redland or equal and approved cement roof tiles with Daksed underlay to all houses; on approved timber roof trusses, asbestos cement barge boards and fascias.
12. Alternative designs and forms of the roof will be available for dwellers which could be built instead of item 11 above with the approval and under the supervision of the architect.

Fittings

13. One sink, stainless or concrete; one bath with consultation of architect; one china bowl w.c. with plastic cistern.

Services

14. Electrical and plumbing work, to be built on the wall or into walls, should be done by certified electrician and plumber under the supervision of architect.

Finishing

15. External walls, internal walls and ceilings, could be coated cement, chalk plaster, washable P.V.A. or one coat of clay mud and straw coated with liquid lime.

CHAPTER IV

A -- Summary

B -- Evaluation and Recommendations

CHAPTER IV

A. Summary

In the past decade, there has been a substantial change in emphasis in development planning in the Third World countries, and that in no sector of the economy is this more marked than housing.

Conventional housing programs for low-income families could not keep pace with urban population increase, boosted to historically unprecedented rates, by rural to urban migration. Moreover, what housing was provided, was too costly for the low-income group.

Low-income households tend to congregate in squatter settlements where they provide their own shelter. Although such shelter never meets official standards, it is often substantial. It suits the pocket of the poor and it can be improved as and when possible by changes in family size and financial circumstances of the occupier.

The Author in this study has tried to use this natural tendency of the low-income people to build their own house in solving the problem of housing of low-income groups by applying appropriate concepts and supervising the implementation.

The summary of the study, therefore, is classified as follows:

I. In the first chapter the problem has been explained as to be the government's approach of providing fully finished homes with high standards. Experience in all parts of the world has shown that by this approach neither the required number of houses could

be built nor the cost is affordable by any low-income group. The objective of the study, therefore, was to propose a new strategy which would permit and enable the people to build their own houses, by providing to them, the land, services, and guidance.

II. In Chapter II the philosophy of the strategy is explained. The concept is a combination of two well-known concepts: "Sites-and-Services" and "Support," a summary of both of which has been presented in this chapter. The "Strategy Outline" is a method of combining these two concepts.

III. In Chapter III, which is the main body of the study, the strategy has been proposed for a site selected in South Africa. This is a real site which has been selected by the government for development of alternative low-income housing schemes. Then it is proposed that the site be subdivided into small lots of 300 to 600 m². The roads to be rather narrow - 9 m and 12 m wide (including sidewalk). Full services, including water, sewerage and electricity will be provided. In addition to the land and services, some "supports" also will be made available to the dweller. "Support" in this strategy consists of design, guidance, supervision (and in some cases, cheap stone or concrete block and cement mortar) to dweller to enable him to build a platform. This platform, which replaces foundation, prevents the house from humidity and water damage and gives flexibility to the dweller to build or modify his building when and as he may wish. The other support component that is essential is the roof, which either is prefabricated and/or material and assistance is given to the dweller as an

incentive. Other supports, such as bath, w.c. and kitchen, also will be made available to dwellers.

Two important elements of this proposal are (a) a very practical minimum standard and code of construction, and (b) availability of local builders to help, guide and supervise the work of dwellers.

B. Evaluation and Recommendation

Housing and home ownership is a dynamic and constantly involving process and no one should believe in a final solution to the design, construction or financing of low-income dwellings.

The ingenuity of men will ensure that such an unhappy statement will never exist.

To ease the shortage of housing and to find a solution to problems of squatting and slum areas, two lines of work are defined.

- 1 - Effective control of the creation of new squatter settlements and upgrading of existing squatter camps.
- 2 - Provision of new strategies, that enable and ease the natural process of housing but do not create new slums.

In South Africa there had been much resistance on the part of Government to any housing scheme other than that of fully built townships. But in the last year or so, more encouraging signs have appeared. In this context before any new strategy or scheme is to be introduced it is recommended that some major implementation obstacles have to be removed. These obstacles are explained under headings as follows:

- 1 - Legislative: Adjustments to the legislation of 1976, 1977 and

1980 which makes provision for a general prohibition on squatting.

- 2 - Standards: The existing standards are far too high for the realities of housing in South Africa. Standards translate directly to cost. Only by rationalization and modernization of aspirations, costs can be contained. This is a matter of deciding what is necessary. Some of these decisions, for example, foresee cost savings in road surface widths and materials, the use of PVC pipes for underground services, the cutting down of electricity cable size, etc.

Also, changes in standard sizes of lots and dwellings can bring about a substantial reduction in service costs. In short, the standards accepted must be the absolute minimum so that available funds serve the greatest number of people.

- 3 - Affordability: For one group of people (those responsible for the provision of housing) to suggest to another group (the ultimate user of that housing) what they can afford to spend on their dwellings may be regarded as presumptuous and can give rise to considerable resentment.

Every household should have the right to allocate its budget in whatever way it chooses.

Families may, for example, choose to live in slum conditions because it releases money for other types of expenditures which have higher priority, such as education or health.

Turner¹¹ suggests that in the Third World countries the physical quality of ones shelter has a very low priority for the very poor. This view, however, does not support the existence of slums. It merely points to an important aspect of housing which lacks much needed research.

- 4 - Variety: As needs and aspirations vary from one area to another, and from one family to another, any low-income housing policy should contain a number of different alternatives. By doing so it would widen the range of choices available and thereby increase public welfare.
- 5 - Financing: Another obstacle is financing. Most of the low-income group are not able to pay a regular monthly payment because their income is different from month to month and even in some months they may have no income. New approach in financing, therefore, is needed.
- 6 - Contractor: In the context of South Africa, a few major contractors control the housing industry. These contractors expect and prefer to handle conventional schemes, which provide fully finished houses.

They usually find it hard to adopt new building methods.

- 7 - Developers: Because of the unprecedented history of self-help and Site and Service type development, many private ventures are skeptical of the feasibility of such schemes.
- 8 - Government: One of the government's strongest objections to the above-mentioned strategies is the image of helping creation of slums. Also the lack of previous examples makes it harder to justify such actions.

Footnotes

Footnotes

- ¹Sites and Services: A World Bank Paper, April, 1974
- ²Housing -- BEHUISING. Nov.-Dec. 1980. Published in Johannesburg, South Africa.
- ³Housing in South Africa: Official Publication of the South African Institute of Housing Management, November, 1980.
- ⁴Article in STAR 9/4/81: Plea for cheaper home building (Appendix 1).
- ⁵Article in Journal News, April 9, 1981: Help end housing shortages. (Appendix II).
- ⁶Dr. Emile Jammie: Avoid Drastic Alternatives. Paper to UNESCO, November, 1980.
- ⁷R. L. Stevenson; President of the building industry, South Africa.
- ⁸A. V. Rabie, Director of Community Services of the West Rand Administration Board. Paper submitted to South Africa Foundation Seminar, 1981.
- ⁹D. J. Willers, Editor, Aspect of Black Housing, 1981. pp. 10+
- ¹⁰Prof. Wallace Van Zyl, Aspect of Black Housing Policy with special reference to "Infills" Housing in Bosothe Qwaqwa. Publication of the South Africa Foundation, 1981.
- ¹¹John F. C. Turner, "Freedom to build." New York: MacMillan Co. 1972.

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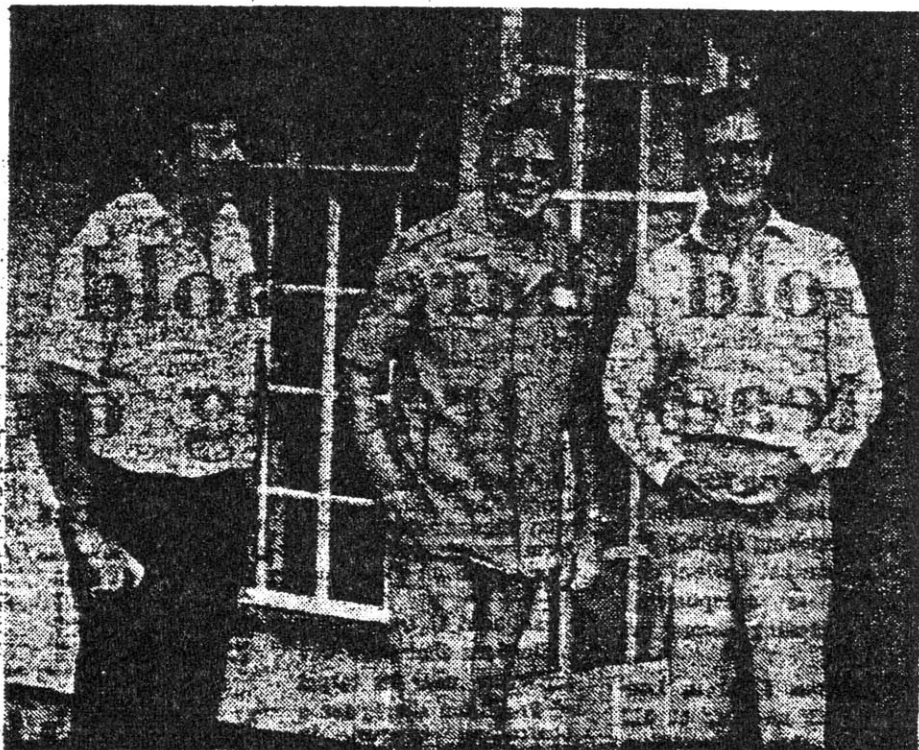
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APPENDICES:

- 1 -- Newspaper Clipping
(Plea for cheaper Home building)
- 2 -- Newspaper Clipping
(Help end housing shortage)
- 3 -- Specification
- 4 -- Minimum requirements for the granting of
building loans



At the entrance to the Rhinosield game lodge at Sabiepark are (from left) Mr William Bester of Bester Homes, Dr Rudolph Fekeme, vice chairman and managing director of Gypsum Industries, and Mr Tim Hart, director of the Association of Building Societies.

Plea for cheaper home building

Why are so many local authorities taking so long to accept new systems of cheaper home construction?

That's the question Mr Tim Hart, director of the Association of Building Societies, asked at the recent opening of the Gypsum Rhinosield Game Lodge at Sabiepark near the Kruger National Park.

Sabiepark is the feature project of Gypsum Industries, developers of the Rhinosield building system.

Mr Hart said: "We have here a method of house

building

construction which is not intended to replace bricks, but which is a most welcome addition to methods of constructing homes."

LESS TIME

Pointing out that the Rhinosield home could be completed in a shorter time than the conventional home, Mr Hart said this was not the major attraction.

"What is more important is that whatever sav-

ings can be effected arising from reduced costs of materials and also from the shorter construction time, could be put into the houses in the form of additional luxuries and higher standards of finish," said Mr Hart.

Looking at the acceptability factor, Mr Hart said that here was a housing system which could be used to upgrade the standard for ordinary housing at comparable cost to other housing, and yet "it is a disappointment to see some local authorities taking such a long time to accept the system."

'Help end housing shortage'

Own Correspondent

The National Housing Commission has called on housing experts to help overcome the country's critical shortage of low-cost accommodation.

They have been asked to send memoranda to or give evidence before a

committee especially appointed for the task by the Minister of Community Development, Mr Kotze.

The special committee is headed by Professor Tobie Louw, chairman of the National Housing Commission, and its members represent the Advi-

sory Committee on Housing Matters, the National Building Research Institute, the Urban Foundation, the United Municipal Executive and experts from State departments.

Mr Kotze said this week that the committee would investigate:

- The desirability and possibility of providing housing for the lower income groups on a large scale, also by way of unconventional building methods.

- The supplementary role which could be played by alternative me-

thods in the provision of housing for lower income families.

Mr Kotze said his department, which took over black housing only two years ago, was faced with a mammoth task of providing 160 000 living units for blacks staying outside the national states.

SCHEMES

Site and service projects and limited squatting schemes were some of the suggestions which had been made in recent times to overcome the low-cost housing problem.

Mr Kotze said he was sure the problem would be overcome, just as the provision of coloured housing had been largely overcome.

In just five years the department had constructed 155 602 living units for all groups, which gave accommodation to 310 000 people.

Appendix 3

S P E C I F I C A T I O N

(to be read in conjunction with standard minimum building society specifications)

STRUCTUREFootings and Foundation Walling

1. The contractor is to inspect the site and make allowances for adverse conditions.
2. Footings to 220 mm load bearing external walls to be as per drawings and slab thickening 300 x 150 overall for non-load bearing interior walls.
3. Foundation walls, general, clay brickwork. This item is not subject to remeasurement.

Floor

4. 75 mm concrete slab on 250 micron damp proof membrane on compacted filling.
- 4a. All surface bed areas to be screeded or powerfloated.
- 4b. Garage surface bed to be powerfloated.

SUPERSTRUCTURE

5. External walls 220 mm in concrete bricks to SABS approval. Grade 8.
6. Internal walls 115 mm ash bricks or 108 mm ash blocks. Samples to be provided on site for inspection and approval by Architect. Internal walls tied to external walls every 3 courses with reinforcement where internal walls & ash blocks.
7. One airbrick to be provided above each window and internally above fanless doors except bathroom and toilet which are to get 2 airbricks above the windows.
8. Reinforced brick lintels or U blocks over openings are required, or prestressed concrete lintels.
9. Samples of Mortar to be provided on site for testing and approval by Architect.

ROOF AND CEILING

9. Redland or equal and approved cement roof tiles with Dakseel underlay to all houses, on approved timber roof trusses, Asbestos Cement barge boards and fascias. No gutters or downpipes. No Dakseel required where manufacturers minimum pitch requirements are met. Refer 5.2.7. Dakseel equivalent approved underlay where used.
10. Ceilings Herculite, Ceillite Board, on brandering.
11. Rafters where exposed externally to be wrot and painted with two coats creosote or stained and varnished.
12. 600 x 600 Trapdoor in ceiling.

COMPONENTSWindows

13. Windows to be standard type with standard decorative type burglar proofing to architects approval and glazed with 3 mm clear glass for panes smaller than 0,5 m² and 4 mm clear glass for panes greater than 0,5m² (obscure glass to be used in the bathroom and W.C. windows). Standard N Window Frame Range to be used.

Doors and Doorframes

14. All doorframes are to be standard pressed steel to accommodate doors 813 x 2032 in size except the bathroom and W.C. doors which are to be 762 x 2032 mm.

Doors are all to be hollow core flush type, Masonite Exposed Edges except the front and back door which are to be Framed Ledged and Braced (Meranti), the front door to be flush panel on semi solid core, internally.

Fittings

15. 1 350 x 520 mm Stainless steel sink unit with single bowl on steel cabinet with 2 doors.
16. One No. C.P. towel rail (900 mm)
17. One No. white glazed soap holder to bathroom and kitchen
18. Bath - 1,800 x 750 standard Plexicor - colour as requested.
19. Handbasin - 600 x 400 Plexicor - colour as requested.
20. W.C. - Vitreous china bowl with plastic cistern - white or coloured.
21. C.P. paper holder.

GENERAL

22. Steel pelmets to be fitted above all windows.
23. Rubber doorstops to be provided where necessary.

FINISHESSuperstructureExternal

→ EXTERNAL BRICK TOP FINISH

24. Semi face with ruled joints where applicable on drawings.
25. All plinth work in semi face brickwork.

Internal

26. All rooms including bathroom to get one coat cement plaster followed by a filler coat and then one coat washable P.V.A.
27. 2nd Grade white glazed tiles - 3 course splash-back, basin and sink and side of bath.

Page Three

Floor

- 28. 1,6 mm Vinyl Asbestos, floor tiles, throughout, except as described in 30 below
- 29. 32 mm Meranti quadrant as skirting.
- 30. Ozaline carpeting to main bedroom, lounge and diningroom

Ceiling

- 31. Ceilings to receive one coat sealer, then 2 coats P.V.A., the metal jointing strips and nail head to be primed and painted one coat flat oil paint.
- 32. Quadrant beading to be stained and varnished.
- 33. Knotty pine ceilings to receive 2 coats clear varnish.

Windows and Doors

- 34. Steel windows, door frames, doors, pelmets and steel columns to be painted with one undercoat and one coat exterior quality enamel paint.
- 35. Flush doors to be painted with egg shell enamel and have 2 lever mortice locksets.
- 36. Front door to receive Rhondo or equal and approved lockset.

SERVICESElectrical

- 37. Electrical conduits, switch boxes and switch socket outlets to be built into walls.
- 38. 150 Litre horizontal geyser fitted with pressure reducing valve, wall mounted above kitchen sink or in roof space where possible.
- 39. Light Fittings - P.C. R100,00
Power Points - each room to get one point, the kitchen to get two points as well as a stove outlet.
- 40. Wiring from distribution board, including wiring from meterbox located on an external wall of house at a point closest to the mains supply. Contractor to allow for everything necessary.

Water

- 41. Galvanised steel piping to be used.

Waste disposal

- 42. P.V.C. soil and waste pipes may be used.
Inspection eyes to all sewer bends and junctions.
Wastes to be fitted with reseal traps and to be fully accessible.
Inspection eye to be provided not further than 1,2 m from connection to main sewer.

Page Four

GENERAL

43. Drainage and water services to be provided and is not provisional
44. Stoep screeded - to receive quarry tiles.
45. Concrete wash trough and cold water feed.
46. All built in cupboards and pathways or driveways have been excluded, except the main bedroom which will receive built in cupboards.
47. Electric Stove P.C. R180.00
48. Fencing standard 1,2 m high diamond wire mesh to street frontages and 3 strans 8 gge galvanised wire to back and sides with 3,6 m double gate to street frontage.
49. Windy dry circular washline to backyard.

----- oOo -----

Appendix 4

L50

Natal Building Society

Minimum requirements
for the granting of building loans

(Hierdie vorm is ook in Afrikaans verkrygbaar)

**1
GENERAL****1.1 Definitions**

- (a) "Society" shall mean the.....
Building Society.
(b) "Acceptable" shall mean acceptable to the Society.

1.2 New type materials and construction methods

The following documentation indicates minimum requirements. If for any reason it is desired to use new types of materials or construction methods, the prior consent of the Society must be obtained.

1.3 Conformity with governing regulations

All work shall conform to and be carried out in accordance with Government Standard Regulations or Local Authority By-laws. Plans submitted to the Society are to be approved by the relevant Authority and shall incorporate a satisfactory schedule indicating all finishes. When the provisions of the minimum requirements are in conflict with governing regulations and/or by-laws, the latter shall take precedence over the requirements, provided they are not less stringent.

1.4 Work to be acceptable to the Society

All work executed shall be acceptable to the Society. The Society shall be entitled at the contractor's expense to call for the opening up of any concealed work.

1.5 Inspection by the Society

Reasonable notice shall be given to the Society by the builder of the date on which:

- (a) the foundation trenches will be ready for inspection and,
(b) special damp-proofing and antguards will be completed.

Note: No concrete shall be poured prior to the Society's acceptance of the foundation trenches.

1.6 Conditions precedent to progress payments

The builder's waiver of lien and all necessary documents relating to the loan shall be completed and signed by the owner and/or builder before progress payments are requested from the Society.

1.7 S.A. Bureau of Standards mark

All building materials shall bear the standardisation mark of the S.A. Bureau of Standards or be acceptable to the Society.

**2
EXCAVATOR****2.1 Site**

The area of the site to be built upon shall be cleared of all refuse and vegetation. The site shall be examined for termite workings and if necessary, treated in terms of the SABS code relating to soil poisoning. Where trees or tree roots within the building area are removed, the ground must be consolidated.

2.2 Trenches

Trenches for foundations shall be excavated to firm natural ground except where the Society has approved some other method in advance, and shall not be less than a minimum depth of 300 mm below ground level. Bottom of trenches shall be level, and where necessary stepped and rammed. Sides of trenches shall be trimmed to the full width of the concrete foundations from top to bottom. In stable soil the following minimum widths shall be acceptable:

2.2.1 Single storey buildings

- (i) Under external walls — minimum width 600 mm.
(ii) Under 110 mm internal walls — minimum width 450 mm.

2.2.2 Double storey buildings

- (i) Under external walls — minimum width 750 mm.
(ii) Under 220 mm internal load bearing walls — minimum width 600 mm.
(iii) Under 110 mm non-load bearing walls — minimum width 450 mm.

2.2.3 Chimneys, steps, high gables

Concrete foundations shall project not less than 150 mm beyond the perimeter of the brick structure.

**3
CONCRETOR AND BRICKLAYER****3.1 Foundations**

Foundations shall be reinforced where necessary and the thickness shall be not less than 220 mm. Steps shall be a minimum depth depending on the slope of the ground with an overlap of at least the width of the foundations. In special circumstances, or in unstable ground, an engineer's report and recommendations shall be submitted to the Society and all work carried out in strict accordance with such recommendations.

3.1.1 Site mixed concrete shall be composed of:

- 5 parts coarse aggregate,
4 parts clean sand,
1 part cement and
20 to 44 litres of water to every 50 kg bag of cement.

The nominal size of coarse aggregate to be used shall be either 19,0 mm or 26,5 mm.

3.1.2 Ready-mixed concrete shall comply with SABS 878.**3.2 Foundation walls**

Foundation walls shall be of hard burnt clay bricks, stone or concrete blocks in terms of SABS 527. Concrete foundation walls shall be of a quality not less than that specified in paragraph 3.1.1. Where filling is in excess of 1 m in height, the thickness of the foundation walls shall be suitably increased and/or reinforced.

Suspended floors shall be supported on brick piers 220 × 110 mm bonded into the external wall.

3.3 Filling

The filling under concrete surface beds shall consist of earth, sand, or other acceptable material free of clay and organic matter, well watered and rammed in layers of not more than 200 mm, covered by at least 100 mm of hardcore.

3.4 Damp-proofing

Damp-proofing shall be placed under all walls at a minimum height of 150 mm above the ground level and shall comply with SABS 248 (bituminous damp-proof courses) or Class B of SABS 952 (polyethylene sheet for waterproofing of structure — 375 microns embossed) or other acceptable material. The damp-course shall be laid to full width under walls and wall-plates for suspended floors without longitudinal joints. The overlaps at ends, angles, and junctions shall be a minimum of 100 mm. Vertical damp-proof shall be provided on basement walls and elsewhere if considered necessary. An approved waterproof membrane complying with SABS 952 Type C shall be laid under concrete surface beds in damp areas and where a high water level is prevalent or where considered necessary by the Society.

3.5 Antguards

Where necessary and at the Society's request an antguard shall be fixed on top of the damp-proof course and shall be a continuous layer of 0,60 mm galvanised sheeting projecting at least 50 mm over the internal faces of all walls and piers under all floors. The joints shall be riveted and soldered with a 25 mm lap. Where antguards are used, the woodwork shall be not less than 40 mm above the guards. Access openings for inspection purposes shall be provided under suspended floors.

3.6 Sleeper piers under suspended floors

Foundations for brick piers shall be 450 × 450 mm with a thickness of not less than 110 mm. Brick piers shall be 220 × 220 mm up to 1 m in height and not less than 330 × 330 mm where height exceeds 1 m. Spacing of piers shall be not more than 1,5 m apart. Wire ties to secure bearers shall be cast into the concrete foundation under piers.

3.7 Ventilation

Adequate cross ventilation shall be provided under all suspended floors and through foundation walls. The ground shall be not less than 450 mm below the underside of the timber supporting the floor to facilitate examination purposes.

All external air ventilators shall be vermin-proof and provision of air bricks to all rooms shall be in accordance with governing regulations and/or building by-laws:

3.8 Masonry

3.8.1 Bricks

Clay bricks shall be sound, hard, well-burnt and acceptable to the Society; sand lime bricks shall comply with SABS 285 (calcium silicate masonry units); and cement bricks shall comply with SABS 987 (cement bricks).

3.8.2 Blocks

Hollow clay blocks shall comply with SABS 589 (hollow clay building blocks) and concrete blocks with SABS 527 (concrete building blocks).

3.8.3 Stone

Stone facings shall be acceptable to the Society.

3.8.4 Mortar

Mortar shall be composed as follows (measured per volume):

- (i) *Cement mortar*: 6 parts clean sand and 1 part cement.
- (ii) *Compo mortar*: One part cement, to 1½ parts lime and not more than 6 parts sand.
- (iii) *Mortar mix* for use with cement blocks and bricks shall be in accordance with the manufacturer's recommendations.

(Note: Special mortars other than those indicated above, which have been proved satisfactory are acceptable.)

3.8.5 Brickwork

All brickwork shall be plumb and true, correctly bonded, and shall rise uniformly with no portion exceeding more than 1,5 m above any other part of the work. Solid external walls shall be at least 220 mm thick, and cavity walls at least two-110 mm skins with a 50 mm cavity between, the skins tied with galvanised crimped metal ties spaced at distances of not more than 1 m horizontally and 6 courses vertically, unless otherwise approved by the Society. Internal walls shall be not less than 110 mm thick and conform to Local Authority requirements. External walls shall have a beam filling to the underside of the roof covering in the case of open eaves. Gable and cavity walls shall be satisfactorily closed at plate level.

Brick gable walls above plate level shall be not less than 220 mm thick.

(Note: Where construction differs from the above, special permission shall be obtained from the Society.)

3.9 Chimneys

Chimneys shall have a height not less than 600 mm above the highest point of the roof within a radius of 2,25 m and a wall thickness of at least 220 mm with a minimum flue area of 500 cm². Flues incorporated with factory-made fireplaces, boilers, etc., shall be in accordance with manufacturer's requirements. Unlined flues shall be parged as the work proceeds. Roofing timber shall not be built into chimney brickwork, but suitably trimmed around the stack or supported by not less than two courses of corbelling.

3.10 Boundary walls

Brick walls up to 1,8 m in height shall be a minimum thickness of 110 mm, with 220 × 220 mm piers spaced not more than 3,0 m apart. Concrete foundations shall be wall width plus 300 mm and not less than 150 mm in thickness. Posts for precast walls shall be encased in concrete below ground level.

3.11 Sills

External window sills shall be of an acceptable material having an adequate slope and shall project at least 25 mm beyond the wall face. The damp-proofing under all sills shall be carried to the back of the timber frame or have the edge turned into the sill section of steel frames and project 75 mm beyond the reveal edge. Internal sills shall be of slate, tiles, timber or other acceptable material.

3.12 Lintels

All reinforced concrete or reinforced brick masonry lintels shall be designed by a structural engineer or other competent person or be constructed according to a recognised code or guide acceptable to the Society. Pre-stressed concrete lintel units shall be obtained from a recognised manufacturer, acceptable to the Society and shall be used in accordance with the manufacturer's instructions.

3.13 Steps

Steps shall be of brick or concrete as specified in paragraph 3.1 with granolithic or other acceptable finish, built on an adequate foundation. Risers shall be uniform and not exceed 175 mm. Treads shall be not less than 250 mm and finished with a non-skid surface.

3.14 Surface beds and screeds

Concrete for surface beds shall be a minimum thickness of 75 mm and of a quality as specified in paragraph 3.1.1. Surface beds shall be suitably reinforced where the depth of filling exceeds 1 m. All concrete surfaces shall be chipped, thoroughly washed, cleaned and slurred with cement grout immediately before screeds are laid. Screeds shall be 1 part cement to 3 parts coarse sand and be not less than 20 mm thick.

3.15 Reinforced concrete

All reinforced concrete shall be in accordance with plans and specifications prepared by a registered Civil or Structural Engineer, and certified on completion.

4

PLASTERER AND WALL TILER

4.1 Materials

4.1.1 Sand

The sand shall be sharp, free of loam and organic matter.

4.1.2 Cement

The cement shall comply with SABS 471.

4.1.3 Lime

Lime for undercoats shall be Type A2 or A2P of SABS 523, and Type A1P for putty plasters.

4.2 External plaster

External plaster shall be 5 parts sand and 1 part cement. All wall surfaces shall be cleaned and wetted as required.

4.3 Internal plaster

Internal plaster shall be rendered to an acceptable finish and composed of 6 parts sand and 1 part cement, or when lime is used, in the following proportions by volume:

Sand	Lime	Cement
	4	0
	3	1
15-20	2	2
	1	3

4.4 Tiles

Tiles shall be of an acceptable quality set in 4 to 1 cement mortar or fixed with an acceptable adhesive. Joints shall be neatly filled and cleaned.

4.5 Fireplaces

Fireplaces shall be acceptable design and material, complying with Local Authority and smoke-free area by-laws.

5

CARPENTER AND JOINER

5.1 Structural timber

All timber shall comply with and bear the SABS mark, and where required by governing regulations, treated against woodpest infestation. Where necessary all woodwork in contact with brick or stone shall be treated in accordance with SABS 05.

5.2 Roofing

Principal rafters, tie beams, struts and posts shall be a minimum of 114 × 38 mm timber. Trusses for slate and tiled roofs shall be bolted as well as nailed. All nails shall protrude at least 25 mm and be firmly clenched.

Timber of lesser dimensions than specified above is acceptable in the form of engineered trusses designed and constructed by specialist firms. Hip rafters shall be not less than 228 × 38 mm framed to form a half principal. Dragon ties shall be used for slate or tile roofs. Roof timbering shall be securely anchored to the supporting walls with galvanised hoop iron or 4 mm galvanised wire built into walls not less than 600 mm below the wall plates and spaced at not more than 1,35 m centres. Roof construction shall have adequate cross bracing. Roof trusses shall not be supported on internal non-load bearing walls. Timber barge and fascia boards shall be not less than 19 mm thick for widths up to 152 mm and 25 mm thick for wider boards. All softwood fascia and barge boards shall be knotted and primed all round prior to fixing and shall be adequately secured to prevent warping. Other acceptable material may be used.

Note:

- (a) The prior consent of the Society must be obtained for any other method of roof construction.
- (b) **No roof covering shall be built into walls.**

5.2.1 Corrugated galvanised steel roofing

Trusses shall be spaced not more than 1,35 m centres, purlins shall be 76 × 50 mm on edge spaced at 1,20 m centres. Roofing sheets shall be at least 0,60 mm thick with a side lap of 1½ corrugations, and a minimum end lap as follows:

Slope of roof, degrees	End lap mm
7 to 15	230
15 to 20	200
20 to 25	180
25 and over	150

In coastal areas it may be necessary to increase the figures for minimum roof slope by 5° and additional approved underlay may be required at the discretion of the Society.

Fixing shall be with corrosion resistant screws or hook bolts and washers. The ridding shall be not less than 450 mm wide and the same thickness as the galvanised steel sheeting.

5.2.2 Troughed roofing

(i) Pitched roofs

Pitched roofs shall be in accordance with paragraph 5.2.1.

(ii) Low pitched roofs (Unbroken length sheets)

The slope of the roof shall be not less than 3 degrees. Rafters shall be spaced not more than 1,0 m centres and shall be not less than 228 × 38 mm.

(Where a tile overlay is intended, rafters shall be spaced not more than 700 mm centres.) Purlins shall be 76 × 50 mm on edge spaced not more than 1,0 m apart. Sheets are to be fixed in strict accordance with the manufacturer's instructions.

5.2.3 Aluminium roofing

Construction details shall be as in paragraph 5.2.1. No other metals shall be permitted to come into contact with the aluminium roofing. Sheets shall comply with SABS 903 (aluminium alloy corrugated and troughed sheets).

Fixing shall be in compliance with manufacturer's instructions.

5.2.4 Asbestos corrugated roofing

Trusses shall be spaced not more than 1 m centres; purlins 76 × 50 mm on edge spaced not more than 1,4 m centres. Side lap shall be in accordance with manufacturer's instructions and end lap as follows:

Slope of roof, degrees	End lap, mm
7 to 15	300
15 to 20	250
20 to 25	200
25 and over	150

In coastal areas it may be necessary to increase the figures for minimum roof slope by 5° and additional approved underlay may be required at the discretion of the Society.

Fixing shall be in compliance with manufacturer's instructions. Holes shall be drilled 2 mm oversize and not punched.

5.2.5 Asbestos slate/tiles/shingles

Trusses shall be spaced not more than 750 mm centres. Battens shall be 38 × 38 mm spaced to suit the shingles size. The end lap of shingles shall be at least 60 mm with the joints in adjoining courses staggered, and double courses laid at eaves and gutters. Every shingle shall be fastened with at least two corrosion-resistant nails and fixed in accordance with manufacturer's specifications. An approved underlay shall be provided where the roof slope is less than 20°. The slope shall not be less than 15°.

5.2.6 Wood shingle roofing

Wood shingles shall comply with SABS 448 (S.A. wood shingles for roofs and walls). Trusses shall be spaced at not more than 900 mm centres. The maximum permissible butt exposure shall be as follows:

Roof slope (degrees)	Butt exposure (mm)
35	125
26 to 35	95
20 to 25	95

(plus underlay on boarding)

5.2.7 Tiled roofing

Trusses shall be spaced at not more than 700 mm centres. Battens shall be 38 × 38 mm spaced to suit tiles. Interlocking and plain tiles shall be fixed and laid in strict compliance with manufacturer's specifications. An approved underlay shall be provided where the roof slope is less than 26°. Roof slopes shall not be less than 15°. Tiles on exposed eaves and gable ends shall be secured to the battens with corrosion-resistant nails or wire.

5.2.8 Slate roofing

Slates shall comply with SABS 995 (natural building and monumental stone) and roof construction and fixing details and shall be as specified in paragraphs 5.2.5 and 5.2.7.

5.2.9 Thatched roofing

Roof trusses shall be spaced at not more than 700 mm centres. The thickness of thatching shall be at least 150 mm and consist of not less than two layers of bundles for a slope of not less than 45°, or double the thickness for a slope of not less than 35°. Thatching shall be secured to the battens with tar-soaked twine. Where poles are used in roof construction they shall be not less than 100 mm in diameter, acceptably straight and treated against wood-borer beetles and termites as described in SABS 05. Joints of rafters shall be suitably strapped or bolted and securely fixed to the external walls. Provision shall be made for adequate lightning conductors as described in SABS 03 (protection of buildings against lightning).

5.2.10 Bituminous felt roofing

Material shall comply with SABS 92 (bituminous roofing felt) or SABS 745 (bituminous roofing (glass fibre base)), and shall be laid on boarding not less than 19 mm thick. Timber constructed roofs shall have rafter dimensions and spacings to be determined in accordance with the span and the load of the sub-roof. Water-proofing overlay shall be executed by specialist firms providing an adequate guarantee of workmanship and material.

5.3 Flooring

5.3.1 Suspended floors

Wall plates shall be a minimum of 76 × 38 mm and sleeper joists 114 × 76 mm spaced not more than 450 mm centres. All underfloor woodwork shall be treated with a preservative. Strip flooring shall be not less than 19 mm tongued and grooved boards. Adequate cross ventilation shall be provided.

5.3.2 Upper floors

Joists with spans up to 3 m shall be 228 × 38 mm and 228 × 50 mm for spans over 3 m. Joists shall be spaced not more than 450 mm apart and strutting provided as deemed necessary. All floors above ground floor shall have acceptable sound insulation.

5.3.3 Wood block floors

Wood blocks shall be of good quality hardwood.

5.3.4 Tiles

Floor tiles shall be of a suitable material and laid in an acceptable manner.

5.3.5 Skirtings and quadrants

Where applicable skirtings and quadrants shall be of suitable materials and sizes, securely fixed in long lengths and neatly joined.

Note:

All wood floors shall be machine-sanded on completion to an acceptable finish.

5.4 Staircases

Staircases shall be of acceptable materials and design. The risers shall be not more than 175 mm and treads not less than 250 mm with handrails not more than 900 mm measured vertically from top of tread.

5.5 Ceilings

Ceilings shall be of approved materials, fixed in an acceptable manner. Where applicable, cornices shall be of a suitable material, neatly fixed in long lengths. At least one trap door of minimum size 600 × 600 mm shall be provided and ceiling heights shall comply with Local Authority regulations.

5.6 Doors and frames

5.6.1 Timber frames and doors

External door frames shall be a minimum of 100 × 76 mm rebated. Jamb linings shall be of a suitable thickness and fixed in an acceptable manner. All external doors shall be of a solid type and fitted with an acceptable weather board where required. Interleaving doors between garage and dwelling shall be fireproofed in terms of Local Authority requirements.

5.6.2 Steel frames and doors

Pressed steel door frames and linings shall be of approved manufacture and suitably fixed. Where necessary, steel doors and frames used within 20 kms of the coast, shall be hot dipped galvanised.

5.7 Windows

- Timber windows and frames shall be of approved manufacture.
- Steel frame windows used within 20 kms of the coast, shall be hot dipped galvanised.

5.8 Ironmongery

All doors, casements, fanlights, etc., shall be fitted with suitable hinges, locks and furniture, and where applicable, ironmongery exposed to the weather shall be of a non-corrosive type.

6 PLUMBER

6.1 Gutters and downpipes

Gutters shall be of an acceptable size of not less than 0,60 mm galvanised steel sheeting, properly riveted and soldered, with downpipes extending to within 100 mm of the surface channels or disposal apron. Valleys, box gutters and soakers shall be not less than 0,60 mm galvanised sheeting or other approved material and shall be of acceptable design. Asbestos gutters, downpipes and PVC rain water goods shall comply with SABS specifications.

6.2 Flashings

Flashings shall be not less than 0,60 mm galvanised sheeting or other acceptable material properly dressed and jointed.

6.3 Water supply

Water supply shall be in accordance with the Local Authority requirements. Borehole supply shall be connected from storage tank to buildings through suitable galvanised piping. Borehole water for domestic use shall have a minimum yield of 1 500 litres per hour with supporting certificate. Hot and cold water systems shall be installed and piping from hot water supply shall be not less than 19 mm in diameter with control valves fitted in accessible positions. At least two standpipes shall be erected in suitable positions and all materials and fittings used shall comply with SABS standards.

6.4 Drains

Drains shall be laid strictly in accordance with the requirements of the Local Authority. French drains and septic tanks shall be to a size and design approved by the Local Authority.

6.5 Stormwater drains

Stormwater drains shall comply with the requirements of the Local Authority.

7 GLAZIER AND PAINTER

7.1 Glazing

All glass shall be free from defects, set in putty and sprigged where necessary or fixed in accordance with manufacturer's instructions. The minimum thickness shall be as follows:

Thickness	Area
3 mm	1,0 m ²
4 mm	2,5 m ²
6 mm	Over 3,5 m ²

Putty shall comply with SABS 680 (glazing putty for wood and steel sashes).

7.2 Oils and paints

All paints, stains, varnishes, linseed oil, knotting, driers, distempers, etc. shall be of an approved manufacture, and be used exactly as supplied in strict compliance with the manufacturer's instructions. All timber surfaces to be painted shall be knotted, stopped, primed and finished with at least two surface coats. Varnished surfaces shall have two coats.

8 ELECTRICIAN AND GAS INSTALLATION

All electrical and gas installations shall be carried out strictly in accordance with Local Authority requirements.

9 FENCING

The site shall be fenced with wire mesh or other acceptable material, unless otherwise agreed to by the Society. Small holding plots shall be suitably fenced.

10 CLEARING OF SITE

The site shall be cleared of all builder's rubble upon completion of work and left clean and tidy. All earth banks over 1,5 m in height shall be suitably cut and/or retained to the Society's approval.

11 SITE DRAINAGE AND SEEPAGE WATER

Adequate precautions shall be taken to drain surface and seepage water away from buildings.

12 SWIMMING POOLS

Specifications for swimming pools shall be approved by the Society. Adequate precautions shall be taken against stormwater damage to electrical pumps and flooding of swimming pools.

ADDITIONAL WORK AS FOLLOWS

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"It is understood and agreed that the Society, as Mortgagee, shall be entitled to reject any work or material which, in its opinion, does not conform with the aforementioned minimum requirements. The Society shall, however, be under no liability for not rejecting any work or material not conforming with its requirements which are laid down solely as a safeguard for the protection of the Mortgagee."

I/We agree to carry out the work in accordance with the foregoing minimum requirements relating to my/our new building situate.....

.....
(Owner)

Date.....
(Builder)

Supplementary requirements applicable to areas subject to moving soils

All work shall be carried out in strict accordance with detailed specifications and plans prepared by a Registered Structural Engineer who shall obtain a soil analysis and design the structures to suit the conditions of the site.